NATIONAL GUIDELINES ON INFECTION PREVENTION AND CONTROL FOR VIRAL HEMORRHAGIC FEVERS (VHF)

September 2023

About NCDC

The Nigeria Centre for Disease Control and Prevention (NCDC) is the national public health institute with the mandate to lead the preparedness, detection and response to infectious disease outbreaks and public health emergencies. The first formal step to establish the NCDC took place in 2011 when some departments in the Ministry of Health, including the Epidemiology Division, the Avian Influenza Project and its laboratories; and the Nigeria Field Epidemiology and Laboratory Training Programme (NFELTP) were moved to form the nucleus of the agency. The Bill for an Act to establish NCDC was signed into law in November 2018, by President Muhammadu Buhari.

Vision

A healthier and safe Nigeria through the prevention and control of diseases of public health importance.

Mission

To protect the health of Nigerians through evidence-based prevention, integrated disease surveillance and response activities, using a one health approach, guided by research and led by a skilled workforce.

Core Functions

- Prevent, detect, and control diseases of public health importance.
- Coordinate surveillance systems to collect, analyse and interpret data on diseases of public health importance.
- Support states in responding to small outbreaks and lead the response to large disease outbreaks.
- Develop and maintain a network of reference and specialised laboratories.
- Conduct, collate, synthesize, and disseminate public health research to inform policy.
- Lead Nigeria's engagement with the international community on diseases of public health relevance

Organisation of the Nigeria Centre for Disease Control and Prevention

The NCDC under the leadership of the Director General has a staff size of about 500. At the national level, this comprises staff working across three sites - the Headquarters and National Reference Laboratory (NRL), located in Abuja as well as the Central Public Health Laboratory (CPHL) in Lagos State, a campus of the NRL. At the subnational level, there are State Surveillance Officers across the 36 States of the federation and the Federal Capital Territory(FCT).

The NCDC currently operates through seven departments. These include:

- Public Health Laboratory Services
- Health Emergency Preparedness and Response
- Planning, Research and Statistics
- Surveillance and Epidemiology
- Administration and Human Resources
- Finance and Accounts
- Subnational Support Department

FOREWORD

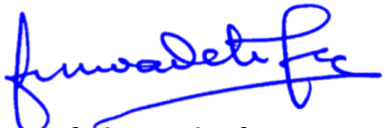
Viral haemorrhagic fevers (VHF) are emerging and re-emerging at an increased frequency across Africa for various reasons not limited to unplanned urbanisation, climate change, spread of vectors, increase movement/travel of potentially infected hosts, limited number of vaccines against VHF pathogens, etc. And Nigeria is not an exception especially given the ongoing Lassa fever outbreak and increasing reports of cases with dengue fever. Consequent to the foregoing, it is critical to equip healthcare workers (HCWs) with the right knowledge, skills, and practice principles, needed to respond safely to these disease outbreaks whilst effectively protecting themselves, their patients and host communities. Through this updated and comprehensive guideline, the Nigeria Centre for Disease Control and Prevention (NCDC) has prioritised VHFs for improved infection prevention and control (IPC) practice which is central to the control of these VHFs in healthcare delivery facilities and during outbreak response within communities.

Prior to the COVID19 pandemic, the NCDC had responded to Ebola Virus Disease, Yellow fever and Lassa fever outbreaks. The cumulative practice experiences from these outbreaks provided impetus for the development of 2019 and first edition of the national guidelines of IPC for VHF, which provided details of not only the tenets of infection prevention and control in VHF contexts, but also the epidemiological, laboratory and clinical backgrounds for various VHFs, linking them up appropriately to the expected IPC actions, that ensure safety of health workers and best patient outcomes.

Furthermore, with lessons learnt from pre and post COVID19, it is notable that this document presents updates to previously described IPC processes, and its prescriptions are aligned with the current World Health Organisation requirements for IPC in health service provision and outbreak scenarios. It highlights current practices, uses the most recent and available evidence that have been validated by experts, and are consistent with global best practices.

I encourage health facility heads, all healthcare workers across all cadres and all stakeholders to deliberate on and act on the content of this document by adopting its guidance for use in all outbreak response, and clinical and public health settings where suspected and confirmed VHF cases are to be managed.

Finally, we are confident that the new national guidelines on IPC for VHFs, will add much value to our joint efforts to reduce the transmission, morbidity and mortality of VHFs, especially those associated with healthcare associated infections in Nigeria.



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Nigeria Centre for Disease Control and Prevention
December 2023

ACKNOWLEDGEMENT

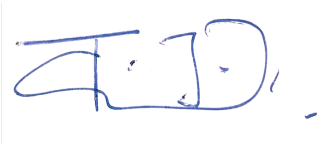
NCDC'S IPC Core team is responsible for the development of this document

This document represents the outcome of robust stakeholder discussions, deliberations, research, observations and expert reviews., The outputs of these processes, in addition to individual and collective enquiry into the scientific basis of infection prevention and control practices in the management of viral heamorrhagic fevers, birthed these guidelines. The updates in a post-covid 19 era, have been broadened to include other emerging and reemerging viral haemorrhagic fevers likeMarburg, yellow fever and Ebola virus disease.

Importantly, experts and practitioners directly involved in the management of VHFs in Nigeria and who have a deep understanding and wide experience have made significant contributions to this document, particularly to the content, relevance, updates, as well as best practices and their applicability to current practice scenarios.

Overall, we appreciate the commitment of stakeholders and the persistence of the team in ensuring that the final document sees the light of day. We commend all the contributors for their hard work, focus, and steadfastness in ensuring that the guidance on IPC for VHF is made available to health workers in the form of an easily readable document that will be applicable to all types of healthcaresettings in Nigeria.

In essence, we are confident that if these guides are put to practice by health workers, they would enhance the safety of all involved in the management of VHFs, to a reasonable degree such that the desired goal of 'the reduction in infection transmission from all areas and activities' is achieved.
Finally, we acknowledge the technical and financial support from our collaborating partners especially the USAID Medicines Technologies and Pharmaceutical Services (MTaPS) who led the process of the development of the new IPC for VHF manual.
We are grateful and remain indebted to you all.



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ACRONYMS AND ABBREVIATIONS

ABHR	Alcohol Based Hand Rub
AMR	Antimicrobial Resistance
CCHF	Crimean-Congo Haemorrhagic Fever
CDC	Centers for Disease Control and Prevention
DF	Dengue Fever
DSNO	Disease Surveillance and Notification Officer
EVD	Ebola Virus Disease
HAI	Healthcare-associated Infection
HCF	Health Care Facilities
HCW	Healthcare Worker
ICU	Intensive Care Unit
IPC	Infection Prevention and Control
IPCC	Infection Prevention and Control Committee
IPCT	Infection Prevention and Control Team
IW	Infectious waste
LF	Lassa Fever
LGA	Local Government Area
LASV	Lassa Fever Virus
NCDC	Nigeria Centre for Disease Control and Prevention
ORS	Oral Rehydration Solution
PCA	Patient Care Area
PCR	Polymerase Chain Reaction
PPE	Personal Protective Equipment
PPM	Parts Per Million
S-I-N	Screening Isolation and Notification
SOP	Standard Operating Procedure
VHF	Viral Haemorrhagic Fever
WHO	World Health Organization
YF	Yellow Fever

CHAPTER ONE:
Introduction

What are viral haemorrhagic fevers?

Viral haemorrhagic fevers (VHFs) are a group of zoonotic infections with the typical clinical features of fever, headache, malaise, vomiting, mucosal and gastrointestinal bleeding, edema and hypotension which in turn could result in shock (with or without bleeding) and a high death rate. VHFs are severe multisystem illnesses as multiple organ systems are often affected.

VHFs are caused by RNA viruses in these 4 families:

a) Arenaviridae
b) Filoviridae
c) Flaviviridae
d) Bunyaviridae

Some common VHFs include Lassa fever (LF), Ebola virus disease (EVD), Yellow fever (YF), Dengue fever (DF), Marburg fever and Crimean-Congo haemorrhagic fever (CCHF).

Lassa Fever

In Nigeria, Lassa fever is a disease that is significant for public health because of its rising incidence and geographic distribution. It is brought on by the Lassa virus (LASV), a single-stranded bi-segmented RNA virus, that is a member of the VHF family, Arenaviridae. It causes an acute febrile sickness and has an incubation period of 2–21 days. It is widespread throughout the nation and has a seroprevalence of between 21 and 58%. The animal reservoir for the zoonotic disease is a rodent from the genus *Mastomys*, also known as the multimammate rat. *Mastomys* with LASV infection can shed the virus in their urine and faeces but do not experience any physical symptoms. Transmission happens all year round, but it is most active in the dry season.

Every year, between 100,000 and 300,000 persons in West Africa contract LASV. Only 20% of patients experience mild or severe symptoms, whereas 80% of infected individuals show no symptoms. The observed case-fatality rate among patients hospitalized with severe LF has been recorded between 15% and 20%, but the overall case-fatality rate is approximated at 1%. Both sexes and all age groups can contract Lassa fever. The following people are most at risk of infection:

a) Those living in endemic areas
b) Those living in communities with poor sanitation or crowded living conditions, especially in areas where *Mastomys* are found
c) Health care workers. During the 2018 Lassa fever outbreak in Nigeria, 43 health care workers were infected and 10 died, while between January and April 2019, 18 health care workers were infected. Additionally, hospital-acquired outbreaks have higher case-fatality rates ranging from 36% to 65%.

Ebola Virus Disease

The Ebola virus disease (EVD) affects non-human primates such monkeys, gorillas, and chimpanzees as well as people. It is a serious, frequently fatal illness. The Filoviridae family of VHFs' single-stranded, negative-sense RNA viruses includes the Ebola virus. Six

subspecies of the Ebola virus have been identified. They include the Zaire Ebola virus, Sudan Ebola virus, Tai forest Ebola virus (formerly known as the Cote d'Ivoire), Bundibugyo, Reston, and Bombali Ebola viruses. All of these six, with the exception of the Reston and Bombali Ebola viruses, have been proven to cause illness in humans. Only lately has the Bombali Ebola virus been found in bats in Kenya and Sierra Leone. Although human infections have not yet been reported, it has been demonstrated to infect human cells in vitro. However, the Ebola virus reservoir host is yet unclear, researchers think that bats are the most likely reservoir because the virus is enzootic. It is still uncertain how the virus manifests itself in a human at the beginning of an outbreak, but it is hypothesized that the first patient becomes infected through contact with an infected animal.

It has an incubation period of 2 to 21 days and causes an acute febrile sickness. Case mortality rates have ranged from 25 to 90% during epidemics. The 2014–2015 outbreak started in Guinea and spread to neighbouring nations, including Sierra Leone, Liberia, and Nigeria. 11 of the 19 people who contracted the Ebola virus during the 2014 epidemic in Nigeria were healthcare workers (HCW), and 4 of them passed away.

Marburg virus disease

Marburg virus disease is a highly virulent disease that causes hemorrhagic fever, with a fatality ratio of up to 88%. It belongs to the same family as the Ebola virus family of pathogens. The disease was first identified as a result of two significant epidemics that took place concurrently in 1967 in Belgrade, Serbia, Marburg, Frankfurt, and other locations in Germany and Serbia. The outbreak was linked to laboratory experiments with imported Uganda African green monkeys (*Cercopithecus aethiops*). Two distinct occurrences were documented in 2008 in tourists who went to a cave in Uganda that was home to Rousettus bat colonies.

Human infection with Marburg virus disease initially results from prolonged exposure to mines or caves inhabited by Rousettus bat colonies. After becoming infected, a person can contract Marburg through direct human-to-human contact (through cuts, scrapes, or ruptured mucous membranes) with the blood, secretions, organs, or other bodily fluids of an infected person as well as with surfaces and items (like bedding and clothing) that have been contaminated with these fluids.

When caring for patients with suspected or proven MVD, healthcare personnel commonly become infected. Close contact with patients has led to the spread of MVD when infection control measures are not carefully followed. More severe disease, quick deterioration, and probably a greater fatality rate are all linked to transmission via contaminated injection equipment or through needle-stick wounds. Burial ceremonies that involve direct contact with the body of the deceased can also contribute to the transmission of Marburg.

The time of incubation ranges from 2 to 21 days. The Marburg virus causes sudden onset of high fever, severe headache, and severe malaise. A common aspect is aches and pains in the muscles. On the third day, severe watery diarrhoea, cramps and pain in the abdomen, nausea, and vomiting are all possible. A week can go by with diarrhoea. Patients at this stage have been described as having ‘’ghost-like" drawn features, deep-set eyes, expressionless faces, and profound lethargy.

Between five and seven days, many patients experience severe hemorrhagic symptoms, and fatal cases frequently involve numerous sites of haemorrhage. Bleeding from the nose, gums, and vagina frequently accompany fresh blood in vomitus and faeces. At the sites of venipunctures, spontaneous bleeding can be particularly problematic. Patients have experienced persistently high fevers during the acute stage of the illness. Confusion, impatience, and violence might result from central nervous system involvement. Rarely, at the advanced stages of the illness, orchitis has been documented.

Death in fatal instances typically occurs 8 to 9 days after the onset of symptoms, and is typically preceded by substantial blood loss and shock.

Yellow Fever

Yellow fever virus, an arbovirus of the genus *Flavivirus.* Yellow fever primarily affects humans and monkeys, and is spread by mosquitoes of the *Aedes* and *Haemagogus* species. It is an acute viral hemorrhagic fever that is vaccine-preventable and epidemic-prone. It can be found in the tropics of both Africa and America. There is an increased concern over the potential introduction and spread of the virus across international borders,, due to an increase in the number of travelers to and from endemic areas as well as outbreaks close to significant urban centres. The name's reference to "yellow" relates to the jaundice that some individuals with acute liver failure experience due to infection with the yellow fever virus.

Suspected Case

Any person with an acute onset of fever with jaundice appearing within 14 days of onset of the first symptoms, (WHO Yellow fever Outbreak toolbox) (June 2022)

Probable case (WHO 2022)

A suspected case; and one of the following:
Presence of yellow fever IgM antibody in the absence of yellow fever immunization within 30 days before onset of illness; or positive post-mortem liver histopathology; or epidemiological link to a confirmed case or an outbreak.

Confirmed case (WHO 2022)

A confirmed case of yellow fever in an unvaccinated population is considered an outbreak. A confirmed case in any context must be fully investigated. Investigation teams must assess and respond to the outbreak with both emergency measures and longer-term immunization plans.

1. A probable case;and

Absence of yellow fever immunization within 30 days before onset of illness;andone of the following: detection of yellow fever-specificIgM;2or detection of fourfold increase in yellow fever IgM, or IgG antibody titres between acute and convalescent serum samples, or both;or detection of yellow fever-specific neutralizing antibodies.

or

2. Absence of yellow fever immunization within 14 days before onset of illness;andone of the following: detection of yellow fever virus genome in blood or other organs by polymerase chain reaction (PCR);or detection of yellow fever antigen in blood, liver or other organs by immunoassay;or isolation of yellow fever virus.

Why are VHFs of public health importance?

VHFs are of public health importance because they can spread readily within a hospital setting, have a high case-fatality rate and are difficult to detect and diagnose because they mimic common infections such as malaria and typhoid. Although treatment options for VHFs are limited, ribavirin has been shown to improve survival in LF patients when administered early in the course of the disease. For Ebola virus, an effective vaccine has recently been developed and more than 100,000 vaccine doses have been administered in the current outbreak in the Democratic Republic of the Congo. Several treatment approaches are also being evaluated within this outbreak.

How do humans primarily get infected with viral hemorrhagic fevers from the known host animals?

- Lassa fever: Contact with infected rodents' urine, faeces or saliva; contact with contaminated items/surfaces; eating infected rodents.
- Ebola: Hunting, killing, or eating infected wild animals.

How are viral hemorrhagic fevers transmitted from human to human?

- Contact with body fluid or blood of an infected person or someone that died of VHF
- Traditional burial rites that involve washing and touching of an infected corpse
- In healthcare settings, transmission can also occur through indirect contact with virus-contaminated objects, body fluids, surfaces, medical equipment, waste and bed linens of infected persons

Which body fluids are infectious in Lassa fever and Ebola virus disease?

All body fluids of persons infected with Lassa and Ebola viruses can potentially transmit infection including:

a) Blood
b) Urine
c) Vomitus
d) Faeces
e) Saliva
f) Breast milk
g) Semen
h) Sputum
i) Amniotic fluid

j) Cerebrospinal fluid

In order to transmit infection, these infectious fluids must come in contact with another person's:

- Mucous membrane (eyes, mouth, nose)
- Non-intact skin (cuts, open sores or wounds, needle-stick injury)

Contact can also occur indirectly through contaminated objects or e.g. hands.

How do we prevent transmission of VHF from person to person?

Until we have vaccines that can give long-term immunity against all species of viruses that cause VHFs, continuous and appropriate use of infection prevention and control (IPC) methods is crucial to protect frontline health care workers (HCWs) and prevent healthcare-associated Lassa fever and Ebola infections (HAIs) from spreading and being transmitted into the community.
IPC is the key to preventing the spread of infection from patients to health workers, health workers to other health workers or their families, and from the patients to the rest of the community. Preventing transmission requires strict adherence to standard precautions as well as additional transmission-based precautions for health care, environmental and laboratory workers and community members.

Scope of this guideline

This document provides recommendations relating to IPC measures for VHFs with specific emphasis on Lassa fever, Ebola Virus Disease and Marburg, as these three diseases have an established human-to-human mode of transmission and can constitute national public healthemergencies or have the potential for importation into and rapid spread, causing epidemics in Nigeria.

Case Definition:

Lassa fever

Preamble: This case definition is for clinical decision making to guide the management of LF cases in health facilities.

Alert Case
Any person who has an unexplained fever (i.e., malaria and other common causes of fever have been ruled out), with or without bleeding. **OR** Any person who died after an unexplained severe illness with fever and bleeding.
Suspected Case
Any individual presenting with fever for 3-21 days with a measured temperature of 38^{O}C or more with one or more of the following: malaise, fever, headache, sore throat, cough, nausea, vomiting, diarrhea, myalgia, chest pain, hearing loss and either: a. History of contact with excreta or urine or rodents. b. History of contact with a probable or confirmed Lassa fever case within a period of 21 days of onset of symptoms OR Any person with inexplicable bleeding/ haemorrhage. **OR** **In Neonates:** Maternal Lassa fever +/- signs and symptoms.
Confirmed Case
A suspected case with a laboratory confirmation (positive IgM antibody, PCR or virus isolation) Probable Case A suspected case who died or absconded without collection of specimen for laboratory testing.

Note:

Any of the following scenarios should raise the index of suspicion:
a) Patient has not responded to standard anti-malaria treatment and treatment for other common infectious causes of fever within 48-72 hours b) History of recent contact with a probable or confirmed case of Lassa fever within 21 days of onset of fever c) Patient with history of fever and history of travel to high risk/burden area of Lassa fever d) Contact with body fluids or tissues of a dead patient with a febrile illness, symptoms and signs highly suggestive of Lassa fever leading to death

Ebola Virus Disease

Suspected Case
An illness with sudden onset of fever and no response to treatment of usual causes of fever in the area (including Lassa virus), and at least one of the following signs and symptoms: unexplained bleeding from skin or mucous membranes, bloody diarrhea, severe fatigue, anorexia or loss of appetite, difficulty swallowing, abdominal pain, difficulty breathing, vomiting, hiccups, diarrhea, muscle or joint pain.
Probable Case
Any deceased or alive suspected case (where it has not been possible to collect specimens for laboratory confirmation) having an epidemiological link with a confirmed case.
Confirmed Case
A suspected case with laboratory confirmation (positive IgM antibody, positive PCR or viral isolation), **OR** with an epidemiological link to confirmed cases or an outbreak.

Note: During an outbreak, these case definitions may be changed to correspond to the local event.

Marburg Virus Disease

Suspected Case
Any person, alive or dead, suffering or having suffered from a sudden onset of high fever and having had contact with: • A suspected, probable, or confirmed Marburg case • A Mine OR Any person with sudden onset of high fever and at least three of the following symptoms: headaches, anorexia/loss appetite, lethargy, aching, Muscles, or joints, breathing difficulties, vomiting, diarrhea, stomach pain, difficulty in swallowing, hiccups OR any person with inexplicable bleeding OR any sudden inexplicable death.
Probable Case
Any suspected case evaluated by a clinician OR any deceased suspected case (where it has not been possible to collect specimens for confirmation) having an epidemiological link with a confirmed case.
Laboratory Confirmed Case
Any suspected or probable case with a positive laboratory result. Laboratory confirmed cases must test positive for the virus antigen, either by detection of virus RNA by reverse transcriptase-polymerase- chain reaction (RT-PCR), or by detection of IgM antibodies directed against Marburg or Ebola
Non-Case
Any suspected or probable case with negative laboratory result. ‘’Non-Case’’ showed no specific antibodies, RNA or specific detectable antigens.

Yellow Fever Disease

Suspected Case
Any person with an acute onset of fever with jaundice appearing within 14 days of onset of the first symptoms, (WHO Yellow fever Outbreak toolbox) (June 2022)
Probable Case
A suspected case;andone of the following: - Presence of yellow fever IgM antibody in the absence of yellow fever immunization within 30 days before onset of illness;or - Positive post-mortem liver histopathology;or - Epidemiological link to a confirmed case or an outbreak.
Confirmed Case
1. A probable case;and Absence of yellow fever immunization within 30 days before onset of illness;andone of the following: - Detection of yellow fever-specific IgM;or - Detection of fourfold increase in yellow fever IgM, or IgG antibody titres between acute and convalescent serum samples, or both;or - Detection of yellow fever-specific neutralizing antibodies. or 2. Absence of yellow fever immunization within 14 days before onset of illness;andone of the following: - Detection of yellow fever virus genome in blood or other organs by polymerase chain reaction (PCR);or - Detection of yellow fever antigen in blood, liver or other organs by immunoassay;or isolation of yellow fever virus. (CDC yellow fever)

CHAPTER TWO:
Basic principles of infection prevention and control

What is infection prevention and control (IPC)?

Infection Prevention and Control is a scientific approach and practical solution to prevent harm (caused by infections) to patients, health workers and visitors/community. Its base spans the disciplines of social science, epidemiology, infectious diseases, and bolstering the health system. IPC plays a special role in ensuring patient safety and high-quality universal healthcare because it is essential for both patients and healthcare professionals during every single medical interaction. The basis of IPC is the identification and prioritization of infection risks followed by the application of resources to minimize, monitor, and control the problem.

Standard Precautions are the minimum level of preventative IPC measures practised by health workers and implemented to all patients, regardless of diagnosis, based on risk assessment of a procedure(s), in order to improve treatment and/or safeguard patients, healthcare personnel, visitors/community. Regardless of the patient's suspected infectious status, they are always used on all patients in all healthcare situations. The objective is to lower the danger of microbe transmission from both known and unknown sources of infection. All healthcare professionals should adopt the habit of taking standard measures as a matter of course..

The core components of standard precautions are:

- Hand hygiene
- Safe injection practices
- Respiratory hygiene/Cough Etiquette
- Appropriate use of Personal Protective Equipment (PPE)
- Safe sharps and waste disposal
- Environmental cleaning, disinfection and sterilization of patients' equipment
- Safe handling of linen
- Patient placement and physical distancing

When standard precautions are correctly implemented, the spread of infectious diseases such as the VHFs (Ebola and Lassa fever) can be prevented or at least decreased. Below are some recommendations of how to implement standard precautions.

Standard Precautions for the Care of All Patients in All Healthcare Settings

Component	Recommendations
Hand hygiene: The 5 Moments for Hand Hygiene (described in more detail below in this guideline) should be observed at all the indicated moments.	
Moments	**Actions**
1	Before touching a patient
2	Before performing clean/aseptic procedures
3	After body fluid exposure risk (e.g., after handling any potentially contaminated equipment or material such as laundry, wastes, dishes, vomit and stool buckets, etc.)
4	After touching a patient
5	After touching patients' surroundings
Personal protective equipment (PPE)	
Gloves	Used when there is risk of contact with blood, body fluids, secretions, excretions, contaminated items, mucous membranes and non-intact skin.
Gown	Used during procedures and patient-care activities when contact of clothing/exposed skin with blood/body fluids, secretions, and excretions are anticipated.
Mask, Eye-protection (goggles), Faceshield	Used during procedures and patient-care activities likely to generate splashes or sprays of blood, body fluids, secretions, especially suctioning, endotracheal intubation.
	During aerosol-generating procedures (AGPs) on patients withsuspected or proven infections transmitted by respiratory Aerosols; a fitted N95 respirator should be worn in addition to gloves, gown and face/eye protection.
Safe Linen Management	
Soiled patient-care equipment	These should be handled in a manner that prevents transfer of microorganisms to others and the environment. Gloves should be worn while handling patient-care equipment and hand hygiene should be done before and after.
Linen and laundry	Linen should be handled in a manner that prevents transfer of microorganisms to others and the environment. Appropriate PPE should be used when handling dirty and/or soiled linen and hand hygiene should be done after.
Environmental control	
Cleaning of surfaces	There should be routine care, cleaning, and disinfection of environmental surfaces, especially frequently touched surfaces in patient-care areas. There should be specialized terminal cleaning done upon patient discharge.

Safe Injection Practices	
Needles and other sharps	Never ***reuse*** needles. Do not recap, bend, break, or hand-manipulate used needles a) Use safety features when available b) Place used sharps in puncture-resistant containers c) Do not overfill the containers for disposing sharps and needles (not more than 2/3rd of the container should be filled)
Patient Placement	
Prioritize a single-patient room if patient: a) is at increased risk of transmission b) is likely to contaminate the environment c) does not maintain appropriate hygiene d) is at increased risk of acquiring infection or developing adverse outcome following infection Where a single patient room is not available and cohorting is done, ensure adequate spacing (at least 3 feet/1 meter) in between patients	
Respiratory hygiene/cough etiquette	
Instruct symptomatic persons to cover mouth/nose when sneezing/coughing (especially important in waiting areas or crowded rooms) Use tissues and dispose in no-touch receptacle Encourage patients to cough into elbow if disposable tissue is not available Observe hand hygiene after sneezing/coughing/soiling of hands with respiratory secretions Wear surgical mask if tolerated Maintain spatial separation, >1 meter if possible Symptomatic patients should be prioritized	

In addition to standard precautions, more specific precautions are needed for some diseases depending on the mode of transmission and the organisms involved. These are called transmission-based precautions.

Staff caring for patients suspected to have VHF are required to observe additional transmission-based precautions due to the increased risk of person-to-person transmission through blood and body fluids and the virulence of the organisms involved. These precautions will be addressed in other parts of this guideline and includes: Droplet and Contact Precautions.

CHAPTER THREE:
Hospital Screening for Viral Hemorrhagic Fevers (VHFs)

Early VHF case detection and isolation from other patients who are not affected are two of the most important steps in the prevention and control of VHF outbreaks. All patients and visitors must undergo prompt screening to avoid the spread of disease inside medical institutions. If a screening indicates a suspicion of VHF, isolation is necessary for additional evaluation before notifying the proper authorities.

Screening, Isolation and Notification (S-I-N) approach

Screening, Isolation and Notification (S-I-N) of suspected cases ensures that the goal of promptly identifying and separating suspected cases from other patients and community members visiting healthcare facilities and immediately informing health authorities about a suspected case is achieved.

During an outbreak, each health care facility in the outbreak area and environs should have a well-equipped screening **a**rea at the entrance of the health facility to identify any potential suspect patient. The Screen-Identify-Isolate-Notify (S-I-N) approach should then be used.

Foundation of S-I-N approach

1. SCREEN INDIVIDUAL for VHF disease
2. ISOLATE from other patients
3. NOTIFY appropriate authorities

SCREEN INDIVIDUAL	ISOLATE	NOTIFY
- All persons (patients, staff and relatives) coming into the health facility should be screened at the entry points into the health facility or as close as possible to the entrance or just outside the entrance. Use of a standardized screening tool (see Appendix 4) is required. - Avoid direct contact with patients as much as possible by observing a “no touch” policy when screening a patient. - Take patient’s temperature with an infrared thermometer.	- Move suspected persons to a holding area to wait for further assessment by the designated physician. - Suspected cases should be kept in an isolation room or holding area. - Educate the suspected case on the need and requirements for Isolation - Get a clinician suited in appropriate PPE to further evaluate the case for VHF (if there is a facility protocol for this, it should be followed). - If the patient meets criteria for VHF, provide health education on respiratory/cough etiquette and provide face mask.	- Quickly Notify LGA DSNO or State Epidemiologist - Initiate contact tracing

Triaging

Triaging is a process of rapidly assessing or examining sick individuals when they initially arrive at the health facility or are first encountered in the field; in order to determine the urgency of their healthcare needs and appropriately group them into defined categories, according to the nature of care required.

Triaging gives rise to three types of Cases:

1. Cases with Priority Signs: Those with symptoms and signs that should be given priority in the queue so that they can be rapidly assessed, treated, moved, or isolated without delay.

2. Cases with Emergency Signs: Those with symptoms who require immediate urgent treatment.

3. Cases with no priority or emergency signs: These are the non-urgent cases who can wait their turn on the queue and do not require emergency treatment.

Requirements for Triaging

- A well-defined triaging station at entry or exit points in the facility.
- Trained Staff supporting these stations.
- Availability of PPE
- A high index of suspicion by staff
- Use of screening questionnaires with updated case definitions
- Posters and reminders for symptomatic patients to urgently alert HCWs or relevant authorities
- Waste bins
- Flow charts and Protocols
- Algorithm for triage
- Hand Hygiene equipment
- Clear signage

Screening: (Screening-I-N)

Overview: It is important for staff to be familiar with requirements for screening such as setting up a screening area, procedures to be used, and criteria for such screening as described below.

Patients waiting to be screened must be seated at least 1.5 meters apart (preferably seats should be bolted down or too heavy to move) as some patients may be negative while others are positive.

Patients with wet symptoms such as cough, sneezing etc. should practice respiratory hygiene/cough etiquette such as using facemasks and disposable tissue paper and if possible, placed in a separate waiting room. Ensure proper ventilation of screening area. Windows and doors must be always opened.

SCREENING (see appendix 4: screening form)	
Setting up a screening area	Cadre/level of healthcare worker (HCW) responsible for the screening area should be at the minimum: **Tertiary health facility** – IPC Trained Nurse or a Medical Doctor **Secondary health facility** – IPC trained nurse/Qualified Nurse **Primary health facility** – Community Health Extension Worker (CHEW) The screening area should be located at the entry points into the health facility as close as possible to the entrance or just outside the entrance. It is recommended that the IPC team takes some time to undertake a walk-through of the facility to decide and document all the possible areas suitable for screening and also decide the staffing for these locations. For large health facilities, the entry points may be many (e.g. accident and emergency, labour ward, specialty-specific out-patient clinics, etc.) and the entrances at these points should be manned by staff trained on how to perform screening. Some VHFs like Ebola could require a screening area located just before the entrance gate of the health facility. Entrance to health facilities in such cases should be limited to the gate(s) with screening facilities. All patients, visitors and staff must go through the screening station before entering the facility. Avoid patient overcrowding. Keep at least 1.5 meters distance between patients.

	Hand washing stations, alcohol hand rubs and dedicated toilet facilities should be accessible in the screening area. Provide dedicated materials for cleaning spills and disinfecting surfaces in the screening area. Hand washing posters should be displayed strategically in screening areas. Screening posters as well as the triage algorithm should also be displayed. Regular trainings for staff and simulation exercises should be performed and documented according to a defined curriculum. Staff education on the policies/SOPs for screening and triage is also necessary to ensure health workers know what to do.
Procedure for screening	1. Wear appropriate PPE (at minimum, gloves). 2. Avoid direct contact with patients as much as possible by observing a “no touch” policy and by keeping at least a 1.5 meters distance between health worker and patient and between patients. 3. Avoid being face-to-face with patients during screening. 4. Take patient’s temperature with an infrared thermometer. Where the infrared thermometer is not readily available, each patient should use a personal digital thermometer. 5. If a personal digital thermometer is to be used, teach and demonstrate to the patient how to use it. The patient should measure his or her own axillary (armpit) (or his or her child’s) temperature and read it aloud to the staff. The patient should also show thereading to the staff conducting the screening. 6. If patient meets criteria to be classified as a VHF suspect, move the patient to an isolation holding area to wait for further assessmentby the designated physician. 7. Patients that do not meet the suspect case definition should continue accessing the care they came for in the health facility. 8. After each patient's screening, clean the liquid-proof table with 0.5% chlorine solution using a moistened fabric towel which should be decontaminated with 0.5% chlorine solution before reuse. Also decontaminate gloves with ABHR before removal. (See section on decontamination of surfaces) The gloves should be disposed as high-risk medical waste (red container). Perform hand hygiene and put on a new pair of gloves.

Using screening criteria to make decision	**<u>Screening Criteria for VHFs</u>** Any person with any of the following: Fever of ≥38^{o}C for more than 48hrs and less than 3 weeks; **AND** Unresponsiveness to standard treatment for malaria and other common infectious causes of fever within 48-72 hours plus Any one of these symptoms: - abdominal pain - sore throat - malaise - headache - cough - myalgia - nausea - vomiting - diarrhea - retrosternal /chest pain - hearing loss - unexplained haemorrhage {bleeding from gum, bloody diarrhea, bleeding into eyes and urine, bleeding into skin (purpura)} - woman with abnormal vaginal bleeding - jaundice **OR** History of recent contact with a probable or confirmed case of VHF within 21 days of onset of fever; **OR** Patient with history of fever and history of travel to high risk/burden area of Lassa fever, Ebola, or Marburg; **OR** Contact with body fluids or tissues of a dead patient with a febrile illness, symptoms and signs highly suggestive of VHF leading to death; **OR** Travel to VHF endemic areas within the past 21 days plus contact with any of their reservoir hosts (rodents or their excrements for Lassa Fever; bats and non-human primates such as monkeys, apes and baboons for Ebola and Marburg) or consumption of bush meat .
	<u>Staff responsible for screening must keep a screening register</u>

- If patient does not meet the case definition for suspect case of VHF, then he/she should continue to access care in the healthcare facility.

Patient placement in the VHF treatment centre

Managing those who flag off at screening (isolate) (S- Isolate -N)

- Once identified at screening as a suspected case, the patient should be moved immediately to a holding area for further evaluation
- A trained clinician wearing appropriate PPE based on a risk assessment should gather more information about potential exposures, symptoms and possible alternative diagnosis and determine if the patient meets the definition for a suspected case of VHF
- Suspect cases should be kept in an isolation room or holding area while appropriate transportation to a treatment centre is arranged e.g. Ambulance
- Trained dedicated staff should be assigned to the holding area

Educate the patient if conscious and co-operative

- Inform the patient of what will happen or be done to him/her
- Explain the reasons for the isolation/holding and ensure patient understands by repeating the reasons
- Explain the procedures you are following with respect to controlling transmission to the family, healthcare workers and the community
- Educate the patient on respiratory hygiene and cough etiquette
- Give the patient a face mask and make sure he/she understands how to use it

Once a VHF is suspected after the clinician's review, the patient should be immediately separated/isolated with a dedicated staff to prevent infection of other patients/staff and the appropriate internal and external authorities (facility management and admin as well as external LGA and state ministry of health structures should be notified (Local Govt. DSNO, State DSNO).

- Suspect cases should be kept in a dedicated holding area while appropriate transportation to an in-facility or external treatment centre is arranged e.g. Ambulance.
- Ideally, a single-person holding area is recommended but where this is not possible and there are more than one VHF probable case:
  - Maintain at least 1.5metres or more between patients.
  - Ensure hand hygiene (hand washing or the use of ABHR) between patients and after handling dedicated equipment (thermometer, sphygmomanometer, and stethoscope, etc.).
- **In the holding area, staff must wear appropriate PPEs based on risk assessment, including full-body PPE when indicated** (double gloves, gown (or coverall), mask, eye protection, protected foot wear and head covering) to perform examinations of patients. (See Appendix 2d)
- The holding area should have the following:
  - Dedicated toilets and sinks with running water and soap for patients

- Stocks of PPE and medicines
- Hand hygiene stations and behaviour change communication posters for HCWs and patients
- Waste management materials (e.g. bin lined with red bin liner)
- Clearly displayed signage for respiratory hygiene and cough etiquette
- Signage for unidirectional movement and access control (e.g. no unauthorized entry, designated staff only, etc.)
- Discrete areas for donning and doffing PPE must be available at the entry and exit of the holding area
- Dedicated cleaning equipment and supplies to be used only for this holding area (not shared with other areas in the health facility)

- Ideally, suspect or confirmed cases should be managed under strict IPC measures by dedicated healthcare staff where available if human resources permit. Thus, caregivers **should not be** in the same room as probable or confirmed cases.
- Nonetheless, where human resources are not available thereby necessitating the assistance of caregivers or when children are the cases, the following measures should be implemented.
  - There should NOT be more than one caregiver per patient and that caregiver must be consistent throughout the duration of patient care. The caregivers should be monitored to enable early detection of incidental or nosocomial infection both during care and for 21 days post patient discharge.
- Initial laboratory testing should be performed. If possible, sample should be safely collected at the holding area (see chapter 11). Transport of this sample to a designated testing facility should be arranged according to the NCDC approved transport protocols (see section on sample transportation).
- Initial therapy should be initiated if there is expertise for this.
- Do NOT delay referral of clinically probable or confirmed cases to a designated treatment centre.

Setting up the holding area

- Holding area should be a room, a section of a room, or rooms
- Holding area should be close to a facility's exit
- Assure good ventilation with extractors (no fans) to move air towards the windows and
- Ensure an ante room for donning and exit room for doffing and decontamination
  - Ante room: – PPE for contact and droplet precautions: gloves, face masks, overalls,eye wearInside room:
    - Plastic chair(s) and/or bed(s) with plastic cover
    - Bedpan

    - Plastic bucket
    - Plastic bags
    - Bottled water
- Exit room - for doffing, decontamination, hand hygiene, and waste disposal

Isolate: Restricted Personnel Access

If needed, assign one medical staff member to monitor the patient(s)

- Visitors must be prohibited in the holding area
- Maintain a register of all persons who enter the holding area including address, phone number and relevant biodata

Notification (S-I-Notify)

- Notify appropriate authority (facility Surveillance Officer, LGA DSNO, State DSNO or State Epidemiologist) aboutany suspected case; DO NOT wait for laboratory confirmation before notification.
- This may be a good time to take some lists of contacts as this will be useful in contact tracing if patient turns out to be a confirmed case.
- Make every effort to reduce the waiting time between first contact with the patient and notification/transfer; ideally it should be immediate.

Post S-I-N signs in the entry points into the health facilities

How to transport a suspected or confirmed VHF patient to a treatment center

Safe ambulance transfer is recommended for transport of a suspected/confirmed patient to the treatment centre. Under no condition should a suspected or confirmed VHF patient be allowed (or made to) travel in a way that exposes other people to infection (e.g. taxi, commercial car, bus, etc.). DO NOT REFER a suspect or confirmed case on his/her own; establish an ambulance system for safe transfer of suspected/confirmed patients.

The following safety precautions should be observed for patient transport:

a. During transport, ask patient to put on a face mask.
b. If patient is ambulatory, s/he should sit in the back of the ambulance/vehicle alone.
c. If patient is severely ill, then accompanying staff should wear **full set of PPEs** as they will be in close contact throughout the duration of the journey.
d. Ensure appropriate ventilation within the ambulance (add windows)
e. Make sure that there is a bin and red bin bag for infectious waste and also a receptacle for vomitus or stool.
f. There should be ABHR for hand hygiene and 0.5% chlorine solution for disinfection.
g. On arrival at the VHF treatment centre, ambulance must drive up to the separate ambulance entrance to the treatment centre.

h. If patient is ambulant and can walk by her/himself, then staff wearing basic PPE can stay at a distance of at least one meter and escort the patient to the appropriate entry into the suspect or confirmed ward.
i. However, if patient is not ambulatory and needs assistance then, staff wearing **full set of PPE** should come to collect the patient and move him into the isolation ward.
j. After drop-off, clean and disinfect the area where patient and staff have walked as well as the back of the ambulance with 0.5% chlorine solution.
k. Disinfect the ambulance in the designated ambulance disinfection area.
l. Ambulance staff must doff in a safe doffing area with the appropriate materials for waste disposal and management.
m. Note that the driver of the ambulance does not need to wear PPE if he will have no contact with patient but he should perform hand hygiene as frequently as necessary.
n. Public transport can only be used when such transport is dedicated only to the patient to be transported and when safe ambulance transport is not available
o. In such situation, the precautions mentioned above should also be observed strictly and such vehicle thoroughly cleaned and disinfected after use.

Procedure for "Cleaning" and "Disinfection" of the ambulance

1. Put on PPE—gown, apron, boots, goggles, face mask and domestic gloves. (See appendix 2d).
2. Spray the backside of the ambulance with 0.5% chlorine solution and allow for a contact time of 5 minutes (pay attention to door handles and other places the patient may have touched).
3. Open the back door of the ambulance.
4. Tie up any used garbage bag and place in waste zone of the treatment centre.
5. Spray the entire surface of the ambulance thoroughly especially the roof, floor, walls, stretcher and inside of the door with 0.5% chlorine solution and allow for a contact time of at least 10 minutes.
6. Use detergent and water and a cleaning cloth and clean all surfaces of the ambulance especially the roof, floor, walls, and stretcher and inside of the door.
7. Carefully rinse the inside of the ambulance with clean water (avoid splashes).
8. Close the door of the ambulance and wash the entire outside surface of the ambulance with detergent solution then spray the entire surface of the outside of the ambulance with 0.5% chlorine solution and allow a contact time of at least 10 minutes.
9. Carefully rinse the backside of the ambulance with clean water and then request the driver to drive out of the decontamination area.
10. Spray the surfaces/environment where the cleaning of the ambulance has taken place with 0.5% chlorine solution.
11. Close and spray the gate with 0.5% chlorine solution.
12. Proceed to the designated doffing area and remove the PPE (See appendix 2e.)
13. Perform hand hygiene.

CHAPTER FOUR:

Hand hygiene in management of VHF patients

Hand hygiene reduces the level of contamination of hands with micro-organisms. Hand hygiene is one of the most important ways to reduce the transmission of infections in healthcare settings. It includes:

- Hand washing with soap and water
- Antiseptic hand-wash
- Alcohol-based hand-rub
- Surgical hand-scrub

The five critical moments that hand hygiene has to be performed in healthcare settings are:

1. Before touching a patient
2. Before performing clean or aseptic procedures
3. After body fluid exposure (after performing a task involving the risk of exposure to a body fluid)
4. After touching a patient
5. After touching patient surroundings

Why is hand hygiene important in VHF management?

When properly done, hand hygiene is a very important way to reduce the risk of healthcare workers (HCWs) contracting VHFs. The main route of VHF transmission from human to human is through direct and indirect contact. By washing hands after all contact with patients, the patient's environment, medical items/equipment and PPE, healthcare workers reduce the chances of introducing the virus into their mucus membranes.

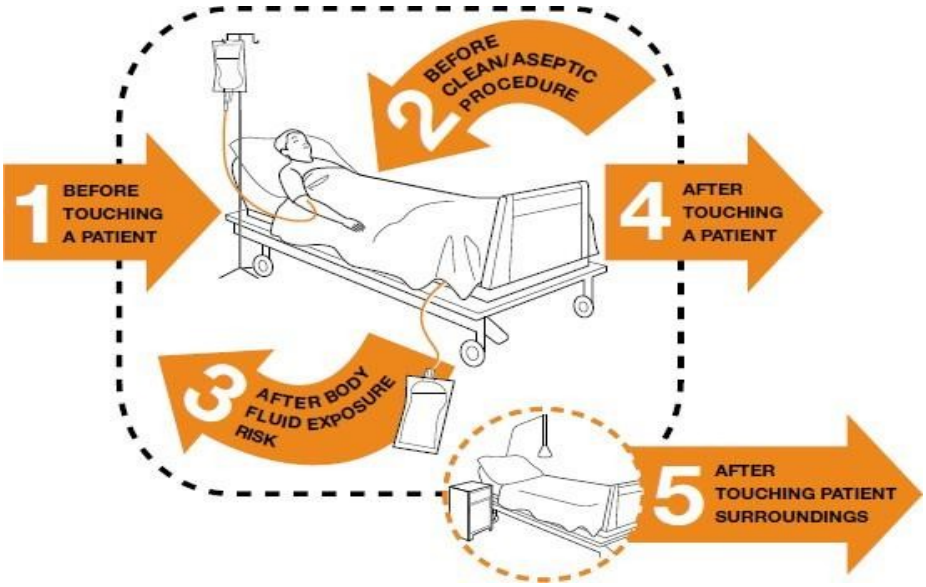


Figure 1: The WHO 5Moments for Hand Hygiene (Source MBA)

UNGLOVED HANDS
Alcohol-based hand-rub (ABHR) is the standard of care when hands are not visibly soiled. ABHR should be made available at every point of care (i.e., at the entrance and within the suspect and confirmed cases wards and upon exit). If hands are visibly soiled, use soap and water for performing hand hygiene. Hand washing with soap and water is also recommended for hand hygiene before wearing and after removal of hand gloves. This should be followed by hand drying using single use towels.
GLOVED HANDS
Changing gloves between patients and performing hand hygiene is considered best IPC practice. Glove change can be safely performed by following a two-step procedure: ▪ Disinfect the outer gloves with 0.5% chlorine solution before removing them safely. ▪ Keep the inner gloves on and disinfect them with ABHR before putting on a fresh outer pair. ▪ Alcohol-based hand-rubs are preferred when disinfecting gloved hands. However, if this is unavailable, soap and water or bleach/chlorine solutions are Acceptable

Important points to note in carrying out hand hygiene

- All HCWs (including aides and cleaners) and visitors should be trained/instructed on the proper technique of hand hygiene.
- Instructions should be displayed at the point of entry into the isolation unit/room and in all areas of the treatment centre where hand hygiene should be performed.
- Perform hand hygiene with an alcohol-based hand-rub solution for 20-30 seconds or soap (preferably liquid soap), running water and single-use towels (40-60 seconds), applying recommended techniques (see appendix 2a).
- Always perform hand hygiene with liquid soap and water when hands are visibly soiled.
- Alcohol-based hand rubs should be made available at every point of care

In addition to the 5 moments, before and after any direct contact between a HCW and a patient and contact between patients, whether or not gloves are worn, hand hygiene should be performed in the following scenarios:

- Upon entering the isolation area, before putting on PPE and gloves
- Upon leaving the isolation area, after removal of PPE
- After touching contaminated surfaces/items/equipment in patient's surroundings

Hand hygiene with Alcohol-based Hand-rub

ABHR containing 70-80% alcohol is effective for removing most microorganisms including Lassa fever, Ebola and Marburg viruses, from the hands. However, ABHR does not remove soil or organic matter. So, if hands are visibly soiled or contaminated with blood or body fluids, they must be washed with soap and water. For hand hygiene with ABHR to be effective, approximately 3-5 ml (about a teaspoonful) of ABHR should be used.

The solution should be rubbed following the steps below until it completely dries (20-30 seconds). The same steps must be followed when cleaning gloves.

Figure 2: Steps for Hand Hygiene with Alcohol-based Hand-rub (Source: WHO)

Hand washing with Soap and Water

Hand should be washed when visibly soiled. Clean water must be supplied and used regularly in order to prevent microorganisms from water contaminating the hands. Proper hand washing requires that soap be rubbed on all surfaces of both hands followed by rinsing and drying. WHO recommends that this process takes between 40-60 seconds. The procedure is the same when performing hand hygiene and when cleaning gloved hands.

- Never perform hand hygiene by dipping hands into basins containing standing water

Figure 3: Handwashing with Soap and Water (Source: WHO)

- Do not add soap to a partially empty liquid soap dispenser; the practice of topping off dispensers can lead to the growth of microorganisms and contamination of the soap
- If there is no running water, a covered bucket with a tap (called Veronica bucket) can be used

Hand Hygiene Tips

- Keep fingernails short and filed
- No artificial nails
- No nail polish
- Use hand lotion to prevent skin dryness
- No jewelry
- Use liquid soap, not bar soap

CHAPTER FIVE:
Facility considerations including Water, Sanitation and Hygiene (WaSH) in a VHF treatment centre

Overview

Any person suspected/confirmed to be suffering from VHF such as Lassa fever, Ebola, or Marburg virus disease should be safely transported to an isolation facility referred to as **"VHF treatment centre"**.

The objectives of establishing these isolation/treatment centres are to:

1. To contain the spread of infection amongst patients and between patient and health care workers (HCWs) and amongst caregivers/relatives
2. To stop the spread of these diseases in the community
3. To provide good quality clinical care to the infected patients
4. To sustain a safe and secure environment for staff and patients

These objectives are achieved through the enforcement of proper Infection Prevention and Control (IPC), administrative controls and safe work practices, engineering measures and PPE for contact and droplet precautions.

Structural Design of VHF treatment centres

VHF treatment centres are designed to ensure optimal IPC with clearly demarcated high and low risk areas. The general principles guiding the design of a VHF treatment centre are based on a unidirectional flow of staff, patients, solid waste and dead bodies from low-risk to high-risk zones, use of strict barrier nursing (PPE), proper and effective hand hygiene approaches and techniques and use of correctly constituted disinfectants for specified purposes.

The VHF treatment centre should be well thought out and constructed. The principles that must be adhered to in the design of VHF treatment centers are:

- Well defined and cordoned (fenced) off Centre.
- Access controls in the centre to avoid trespassing (see below for explanation).
- Clearly marked "clean or low risk" and "dirty or high risk" areas.
- Patients' care area should have separate entry and exit points
    - Separate entry point for patients and health care workers
- Unidirectional flow of patient care from suspect to confirmed patients care areas.
- Strict adherence to demarcation lines to reduce transmission and cross contamination.

In the treatment centre, isolation areas are secured through the structural design and a system of demarcation to separate the different areas. The entire centre should be divided into three zones:

Very Low Risk: (Offices, warehouse, pharmacy and kitchen)
Low Risk: (Changing room, nursing station, consulting room)
High Risk: (Patients' care area, laundry, waste management zone and morgue).

*****The access to each zone is regulated and only essential staff can enter the different zones.**

Within the high-risk zone, further divisions are made based on the level of contamination:

Zone 1: Ambulance bay, triage and suspect bay

Zone 2: Suspect bay for patients with wet symptoms

Zone 3: Confirmed ward, Recovery ward, waste area, and morgue and ambulance bay for the morgue

Patient arrival and screening area in the VHF treatment centre

Ambulance area: this area is in the high-risk zone and is where the ambulance drops off the patients.

Screening and triaging area

SCREENING	Is the process whereby a healthcare worker rapidly assesses a patient to determine whether VHF is suspected or not.
TRIAGE	Is a process in which the healthcare worker assesses the severity of the patient's condition in order to identify cases that require urgent treatment and also determine how to place the patient in the treatment centre.

The objectives of screening and triaging patients in the VHF treatment centre are:

1. To isolate patients with suspected VHF from those who may not have VHF in order to prevent or reduce transmission
2. To improve the chances of survival and reduce case fatality rate
3. To identify patients who are unwell but NOT likely to have VHF so that they can be sent for appropriate treatment, thereby reducing their risk of contracting VHF from other patients
4. To identify patients with a higher probability of spreading infection such as vomiting, diarrhea, coughing or bleeding patients in order to place them in wards in a manner to minimize the risk of spreading their infection

The screening and triaging process must take place as soon as patients arrive the treatment centre. All patients must enter the treatment centre through one common entrance in order to access the screening area where triaging also takes place.

The only exception is for confirmed cases that are transported to the treatment centre's confirmed ward. These patients should be taken straight through the confirmed cases entrance. After patients are screened, those that do not meet the case definition for VHF should be discharged and followed up. Patients that meet the case definition should be triaged and managed accordingly.

If a patient is coming directly from the community and has not been assessed in a health facility before being sent to the VHF treatment centre, then such a patient should be taken through the screening and triage section in the treatment centre as described here.If such a

patient meets the suspect case definition, then he/she should be admitted into the suspect ward.

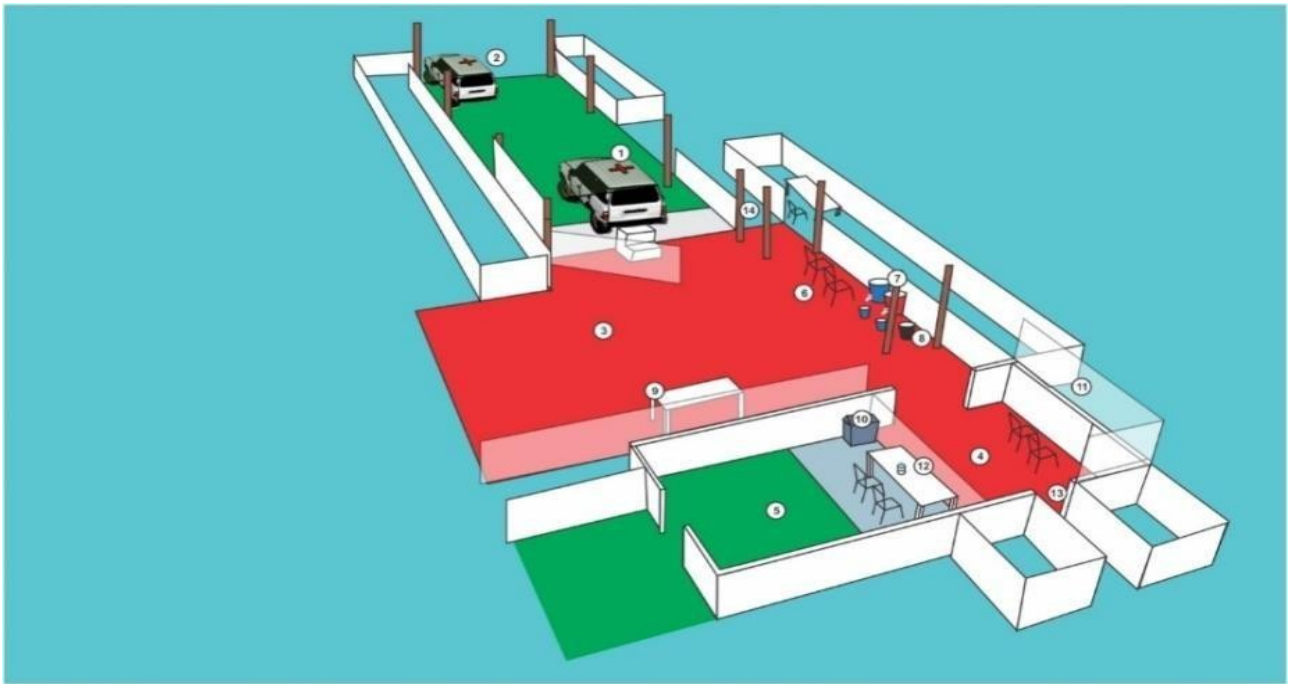
Patients with laboratory diagnosed VHF should be taken directly to the confirmed ward.

The screening area in a VHF treatment center:

- Should be manned by staff that have been trained in case definition of VHF and also trained in IPC including correct use of PPE
- Should be well ventilated and chairs should be placed at least two meters apart (There may be a need for a trolley to keep stretcher for patients that can't sit)
- Should have accessible toilet and shower
- Should have hand hygiene material (soap and water, and ABHR) always available including hand hygiene posters
- Should have infra-red thermometers with instructions on how to use them
- Should have disposable non-sterile gloves
- There should be 0.5% chlorine solution and disposable towels for table disinfection
- There should be a waste bin with red liner
- There should be a separate area for donning and doffing of PPE
- Screening and triage algorithm should be present and prominently displayed
- Only patients and health care workers should enter the screening and triage area
- Infants/young children requiring adult assistance should be accompanied by only one adult (the adult should be educated on PPE use and standard precautions)

Actions to take during Screening and Triaging:

1. A trained health care worker wearing minimum PPE namely: scrub suit, a pair of goggles or face shield to protect the eyes, mask to protect the nose and mouth, head cover, disposable gown, waterproof apron, two pairs of gloves (double gloving) and boots should perform the screening and triaging.
2. Screening staff should remain 1-meter away from the patient
3. If a patient cannot move and needs to be carried or a healthcare worker has to interact with the patient at a distance less than one meter, then the healthcare worker must wear full PPE to attend to the patient
4. The health worker should not touch the patient at any time during the interview inadvertent infection of non-VHF suspect cases while they are awaiting confirmation. Patient should also be placed in such a manner that privacy and socially acceptable separation is guaranteed. There should be no mixing of suspect and confirmed cases.



1. Entrance to ambulance, 2. Ambulance bay, 3. Patient drop off & disinfection of ambulance, 4. Triage high risk, 5. triage low risk, 6. Waiting area, 7. Clean water + 0.5% Chlorine Solution, 8. Buckets for vomiting patients, 9. High bench for stretcher transfer, 10. Waste bin for gown & wipes, 11. See through wall, 12. Hand sprayer with 0.5% Chlorine solution, 13. Non case exit-gate, 14. Walking patient one way door

Figure 4: Screening and triage area

Patient placement in the VHF treatment centre

High risk zones

SPECIFIC AREAS	Descriptions and Specifications for IPC
SUSPECT WARD	▪ This is the area where suspected VHF cases are managed until laboratory results are out. ▪ These should be single patient rooms. If single patient rooms are not available, suspected patients should be admitted in the suspect bay/ward in the VHF centre with bed spacing of at least one meter between patients. Privacy curtains or screens may be pulled as environmental barrier ▪ Suspect case with wet symptoms (vomiting, diarrhea, cough, sneezing or bleeding) should be separated from others. However, it should be borne in mind that a wet patient may not necessarily be VHF so very strict IPC practices should be maintained to ensure that wet patients are also protected from getting infected by other wet patients ▪ Male and female wards should be separated ▪ Paediatric and obstetric wards should also be provided

	▪ Suspect area should have an observation window/see through walls/CCTV cameras to enable healthcare workers observe patients without going into the rooms ▪ The suspect cases rooms should be well ventilated (air flows from the corridors to rooms then vented outside) ▪ Alarms should be provided in the rooms by patients' bedside ▪ There should be separate toilets and bathrooms for each patient ▪ There should be hand hygiene facilities with hand hygiene posters displayed at points of care ▪ Alcohol based hand rub conveniently located at points of care (this ensures that the 5 moments for hand hygiene are still complied with) ▪ Sharps containers should be located at points of care and should be mounted properly such that they remain in upright positions at all times
CONFIRMED WARD	▪ Single patient rooms are recommended for confirmed cases ▪ If single patient rooms are not available, confirmed patients may be admitted in a general confirmed bay/ward but with at least one meter between patients ▪ Rooms in the confirmed patient section should have observation windows/see through walls/CCTV cameras to enable staff observe patientswithout entering the rooms ▪ Rooms should be well ventilated (air flows from the corridors to rooms then vented outside) ▪ Alarms should be provided in the rooms by patients' bedside ▪ There should be separate toilets and bathrooms for each patient ▪ There should be hand hygiene facilities with hand hygiene posters displayed at points of care ▪ ABHR (Alcohol based hand scrub) should be conveniently located at points of care (this ensures that the 5 moments for hand hygiene are still complied with) ▪ Sharps containers should be located at points of care and should be mounted properly such that they remain upright at all times

DOFFING AREA	▪ All staff should leave the patient care area (PCA) through a designated exit point ▪ There should be no cross over into the entry section ▪ Protocol with pictures for doffing PPE should be displayed inconspicuous places ▪ There should be a full-length mirror to guide proper Doffing
	▪ There should be enough hand hygiene stations to accommodate more than one staff doffing at the same time (Depending on the staff number needed in the patient care area) ▪ There should be clearly displayed hand hygiene posters. ▪ There should be an infectious waste container and liner (red) for used PPE (one for disposable and one for reusable PPE) - There may be a plastic bench to sit down if necessary
PATIENT REST AND PSYCHOSOCIAL AREAS	As patients recover, they may wish to come outside for some view and fresh air This is also a space where patients can receive counselling, information on test results and other information they may need from staff that are usually not apart of their clinical case management ▪ This area is within the high-risk area and strict IPC measures should be observed
MORGUE	Ideally, the VHF treatment centre should have a dedicated morgue for keeping the bodies that are not immediately taken from the treatment centre for burial. ▪ The morgue should be located in the high-risk zone ▪ It should be well ventilated ▪ It should have good natural lighting ▪ The entrance and exits to and from the morgue should close easily and securely. ▪ Emphasize access controls
HYGIENE ROOM	▪ There should be an area for dirty equipment to be kept and washed as well as areas where the equipment are stored when clean and ready to use ▪ There should also be an area for storage of cleaning products and drying equipment

Low risk zones:

SPECIFIC AREAS	Descriptions and Specifications for IPC
STAFF AND VISITOR ENTRY AREA	There should be separate entry points for visitors and for staff into the treatment center
STAFF CHANGING ROOM	This area is located near the staff entrance. ▪ This is the area where staff change from their street clothes into scrubs and boots before starting work ▪ There should be separate changing rooms for males and females ▪ Individual lockers should be provided for staff to safely store their street clothes and other valuables including mobile phones ▪ Clean scrubs and boots should also be stored in this area ▪ There should also be large laundry bins for used scrubs to be dropped for laundry
DONNING AREA	▪ This is located at the area before the high-risk zone ▪ Here staff dresses in PPE before crossing the one-way entrance into the high-risk zone ▪ There should be a clearly demarcated entry point (well-marked) for staff going into the high-risk zone after putting on PPE ▪ This area should be able to hold two days' stock of PPE for scheduled staff ▪ The protocol and pictures for putting on PPE should be clearly displayed ▪ There should be a full-length mirror for staff to examine themselves after donning PPE ▪ There should be a hand hygiene station (soap and water and ABHR) with hand hygiene posters clearly displayed ▪ Ideally, PPE donning areas for males and females should be clearly defined ▪ A donning checklist should be pasted on the wall

COORDINATION AREA	▪ The treatment centre should have an area in the low-risk zone for staff meetings and planning activities, debriefing and shift changes ▪ This area should be large enough for meetings and work organization and planning ▪ This area should have the view of the high-risk zones (especially the ICU) and also the donning and doffing areas
ADMINISTRATIVE/OFFICE SECTION	This is the area in which the offices of the case management team, IPC team, environmental health officers, cleaners, psychosocial and health promotion teams is located in the low-risk zone
STORE	▪ This is located in the low-risk zone with access for receiving materials from outside the treatment centre ▪ This store should be able to hold at least two days' worth of stock ▪ This store can be combined with the pharmacy ▪ Store should be well built and structurally sound (protected from elements, no leaking roof, pest control, etc.)
LAUNDRY	▪ The laundry is best located near the exit to the doffing area. ▪ This area should have sufficient space for the activities that need to be carried out in the laundry ▪ This area should be very well ventilated (because of chlorine gas) ▪ The area should also be covered to prevent rain from falling on workers while working ▪ Washing machines are preferred but provisions also have to be made for hand laundry (see SOP on Linen and Laundry management) in case of breakdown or unavailability of washing machines
STAFF REST/REFRESHMENT AREA:	▪ Ideally, this area should be located outside the treatment centre but if this is not feasible, then it can be located in the low-risk zone ▪ This area is where staff can eat food and have other refreshments. ▪ There should be hand washing stations with soap and water

VISITORS' AREA	▪ This area is for visitors and should allow direct communication with patients (over a fence or across a barrier/space of at least two meters) ▪ This area should be covered/protected from natural elements (rain, sun, etc.) ▪ There should be seats for visitors ▪ A visitors' register should be kept ▪ There should be hand hygiene facilities (soap and water and ABHR) and hand hygiene posters ▪ There should be toilet facilities ▪ There should be information posters and leaflets for visitor education ▪ There should be non-infectious waste bin

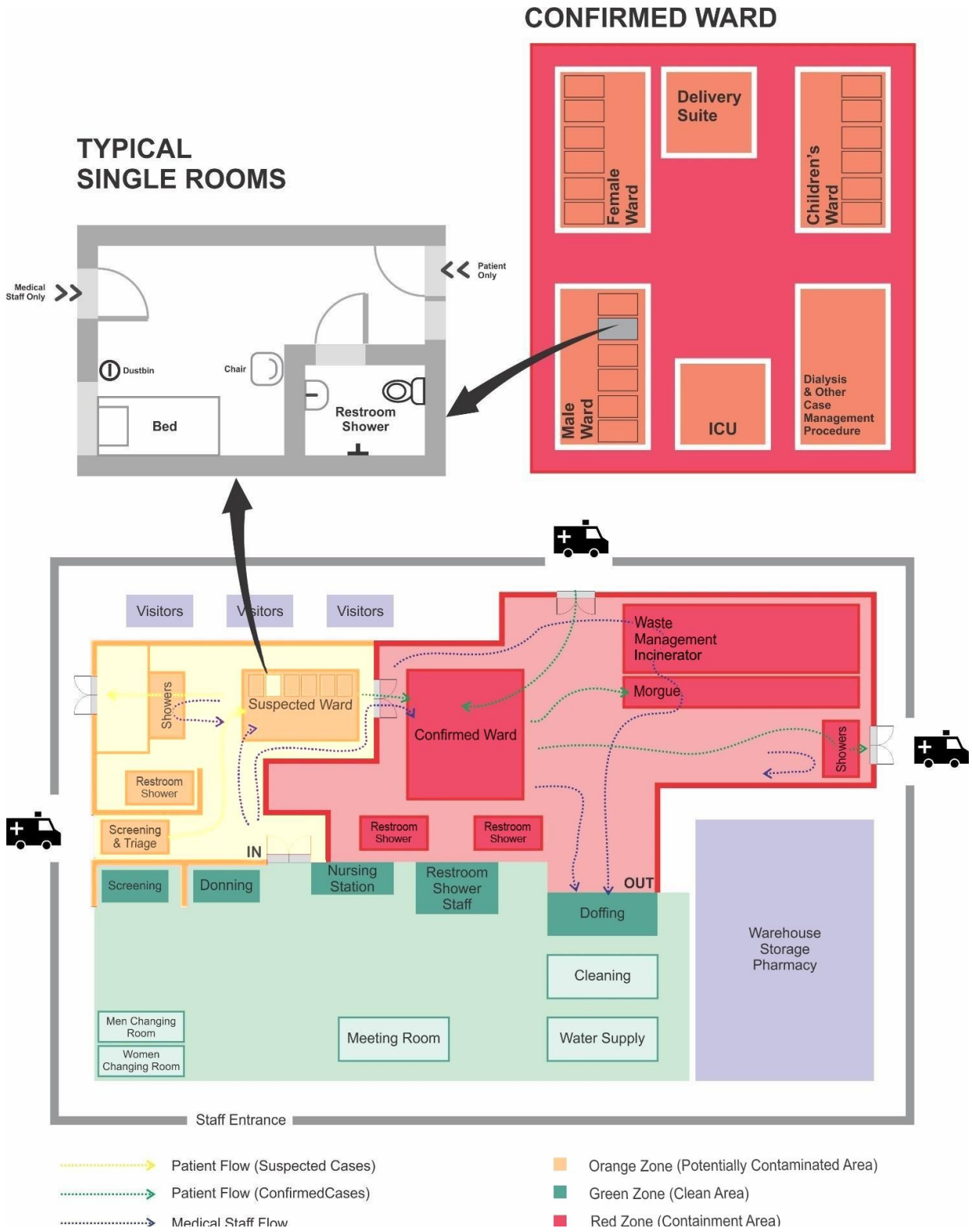
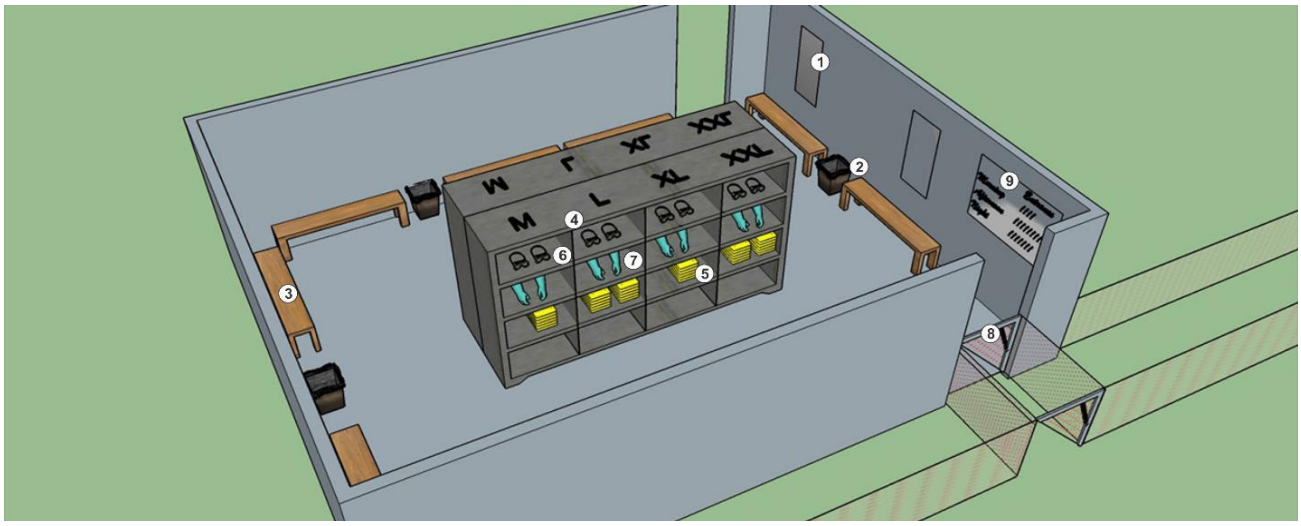
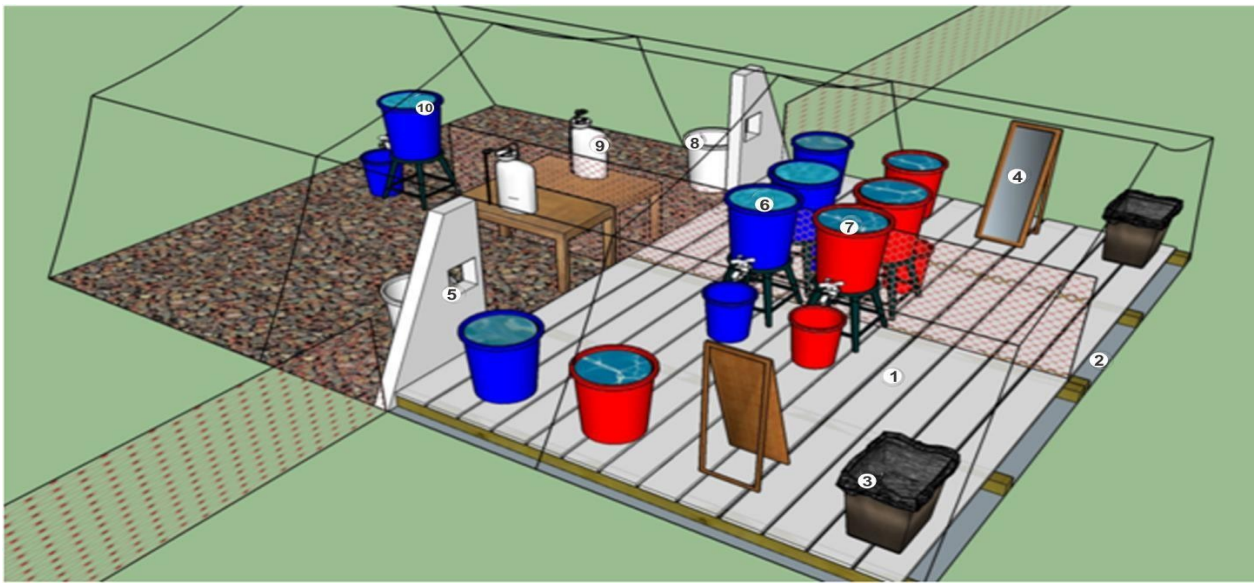


Figure 5: Directional Flow of the VHF treatment centre and patient areas also showing a typical single patient room.



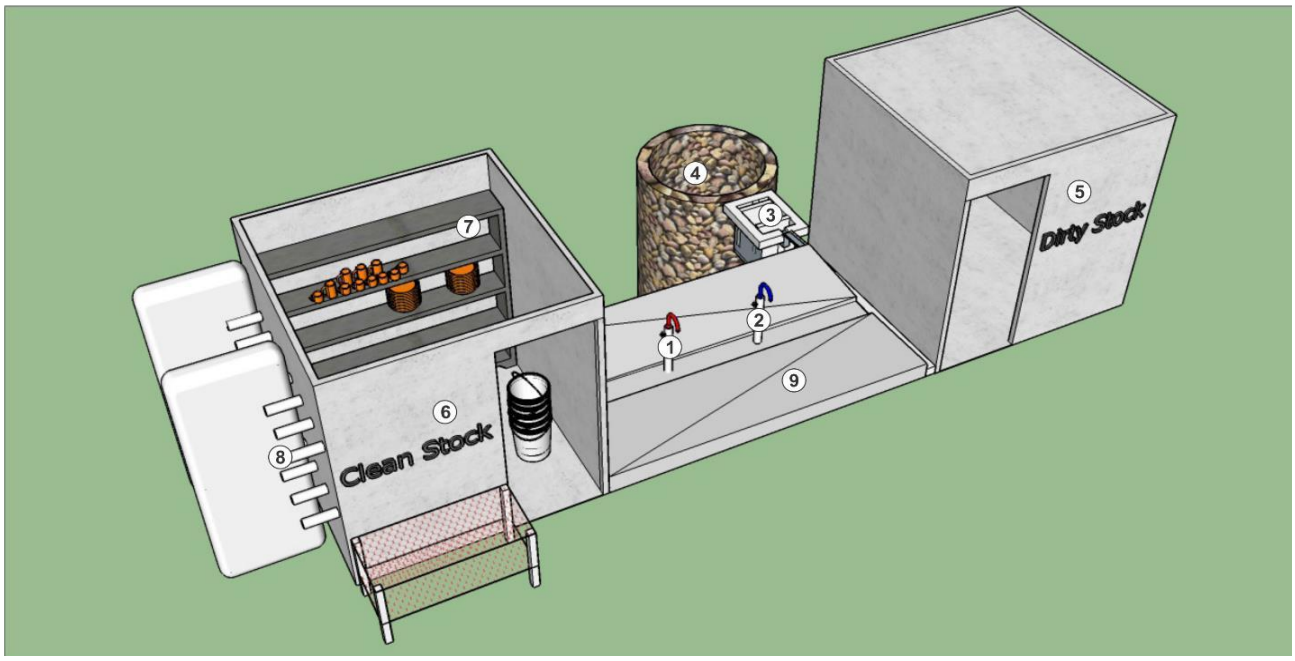
1. Mirrors, 2. Linen waste bin, 3. Bench, 4. Shelves organized by size, 5. Hood, 6. Goggles, 7. Gloves,
8. One-way door, 9. White board for follow up of time of entrance to high risk zone.

Figure 6: Diagram of Donning area of the VHF Treatment Centre



1. Non slippery floor evacuating water -Wooden board wrapped in plastic sheeting -Rough concrete slopped platform, 2. Underfloor infiltration or slab with slope, 3. Lined waste bin, 4. Mirror, 5. 0.5%chlorine solution 100L bin, 6. Clean Water 100L, 7. Opening to drop disinfected aprons, goggle & gloves to low risk zone, 8. Collecting bucket for disinfected aprons, goggles and gloves, 9. Sprayer with 0.5% chlorine solution, 10. Clear clean water + soap

Figure 7: Diagram of a doffing area



1. 0.5% Chlorine solution tap , 2. Clean water trap, 3. Grease tap, 4. Soak away or infiltration trenches, 5. Store room for contaminated material, 6. Store room for clean material, 7. Drying rack for plates, buckets, 8. Drying rack for mattresses, Shelves to store clean materials, 9. Slope

Figure 8: Diagram of a hygiene area in a VHF treatment centre

Requirements for water supply in a VHF treatment centre

Water supply is essential for the functioning of the VHF treatment centre, and in particular for disinfection, hand washing, cleaning and washing activities. Treatment centers require constant water supply therefore there has to be guaranteed 24-hour undisrupted water supply. Where there is no piped (municipal) water supply, a backup plan has to be made through drilling a borehole, installing a pump and connecting it to the treatment centre. There should also be arrangements for water storage that can hold at least three days' supply of water.

Water distribution in VHF Treatment center

Plain water	**Green line**	for personal hygiene, laundry, kitchen and washing/rinsing floors
0.05% chlorine water	**Yellow line**	for laundry and cleaning toilets in low-risk areas

0.5% chlorine water	**Red line**	for disinfection of the high-risk areas, disinfection of objects coming from the high-risk areas (e.g., patient care items, PPEs such as googles and boots), and disinfection of ambulances

All chlorinated water should not be stored for more than 24 hours. Storage should be in covered containers. Supplies that last beyond 24 hours should be drained and new solutions prepared. Taps dispensing all three, should be clearly marked with both written and visual signs (preferably color coded).

- All entry and exit points of the patients care area should have hand wash stations with soap and water
- All toilet exits should have liquid soap and water for hand washing
- All staff congregation area (Nursing Station, consulting room, rest area, coordination area) should have hand hygiene stations (soap and water and ABHR)
- All the donning and doffing areas should have hand hygiene stations (soap and water and 0.5% chlorine solution)

Power/Energy requirements for VHF treatment/isolation centre

There should be uninterrupted supply of electricity to the VHFs centre. The VHFs centre should be connected to the national electricity grid. An alternative means of power supply should be made available such as functional generators which run on petrol or diesel (arrangements should be made to expand the fuel capacity of the generator by constructing an external tank for diesel) and/ or solar inverters.

CHAPTER SIX:
Personal Protective Equipment (PPE) in the Care of Viral Haemorrhagic Fever Patients

Overview of PPEs

Personal protective equipment (PPE) are designed to protect the wearer's skin, eyes, mucous membranes, airways and clothing from coming into contact with infectious agents. Mucous membranes and skin with compromised integrity are portals of entry that are highly susceptible to infectious agents. Therefore, it is important that appropriate protective measures be taken. It is also important to note that the use of PPE is not a substitute for properinfection prevention and control practice. For example, the use of gloves is not a substitute for hand hygiene.

Staff with untreated cuts or chronic skin disease, such as eczema, should not work in the Lassa fever treatment centre.

Healthcare workers who work in the VHF treatment centres must be proficient in donning and doffing PPE and this requires specific training. The donning and doffing of PPE has to be done under constant supervision.

Who should wear protective clothing?

- All doctors, nurses, and health workers who provide direct patient care to suspected or confirmed VHF patients should wear a full set of PPE.
- All support staff who clean the isolation room, handle contaminated supplies and equipment, launder re-usable supplies, and collect and dispose of infectious waste from VHF patients should wear appropriate PPE.
- All laboratory staff who handle patient specimens and body fluids from suspected and confirmed VHF cases.
- Laboratory support staff who clean and disinfect laboratory equipment used to test VHF specimens.
- Safe burial teams who remove bodies of deceased VHF patients and prepare them for burial
- Family members who care for VHF patients.

The PPE is to be worn systematically prior to entry into isolation area, regardless of the tasks to be performed (care, cleaning, distribution of meals, etc.) and to be removed beforeleaving the isolation area.

Point of care risk assessment should be done to determine the appropriate PPE to be used.

Types of PPE and how to use them.

PPE	Characteristics and how to use
Eye protection  	• Should adequately protect the healthcare workers conjunctival mucous membranes from splashes • Face shield or goggles can be used. Goggles should be preferably used for high-risk situations • Normal reading glasses are not acceptable as PPE for eye protection so a face shield with anti-fog should be worn over the glasses or goggles big enough to cover the glasses • Goggles must fit comfortably and securely; each person should have his/her own goggles/face shield with personal names on them • Condensation of the goggles can be a major problem: it impairs the user's vision and is dangerous but can be minimized by anti-fog spray • It should be disinfected with 0.5% Sodium hypochlorite solution forsubsequent use • Initial decontamination of goggles or face shields using 0.5% chlorine water should be done by the person wearing them. Subsequently, the hygienist should wash with water and then hang outside the changing room to dry
Mouth and nose protection 	• Healthcare workers need to cover the mouth and nose to avoid body fluid splashes and droplet spread. • N95 respirator is acceptable, when not available surgical mask should be used. • Medical-surgical mask should be **fluid-resistant** with structured design that does not collapse against the mouth (i.e., **duck bill** or cup shape). • Face masks with loops over the ears is recommended. • Ideally, a face shield should be worn over the mask/respirator.
Gloves	• Correctly sized latex or nitrile examination gloves should be used to protect hands against both direct and indirect contact. • In all instances in the care of VHF patients, double gloving (i.e. two layers of gloves) should be used.

	• Inner gloves should be worn under the gown/coverall cuff and outer gloves worn over the cuff, reaching well above the wrist. • Inner gloves should preferably be “nitrile” while the outer gloves could be latex. • A new pair of outer layer gloves should be used for each patient. Remember that for invasive procedures you need sterile gloves. • **DO NOT** touch eyes, nose or mouth areas with gloved hands. • When handling chemical disinfectants, there may need to wear industrial or utility gloves.
Protective body wear 	• **Scrubs** should be worn at work. Staff should change from street clothes into scrubs before starting work in the treatment centre. N.B.: Scrubs trousers should be with elasticated waist bands and not ropes. • **Disposable gown** or **coverall** made of fabric that is tested for resistance to penetration by blood or body fluids or blood borne pathogens should be worn over the scrubs. 
Apron 	• **When the risk of splashes from patient’s vomiting, diarrhea or bleeding** is high, aprons should be worn over the gown or coverall because fluid-proof aprons provide extra protection of the front part of the body and is easier to replace than a soiled gown or coverall. • Disposable aprons should be used, but if non-disposable apron is used, it should be disinfected with 0.5% chlorine solution by the person wearing it (This should include cleaning to remove gross contamination, disinfection and then hanging to dry outside the changing room in the sun)
Footwear	• **Rubber or gum boots** are preferred over closed shoes because they are fluid-proof, easier to clean

	and disinfect. They provide optimal protection from splashes/wetness and protect from sharp injuries. • If not available, then wear **closed shoes with disposable impermeable shoe covers.** • Boots should also be cleaned to remove gross contamination and then disinfected prior to re-use (see appendix 2e).
Head cover 	• The purpose of head covers is to protect the skin and hair from virus contamination with subsequent unrecognized transmission to the mucosa of the eyes, nose or mouth. • A head cover that protects the neck and sides of the head (leaving no skin or as little as possible skin exposed) is preferred. • The hood of the *"tyvek suit"* may serve the purpose of covering the neck and sides of the head. However, when not available, a surgical head cover can be used for minimally invasive procedures. Note that there are various types of head covers but the aim is to protect from liquid splashes, flying particles and dust
Heavy-duty rubber gloves 	• Cleaners, launders and hygienists when handling infectious waste (i.e. solid waste or any secretion or excretion of with visible blood) should wear heavy duty rubber gloves over nitrile gloves. • Movement of human remains or performing environmental cleaning activities also requires the use of heavy-duty rubber gloves.
Before exiting isolation area, carefully remove PPE (see appendix 2d) and dispose in waste containers in a **designated doffing/contamination area.** • Do not recycle any single-use PPE. • Remove PPE under supervision of a trained buddy. • **Avoid any contact** with soiled items and areas of the face or skin. • Place reusable equipment in bin for decontamination. • Ensure disinfection of rubber boots, goggles/face shield with 0.5% sodium hypochlorite solution(see appendix 2e)	

Procedure for donning and doffing gloves

The IPC team supervisor is responsible for the management and monitoring of Personal Protective Equipment (PPE) in the VHF treatment centre. Every person entering the High-Risk zone to perform any activity (medical activities, disinfection and cleaning, technical maintenance, support activities, etc.) must wear the appropriate PPE.

Note: While working in the patient care area, the outer gloves and apron should be changed between patients and also prior to exiting (change after seeing the last patient). Follow this two-step procedure when changing gloves in between patient care:

1. Spray the outer glove with alcohol and perform hand hygiene technique or alternatively wash in 0.5% chlorine water. Then remove the outer glove.
2. Spray the inner glove with alcohol and perform hand hygiene technique.
3. Put on a fresh pair of gloves on top of the inner gloves.
   This technique requires appropriately sized gloves.

Procedures for "donning" and "doffing" of PPEs (see 2d, 2e and poster)

Procedure for donning of PPE (see appendix 2d and poster)
At the beginning of the work shift, put on scrub suit, gum boots and head cover in the changing room, this is appropriate for moving around in the low-risk zone/green zone. ▪ Move to the designated donning area ▪ Select the appropriate/correctly sized PPE set ▪ Inspect the PPE to ensure that they are of the right size, of good quality and with no external damage ▪ Perform hand hygiene using the techniques for hand hygiene (see appendix 2a) ▪ Begin the process of putting on the PPE under the guidance of the "PPE buddy" ▪ Put on the first pair of gloves (nitrile gloves) ▪ Put on the coverall or gown with the gloves under the cuff (this better done while seated) slide the thumb through the thumb hole/finger loop in the coverall sleeve to anchor the gown ▪ Put on your N95. If not available a KN95 or face mask and take care to fix the lower string first and then the upperstring ▪ Put on face shield or goggles ▪ Cover the head with the hood attached to the coverall ▪ Put on a separate hood to cover any exposed skin and neck completely. No part of the face is exposed. ▪ Put on the disposable fluid proof apron (if this is not available, use the clean heavy duty reusable waterproof apron) ▪ Put on the second pair of gloves over the coverall cuff (preferably long cuffed gloves) (so second glove goes on last) ▪ Self-check in the mirror and ask the buddy to check the face to make sure none of the facial parts is exposed ▪ Let the buddy write your name, function and time that you enter the high-risk zone ▪ Dress up your buddy in the same order. ▪ Then if both of you are secure, you are ready to enter the high-risk zone
Procedure for doffing of PPE (see appendix 2e and poster)
Doffing is the most critical activity in protecting the health worker after working in the high-risk zone of the treatment centre. All the actions in the doffing of the PPE must be done slowly and deliberately in a systematic manner under instructions from the trained staff to make sure that the PPE is removed correctly without infecting the

health care worker. The doffing area must have a highly infectious waste container/receptacle for disposable contaminated (used) PPE and another a receptacle to receive reusableitems such as goggles for cleaning and disinfection.

- Exit the patient care area and step into the designated doffing area
- Spray 0.5% chlorine on the outer gloved hands and perform hand hygiene using the standard technique (see appendix 2a)
- Remove apron: Lean forward and take care to avoid contaminating your hands. When removing disposable aprons, tear it off at the neck and roll it down without touching the front area. Then untie the back and roll the apron forward
- Dispose of the apron in the waste receptacle
- Perform hand hygiene with 0.5% chorine on gloved hands
- Remove the additional separate hood taking care to avoid contaminating your face. Start from the bottom of the hood in the back and roll it from back to front and from inside to outside. Dispose in the waste receptacle (if indicated for single use) or receptacle (if reusable)
- Spray gloved hands with 0.5% chorine and perform hand hygiene using standard technique
- Remove coverall or gown (see appendix 2e for doffing coverall and gown)
    - Tilt head back
    - With one gloved hand, pull the coverall away from your body at the midriff
    - With the other gloved hand, reach for the zipper by following the zipper along the zipped line from the bottom to the top to reach the zipper fastener
    - Take hold of the fastener without touching any bare skin of the neck, pull fastener downwards to unzip completely without touching any skin or scrubs.
    - Then start removing coverall from the top starting with the attached hood.
        - Lift the hood by lifting it off the head with a pulling movement up and backwards and rolling it inside out in the process.
        - Free the shoulders by wriggling out of one shoulder at a time with the chest thrust forwards.
        - Now that the shoulders are free, bend forwards and pull the arms out of the sleeves. This turns the sleeves of the gown or coverall inside out (i.e. the clean side out). At the same time, the outer gloves are rolled away with the cuff of the coverall exposing the inner glove.
        - With the inner gloves on, roll the coverall/gown from the inside of the coverall from the waist down to the top of the boots
        - Use one booted foot to pull off coverall from the other boot by kicking backwards alternatingly and vice versa and then step away from the coverall.
        - Perform hand hygiene on the gloved hand
    - Remove the goggles from the back with the eyes closed to avoid splashes into the eyes. (For people with medicated eye glasses, remove the goggles from the front and also keep the eyes closed)

- Remove the mask or respirator. Pull the bottom string over the head first and then the top string last; then Perform hand hygiene on gloved hands
- Remove the head cover and dispose in the waste receptacle; thenperform hand hygiene on gloved hands
- Remove the rubber boots without touching them and wear the Scholl's. If the same boots are to be used outside of the high-risk zone, keep them on but clean and disinfect them with 0.5% chlorine before leaving the doffing area; then perform hand hygiene on gloved hands
- Remove the gloves (i.e., the inner one now remaining)
- Perform hand hygiene
- Now exit the doffing area
- Perform hand hygiene when you are now outside the doffing area

Trained buddies

- The 'buddy' is a trained, experienced HCW who observes, guides and documents activities of HCWs caring for patients with VHF. This includes alerting the HCW to any potential breaches of IPC, while supervising putting on and taking off PPE
- The level of PPE required by the buddy will depend on whether they are physically assisting with the removal of the PPE or only observing.
- The buddy should wear at least a face shield, gown and gloves.
- If the buddy is required to assist in the patient room in the case of an emergency, they must put on appropriate PPE.

The role of the buddy includes the following:

1. Check and record that the PPE is put on properly, in the correct order according to the checklist, and before the HCW enters the patient room; specifically:
    - Check that the PPE covers all body surfaces and remains in place during bending or stretching
    - Fit-check the N95 mask
    - Assist if required (e.g., with tying the apron or gown)
2. Observe the HCW at all times while in the patient room (via window or video monitor), checking for any breaches in PPE (e.g., HCW touches their own face, dislodges PPE).
3. Keep a record of all people entering the patient room
4. Check and record that the PPE is removed slowly and methodically, to avoid contamination; specifically:
    - Check for visible contamination or damage to the PPE before starting removal
    - Read out and check off each item to be removed in the correct order
    - If necessary, assist with untying the apron or gown ties, or taking off boot covers—perform hand hygiene after this has been done
    - Wipe down surfaces (e.g. chair used by the HCW while taking off PPE).
5. Ensure that the HCW—who is likely to be tired, hot and, possibly, distressed at the

end of a shift—remains calm and focused while taking off PPE.Identify (and record, if appropriate) any potential breach of procedure during patient care or PPE removal, and advise on further action based on national PEP management procedures

6. Ensure that the removed PPE items are discarded into a clinical waste bin lined with red bag and not allowed to come into contact with any environmental surface.

Decontaminating boots

Boots should be disinfected by spraying them with 0.5% chlorine solution then wash with water, rinsed and dried outside in the sun hanging upside down on stakes.

PPE and heat related illness

Heat related illness is a risk when PPE is used in hot tropical climates such as Nigeria. The core temperature of the person wearing PPE can reach over 41^0C in 30 minutes if the healthcare worker is active while wearing occlusive PPE.

Heat related illness spectrum

Core temperature	Normal	>38^{0}C	>40.5^{0}C
Symptoms	Heat cramps	Heat exhaustion	Heat stroke
Skin temperature	Normal	Normal or cool and clammy	Hot and dry
Sweat rate	Increased	Increased or decreased	Decreased
Urine output	Normal	Oliguria	Anuria
Gastro Intestinal	Thirst	Nausea +/- vomiting	Nausea and vomiting
Cardiovascular	Tachycardia	Hypotension	+/- Circulatory collapse
Central nervous system (CNS)	Nil	Uncoordinated, irritable or confused	Delirium/seizure/coma
Other(s)	Thirst		Renal failure, Liver failure, Disseminated intravascular coagulopathy (DIC)

Heat related illness is preventable. Persons wearing PPEs must pace themselves and not over exert themselves or core temperatures will rise rapidly and reach critical levels in less than 1 hour. Hydration is also an important factor but will not prevent the heat related illness caused by wearing PPE.

The Occupational Health team should develop protocols for:

- Prevention of heat illness such as limiting time in PPE and using a trained assistant staff in full PPE should not spend more than an hour in the full PPE.
- Monitoring of heat illness
- Treatment of heat illness

Tips for Using PPE

- Avoid touching or adjusting PPE
- Remove gloves if they become torn or damaged
- Change gloves between patients
- Perform hand hygiene before donning new gloves
- Avoid touching your eyes, mouth, or face with gloved or ungloved hands

How to perform a particulate respirator fit test and seal check

1. Place fingertips of both hands at the top of the metal nosepiece.
2. Mould the nosepiece (USING TWO FINGERS OF EACH HAND) to the shape of your nose (Pinching the nose piece with one hand may result in less performance).
3. Cover the front of the respirator with both hands, being careful not to disturb the position of the respirator.
4. Perform a POSITIVE SEAL CHECK: Exhale Sharply. Positive pressure insider the respirator=no leakage. If a leakage is observed, adjust the position and/or tension of the straps and retest.
5. Repeat until the respirator is properly secured.
6. Perform a NEGATIVE SEAL CHECK: Inhale deeply. If no leakage, a negative pressure will make respirator cling to your face. A leakage will be observed as air entering through gaps in the seal.

CHAPTER SEVEN:
Injection safety and management of sharps

Safe handling and disposal of sharps is a vital component of the Standard Precautions required to reduce the risk of transmission of HAIs.

The following recommendations apply to the use of needles, cannulas and, where applicable, intravenous delivery systems. Use aseptic technique to avoid contamination of sterile injection equipment. Safety engineered injection devices with single use and reuse prevention technology should be used.

- Each patient should have exclusively dedicated injection and parenteral medication equipment which should be disposed of at the point of care.
- Limit the use of needles and other sharp objects as much as possible (no unnecessary injections or intravenous cannulas).
- Limit the use of phlebotomy and laboratory testing to the minimum necessary for essential diagnostic evaluation and patient care.
- Syringes, needles or similar equipment should never be reused – **"One Needle, One Syringe Policy"**.
- If the use of sharp objects cannot be avoided, ensure the following precautions are observed:
    - Never recap a used needle
    - Never direct the point of a used needle towards any part of the body
    - Do not remove used needles from disposable syringes by hand, and do not bend, break or otherwise manipulate used needles by hand
    - Ensure that adequate number of sharps containers are always available and conveniently placed in clinical areas
    - Ensure that sharps containers are placed as close as possible to the point of use to limit the distance between use and disposal
    - Dispose sharp objects into sharps containers immediately after use. Do not put on tables, beds, trays, kidney dishes, etc.
    - Ensure the sharps containers always remain in an upright position
    - Ensure the sharps containers are placed in an area that is not easily accessible by visitors, particularly children
    - Care should be taken to ensure that the sharps container is correctly assembled with the proper size opening. The opening of the sharps container selected should be designed to deter hand entry but be big enough to permit dropping of the used sharp into the container as a single-handed procedure.
    - Label the container upon assembly as "SHARPS CONTAINER "with Biohazard symbol and department name.
    - It is the responsibility of the person using the sharp to dispose of it safely.
    - Ensure that sharps containers are securely sealed and replaced when 3/4 full before sending for final disposal.
    - Dispose of sharps container by putting in a red bag and transport
    - Sharps containers when carried should be held away from the body

The DON'Ts of sharp management
Do not pass used sharps from hand to hand
Do not recap (re-sheath), bend or disassemble sharps after use.
Do not exceed the **"Fill Line"** in the sharps box
Never try to retrieve items from a sharp's container
Do not press sharps down or shake the box to make more room

Special considerations in the management of VHFs

- It is recommended to prepare medic/drugs before going into patient care zone.
- Where available, single use vials are preferable.

CHAPTER EIGHT

Environmental cleaning, linen processing and waste management practices to prevent transmission of VHF

Environmental cleaning

Environmental cleaning (cleaning the area around a patient) is a crucial part of infection control in VHF treatment centres and must be done with special care and attention. A patient admitted into the VHF treatment centre can develop infection due to other infectious organisms that survive in the healthcare environment. In the same way, the patient care environment can also transmit VHF if not properly cleaned. Contamination of surfaces in the health care environment plays an important role in the transmission of pathogens such as Lassa fever and Ebola viruses.

These viruses can remain active for up to 6 days. So poorly cleaned patient care articles such as bedpans, urinals, jugs, bowls and mattresses can pose a risk of transmission of infection. However, some items may need to be reused and should therefore be thoroughly cleaned and disinfected before reuse. Considering the high concentration of these viruses in blood and other body fluids, spills of blood and body fluids on environmental surfaces or equipment should be cleaned as soon as possible. Due to the high risk of environmental contamination and infection transmission, cleaners must be educated and trained.

Design of the VHF treatment centre should allow efficient cleaning

Surfaces	Surfaces, including walls and ceilings should be smooth, easy to clean, impervious, and protected from water damage
Floors	Floors should be nonslip, smooth, impervious, and seamless for easy cleaning
Cupboards	Cupboards, which prevent the accumulation of dust, are recommended over shelves in the administrative areas and stores. Cupboards should be placed in such a way that all surfaces are easily accessible for cleaning
Furniture and Blinds	Materials that are impervious, easy to clean, and durable should be used on furniture. Fabrics should not be used, because of the great risk of soiling them with blood and other body fluids. Furnishings and fittings should be able to withstand appropriate disinfectants used in cleaning There should be no wooden structures (chairs, tables, etc) whenever possible

How should the patient environment be cleaned in the VHF treatment centre?

- The patient care areas should be cleaned at least three times daily
- Terminal cleaning should be done after every patient discharge. Facilities should follow approved protocol for terminal cleaning. Refer to terminal cleaning section
- Environmental surfaces or objects contaminated with blood, other body fluids, secretions

or excretions should be cleaned and disinfected as soon as possible using detergents followed by disinfectants (e.g. a 0.5% chlorine solution)

CLEANING PATIENT AREAS	FREQUENCY OF CLEANING
Cleaning floors. Latrines, showers and other surfaces not visibly soiled	Cleaning should be done thrice a day using disposable towels/rags soaked in detergentsolution and then 0.5% chlorine solution. Terminal cleaning should also be done after discharge or patient's death.
	Allow surfaces to dry before using.
	Latrines and showers should be cleaned thrice daily.
Cleaning contaminated objects	
Contaminated objects	Clean with disposable towels/rags soaked in soap and water and then water followed with 0.5% chlorine.
If not visibly soiled	If possible, soak directly in soap and water, rinse in water, then dry
If visibly soiled	Follow steps described above for disinfecting spills of body fluids (see appendix 2f)
Washing plates and utensils	Dispose of leftover food as solid waste
	Leave the utensils in 0.5% chlorine solution for a minimum of 10 Minutes
	Wash them with soap and water
	Rinse them with clean water
	Then let them dry in the sunlight
Bedpan or waste bucket	Discard contents (see waste management)
	Soak and rinse the bedpan with 0.5% chlorine solution for a minimum of 10 minutes. Then rinse with clean water

Cleaning and disinfection in the VHF treatment centres

IPC considerations

- Cleaners should wear PPE based on the area of the treatment centre to be cleaned
- Cleaners should perform hand hygiene as shown in the section on hand hygiene (see appendix 2a)
- Remain at least 1 meter away from other persons (including patients) until PPE has been removed
- Cleaning and disinfectant solutions should be prepared every day. Discard solution after 24 hours even if not used
- Change cleaning solutions and refresh equipment frequently while it is used during the day. Change when it is dirty or cloudy or when it has lost the smell of bleach
- Always clean by starting with 'clean' areas first and then moving to 'dirty' areas
- Maintain separate implements (buckets, cleaning and disinfection solutions) for each area (e.g., triage, isolation) and conduct cleaning duties separately for each of these areas
- Clean non-disposable PPE (heavy duty gloves and aprons) at the end of the day. If visibly soiled safely remove immediately

Procedure for cleaning patient care areas**.** (see appendix 2f)

Terminal cleaning

- Terminal cleaning is carried out when a patient is discharged or has died
- The purpose of terminal cleaning is to make the place safe for health care workers and the next patient (by reducing the chance of transmitting infection from contaminated surfaces)
- In a busy VHF treatment centre, the rapid patient turnover may make it difficult to do this thoroughly so contingency plans have to be in place to ensure that this is done well
- All disposable items or disposable equipment which has been in contact with a VHF patient must be discarded as highly infectious waste
- All reusable items (if any) should be decontaminated immediately

How should blood and body fluid spills be handled?

- Alert others to the spill and isolate the area appropriately using a signage
- Wear full PPE (see chapter 6) and ensure any cuts and abrasions on body parts are covered with a waterproof dressing
- Get paper towels and absorbent granules, waste bags, forceps, mop, bucket, detergent, sharps container and 0.5% chlorine solution
- Remove any broken glass or sharp material with forceps or tongs and discard in the sharp's container
- Remove visible organic matter with absorbent material (e.g., disposable paper towels)and discard in red waste bag
- For large spills, soak up excess liquid using paper towels or absorbent granules and dispose in red waste bag
- If spill is less than 10cm, use paper towels to mop up the spill and dispose in a red waste bag
- Clean the area with warm detergent solution
- Disinfect the area after cleaning with a freshly prepared 0.5% chlorine solution and leave to dry
- For small spills, (e.g., spots of blood on tiles) an alcohol wipe may be sufficient.
- Clean all equipment with warm detergent solution, disinfect with 0.5% chlorine and keep outside in the sun to dry
- Proceed to doffing area and doff following the procedure for doffing (see appendix 2e)
- Ensure plastic apron (if reusable apron is used) and safety glasses are disinfected with 0.5% chlorine solution prior to storing
- Remove and dispose gloves into the red waste bag
- Dispose of the red waste bag into a biological hazard wste disposable bin/bag or sanitary bin
- Wash hands thoroughly with soap and water and dry with paper towels
- Report direct contact with blood or bodily fluids to the supervisor for immediate action

Linen Management

Linen is a potential source of VHF transmission, particularly when contaminated with blood and body fluids. Healthcare workers and laundry staff must understand the importance of handling linen correctly to prevent the spread of potentially infectious microorganisms. Disposable linen is ideal, but in most resource constrained settings, linen may be reused. Linen from the VHF treatment centre should be handled in a manner that prevents skin or mucous membrane exposure, contamination of clothing, and transfer of microorganisms to other patients and the environment.

Linen from staff areas (e.g., nurse's overnight room) should not be mixed with or processed with linen from patient treatment areas. Do not agitate or shake linen that has been contaminated. Linen should be gently removed, folded and put in the receptacle.

The PPE to be used by laundry staff are:

- Household gloves
- Aprons
- Face protection (mask/goggles or face shield)
- Scrubs and boots

In processing linen, staff should be appropriately trained and regularly supervised to help reduce accidents that could lead to increased risk of exposure to infectious materials.

When handling contaminated linen in the VHF ward

- Wear appropriate PPE (wear full PPE when handling line, coverall, gloves, boots, mask and goggle or face shield)
- Remove the linen from patient's bed
- Separate heavily soiled linen from non soiled linen in the patient's room for ease of handling in the laundry

  Soak heavily soiled linen in 0.5% chlorine solution
- Soiled linen should be placed in clearly-labeled, leak-proof bags or buckets at the site of use and the container surfaces should be disinfected (using 0.5% chlorine solution) before removal from the site
- Linen should be transported directly to the laundry area and laundered promptly with water and detergent.

Laundering Linen

Heavy-duty washers and dryers are recommended for the VHF laundry. Decontaminating linen prior to washing it is not necessary unless linen is heavily soiled and will be washed. Consider destroying heavily soiled linen.

Washing Linen by Machine

- Wash used linen (sheets, cotton blankets) in hot water (70°C to 80°C), disinfectant, and detergent; rinse; and dry, preferably in a dryer or in the sun.
- If washing by machine is not available, wash linen by hand as described below

Washing Linen by Hand

- Soak the linen in clean water and detergent for 30 minutes.
- Stir with a stick (paddle)
- Remove and inspect the linen, rub to remove dirt and discard the water.
- Make up a fresh solution of 0.5% chlorine in water (bleach) and soak the linen in it for another 30 minutes.
- Remove, rinse in clean water and wring out
- If safe cleaning and disinfection of heavily soiled linen is not possible or reliable, it may be better to burn the linen to avoid any unnecessary risks to individuals
- Wash the domestic gloves with soap and water before removing the PPE
- Remove all the PPE safely
- Carry out hand hygiene

Drying, Checking, Ironing, and Folding Linen

- Spread in the sun to dry. Air dry in direct sunlight, if possible, keeping the fabric off the ground and away from dust and moisture. Do not spread the linen on shrubs and flower hedges, ensure that there is a well set up clothes line dedicated for linen
- Completely air or machine dry before further processing
- After linen is totally dry, check for holes and threadbare areas
- Iron and fold clean and dry linen

How should mattresses be disinfected?

- While wearing appropriate PPE, the mattress must be checked for any damage (there should beno tears or cracks)
- Fill a bucket with clean water and detergent
- Use a cloth soaked in the bucket to wipe over the surface of the mattress
- Wipe to dry
- Wipe over with disinfectant such as 0.5% chlorine solution and allow to dry (preferably in the sun)
- Remove PPE and dispose of appropriately
- Perform hand hygiene

Correct preparation and use of chlorine (bleach) in the VHF treatment centre.

Chlorine is very important in disinfection of the VHF treatment centre during all operations in both the low risk and high-risk zones. Chlorine is used both as 0.05% and 0.5% for different purposes. Chlorine is available in the open market in different physical and chemical forms as well as different concentrations: Chlorine powder (Calcium Hypochlorite HTH 70%), Liquid solution (Jik, Hypo), Chlorine tablets. Any of these forms and concentrations can be used to make 0.5% and 0.05% chlorine solutions. The required concentration can be obtained using the appropriate formulae to dilute the chlorine.

CAUTION!!!!

- Chlorine is a very aggressive and corrosive chemical
- Store the products for preparing the solution in a clean, dry and well-ventilated place away from sunlight
- The person preparing the chlorine solution must always wear appropriate protective clothing when handling the chlorine products and solutions
    - Apron
    - Goggles
    - Mask
    - Heavy duty gloves
    - Rubber boots
- Always prepare chlorine solution in a well-ventilated area (preferably in the open)
- Use clean cool water
- Avoid inhaling the vapors and dust (wear a mask)
- Store the chlorine solution in a closed, opaque plastic container (non-metallic e.g. jerry can, “buta”) with a tap for easy dispensing
- Prepare a fresh batch of chlorine solution every 24 hours
- Never mix chlorine solution with soap
- Chlorine solution is a disinfectant and so should not be used in place of sterilization

If the demand for chlorine in the treatment centre is high, then large batches of 0.05% and 0.5% can be prepared and dispensed from pipes.

Once diluted, chlorine solutions lose potency rapidly and so must be prepared at least daily, in small volumes, as required for use. Spray bottles should be avoided because of the danger of creating wet and slippery surfaces (from the overspray), as well as the risk of inhaling toxic chlorine-containing droplets or causing eye irritation for patients or health workers due to droplets.

PREPARATION OF CHLORINE SOLUTION USING SOLID CALCIUM HYPOCHLORITE STOCK (CHLORINE GRANULES/POWDER/CRYSTALS/TABLETS/PELLETS)

Formula for calculating grams of Chlorine Solid (Calcium Hypochlorite Concentrations) required to make Chlorine Solution from SOLID

$$\frac{DC}{ACP} \times 1000 =$$

Total weight in grams of Calcium Hypochlorite required to make desired chlorine solution from 1 litre of water

Where:

DC = % Chlorine concentration in final solution desired for IPC purposes

ACP = % Chlorine in Calcium hypochlorite Powder/Pellets/Granules/Crystals/Tablets available

Example: Assuming your health facility was supplied 35% calcium hypochlorite powder and you were asked to prepare 0.5% chlorine solution to clean blood stains in the ward.
You will have the following equation

$$\frac{\%\ chlorine\ concentration\ in\ final\ solution\ \textbf{\textit{destred}}\ for\ IPC\ purposes}{\%\ chlorine\ in\ calcium\ hypochlorite\ powder\ or\ granules\ \textbf{\textit{available}}} \times 1000$$

= Total grams of calcium hypochlorite powder required to make Chlorine solution from each litre of water

$$0.5\%/35\% \times 1000$$

i.e. [0.5% chlorine desired/35% chlorine in hypochlorite powder available] ×1000

$$0.01428571 \times 1000$$

=14.3grams

(Total grams of calcium hypochlorite powder required to make desired Chlorine solution from each litre of water)

Desired Chlorine (DC)

_____ X 1000 = 14.3 ***Grams of calcium hypochlorite powder for each litre of water***

Available Chlorine Powder (ACP)

DC (0.5%)

_____ X 1000 = 14.3 ***Grams of calcium hypochlorite powder for each litre of water***

ACP (35%)

0.0143 X 1000 = 14.3 ***Grams of calcium hypochlorite powder for each litre of water***

INTERPRETATION:

Therefore, you shall dissolve 14.3 grams of calcium hypochlorite powder in each litre of water to make a 0.5% chlorine solution

Summary approach to dilution of solid chlorine crystals

Solution in % of active chlorine	Measurements (Quantity of 67% [may vary between 65%-70%) Chlorine Granules] bleach	Procedure

0.50%	7.5g (half a table spoon)/litre 75g (five table spoons)/10 litres 150g (ten table spoons)/20 litres	Pour the correct measure of clean cold water into a clean plastic container Add the correct measure of chlorine powder into the water Close the plastic container Mix the content well by rocking the container or stirring with a plastic ladle Allow the deposits to settle and use the supernatant liquid Store the solution in a closed non-metal container, in a dark place
0.05%	7.5g (half a table spoon)/10 litres	

PREPARATION OF CHLORINE SOLUTION USING LIQUID CHLORINE (BLEACH)

Formula for calculating Water required to make up Chlorine Solution from LIQUID Sodium Hypochlorite Concentrations

$\frac{AC}{DC} - 1 =$ ***= Total number of equal parts of water needed to make up 1 equal part of sodium hypochlorite***

Where:

AC =Available % chlorine concentration in liquid sodium hypochlorite (bleach/stock chlorine solution)

DC= Desired % chlorine concentration required for IPC purposes

Example: If you are given a bottle of 'Jik' or 'Hypo' or 'bleach' in your health facility which has 3.5% chlorine as liquid Sodium Hypochlorite and asked to make 0.5% chlorine solution for disinfection.

You will have the following equation

[3.5% chlorine available (AC)]

_____ - 1 = 6 parts of water for each part sodium hypochlorite

[0.5% chlorine desired (DC)]

AC

_____ - 1 = 6 Parts of water for each part of sodium hypochlorite

DC

7 - 1 = 6 Parts of water for each part of sodium hypochlorite

Summary table for dilution in litres

Solution in % of active chlorine	Quantity of 3.5% liquid bleach (this is the common concentration in Nigeria)	Water
1%	One litre	3 litres
0.5%	One litre	6 litres
0.05%	One litre	69litres

To ensure adequate disinfection, a contact time of at least 30 minutes should be allowed between the moment the chlorine is added to the water and the moment the solution is available for use.

Effective disinfection requires that the water has a low turbidity. If the turbidity is high, then the water should be treated to remove suspended matter before disinfection, by filtration or sedimentation.

Waste management in VHF treatment center

The types of waste generated in a VHF treatment centre

Sharps

Sharps are all objects and materials with puncture or cutting properties such as syringes with needles, blades and broken glass and pose a potential risk of injury and infection. For this reason, sharps are considered as one of the most hazardous categories of infectious waste (IW) generated during procedures in the treatment centre.

Highly Infectious Waste:

Red (biohazard bag or bin with liner)

All waste from patients with suspected/confirmed VHF infection is classified as highly infectious waste. This includes PPE worn in the isolation wards.

Pathological Waste:

Red (biohazard bag or bin with Liner)

Pathological Waste includes body organs (including placentas), tissues as well as blood and body fluids.

Liquid waste and Effluents

Effluents from isolation wards are considered as hazardous liquid waste that should receive specific treatment before being discharged into the sewerage/drainage system.

Recommended colour coding system for waste segregation in Nigeria is Black, Yellow, Red and Brown.

<table>
<tr><th>Black</th><th>Yellow</th><th>Red</th><th>Brown</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">Non-risk waste.
General waste</td><td>Infectious waste</td><td rowspan="2">Highly infectious waste (all waste generated in the suspect and confirmed wards)</td><td rowspan="2">Pharmaceutical waste and some chemical waste</td></tr>
<tr><td>Sharps boxes (puncture proof) colored yellow</td></tr>
</table>

- Safe management of health care waste is a key issue in controlling and reducing transmission of infection in VHF treatment centres
- There should be a responsible person for the organization and management (collection, packaging, storage, transportation and disposal) of waste and this should be conducted in coordination with the infection-control team
- Every treatment centre should have a clear policy stating who is responsible for collecting the waste, where containers will be stored, and how the waste will be transported and finally disposed of.

Waste segregation in the isolation wards

- Segregate waste at the point of generation.
    - Sharp objects (e.g. needles, intravenous cannula, syringes, glass articles) and tubing that have been in contact with the bloodstream should be placed inside puncture resistant sharps containers. These should be located at arm length or as close as practical to the area in which the items are used
    - Solid, non-sharp, medical waste should be in leak-proof red infectious waste bags and covered bins

Procedure for waste collection inside the patient care areas.

- Wear appropriate PPE
- Tie the neck of the waste bag and lift the bag gently, ensuring that it does not spill
- Then, place it in another red bag
- Tie the neck of the second bag and disinfect the outside of the bag with 0.5% chlorine solution
- Place it at the collection point which should be just outside the clinical area – ideally, a large red plastic waste bin with cover
- Move to the doffing area and remove PPE following the appropriate procedure (see appendix 2e)

Health Care Waste Packaging in the treatment centre

- Infectious wastes should be contained from the point of origin to the point of treatment where it is rendered non-infectious
- The packaging should be appropriate for the type of waste involved
    - Sharps (sharp items, or items with sharp corners): place sharps in impervious rigid, puncture-resistant containers made of glass, metal, rigid plastic, or

cardboard. Solid or semisolid waste should be placed in durable, tear resistant plastic bags

- Liquid infectious waste should be placed in capped or tightly stoppered bottles or flasks and large quantities may be placed in containment tanks. There are also products available that can be added to the infectious liquids to turn them into gel and easier to transport without the risk of spillage.

- Do not load bags beyond their weight or volume capacity
- Keep bags away from contact with sharp objects
- The waste should be packaged securely enough to ensure containment of the waste and to prevent penetration by rodents and vermin - ideally, in a large red plastic waste bin with cover.

Waste storage

- Highly infectious waste and pathological waste should be disposed of immediately
- No waste should be stored for more than two days before being treated or disposed of
- There should be an adequate place dedicated for storing the highly infectious health care waste red bags and bins separate from the general waste in black bags
- The designated storage area should be located within the treatment centre premises away from food storage or food preparation areas
- The designated storage area should be large enough to contain all the highly infectious healthcare waste produced by the hospital within two days with spare capacity to cope with any maintenance or breakdown of the final disposal facility such as the incinerator
- The designated central storage facility shall be totally enclosed and secured from unauthorized access and inaccessible to animals, insects and birds
- The designated central storage facility should be easy to clean and disinfect and must have an impermeable hard-standing base, good water supply, drainage and ventilation.

The following procedures area recommended- type setting

- The universal biological hazard symbol should be pasted on the storage area door, and on waste containers
- Containers for the highly infectious waste material should be a distinctive red colour

Waste Handling

- All health care waste or disposal of medical equipment shall be disposed of at the point of generation/use by the person who generated/used the item
- In case the used equipment is found when not disposed of or handed over to another person for disposal, the one who finds it or was given the responsibility of disposing it should dispose of it
- All the specific procedures of health care waste segregation, packaging and labeling shall be explained to all health care workers and displayed in each department in chart form and plastered on the walls above the health care waste segregation containers to remind the health worker of what to do.

PPE for waste handling

- Staff handling waste inside the patient care areas should wear the appropraite set of PPEs including heavy duty rubber gloves, boots and apron
- Waste handlers must wear protective clothing including face masks, aprons and boots, heavy duty gloves, goggles as required when handling waste that has been bagged and disinfected

Transportation of waste

- Use a covered trolley or a wheeled bin with a lid to transport infectious waste from the collection point to a designated incineration point or pit
- Infectious solid waste should not be transported by hand as this increases the risk of accident or injury from infectious material or incorrectly disposed sharps
- In facilities where use of such trolleys is difficult due to a lack of concrete or level flooring; a wheelbarrow may be used
- The waste collection trolley should be easy to load and unload
- Red bags of highly infectious health care waste and black bags of non-hazardous HCW should be collected on separate trolleys painted and marked with the corresponding colour codes
- The collection route should be the most direct one from the collection point to the storage site while still maintaining the unidirectional flow of the treatment centre
- The collected waste shall not be left temporarily anywhere along the way to the storage area other than at the designated central storage
- Containers should be covered with lids during storage and transport
- If none of the above is available, a labeled and firmly lidded collection bin can be used

- After each use, all surfaces of the trolleys, wheel barrows or bins should be washed with soap and water and disinfected with 0.5% chlorine solution. This should be done in designated areas

Transport to Final Disposal Site

When the waste is to be moved to final disposal site, special handling or packaging is necessary to keep bags intact and to ensure containment of the waste. The following procedures should be followed:

- Properly bagged waste and containers of sharps and liquids should be placed within a rigid or semi-rigid container such as a bucket, box or carton lined with plastic bags
- Containers should be covered with lids during transportation
- When transporting plastic bags of infectious waste, care should be taken to prevent the bags from tearing
- Infectious waste should be transported in closed, leak-proof dumpsters or trucks to final disposal site
- The waste should be placed in rigid or semi-rigid, leak-proof containers before being loaded onto truck

Disposal of liquid waste

- Waste, such as faeces, urine, vomit, and liquid waste from washing, can be disposed of in the sanitary sewer or pit latrine after chlorination in buffer tanks which may have as high as 0.5% chlorine solution. No further treatment is necessary.
- Wear appropriate set of PPEs including utility gloves, protective eyewear, and a plastic apron when handling and transporting liquid waste (e.g., any secretion or excretion with visibleblood even if it originated from a normally sterile body cavity)
- Avoid splashing when disposing of liquid infectious waste. Goggles provide greater protection than visors, from splashes that may come from below when pouring liquid waste from a bucket
- Decontaminate containers by placing them in a 0.5% chlorine solution for 30 minutes before washing with detergent solution and rinsing

Disposal of solid wastes

- Waste should not be stored for more than 24 hours before being properly destroyed/disposed

- As much as possible, the final disposal site should be within the treatment centre premises
- The area designated for the final treatment and disposal of waste should have controlled access to prevent entry by animals, untrained personnel or unauthorized persons
- The biohazard sign should be prominently displayed
- High temperature incineration is the recommended method of final destruction of wastes.
- Incineration provides high temperatures and destroys microorganisms. It also reduces the volume of waste to be buried. Incineration is the best method for disposing of contaminated waste
- Simple incinerators can be built from locally available materials—bricks, concrete blocks, or used fuel or oil drums.
- Incinerate collected waste within 24 hours of collection and storage
- **Infectious waste should not be compacted before treatment**.

Final disposal of sharps

- The sharps container must be sealed when it is 75% (¾) full
- A health worker on PPE places it in an appropriately labeled red bag
- The neck of the bag is tied and then taken to the final disposal site
- High temperature incineration is recommended
- Final ash and remains of the sharps is safely buried in an ash pit

Appropriate PPE for different support services areas

Procedure	Gloves	Gown or coverall	Apron	Face Mask	N95 respirator	Face shield	Goggles	Hood or head cover	Boot
Direct clinical contact **(Invasive procedure)**	☐	☐	☐		☐	☐	☐	☐	☐
Direct clinical contact **(less invasive procedures)**	☐	☐	☐		☐		☐	☐	☐
Laundry	Domestic	☐	☐	☐		☐		☐	☐
Waste	Heavy duty	☐	☐		☐		☐	☐	☐
Body removal	Heavy duty	Coverall preferred	☐		☐		☐	☐	☐
Sterile Service Department	Heavy duty gloves	☐	☐	☐		☐		☐	☐
Environmental cleaning	Domestic (rubber)	Coverall preferred	☐	☐		☐		☐	☐
Washing patient care articles	Domestic (rubber)	☐	☐	☐		☐		☐	☐
Burial of bodies	Heavy duty	Coverall preferred	☐		☐			☐	☐

CHAPTER NINE:

Infection prevention and control measures in the dialysis of VHFpatients

In supportive care for VHF patients, haemodialysis (HD) has been found to improvesurvival. IPC is very important during haemodialysis especially for Lassa fever patients because the hemodialysis patient is particularly susceptible to several infections with both bacterial and blood borne viral pathogens, often accompanied by decrease in immunity. In addition, the staff of a dialysis unit are uniquely at risk of contracting these infections from contaminated blood and dialysate.

Preventing the transmission of infections involves several links in the chain involving the patients, the dialysis procedure, ancillary care, the staff of the unit and various administrative and waste disposal protocols.

It should be emphasized that haemodialysis machine itself usually does not transmit infection because all the components of the extracorporeal circuit that come in contact with the patient's blood are disposable and should be discarded after the procedure, and the machine sterilized meticulously with citrosteril (20 -50% depending on the brand of machine) and hot rinsing after each procedure. However, any breach in IPC measures canresult in transmission of infection between patients and dialysis unit staff.

NOTE: Hemodialysis is an aseptic procedure and there should be established written protocols for all procedures including cleaning and disinfecting surfaces and equipment in the dialysis unit.

Some important infections that can be transmitted during haemodialysis

Hepatitis B

Hepatitis B virus (HBV) is transmitted through percutaneous or per mucosal exposure to the blood of infected patients (HBsAg- or HBeAg positive). Blood or body fluids from these positive patients can contaminate the environment which, even when not visibly soiled, can result in transmission of HBV. HBV remains viable at room temperature for at least seven days and has been detected on clamps, scissors, and external surfaces and parts of dialysis machines if the machine is not sterilized as specified. HBV can also be transmitted to patients or staff with cuts or abrasion of care providers who touch contaminated surfaces or equipment. Hepatitis B vaccine for chronic hemodialysis patientsis an essential component

of IPC measures. In patients with VHF and acute renal failure in need of hemodialysis, IPC measures are crucial,

Hepatitis C

Factors that increase the likelihood of Hepatitis C Virus (HCV) infection in HD patients include a history of bloodtransfusions, volume of blood transfused, and years on HD. Like HBV, HCV transmission isoften related to inadequate IPC practices.

Acquired Immune Deficiency Syndrome

Human immunodeficiency virus (HIV) is transmitted by blood or virus-containing body fluids. HIV infection can result from inadequate disinfection of equipment.

Bacterial infections

Dialysis patients are at increased risk of infection and colonization with multi-drug resistant organisms (MDRO), such as methicillin-resistant *Staphylococcus aureus* (MRSA). Dialysis patients are also at risk of access site infections, bacteraemia, as well as central line-associated blood stream infections.

Staff allocation

- There should be a dedicated hemodialysis machine to be used for VHF patients only
- Staff members caring for Lassa fever positive patients should not care for Lassa fever negative patients at the same time

Standard and transmission-based precautions: Hand Hygiene

- All staff must follow standard Precautions, including hand hygiene, during dialysis of VHF patients. In addition, they must also follow contact precautions
- Contaminated hands of HCW are the major route of transmission ofmicroorganisms in healthcare settings
- Hand hygiene includes hand washing with soap and water, and/or applying an alcohol-based hand rub

- Hands should be washed with soap and water when visibly dirty or contaminated with proteinaceous material (e.g. blood or other body fluids)
- If hands are not visibly soiled, an alcohol-based hand rub is used
- Hand hygiene should be performed (refer to the section on the steps and five moments for hand hygiene). (Refer to chapter 4)
- Hand hygiene facilities should be located as close as possible to the point of care with patients and dialysis equipment
- One hand wash basin should be provided for in the main dialysis area
- Soap solution must be provided in dispensers with disposable cartridges or single-use bottles, to prevent bacterial contamination of the product
- Alcohol-based hand rubs should be placed at the point of care, for example:
    - Next to or attached to the frame of dialysis bed or chair
    - At points of entry and exit of dialysis room
    - At staff stations or chart and medication trolleys
- Staff who has extensive untreated cuts or chronic skin disease, such as eczema, should not work in both the VHF treatment centre and dialysis units when their skin lesions are active

Personal protection: staff carrying out the dialysis for a VHF patient should wear appropriate PPE (see appendix 2d & 2e).

Use of gloves: the healthcare worker carrying out the dialysis for a VHF positive patient should do so in appropriate PPE with double gloves The following precautions should still be applied with respect to the outer gloves (see appendix 2a).

- Clean, non-sterile gloves should be worn when contact with blood or body fluids is anticipated; this includes contact with patients and dialysis equipment
- Gloves must be changed and hand hygiene done between patients and/or stations
- Outer gloves must also be changed and hand hygiene procedures performed with inner gloves between different activities on the same patient (e.g. moving from a contaminated to a clean body site)
- Gloves should be worn for any cleaning activities
- Gloves should not be washed or reused

Environmental cleaning and disinfection

- Storage of equipment close to dialysis machines and patients should be minimized
- Regularly used equipment such as adhesive tapes, tourniquets, blood pressure cuffs and clamps should be designated to each patient
- Consumables taken to the patient's station should be used only for that patient and should not be returned to a common clean area or used on other patients
- Adequate environmental cleaning with a 1.0% chlorine solution is required after a patient is discharged or moved. For all patient areas, pay special attention to high-touch items or surfaces likely to be contaminated with blood or body fluids
- There should be procedures to ensure prompt containment and cleaning of spills of blood or body fluids (see appendix 2c)
- There should also be procedures to ensure prevention of mold contamination resulting from water damage or wetting of permeable walls, furniture, or other items

  Used supplies and dialyzers should be disposed of to prevent contamination of patients and environmental surfaces

Cleaning of dialysis machines and chairs/beds

- Dialysis machines should be disinfected internally, and dried after each patient
- The exterior of the machine should be effectively cleaned using protocols following manufacturer's instructions
- Special attention should be given to cleaning control panels on the dialysis machines and other surfaces that are frequently touched and potentially contaminated with patients' blood
- Cleaning of non-critical surfaces (e.g., dialysis bed or chair, countertops, external surfaces of dialysis machines and equipment) should be done with neutral detergent and warm water and disinfected with 1.0% chlorine solution
- For any surface/item that is visibly contaminated with blood, clean as stated above (see appendix 2c). Disinfection with 1.0% chlorine should have a contact time of 5 minutes
    - Remove chlorine residues from metallic surfaces with water, as sodium hypochlorite in high concentrations (>500 ppm / 0.5%) is corrosive to metals
- External transducer protectors
    - Should be fitted to the pressure lines of extracorporeal circuit
    - Should be replaced if the filter becomes wet
    - The filter may become damaged if a syringe is used to clear the flooded line and this increases the possibility of blood passing into the dialysis machine

- The machine should be decommissioned if spillage occurs at inaccessible locations, such as behind the blood pump until proper cleaning and disinfection are carried out
- The following practices should be avoided
    - Blood tubing draped or clipped to waste containers
    - Use of attached waste containers during priming of dialyzers
    - Placing items on tops of machines for convenience (e.g., dialyzer caps and medication vials)
    - Due to the instability of chlorine compounds all diluted solutions should be discarded at the end of the day

Disinfection of Hemodialysis Machines

- Dialysis units must follow the manufacturer's recommendations in relation to management of haemodialysis machines
- Manufacturers producing dialysis machines each recommend a different procedure for decontamination, but they concentrate only on bacterial kill. It is recommended that efficacy of decontamination procedure should additionally consider level of biofilm and endotoxin removal
- The development of bacterial biofilms in the hydraulic circuit of hemodialysis machines can be prevented by frequent use of chemical and heat disinfection strategies
- Disinfection should include the following:
    - Heat disinfection (80°C to 90°C) after each dialysis
    - Citric acid and heat disinfection at the end of the day
    - Bleaching (5% chlorine) once a month. Frequent bleaching is not recommended because of possible damage to the machine

Dialysates

- Liquid bicarbonate dialysate concentrate can support rapid bacterial proliferation, and hence it should not be used more than 24 hours after opening
- Bottles containing unused dialysate should be immediately capped and the exterior of the bottle wiped over with detergent and water as part of the overall procedure of cleaning the hemodialysis machine
- The date and time of opening should be recorded on the bottle using an indelible pen
- Opened bottles containing unused fluid should be discarded after 24 hours
- Unfinished bottles used for infected patients must be discarded immediately after the dialysis session

Medications

- Medications (including multiple dose vials) or supplies (syringes, swabs, etc.) taken to the patient's station should be used only for that patient and should not be returned to a common clean area or used on other patients
- Wherever possible, multiple dose vials should be used for the same patient
- Bags or bottles of intravenous solution should not be used as a common source of supply for multiple patients
- When multiple dose medication vials (e.g., heparin, vials containing diluents) or solution bags are used for multiple patients, individual patient doses should be prepared in a clean, centralized area away from dialysis stations and delivered separately to each patient
- Do not carry medication vials from station to station
- Do not carry vials, syringes, swabs or other supplies in pockets
- If trays are used to deliver medications to individual patients, they must be cleaned between patients
- Clean areas should be clearly designated for the preparation, handling and storage of medications, supplies and equipment
- Do not handle and store medications or clean supplies in the same area or an adjacent area where used equipment or blood samples are handled

Needle and sharps

- All needles and sharps must be disposed of into a sharps box (see appendix 2g)
- Needles should not be manually recapped
- No-touch technique should be used to drop the needle into the container, as it is likely to have a contaminated surface
- These containers should be located as close as possible to the point of generation either attached to a trolley or on a mobile stand
- Containers should be large enough to accommodate the types of devices being used in the area
- They should be closed and sealed when 2/3 full and disposed of in approved manner (see appendix 2g)

Blood spills (see appendix 2c) see section on management of spills

Blood Borne Virus Screening and Management

- All staff members should be vaccinated against hepatitis B, have their anti-HBs titer tested and be aware of their serostatus, i.e., whether or not they have titers >10 U/ml and should be revaccinated until titer is >10 U/ml if no protective titer is mounted
- Testing of staff and caregivers for HCV or HIV is only recommended following a needlestick injury or body fluid exposure
- When a room/area/machine has been used for dialyzing Hepatitis B infected patients, it should be used for uninfected patients only after cleaning and disinfection
- If a staff member or care giver experiences a needle stick injury or exposure to blood or potentially blood-contaminated secretions from an infected patient, specialist opinion should be sought for management

Preparing the Access for Cannulation

- Disposable drapes should be used and discarded after each procedure, where not possible, the drapes should be adequately sterilized for reuse.
- Staff should wear appropriate PPE and clean gloves and the patient must wear a mask while the site is being accessed. Wash (or ask the patient to wash) the access site with antimicrobial or plain soap and water
- Proper hand hygiene must be carried out by all care providers following each of the World Health Organization's (WHO) 5 moments for hand hygiene (see figure 1)
- Cleanse the skin by applying any one of the following: - 0.5 - 2% chlorhexidine gluconate in 70% ethyl or isopropyl alcohol - alcoholic chlorhexidine (0.5% - 2% chlorhexidine gluconate in 70% ethyl or isopropyl alcohol) - 70% isopropyl alcohol using sterile swabs
- Cleanse in a circular, rubbing motion from the centre outwards, for 1 minute immediately prior to cannulation. Do not use a backward and forward movement
- Repeat skin preparation if the skin is touched by the patient or staff after it has been prepared and cannulation is not completed
- Wear sterile gloves over inner pair of gloves for cannulation
- Gloves should be changed if contaminated

Staff Training

- All staff in dialysis units should be trained in

Infection prevention and control practices including:

  - Proper hand hygiene technique
  - Appropriate use of personal protection equipment
  - Modes of transmission for blood borne viruses (BBV), pathogenic bacteria, and other microorganisms
  - Infection Control Precautions for Dialysis Units
  - Rationale for segregating patients
  - Correct techniques for initiation care, and maintenance of dialysis access sites
- New and inexperienced staff should be supervised until they are considered competent to practice safely on their own

Water treatment and testing

- Water treatment facilities and equipment should be considered as part of patient care equipment
- Testing of dialysis water for chlorine should be performed at least weekly, for total viable counts
- Test for endotoxin at least monthly and for other chemical contaminants at least every 3 months
- Water used to prepare dialysate or to process dialysers and dialysate should contain a total viable microbial count of no more than 100 CFU/ml and an endotoxin concentration lower than 0.25 EU/ml for dialysis water and 0.5 EU/ml for dialysate
- If routine monitoring of dialysis water shows microbiological contaminant levels in excess of 50% of the maximum permitted levels, corrective measures should beinstituted immediately
- There should also be procedures and policies for testing and for follow-up when results are not within acceptable limits

Waste management

Wastes generated by the VHF facility should be consideredinfectious and handled accordingly (see appendix 2g).

CHAPTER TEN:
Discharge of patients from the VHF treatment centre

VHF patients can be successfully treated and discharged from the treatment centre. The decision to discharge should be taken by the case management team. Discharged patients should go through a strict discharge procedure to ensure that such persons do not take infectious agents/materials from the treatment centre to their homes and communities.

The following precautions should be taken when discharging a confirmed case that has completed treatment:

The treatment centre should have a clearly defined protocol and discharge area
When patients are to be discharged from the high-risk area, they should be made to take their bath with soap and water, then move out of the high-risk zone
The patient should put on fresh clothing from outside the VHF treatment centre and go home directly from there
The patient's clothing, shoes and other materials to be taken home should be disinfected by washing with 0.5% chlorine solution
Heavily contaminated clothing, shoes and other materials should be destroyed, and a replacement made
Discharged patients should receive counseling on the potential for sexual transmission of the virus and the use of safe sex (male and female condom). This should continue after discharge for three months
Male patients should be supplied with condoms on discharge (duration should be advised by case management physician)
Patient should be counseled on the need for follow up visit until patient is certified cleared
Discharged breast feeding women should not breast feed until breast milk PCR is negative
Patient should be counseled on good sanitation practices and proper food storage
If necessary, psychosocial support team should arrange for a healthcare worker to accompany the patient home to explain to the family and community (if necessary) that they are no longer infectious

***** A discharge certificate should be presented to patients on discharge if requested by the patient**.

CHAPTER ELEVEN:
Diagnostic laboratory activities: sample management

Any laboratory worker who handles blood or potentially infected body fluids is at risk of accidental injury or exposure. Individuals working in laboratories or research units that handle VHF samples are at even greater risk. Adherence to standard precautions is necessary to minimize the risk of laboratory-acquired infections and to promote a safe environment for all workers in the laboratory and elsewhere. Well-designed laboratory, proper equipment, and well-trained personnel all contribute to the protection of laboratory workers.

General Recommendations for Laboratory Safety

All patient samples should be treated as potentially infectious regardless of presumed diagnosis. Standard precautions must be followed at all times by every laboratory personnel.

- Wear disposable nitrile or latex gloves always when handling blood, body fluids, or other specimens.
- Do not eat, drink, or smoke in the laboratory.
- Do not store food, water or drinks in refrigerators that are used for clinical or research specimens.
- Mouth pipetting is not permitted, rather use mechanical devices, such as suction bulbs.
- Be careful when materials are to be centrifuged as aerosols can be generated.
  - Centrifuge all materials in sealed tubes inside a sealed centrifuge.
  - Do not open a centrifuge until it has come to a complete stop by itself.
- If an open centrifuge is being used, the operator should use face shields or facemask with googles to protect against possible splashes of fluid that may occur
- Opening of specimen collection tubes from suspected cases of VHF should be done either in a class 2 biosafety cabinet or a glove box.
- As a rule, while opening specimen collection tubes, avoid aerosol generation and splashes by covering the top end of the tubes with a paper towel or cotton wool and point them away from anyone's face.
- Any aerosol generating procedure in the laboratory should be done in a biosafety cabinet and not the open bench.
- Decontaminate work surfaces daily before and after every bench activity with a 0.5% chlorine solution. When body fluid spills occur, follow procedure for decontaminating different types of spills. (see appendix 2c)
- Wear disposable nitrile gloves when cleaning laboratory glassware.
- Wear heat resistant (autoclave) gloves when handling autoclaves or hot air ovens
- Do not manipulate sharps (break, bend, re sheath or recap needles).
- Dispose sharps immediately after use in puncture resistant, leak-proof sharps containers, which should be located as close as possible to the work area.
- All infectious waste generated from the laboratory should be incinerated.
- All laboratory exposure or incidents should be reported and managed as appropriate (see appendix 2c)

- Relevant vaccination as appropriate to exposure risk should be provided for laboratory staff (Hepatitis B, Tuberculosis, Yellow fever)

Specific precautions when handling laboratory samples from suspect or confirmed VHF patients.

Laboratory investigations & specimen collection.

Early recognition of VHF depends ona high index of clinical suspicion by the attending health worker. All samples should be considered as highly infectious. The ability to confirm the diagnosis of VHF requires highly specialized reference laboratories. In Nigeria, these are currently located the following locations:

Marburg

Nigeria Centre for Disease Control (NCDC) National Reference Laboratory, Gaduwa, Abuja

EVD

Nigeria Centre for Disease Control (NCDC) National Reference Laboratory, Gaduwa, Abuja

Redeemers' University, Ede

Irrua Specialist Teaching Hospital, Institute of Viral hemorrhagic fevers and Emergent pathogens, Esan Central LGA, Edo State

Lassa fever

1. Irrua Specialist Teaching Hospital, Institute of Viral hemorrhagic fevers and Emergent pathogens, Esan Central LGA, Edo State – to serve the states in the South - South
2. Lagos University Teaching Hospital, Virology Laboratory, Idi Araba, Lagos State, - to serve states in the South west

Nigeria Centre for Disease Control (NCDC) National Reference Laboratory, Gaduwa, Abuja- to serve states in the Northern zone

3. Federal Medical Centre Owo, Ondo State.
4. Federal Medical Centre Abakaliki, Lassa fever Treatment Centre, Ebonyi state- to serve, for now only Ebonyi State.

Laboratory personnel who have been trained in safe blood sampling, use of PPE and shipment of highly infectious biological substances, should ensurethe following procedures are followed:

Diagnostic laboratory activities

- Laboratory personnel handling potential VHF clinical specimens should wear appropriate PPE(see appendix 2d and 2e)
- Do not carry out any procedure on the open bench until sample has been inactivated.

- Perform hand hygiene immediately after the removal of PPE and after any contact with potentially contaminated surfaces even when PPE is worn.
- Disinfect all external surfaces of specimen containers thoroughly (using 0.5% chlorine water) prior to transport.

How to safely collect blood samples from persons suspected to be infected with VHF

Important: A designated assistant wearing gloves should be available to help the trained personnel assigned to collect the sample. This assistant should stand outside the patient room and help in sample preparation for transport, assist in the donning of personal protective equipment, or provide any additional equipment that may be needed in the process.

Before entering patient room,

Step 1: Assemble all equipment (First part)

Step 1a: Assemble equipment for collecting blood:

- Laboratory sample tubes for blood collection (sterile glass or plastic tubes with rubber caps, vacuum- extraction blood tubes, or glass tubes with screw caps). EDTA tubes are preferred.
- Blood sampling systems (Needle and syringe system, vacuum extraction system with holder, winged butterfly system (vacuum extraction) or winged butterfly system)
- Tourniquet (single use)
- Skin antiseptic solution: 70% isopropyl alcohol
- J Gauze pads
- Adhesive bandage
- Tray for assembling blood collection tools
- Rack for holding blood tools
- Laboratory permanent marker for writing on

laboratory sample

- **Step 1b:** Assemble equipment for preventing

infection

i..i.For Hand Hygiene: use Alcohol-based hand rub OR

- Clean, running water
- Soap
- Disposable paper towel ii.

Personal Protective Equipment (PPE):

- Several pairs of disposable gloves (non-sterile, ambidextrous, single layer)
  - One pair of gloves for blood collection
  - One additional pair as a replacement if they become damaged or contaminated
- Disposable coverall suit

Note: In tasks where contact with body or body fluid could happen, then an impermeable gown or a plastic apron over the non-impermeable gown are recommended.

- Face protection: Face shield or "goggles and mask"
- Footwear: puncture-resistant soles or rubber boots

iii. For waste management:

- Leak-proof and puncture resistant sharps container.
- Two leak-proof infectious waste bags: one for disposable material (destruction) and one for reusable materials (disinfection)

Note: Wear double gloves if the quality of gloves is unknown and the risk of exposure to blood is higher.

Collection, handling and transportation of VHF specimen

Step 2a: Fill out patient documentation:

- Label blood collection tubes with date of collection, patient name, and his/her identifier number.
- Do NOT forget to fill out necessary laboratory form and epidemiological questionnaire
- If several patients have to be sampled in the same place or during the same investigation, create a line list. One patient per line. The list should include: patient name, identifier number sex, age (birth date), clinical information: symptoms, date of onset, date specimen was collected, type of sample taken

Step 2b: Assemble materials for packaging of samples:

- Plastic leak-proof packaging container
- Disposable (paper) towels
- Cooler or cold box, if sample requires refrigeration

For the shipment of samples to the National Central Laboratory follow Sample Shipment packaging requirements (see figure 9).

Step 3: Put on full personal protective equipment (PPE)

DO NOT ENTER THE PATIENT AREA IF YOU DO HAVE NOT WORN THE APPOPRIATE PPE

Step 2a: Perform hand hygiene. Duration of the entire procedure: 40-60 sec (see appendix 2a).

Don full PPE (refer to appendix 2d)

Step 4: Collect blood sample from patient

Step 4a: Prepare room:

- Put infectious waste bags and leak- proof and puncture resistant sharps container into patient room and make sure they are ready for use.
- Place all blood collection equipment in a place that is easy to access.

Step 4b: Identify and prepare the patient

- Introduce yourself to the patient and explain what you will do with the blood sample and why.
- Make sure that this is the correct patient from whom you wish to take the blood sample.

Step 4c: Select the site, preferably at the bend of the elbow.

- Palpate the area; locate a vein of good size that is visible, straight and clear.
- The vein should be visible without applying a tourniquet.
- **Step 4d.** Apply a tourniquet around the arm.
- Tie approximately 4-5 finger widths above the selected site.

Step 4e: Ask the patient to form a fist so that the veins are more prominent.

Step 4f: Disinfect the area where you will put the needle.

- Use 70% isopropyl alcohol.
- Wait 30 seconds for the alcohol to dry.
- DO NOT touch the site once disinfected.

Step 4g:

- When using vacuum extraction system with holder, insert the blood collector tube into the holder.
- Avoid pushing the collector tube past the recessed line on the needle holder or you may release the vacuum.

Step 4h: Anchor the vein by holding the patient's arm and placing a thumb BELOW the place where you want to place the needle.

- Do NOT touch the disinfected site.
- Do NOT place a finger over the vein to guide the needle.

Step 4i: Perform the blood draw

- Puncture the vein swiftly at a 30^0 angle.

Step 4j: When blood starts to flow, ask patient to open his/her hand.

Step 4k: Once sufficient blood has been collected (minimum 5ml], release the tourniquet BEFORE withdrawing the needle.

Step 4l:

- Withdraw the needle gently.
- Give the patient a clean gauze or dry cotton wool ball to press gently on the site.

Step 4m: Remove blood collector tube from holder and put into rack.

Step 4n: Put needle into leak-proof and puncture resistant sharps container.

- Do not remove the needle from the holder.
- Do not reuse the needle.

Step 4o: Stop the bleeding and clean the skin.

- Do not leave patient until bleeding has stopped.
- Put an adhesive bandage on the site, if necessary.

Step 4p: Put items that drip blood or have body fluids on them into the infectious waste red bag for destruction.

Note: Only personnel trained and experienced in collecting blood samples should perform this task in VHF patients because of the high risk of infection if not correctly performed

Quick Tips:

- The blood holder tray and rack will need to be disinfected after use.
- A minimum of 5ml of blood should be collected for each patient.

Step 5: Prepare blood sample for transport.

Step 5a: Take the blood tube from the tray and wipe the blood tube with a disposable paper towel containing alcohol.

Step 5b: Place all items that came into contact with blood into the infectious waste bag for destruction.

Step 5c: Protect the sample from breaking during transport by wrapping the tube of blood in a paper towel.

Step 5d: Ask the designated assistant to approach the patient room, without entering

- This person should have gloves on
- This person should come close to you holding the open plastic leak-proof packaging container.
- This person should not enter the patient room.

Step 5e: The personnel who has collected the blood sample should put the wrapped tube ofblood into the plastic leak- proof packaging container.

- Be careful not to touch outside of leak-proof plastic tube with gloves.

Step 5f: Have the designated, gloved assistant tightly close the top of the plastic leak- proof packaging container.

Note: The sample is now ready for shipment to the designated laboratory.

Step 6. Sample storage requirements:

Samples collected within the VHF treatment centre

- Store samples at 2-8 degrees Celsius for up to 24 hours
  - If you need to store the sample for one week before shipping, store between 0-5° Celsius
  - If you need to store the sample for more than one week before shipping, store at –20°C (or better at -70°C if available). Avoid freeze-thaw cycles of samples collected in non-treatment centres tor transportation to designated laboratories

- **Step 7:** Remove Personal Protective Equipment (PPE) (see appendix 2e)

  Place all reusable equipment into a separate infectious waste bag for disinfection

  When collecting blood samples from multiple patients:

  - Change outer gloves between each patient
  - Use ABHR to sanitize gloved hands between each patient, and wear new glove.

- DO NOT WASH GLOVED HANDS
- DO NOT REUSE GLOVES

Step 8 Laboratory specimen transport requirements

When samples are to be transported to an offsite laboratory, the following steps/instructions should be adhered to:

1. **8a. Specimen labelling:** Treat all specimens as highly infectious
2. Avoid contaminating the outside of specimen container(s)
3. Ensure the clinical samples are clearly labelled and clinical details on laboratory request forms are duly filled.

7b. Triple packaging

All samples to be transported must be triple packaged.

This is a system that ensures safe transport of infectious materials/samples from point of collection to the laboratory where it is utilized or stored.

1. The system consists of three layers as follows:
    a. Primary receptacle/specimen bottle: A labeled primary watertight, leak-proof receptacle containing the specimen. The receptacle is wrapped in enough absorbent material (e.g., cotton wool) to absorb all fluid in case of breakage
    b. Secondary receptacle: A second durable, watertight, leak-proof receptacle to enclose and protect the primary receptacle(s)

Note: Several wrapped primary receptacles or specimen bottles or containers may be placed in one secondary receptacle (e.g., samples from multiple patients can be put together in one secondary receptacle). Sufficient additional absorbent material must be used to cushion multiple primary receptacles. A watertight rigid plastic container e.g., universal bottle may be used and this will then be placed in a Ziploc bag.

c. The Outer shipping package protects contents from outside influences such as physical damage and water while in transit. The secondary receptacle is placed in the outer shipping package.

2. Specimen data forms, letters and other types of information that identify or describe the specimen and also identify the shipper and receiver should be taped to the outside of the outer shipping package.

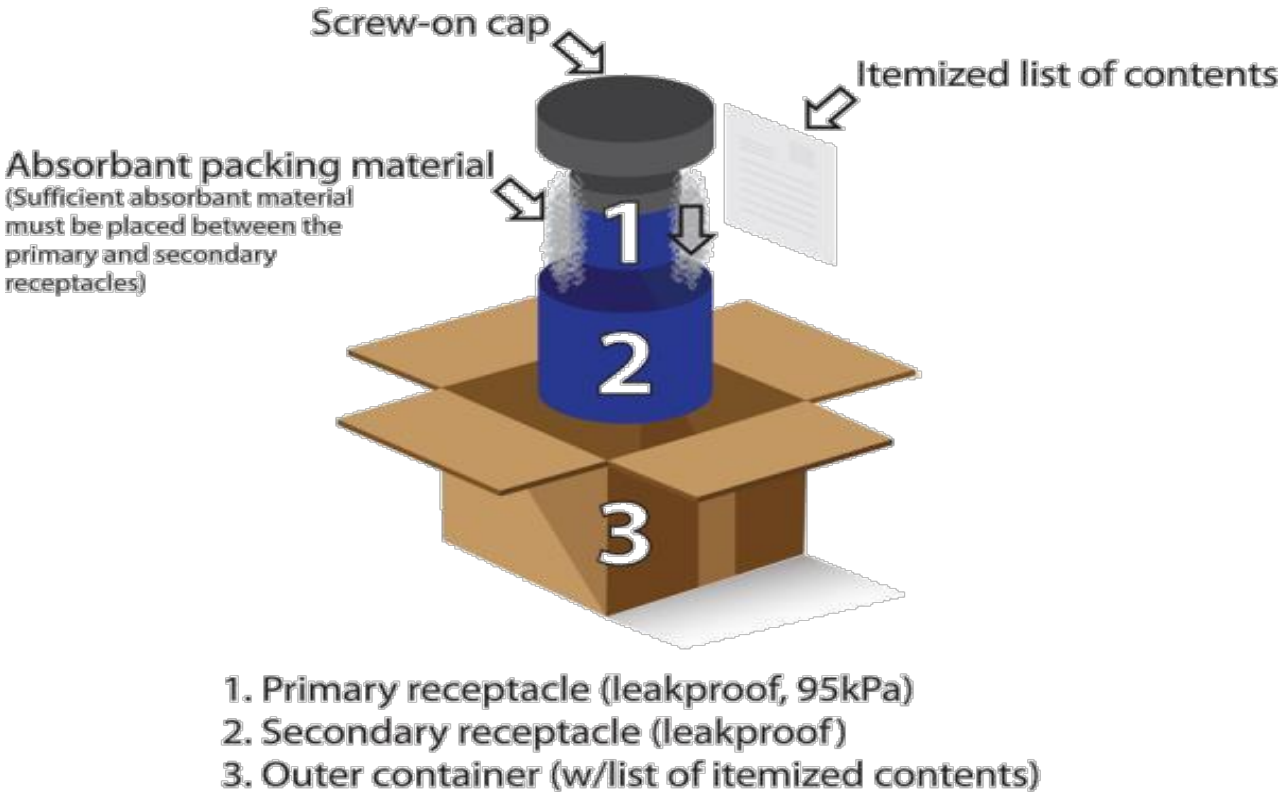


Figure 9: Triple Packing System 2

CHAPTER TWELVE:
Administrative Controls, Safe Work Practices and Employee's Health in the VHF Treatment Centre

These are policies and practices that minimize the risk of infection and contribute to safe working conditions, practices and environment for patients, visitors, care givers and staff. Strict IPC measures must be applied at all times in the care of VHF patients. It must be understood that these measures are geared towards not only preventing the transmission of VHF but also prevent the transmission of other Health care associated infections (HCAIs). This is especially important because VHF patients are vulnerable to acquiring HAIs with high mortality from such HAIs. If a VHF positive patient does not respond to treatment as expected or suddenly stops responding to treatment or deteriorates, efforts should be made to rule out a HAI. The major components of good work practice (and administrative) controls in the management of VHF include:

• An infection prevention and control plan
• Administrative support for procedures in the plan including quality assurance
• Training of staff
• Education of patients, visitors and care givers and increasing community awareness, and
• Coordination and communication

Responsibilities of the employer

- All employers have the responsibility to ensure that all their employees, (including temporary/adhoc staff and volunteers) are appropriately trained and proficient in the procedures necessary for working safely
- Employers should review every procedure carried out by their employees which involves contact with a substance hazardous to health, including pathogenic micro-organisms (e.g., in blood and body fluids) with a view to ensure that the health, safety and welfare of all employees is safeguarded and not endangered or abused
- Employers are also required by the National Policy on Occupational Health and Safety to provide at no cost to the worker occupational health protection and personal protective clothing and equipment which are appropriate for the nature of the job

Responsibilities of the healthcare worker

Employees are responsible to ensure that neither themselves nor any person on the premises (e.g., hospital patients and visitors) is placed at any avoidable risk as far as is reasonably practicable.

General principles

The hospital management has the duty to prepare and update a written statement of health and safety policy, including Infection Prevention and Control, and setting out the local arrangements for complying with Infection Prevention as well as health and safety in the health facility.

Every hospital should also have a Hospital Infection Prevention and Control Committee (IPCC), an executive body in the hospital management that is empowered to make

provisions, policies, and guidelines to govern the IPC programme based on recommendations of the hospital Infection Prevention and Control Team (IPCT).
The meeting of the IPCT and IPCC serves as the main forum for regular routine consultation between the Infection Prevention and Control Team and the rest of the hospital.

It is recommended that every hospital should have an **Infection Prevention and Control Team** which has the primary responsibility for, and reports to the Chief Medical Director (CMD)/Chief Executive on, all aspects of surveillance, prevention and control of infection in a hospital. The IPC team (IPCT) should be made up of trained personnel in charge of day-to-day operation of the IPC programme. For outreach health centres or affiliate hospitals (e.g. community practice areas or comprehensive health centres managed by teaching hospitals etc.) which do not have an Infection Prevention and Control Team, appropriate arrangements should be in place for IPC services to be provided from the parent hospital.

IPC Governance Structure

This is the structure within the hospital responsible for policies, goals, strategies, legal and technical framework as well as monitoring and evaluation. It ensures the provision of technical staff with defined scope and responsibilities and provides the budgetary requirements adequate to meet programmed activities.
Governance Structure for IPC as seen below, from top to bottom includes:

- Hospital management
- IPC Committee
- IPC Team

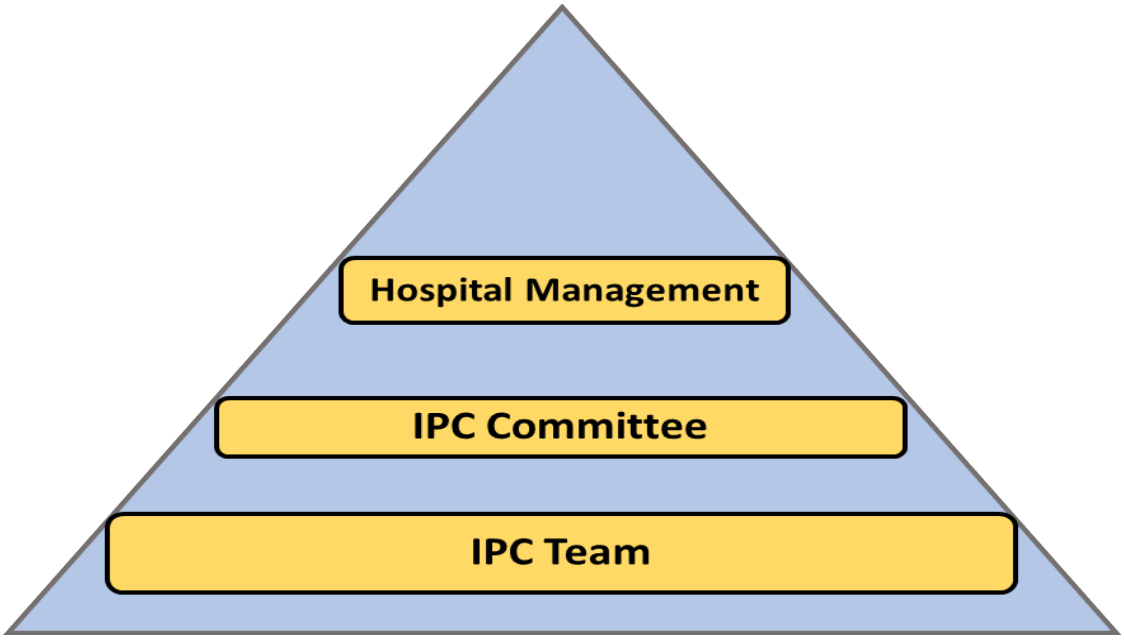


Figure 10: Governance Structure for IPC

The role of the hospital management in IPC governance

- Formulate and communicate IPC and other related policies
- Implement the policies and programmes
- Provide facilities and equipment
- Recruit and deploy staff relevant for IPC
- Train and re-train staff
- Supervise, monitor and evaluate IPC practices
- Budget for and finance IPC programmes and materials

Role of the Infection Prevention and Control Committee (IPCC)

- Develop written policies and guidelines for the hospital's IPC programmes.
- Provide Standard Operating Procedures including regular evaluation and update
- Review periodic IPC work plan and oversee implementation by the IPCT
- Mobilize and direct resources for the IPC programme
- Establish an epidemiologic surveillance system for healthcare associated infections (HAIs), as well as antimicrobial resistance (AMR) surveillance in the facility
- Assessing the impact of all existing and new policies and plans on HAIs and making recommendations for change
- Report all IPC-related matters directly to the CMD/Chief executive

Role of Infection Prevention and Control Team (IPCT)

- Ensure that all staff members have adequate IPC training and monitor adherence
- Oversee assignment of dedicated personnel to triage and patient care areas
- Supervise putting on and removal of PPE
- Ensure strict adherence to staff flow in the red zones
- Coordinate management of accidental exposures including follow-up
- Ensure continuing availability of supplies including PPE, disinfectants, soap and alcohol-based hand-rub in respective stations and also in the treatment centre
- Promote and monitor compliance to hand hygiene
- Ensure regular and rigorous cleaning and disinfection according to protocols
- Ensure appropriate disposal of waste in accordance with protocols
- Oversee chlorine mixing
- Identify and solve any IPC-related problems
- Identify and monitor infectious disease management and hazardous procedures
- Develop a periodic (annual/quarterly) IPC work-plan with clearly defined objectives, activities, budget, etc.
- Investigate suspected outbreaks of HAIs or other related outbreaks
- Step-down the training of all cadre of staff on IPC policies

Safe work practices

During outbreaks of VHF health-care workers may become infected either through exposure in the community or in the health-care facility (i.e., not necessarily as a result of patient exposure). Once infected, these workers can serve as sources of transmission to other staff and to their patients, who may be at higher risk of severe or complicated illness from VHF. The health facility is required to have in place a comprehensive occupational safety and health program that anticipates work-related risks and describes strategies for protection against such risks. The options to protect workers against VHF exposures are limited and must rely extensively on the application of appropriate work practices and personal protective equipment.

The following measures are recommended:

- Keep a register of health-care workers who have provided care for patients with VHF or other highly consequential infection for contact tracing.
- Develop a system to monitor health-care workers' health (such as symptoms reporting)
- Advise workers to take the following actions if they develop a fever > 38°C or symptoms of VHF:
    - Stop work immediately or do not report to work;
    - Limit interactions with others;
    - Exclude themselves from public areas; and
    - Immediately notify management or the team dealing with IPC and occupational health that they are symptomatic and have had contact with a VHF patient.
- Provide prompt access to diagnosis, counseling and treatment for HCWs
- Antiviral prophylaxis is not routinely recommended, rather a risk-based approach should be adopted in making a decision with regards to post exposure prophylaxis.
- Consider developing methods to provide additional support to health-care workers taking care of patients with VHFs (e.g., emotional and family support).

Administrative requirements for personal protective and other equipment

- Ensure that adequate stocks of PPE appropriate to the hospital's function are available, and that sufficient stock is maintained and distributed to manage patients for an appropriate length of time.
- Healthcare workers and support staff deployed to VHF treatment centres and service/entry points should be trained in the safe use of PPE.
    - Training should be done by specialists in IPC and/or infectious diseases, and/or workplace health and safety staff.

- Adequate number of staff (including emergency department and infectious diseases staff) should be trained to ensure their availability at any time and for required duration
- In designated hospitals, this will also include intensive care, laboratory and cleaning staff
- Training should include procedures for safely putting on (donning) and taking off (doffing) PPE, performing initial clinical care, collecting and transporting specimens, and placing intravenous lines after wearing PPE.
- Technique assessment is required to establish competency, but formal certification is not recommended, as training must be repeated regularly (as determined by the healthcare facility) to maintain competency.
- Training records should be kept up-to-date.

- Procedures for disposal of highly infectious liquid waste (in consultation with local water or sewage authorities) and solid clinical waste (in consultation with the appropriate environmental protection or waste management authority) must be reviewed.
- Work rosters should be appropriate to avoid staff fatigue
  - HCWs can tolerate enhanced PPE for only short periods, depending on ambient temperature and intensity of activity, before developing heat exhaustion and dehydration
- Different categories of HCWs (including supervisors) have different levels of risk. Therefore, training in use of PPE, environmental cleaning and use of disinfecting equipment must be appropriate for each category
- Training curricula for the different HCW categories should be defined.
- Adequate resources (human, material and financial) must be provided to support and maintain appropriate IPC measures.

Staff allocation:

Staff must be assessed for their fitness to care for patients with VHF. Staff who may be exempted from care for patients with VHF include those who;

- have underlying conditions that affect immune competence
- have underlying respiratory or cardiovascular disease
- are pregnant
- have non-intact skin (from dermatitis, abrasions, wounds, etc.)
- suffer from claustrophobia or significant anxiety.

- Ensure that staff are assigned exclusively to work in the treatment centre and should not move between treatment centre and other areas in the hospital during an outbreak
- Restrict all non-essential staff from VHF patient care areas
- Maintain a log of persons entering the isolation wards
- Staff should understand the process of reporting ill health

Family members/Visitors/caregivers:

Limit contact between the person suspected or confirmed/under treatment for VHF and family members, caregivers or visitors to the extent possible while working to balance the social and emotional needs of the patient. If the decision is taken to allow a caregiver in the same room or at the bedside of the patient, the caregiver must be informed of the potential risks of close contact with the patient and should be trained and demonstrate proficiency with PPE use and ability to adhere to instructions from the medical team. The staff should liewise observe the caregiver while donning and doffing PPE.

Caregiver presence during initial evaluation of a symptomatic patient suspected of VHF

During initial presentation to the health care facility, it is likely that the patient will come along with family members, caregivers or even spectators. While this initial evaluation is being conducted, the following guidance should be followed:

- All persons accompanying the patient should be evaluated to determine if they are at risk of VHF.
- Limit further exposure to patient by requesting that only one or two family members remain in same room with patient while evaluation is ongoing

Caregiver presence during inpatient treatment of a confirmed case

Where caregiver presence is deemed to be in the best interest of the patient, this decision should be made jointly in consultation with the clinical management team of experts and the infection prevention and control team. In such situations, a strong effort should be made to limit potential risks of exposure to the caregiver and health care providers.

- The decision to allow family member/caregiver presence in the isolation unit confers a responsibility on the health facility to provide PPEs, educate the person, and take measures aimed at protecting such caregivers from acquiring VHF or any other infections
- Female caregivers of reproductive age should be educated on the danger of exposure and particularly the risk for fetal loss, pregnancy-related hemorrhage, serious illness and death. Pregnant caregivers should not be allowed in the isolation treatment room because of the increased risk to her and her foetus.
- Stopping visitor access to area is preferred. If not possible, limit their number to those essential for the patient's well-being and care, such as child's parent. That person should be trained and supervised in donning and doffing, instructed in IPC principles for patient care, and wear **appropriate PPEs** during visit and be screened for symptomsprior to entrance.
- Any visitor wishing to observe the patient should do so from the designated visitor's area of the treatment centers or with an adequate distance from the care area (approximately 15m or 50 feet)

Parental/Caregiver presence while caring for a child with VHF

- In paediatric patients, although there are limited evidence-based criteria to guide practice, given the psychosocial support needs of children, particularly during extreme distress as posed by VHF, it may be in the overall interest of the patient to allow parental/caregiver presence in the treatment room
- The parent/caregiver should wear appropriate PPE and be educated on IPC protocols for managing VHFs

Incident reporting

Every accidental exposure, occupational or otherwise, of a healthcare worker or patient should be reported immediately to the person in charge.

- Ideally, each VHF treatment centre should have a physician appointed to deal with exposure incident

- A register should be set up to record such incidents.
- Blood samples should be taken from source and victim.
- The exposed person should be put under observation for 21 days
- The temperature should be taken twice a day.
- All health workers should be made aware of the risks and the requirements to report any exposure incidents immediately

Management of blood and body fluids exposure incidents (Post exposure management)

Every health facility should have a policy on the management of exposures. The management should designate one or more doctors to whom health care staff may be referred immediately for advice if they have been exposed to potentially infected blood. The policy should also specify who will provide post exposure prophylaxis and follow up. Often an occupational health physician is assigned this role.

Actions to take following accidental exposure to blood via needle-stick or splash exposure

- Wash the damaged area with copious amounts of running water (this has both a mechanicaland a dilutional effect). Make sure there is no chlorine in the water as this will damage the mucous membrane or skin and increase the risk of transmission.

- Report the incident to your supervisor.
- Record in the incident register exactly what has happened and give details:
    - Did anyone observe the incident?
    - How did it happen?
    - When did it happen? Date and time?
    - When was it reported? Date and time?
    - What action was taken?
    - Patient details: name, age, gender. How long has the patient had symptoms of VHF?
- Take blood samples from the patient and from the health worker for VHF testing ,

Hepatitis C, Hepatitis B and HIV for both the HCW and the patient.

- Repeat the HCWs VHF testing (Lassa fever, Marburg or Ebola) on days 7, 14 and 21
- Record the HCWs body temperature every 12 hours each day for 21 days.

Emergency preparedness and control plan for VHF

The goal is to achieve a satisfactory level of readiness to respond to any emergency situation through programs that strengthen the technical and managerial capacity of health care facilities.

The plan is aimed at:

- Assessing the available hospital resources and capacity to manage VHF cases and protect the health care workforce.
- Training and re-training of all cadres of HCWs.
- Behavioural and social change communication.
- Mitigating environmental risks.
- Providing an adequate medical response.
- Liaise with LGA/State team for proper coordination.

Key points for Safe Practice Workflow
Work in pairs; you must always have at least one trained assistant with you whenentering the patient isolation area
Have a detailed plan for duties while inside the treatment area
Always see suspected cases first, then move to confirmed cases Never go backwards (from confirmed to suspected cases)
Try to ensure cleanliness and orderliness of the worksite
Be conscious of heat-related illnesses while using PPEs as it could be a problem in hot tropical areas

CHAPTER THIRTEEN
Handling, movement and burial of bodies of VHF patients

Bodies of persons that died of VHF are most infectious around and just after death due to extravasations (leaking of blood and body fluids) from the patient. During VHF outbreaks, unsafe burial practices promote further spread of the disease.

There are two circumstances in which contact with a deceased body of a known or suspected case of VHF may occur.

1. Patients who died in a treatment center or other healthcare setting.
2. A person who died at home or another location outside a healthcare setting and is known or strongly suspected to have had VHF.

Whether a VHF patient died in the health facility or in the community, the body must be granted a safe and dignified burial.

Safe burial

- A safe burial is a burial with special precautions taken to prevent the spread of VHF. This concept is at odds with the social and cultural rituals common in our Nigerian cultures, and so the procedure should be clearly explained to the community and affected family members. No burial should begin until the family's agreement has been obtained. There must be arrangements in place for the family and relatives to give the person a decent send-off, including prayers said from a distance without contact with the body.

- Only burial team members that have been trained in IPC and safe burial practices should be allowed to handle dead bodies and conduct burials. The team should have the necessary resources such as PPEs, body bags, disinfectant and appropriate transportation.

A. Procedure for safe and dignified preparing/handling of the body of a dead VHFpatient at the health facility.

The body and immediate environment of the deceased are likely to be heavily contaminated with the VHF virus, and therefore scrupulous attention to appropriate PPEs and cleaning procedures are required. Particular care should be taken to avoid injuries from sharp objects in or around the body.

How to prepare the dead body in the health facility

- Assemble the necessary materials and PPEs (coverall, plastic apron, medical mask, goggles, disposable gloves, N95 respirator, heavy duty gloves, rubber boots), 2 body bags, disinfectant (0.5% chlorine), leak proof puncture resistant sharps box, two leak-proof infectious waste bags (one for disposable material to be destroyed and one for reusable materials to be disinfected) and ensure means of transportation of the body.
- Before going in to bag the body, use an indelible marker to mark the top surface of the outer bag with the deceased's name, age, and ID number and clearly mark it to show

that the deceased is a suspected or confirmed case of VHF

- At least four members of the burial team should wear full body PPE with heavy-duty gloves and (in the PPE donning area) (See appendix 2d) including rubber boots.
    - An apron should be worn over the PPE because of the increased likelihood of significant contamination with blood or other body fluids.
    - Use thick rubber gloves as the second pair (or outer layer) of gloves.
- The body should be properly prepared at the site of death. It should only be moved after this has been completed, and the outer surface of the body bag or other outer covering has been disinfected.
- Any person required to identify the body must not have direct contact with the dead body. Any viewing should be done from a separate room through a see-through door or window. Anyone entering the room must wear appropriate PPE.
- Before a body is handled, use a surgical mask to cover the nose and mouth of the deceased. During manipulation and handling of bodies (e.g. while they are being placed into body bags), fluids can be expelled from body cavities. A mask should reduce the risk that fluids will travel any distance from any upper body cavities.
- The body should not be washed, sprayed or embalmed. Any practice of washing the remains in preparation for “clean burials” should be discouraged.
- Identify a family member who can influence the rest of the family members to avoid dangerous practices such as washing or touching the body.
- Leave any medical devices (tubes, drips) in place. Do not attempt to remove them.
- If any family member is present at this point such a person may be asked to say a prayer if they so desire
- Place the body in the first body bag and close the bag.
- Once the body is enclosed in the first bag, change the outer gloves and apron. Disinfect the inner gloves with 0.05% chlorine solution or ABHR before new outer gloves are donned.
- Wipe the entire surface of the outside of the bag with 0.5% chlorine solution.
- Place the first bag in the second bag and close the bag.
- Wipe the entire surface of the outside of the second bag with 0.5% chlorine solution.
- Once the second body bag has been disinfected, move the body to the ambulance exit area, place in a coffin if applicable and decontaminate the coffin with 0.5% chlorine. If no coffin is available, the body bag should be gently placed in the ambulance.
- Move to doffing area and doff the PPE (see appendix 2e)
- Decontaminate the boots (see appendix 2e)
- Transport the body to the burial place as quickly as possible or to the morgue in the treatment centre if immediate burial is not possible.
- After the body of the deceased patient has been moved. The patient care area should be thoroughly disinfected with 0.5% chlorine solution, by a trained staff while wearing full

PPE.

- Entry into the mortuary is restricted to health-facility staff and burial team members wearing appropriate PPE.
- Family members should not touch or handle the body bag with the dead body.

B. Safe and dignified burial in the community

Key steps for Safe and dignified burial outside health facility

- Before departure, the safe burial team should prepare fresh 0.5% chlorine solution.
- Assemble all necessary equipment.
- On arrival at the deceased patient's home, make arrangement for burial with the family and explain risk involve to the family
- Put on all PPE
- Place the body in the body bag
- Place the body bag in a coffin where it is culturally acceptable
- Sanitize the family's environment
- Remove PPE, manage waste, and perform hand hygiene
- Wear utility gloves and transport the coffin or the body bag to the burial site
- At the burial site, place coffin or body bag into the grave
- At the burial site: engage the community in prayers as this helps to dissipate tensions and provides a peaceful experience
- Return to the health facility or team headquarters

Step 1: Before departure, safe burial team composition and preparation of disinfectants

The safe burial team should comprise at least: − 4 members with at least one female

- 1 sprayer
-1 technical supervisor (DSNO)
- 1 communicator, a person who interacts with family and community.
- 1 religious representative.

- All safe burial team members should be clear on their roles and responsibilities, including who is the technical supervisor.
- Disinfectants - ABHR and 0.5% chlorine solution (which should be prepared on the same day) should be available for disinfection of object and surfaces

Step 2: Assemble all necessary equipment

- Assemble all necessary equipment to prevent infections

a. Assemble 2 body bags to hold the body of the deceased
b. Hand hygiene
    - Alcohol-based hand rub solution
    - Personal Protective Equipment (PPE)
        - One pair of disposable gloves (non-sterile, ambidextrous)
        - One pair of heavy-duty gloves
        - Disposable coverall suit (e.g. Tyvek suit)
        - Impermeable plastic apron
        - Face protection: goggles and mask
        - Footwear: rubber boots (recommended)
c. Waste management materials
    - Disinfectant:
        - ABHR
        - One back sprayer (0.5% chlorine solution)
    - Leak-proof and puncture resistant sharps container
    - Two leak-proof infectious waste bags: one for disposable material (destruction) and one for reusable materials (disinfection)

Step 3: Arrival: Prepare for burial with family and evaluate risks.

- Before departure, the team lead should brief the burial team about how to conduct a safe and dignified burial in the particular religious and social context (Using the SOP)
- Upon arrival of the safe burial team at the house of the dead patient, the team should not be wearing PPE.
- Greet the family and offer your condolences before unloading the necessary materials from the vehicles.
- Request respectfully for a family representative.
- The communicator should contact a local faith representative at the request of the family members to arrange to meet at the place of collection for the burial of the deceased. If a local faith representative is not available, the team lead can use the list of phone contacts, with the agreement of the family.
- The communicator and the faith representative should work together with the family witness (such as a paternal uncle), to make sure that the burial is carried out in a dignified manner.
- The burial team should wait whilst the faith representative and family witness can be called and have completed their discussion with the communicator about the safe and dignified burial.
- The burial team lead should ensure that the family witness and other family members have understood these procedures.
- Obtain the formal agreement of the family's representative before proceeding.
- Identify the family members who will be participating in the burial rituals (digging the grave, prayers, orations, closing of the coffin). If the family has prepared a coffin, identify 4 family members to carry the coffin

- Verify that the grave is dug and is at least 2 meters deep. If this is not the case, send selected people to dig the grave at the burial site or at the area identified by the family. This site should be agreed upon by the local authorities and neighbors.
- Propose to one or two family members to witness the preparation activities of the body of the deceased patient on behalf of the other family members.
- Ask the family witness if there are any specific requests from the family or community, for example, about the personal effects of the deceased. The family should decide what to do with the personal effects of the deceased (burn, bury in the grave or disinfect)
- Allow the family witness and family members to take pictures of the preparation and burial. It could also be videoed.
- Ask the family if they want to prepare a civil, cultural or religious item (e.g. identity plaque, cross, picture of deceased) for the identification of the grave (see section on safe burial for a Christian and safe burial for a Muslim)

Step 4: Donning of Personal Protective Equipment

- Evaluate the set-up of the environment.
- If a coffin is to be used, place the coffin outside the house.
- Locate the room where the body of the deceased patient is placed.
- Open the windows and doors for optimal light and ventilation.
- Identify with the family the rooms and annexes (bathroom, toilet) that were used by the deceased patient as they need to be cleaned and disinfected.
- The safe burial team should don all PPE in the presence of the family according to the recommended steps (see appendix 2d)

Step 5: Placement of the body in the body bag

- At least two members of the safe burial team should enter the house
- Place the body bag along the body.
- Open the body bag.
- At least two persons should take the body by arms and legs and place the body in the body bag.
- Close the body bag.
- Disinfect the outer side of the body bag by spraying over the surface of the body bag with 0.5% chlorine solution.

Note: - Manipulation of the body should be minimal.
- Remains should not be sprayed, washed or embalmed.

Place in a second body bag.

Step 6: Placement of the body bag in the coffin where culturally acceptable

- Transport the body bag to the coffin, by 2 or 4-persons wearing PPE (depending on the weight of the body and the number of persons in PPE)
- Place clothes and/or objects of the deceased patient inside the coffin if the family so wishes.
- Allow one of the family members to close the coffin, ensure they are wearing gloves at all times.

- Respect the grieving time requested by the family.
- At the end of this step the coffin is disinfected with 0.5% chlorine solution and is ready to be transported
- In case no coffin is available, the body bag should be gently placed on the rear of the ambulance by placing the head towards the front. This should be performed by 2 staff wearing PPE. It is important that the body bag is not damaged.

Step 7: Sanitize family's environment

- Collection of soiled objects (disinfect if needed, or burning) and cleaning and disinfection of the environment (rooms, house) should be carried out wearing PPE:
    - Collect any sharps that might have been used on the patient and dispose them in a leak-proof and puncture resistant container.
    - Clean with clean water and detergent and then disinfect with a suitable disinfectant (e.g., 0.5% chlorine solution) all rooms and annexes of the house that were possibly infected by the deceased patient.
    - Special focus should be given to areas soiled by blood, nasal secretions, sputum, urine, stool and vomitus.
- Clean all objects (e.g., dishes, cups, cutlery etc.). possibly infected by the deceased patient with water and detergent, then disinfect with a 0.5% chlorine solution.
- 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 disinfected with 0.5% chlorine
- Mattresses or straw mats soiled with body fluid of the deceased patient should be burnt at a distance from the house.
- Ensure the family gives permission to destroy the mattresses, straw mat, etc.

After this operation and before proceeding to doff PPE, think through:

- Did the burial team disinfect or place in a disinfected bag all belongings of the deceased patient?

- Did the burial team burn the mattresses?

At the end of this step all places in the home should have been disinfected

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

- The safe burial team should doff PPE following the recommended steps (see appendix 2 e) and perform hand hygiene (see appendix 2a)
- All single use PPE should be put into a highly infectious bag (Red) an appropriate waste bag , tied and disinfected and thereafter, taken for burning at the treatment centre (or other designated place where single-use equipment will be burned)
- Reusable equipment should be disinfected onsite and placed in a securely tied waste bag before taking to the hospital or team headquarters for appropriate handling.
- Perform hand hygiene.

At the end of this step the burial management team has removed their PPE and has performed hand hygiene

Step 9: Wear utility gloves and transport the coffin or the body bag to the burial site

- Wear gloves and transport the coffin or the body bag from the house to the grave site.
- For the transport of the coffin, which has not been soiled, protection with hand gloves is sufficient.
- Distribute heavy duty gloves to the family members who will carry the coffin.
- The coffin is placed (delicately) on the ambulance or platform of the car that will serve as the hearse, usually the head towards the front.
- Respect the time of grieving, possibly with a speech about the deceased and religious songs (chants) to aid the departure of the deceased to the grave site, according to cultural and religious norms.
- Only the safe burial team, (not wearing PPE) has the right to sit in the car cabin.
- The other participants of the funeral will follow on foot, behind the car at walking pace, with the alarm lights on and possibly dressed with funeral signs (bundles of palm trees on the bumper) or in another vehicle
- Conventional expression of pain through shouting, crying/songs of crying should be respected.

At the end of this step, the coffin has departed for the grave site

Step 10: At the burial site, place coffin or body bag into the grave

- Placement of coffin or body bag into the grave
    - The coffin or body bag should be carried by the carriers wearing heavy duty gloves to the already prepared grave followed by the funeral participants
    - The body should be slowly lowered into the grave with strings/ ropes .
    - Place the coffin or body bag and bags with clothes and objects belonging to the deceased into the grave
    - Depending on the custom in place, respect the rituals that allow for the spirit of the deceased to be liberated as long as it does not involve opening or touching the body bag.

Step 11: Burial at the grave site: engaging community for prayers

Engage with community for prayers as this dissipates tensions and provides a peaceful time.

- Respect the time required for prayers and funeral speeches.
- Family members and their assistants should be allowed to close the grave.
- Place an identification on the grave (name of the deceased and the date) and a religious symbol if requested.
- Recover all heavy duty gloves
- Place used gloves in an infectious waste bag for disinfection.
- The safe burial team may attend funeral and offer condolences (sign book) or offer small gifts to support the funeral.

- Family and funeral attendees should all disinfect or wash hands after the burial using alcohol-based hand-rub solution or soap and water respectively.
- Thank the family members.

Step 12: Return to the treatment centre or team headquarters

- Organize the incineration of the single-use (disposable) equipment at the hospital or in another designated place for burning this type of equipment.
- The reusable equipment is disinfected again and dried.
- The car used for the funeral should be cleaned and disinfected (especially the rear).
- Disinfected rubber boots should be kept at the treatment centre or team headquarters.

C. Procedure for the dignified burial of a Christian deceased patient

- Ask the family if there are any specific requests with regard to a dignified burial. Explain the process of a dignified Christian burial to the family members.
- Give the family opportunity to view the burial process, read a scripture, sprinkle water from a distance over the body (don't touch and bath the body)
- Provide a symbol of dignity and clothing e.g. a white cloth
- Identify a burial site the family can accept and ensure the grave is appropriately labeled.
- If it is their custom or inclination, give the family members the chance to participate in the burial preparation or digging.
- After the body or coffin has been buried, give the family members the choice to place the first dirt on or in the grave in accordance with custom, hierarchy, or local practice.
- The safe burial team will make sure that particular objects are buried with the deceased if the family requests it. The family should not touch items that have recently been in close contact with the deceased themselves.
- Invite the family to prepare or place the label / religious symbol at the grave (e.g. a Cross) if requested by the family.
- A memorial service can be held at a later date, as per custom and /or preference.

D. Procedure for the dignified burial of a Muslim deceased patient

An information card that uses the steps below, endorsed (signed) by a local Imam or Muslim representative, could be used to perform the dignified burial of a patient who has died from suspected or confirmed VHF disease.

- The team leader will explain the safe and dignified process of burial
- Ask the family if there are any specific requests in regard to the process of a dignified burial, for example, do they want to perform a dry ablution on the body prior to burial?
- Deceased Muslims should not be cremated or placed in the body bag naked
- A dry ablution can be performed by a Muslim member of the burial team on the deceased patient before being placed in the body bag. Otherwise, a Muslim person/family member

can perform this simple procedure once they have been placed in the body bag (see next paragraph for information on dry ablution).

- The deceased patient is shrouded by wrapping in a plain white cotton sheet before being placed in the body bag. The shroud should be knotted at both ends. The safe burial team should provide a shroud for the family or they provide one themselves
- If there are female members of the Burial team, they should shroud deceased female patients prior to placing in a body bag (see next paragraph for information on shrouding)
- Permission can be sought in advance from the Imam that the body bag can be used to represent a shroud. White body bags should be used for Muslim deceased patients.

Dry Ablution

(To be only carried out by a Muslim person or Muslim faith representative).

- A short Arabic prayer of intention is said over the deceased.
- The head of the Muslim Burial team carrying out the dry ablution, fully kitted in PPE, softly strikes their hands on clean sand or stone and then gently passes over the part of the body bag where the hands and face of the deceased are (this should have been marked on the external surface of the body bag when the corpse was put into the body bag). This symbolically represents the ablution that would normallyhave been done with water.
- A short Arabic prayer is said over the deceased.
- The body bag should not be opened.
- Dry ablution can also be carried out over the deceased in the body bag if a Muslim Burial team member is not available and it was not possible to perform directly on the body
- This process takes about 1-2 minutes only.

Shrouding

- A plain unstitched white cotton sheet (scented with musk, camphor or perfumed) is placed on top of the opened body bag.
- The deceased is lifted by the burial team and placed on top of the shroud.
- The extended sides and edges of the shroud are pulled over the top of the deceased to cover the head, body, legs and feet.
- Three strips cut from the same fabric are used to tie and close up the shroud. One for above the head, one for below the feet and one for around the middle of the body. It is knotted at both ends.
- If there are female members of the burial team, they should shroud the deceased female patients.
- The body bag is closed.

CHAPTER FOURTEEN:
Infection Prevention and Control in community setting: how to reduce risk of VHFtransmission at home/community.

Individuals are at risk of VHF infection if they spent time with someone sick with VHF or attended a funeral of someone who has recently died of symptoms of VHF.

Some important points to note are:

- Only people who are sick with Lassa/Ebola or Marburg can spread the disease to others.
- Rats are the major source of infection for Lassa fever and also people who become sick with Lassa fever can spread the infection to others.

If someone in the family or community is suspected of having symptoms resembling VHF, the following should be done:

- Take the patient to the hospital or health centre.
- Inform the healthcare workersimmediately of what you are suspecting.
- If the patient cannot go to the hospital immediately (for any reason) then contact any local community leader immediately and/or call 080097000010 (NCDC hotline).

While waiting for help, you should protect yourself and your family.

- Provide the sick person with his/her own space separate from the rest of the family. It will be ideal if this space has its own dedicated toilet.
- Provide the person with dedicated plate, cup, spoon, fork, toothbrush, towel etc. They should not share any items with other family members.
- Only one family member should take care of the sick person. Others should not come in contact.
- Avoid touching the sick person.
- All body fluids including stool, vomitus, blood, breast milk, semen, urine and sweat are dangerous and should not be touched.
- If you need to touch, then you must wear gloves and make sure the gloves do not have holes.
- Put soiled clothes, towels and bed linen in a plastic bag and burn them.
- Wash hands with soap and water or rub alcohol-based hand rub after touching the sick person (after removing gloves), after touching anything that belongs to the person and after touching anything that could be contaminated with the body fluids, even if you wore gloves. Always wash hands with soap and water after visiting the toilet

Every effort should be made to move the patient to the treatment centre as soon as possible because this helps reduce the risk of transmission to other family and community members and also improves the chance of survival of the patient.

As much as possible, restrict number of persons accompanying patients to the treatment facility to one or two persons. The vehicleused to transport the patient to the treatment facility should be decontaminated by the HCW in the treatment facility.

Community Triage

During an outbreak of VHF, cases are identified in the community by case finding and contact tracing. Healthcare workers and community volunteers carrying out this task should protect themselves while ensuring cases are not missed and that patients are evacuated safely from the communities to treatment centres whilst adhering to IPC guidelines.

The following IPC measures should be implemented during contact tracing and case finding interviews in the community:

- Avoid shaking hands.
- A distance of one meter (about 3 feet) should be maintained between interviewer and interviewee irrespective of whether patient is symptomatic or not. Personal protective equipment is not required if this distance is assured.
- As much as possible, avoid touching surfaces or anything in the environment.
- Conduct interviews outdoors preferably.
- Provide staff undertaking contact tracing and case finding with alcohol-based hand rub and train them on the correct way to perform hand hygiene.
- If a VHF patient or a symptomatic contact is identified, he/she should be reported to the DSNO for immediate evacuation to an isolation or treatment centre following standard procedure
- Safe burial of deceased VHF patients has been addressed in chapter 13 of this document.

Risk communication and community engagement on IPC

VHF outbreaks are also invariably accompanied by rumors and misinformation and the process of educating communities and listening to them helps monitor rumors and to better understand how they can be countered.

Public health is a shared responsibility and thus VHF treatment centres are advised to develop a written patient and family education/communication plan while ensuring communication strategies that are consistent with social and cultural values of at-risk populations and other stakeholders. The key message should specify actions that need to be taken by health workers, communities, families and individuals to protect their health and control the outbreak.

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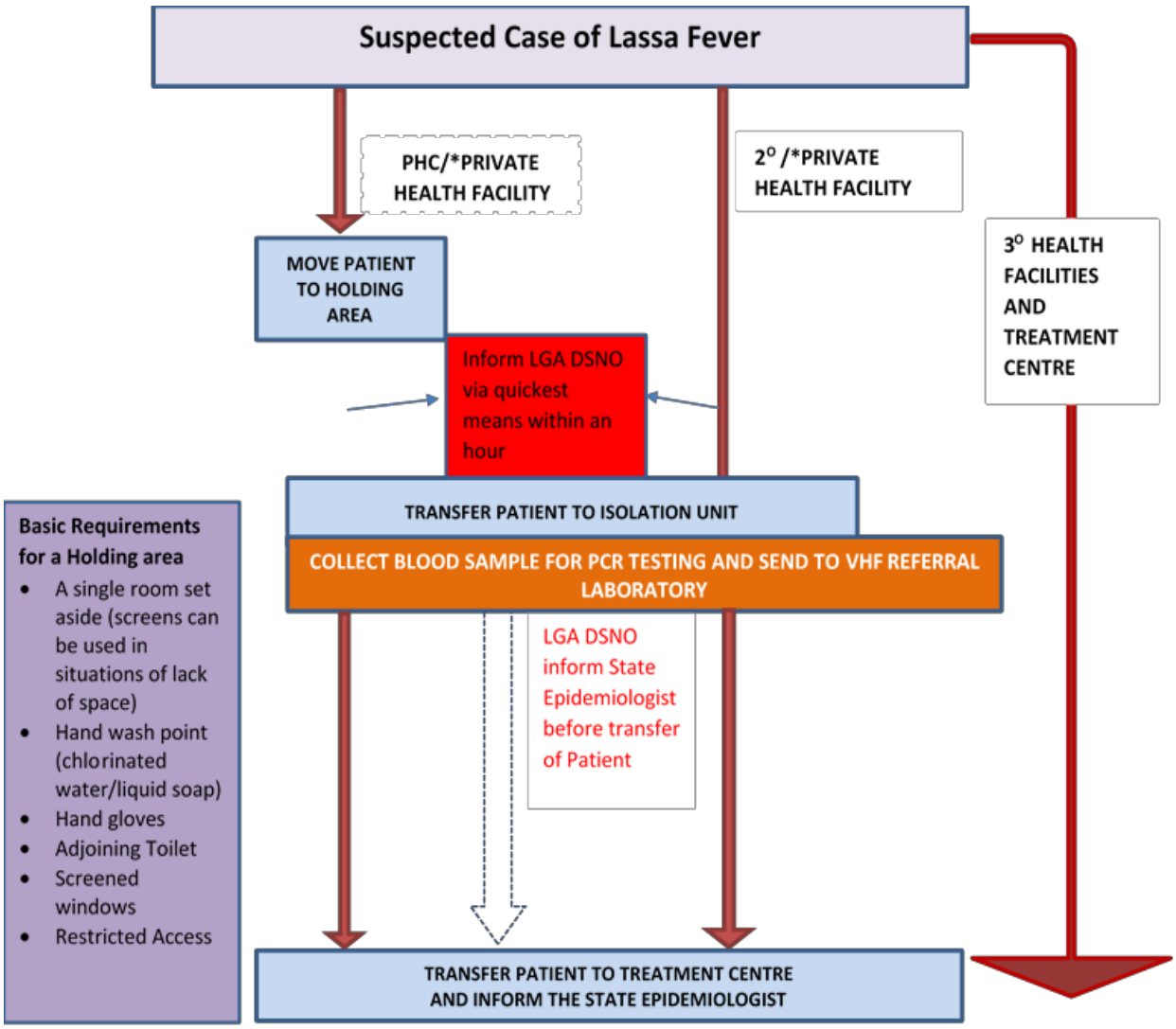
Appendix 1:
Referral flow Chart for VHF cases at different levels of the health system



How to Use the Referral Flowchart

- Suspect patients identified in:
- Primary Health Centres (PHC) and Private Hospitals should keep suspected cases in a holding area and inform the LGA DSNO about the case within 1 hour of identification. The LGA DSNO should immediately inform the State Epidemiologist about the case and arrangements should commenced to transfer the patient to an isolation centre for blood sample collection and other medical care that may be required. Sample is sent to the testing laboratory. If test result is positive, patient is transferred to VHF Treatment Centre for treatment.

- Secondary Health Facility and Private Hospitals should keep cases in an isolation unit and inform the LGA DSNO about the case within 1 hour of identification. The LGA DSNO should immediately inform the State Epidemiologist about the case. At the isolation unit, blood sample collection and other medical care that may be

required are carried out. Sample is sent to the testing laboratory. If test result is positive, patient is transferred to Treatment Centre for VHF treatment.

- Tertiary Health Facilities should send patients to treatment facilities for blood sample collection and provision of other medical care that may be required. If test result is positive, patient is commenced on VHF treatment.

EXPECTATIONS

PRIMARY HEALTH CENTRE	2^{O} OR 3^{O} HEALTH FACILITY	STATE
• Designated Holding area • Basic Requirements for maintaining infection prevention in holding area • Contact Details of LGA DSNO	• Designated Isolation Unit • Basic Requirements for maintaining infection prevention in isolation unit • Contact Details of LGA DSNO	• Designated ambulance for transportation of Lassa fever patients

Appendix 2a:
Standard Operating Procedure (SOP) - Hand Hygiene

Name of Facility:	
SOP Number *(Insert HF SOP number here)*	**SOP Title: Hand Hygiene**
Authorizer:	**Authorization Signature:**
Effective date _____	

Purpose: To avoid contamination of hands with infectious agents and reduce transmission of health care associated infections (HAIs)

Scope: This applies to health workers and care givers at the VHF isolation or treatment centres

Responsibility: All healthcare workers and care givers

Materials and Equipment: Alcohol based hand rub (ABHR) containing 70-80% alcohol or liquid soap and clean running water, paper towel/single use cloth

Procedure:
Before and after any direct contact between HCW and patients and/or care givers, whether or not gloves are worn, hand hygiene should be performed in the following scenarios:

- Upon entering the isolation area or treatment centre, before putting on PPE and gloves
- Before performing clean or aseptic procedures on patient
- After any exposure risk or actual exposure to patient's blood or body fluid
- After touching contaminated surfaces/items/equipment in patient's surroundings
- Upon leaving the isolation area or treatment centre, after removal of PPE

Steps in performing hand hygiene using Alcohol based hand rub (ABHR)

Step 1: Apply about 3-5 ml (1 teaspoonful) of the ABHR in a cupped hand
Step 2: Rub hands palm to palm
Step 3: Right palm over left dorsum with interfaced fingers and vice versa
Step 4: Palm to palm with fingers interfaced
Step 5: Back of fingers to opposing palms with fingers interlocked
Step 6: Rotational rubbing of left thumb clasped in right palm and vice versa
Step 7: Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa.
Step 8: If not dry already, rub palms together until hands are dry, then, your hands are safe.

Steps in performing hand washing using soap and water
Please note, this process takes between 40-60 seconds and should be done under running water

Step 1: Wet palms with water

Step 2: Apply about 3-5 ml (about a teaspoonful) of liquid soap into the palms

Step 3: Rub hands palm to palm

Step 4: Right palm over left dorsum with interfaced fingers and vice versa palm to palm with fingers interfaced

Step 5: Back of fingers with opposing palms with fingers interlocked

Step 6: Rotational rubbing of left thumb clasped in right palm and vice versa

Step 7: Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa

Step 8: Rinse hands with water

Step 9: Dry hands thoroughly with a single use paper towel

Step 10: Use disposable paper towel to turn off tap

How to Handwash?

WASH HANDS WHEN VISIBLY SOILED! OTHERWISE, USE HANDRUB

Duration of the entire procedure: 40-60 seconds

0

Wet hands with water;

1

Apply enough soap to cover all hand surfaces;

2

Rub hands palm to palm;

3

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

4

Palm to palm with fingers interlaced;

5

Backs of fingers to opposing palms with fingers interlocked;

6

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

7

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

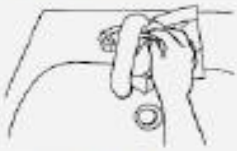
8

Rinse hands with water;

9

Dry hands thoroughly with a single use towel;

10



Use towel to turn off faucet;

11

Your hands are now safe.

CHECKLIST FOR HAND HYGIENE

Place a "□" in case box if step/task is performed **satisfactorily**, an "**X**" if it is **not** performed **satisfactorily**, **N/O** if not observed or **N/A** if not applicable.
Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines
Not Observed: Step, task, or skill not performed by learner during evaluation by facilitator
Not Applicable: Step, task, or skill not required to be performed by learner during evaluation.

CHECKLIST FOR HAND HYGEINE				
STEP/TASK	**EVALUATION**			
	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
Steps in performing hand hygiene using Alcohol based hand rub (ABHR) (20-30 sec.)				
Apply about 3-5mls (one teaspoonful) in a cupped hand				
Rub hands palm to palm				
Right palm over left dorsum with interfaced fingers and vice Versa				
Palm to palm with fingers interfaced				
Back 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				
Process was completed within 20 – 30 seconds				
Steps in performing hand washing using soap and water (40-60 seconds)	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
Wet hands with water				
Apply about 3-5mls (one teaspoonful) of liquid soap into the palm				
Rub hands palm to palm				
Right palm over left dorsum with interfaced fingers and vice versa palm to palm with fingers interfaced				
Backs of fingers with 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				
Rinse hands with water				
Dry hands thoroughly with a single use paper towel				
Use towel to turn off tap				
Process was completed within 40 – 60 seconds				

Appendix 2b:
Standard Operating Procedure (SOP) – Chlorine Preparation

Name of Facility:	
SOP Number *(Insert HF SOP number here)*	**SOP Title: Chlorine Preparation**
Authorizer:	**Authorization Signature:**
Effective date _____	

Purpose: To prepare the required concentration of chlorine solution for decontamination and disinfection purposes.

Scope: This SOP is for use by all health workers at the VHF isolation or treatment centres.

Responsibility: Every health care worker

Materials and Equipment: Chlorine powder**,** clean cold water, plastic ladle, Plastic container, weighing scale, measuring cylinders and beakers appropriate protective clothing.

Procedure:
Chlorine solutions lose potency rapidly and so must be prepared at least daily, in small volumes, as required for use and utilized within 24 hours. Spray bottles should be avoided because of the danger of creating wet and slippery surfaces (from the overspray), as well as the risk of inhaling toxic chlorine-containing droplets or causing eye irritation for patients or health workers due to droplets. Prepared chlorine should be stored in the dark, not in direct sunlight.

For preparation of 0.5% chlorine solutions

Step 1: Pour the correct measure (as below) of clean cold water into a clean plastic container.

Step 2: Add the correct measure (as below) of chlorine powder into the water.

- 7.5g (half a table spoon)/litre
- 75g (five table spoons)/10 litres
- 150g (ten table spoons)/20 litres

Step 3: Close the plastic container.

Step 4: Mix the content well by rocking the container or stirring with a plastic ladle.

Step 5: Allow the deposits to settle and use the supernatant.

Step 6: Store the solution in a closed non-metal container, in a dark place.

For preparation of 0.05% chlorine solutions

Step 1: Pour the correct measure of clean cold water into a clean plastic container.

Step 2: Add the correct measure of chlorine powder into the water.

- 7.5g (half a table spoon)/10 litres

Step 3: Close the plastic container.

Step 4: Mix the content well by rocking the container or stirring with a plastic ladle.

Step 5: Allow the deposits to settle and use the supernatant.

Step 6: Store the solution in a closed non-metal container, in a dark place.

CHECKLIST FOR PREPARATION OF CHLORINE SOLUTION

Place a "□" in case box if step/task is performed **satisfactorily**, an "**X**" if it is **not** performed **satisfactorily**, **N/O** if not observed or **N/A** if not applicable.
Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines
Not Observed: Step, task, or skill not performed by learner during evaluation by facilitator
Not Applicable: Step, task, or skill not required to be performed by learner during evaluation.

CHECKLIST FOR PREPARATION OF CHLORINE SOLUTION				
STEP/TASK	**EVALUATION**			
For preparation of 0.5% chlorine solutions	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
Pour correct measure of clean cold water into a clean plastic container as required (1 litre;10 litres; 20litres) and as applicable.				
Add the correct measure of chlorine powder into the water as required (7.5g/1litre;75g/10litres;150g/20litres) and as applicable. *half tablespoon equivalent- 7.5g				
Close the plastic container				
Mix content well by rocking the container or stirring with a plastic ladle				
Allow deposits to settle and use the supernatant				
Store solution in a closed non-metal container in a dark place				
For preparation of 0.05% chlorine solutions	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
Pour the correct measure of clean cold water into a clean plastic container				

Add the correct measure of chlorine powder was added into the water as required (half a tablespoon or 7.5g/10litres) and as applicable.				
Close the plastic container				
Mix content well by rocking the container or stirring with a plastic ladle				
Allow deposits to settle and use supernatant				
Store solution in a closed non-metal container, in a dark place				

Appendix 2c:
Standard Operating Procedure (SOP) – Handling Blood and Body Fluid Spills

Purpose: To clean and decontaminate blood or body fluid contaminated surfaces

Name of Facility:	
SOP Number *(Insert HF SOP number here)*	**SOP Title: Handling Blood and Body fluid Spills**
Authorizer:	**Authorization Signature:**
Effective date _____	

Scope: This is applicable to surfaces contaminated with blood and all kinds of body fluids in the VHF isolation ward.

Definitions:

Surfaces: Including floor, walls, ceiling and the coverings of physical objects/structures or materials present in the isolation ward.

Responsibility: IPC focal person, health workers

Materials and Equipment: Gloves, mask, apron, eye protection (goggles or face shield), boots, paper towels, detergents, 0.5% chlorine solution, absorbent materials such as disposable towels or absorbent granules, buckets, cleaning mops, water, waste bag/bin, forceps or tongs, sharps box

Pre-Task Procedure:

Step 1: Alert others to the spill and isolate the area appropriately using a signage.

Step 2: Don full PPE in the donning area and ensure any cuts and abrasions on body parts are covered witha waterproof dressing.

Step 3: Get paper towels, absorbent granules, waste bags, forceps, mop, bucket, detergent, sharps bin and 0.5% chlorine solution.

2. During Task Procedure:

Step 1: Remove any broken glass or sharp material with forceps or tongs and discard in the sharps box.

Step 2: Remove visible organic matter with absorbent material (e.g. disposable paper towels) and discard in red waste bag.

Step 3a: For large spills, soak up excess liquid using paper towels or absorbent granules and dispose in red waste bag.

Step 3b: If spill is less than 10cm, use paper towels to mop up the spill and dispose in a red waste bag.

Step 4: Clean the area with warm detergent solution.

Step 5: Disinfect the area after cleaning with a freshly prepared 0.5% chlorine solution and leave to dry.

Step 6: For small spills, (e.g. spots of blood on tiles) an alcohol wipe may be sufficient.

3. Post-Task Procedure

Step 1: Clean all equipment with warm detergent solution, disinfect with 0.5% chlorine and keep outside in the sun to dry.

Step 2: Proceed to doffing area and doff following the procedure for doffing.

Step 3: Ensure plastic apron (if reusable apron is used) and safety glasses are disinfected with 0.5% chlorine solution and air dry prior to storing.

Step 4: Dispose of the red waste bag into a biological hazard waste disposable bin/bag.

Step 5: Perform hand hygiene using the techniques for hand hygiene with soap and water and dry with paper towels.

Step 6: Report direct contact with blood or bodily fluids to the supervisor for immediateaction.

CHECKLIST FOR HANDLING BLOOD AND BODY FLUID SPILLS

Place a "□" in case box if step/task is performed **satisfactorily**, an "**X**" if it is **not** performed **satisfactorily**, **N/O** if not observed or **N/A** if not applicable.
Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines
Not Observed: Step, task, or skill not performed by learner during evaluation by facilitator
Not Applicable: Step, task, or skill not required to be performed by learner during evaluation.

CHECKLIST FOR HANDLING BLOOD AND BODY FLUID SPILL				
STEP/TASK	**EVALUATION**			
PRE-Task	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
Alert others to the spill and isolate the area appropriately				
Wear appropriate PPE and ensure any cuts and abrasions on body parts are covered with a waterproof dressing;				
Get paper towels, absorbent granules, waste bags, forceps, mop, bucket, detergent, sharps bin and 0.5% chlorine Solutions				
During Task Procedure				
Remove any broken glass or sharp material with forceps or tongs and dispose in the sharp box				
Remove visible organic matter with absorbent material and dispose in the red waste bag				
For large spills, soak up excess liquid using absorbent granules and dispose in red waste bag				
If spill is less than 10cm, use paper towels to mop up the spill and dispose in a red waste bag				
Clean the area with warm detergent solution				
Disinfect the area after cleaning, with a freshly prepared 0.5% chlorine solution and leave to dry				
For small spills *(e.g. spots of blood on tiles*) use an alcohol wipe				
POST-Task				
Clean all equipment with warm detergent solution, disinfect with 0.5% chlorine solution and store dry				

Ensure plastic apron and safety glasses are disinfected with 0.5% chlorine solution and dried prior to storing				
Remove and dispose gloves into red waste bag				
Dispose the red waste bag into a Biological Hazard Waste disposable bin/bag or Sanitary Bin				
Wash hands thoroughly with soap and water and dry with paper towels				
Report direct contact with blood or bodily fluids to the supervisor for immediate Action				

Appendix 2d:
Standard Operating Procedure (SOP) – Donning of PPE

Name of Facility:	
SOP Number ***(Insert HF SOP number here)***	**SOP Title: Donning of PPE**
Authorizer:	**Authorization Signature:**
Effective date _____	

Purpose: To ensure PPEs are donned correctly by health workers before attending to VHF patients or working in VHF isolation/treatment centres.

Scope: This SOP for correct donning of PPE applies to all health workers at the VHF isolation/treatment centres.

Definitions:
Personal Protective Equipment (PPE) is any device or clothing worn by a health worker to protect the wearer's skin, eyes, mucous membranes, airways and clothing from coming into contact with infectious agents.

Responsibility: Every health worker

Materials and Equipment: Gloves, head cover, goggles/face shields, N95 Respirator, face mask, gowns, coveralls, aprons, shoe covers, boots, heavy duty rubber gloves, anti-fog spray, Alcohol Base Hand Rub (ABHR), running water, liquid soap, mirror

Procedure:

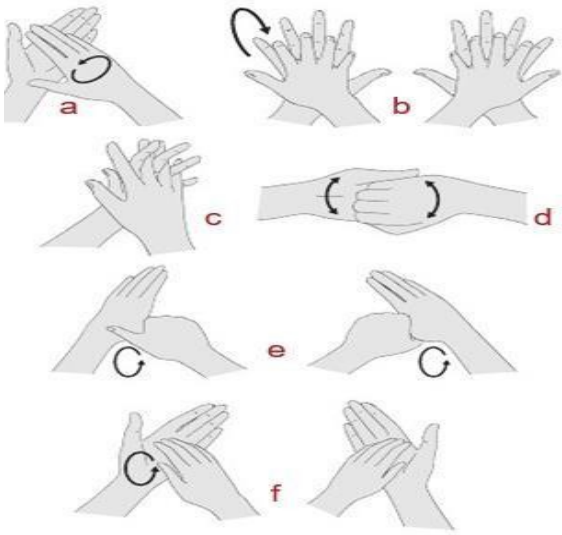
Step 1: At the beginning of the work shift, remove all personal items (jewelry, watches, cell phones, street clothes, shoes,pens etc.)

Step 2:, Put on scrub suit *(ensure elasticated trousers)*,gum boots and head cover in the changing room, this is appropriate for moving around inthe low risk zone/green zone.

Step 3: Move to the designated donning area.

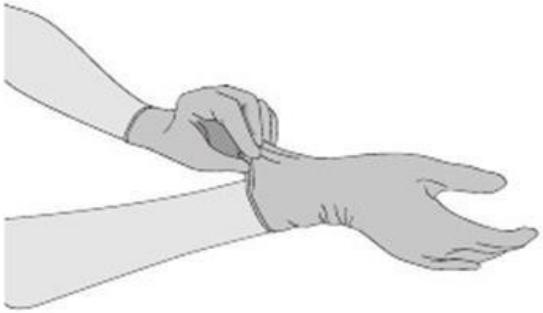
Step 4: Select the appropriate/correctly sized PPE set. Inspect the PPE to ensure that they are of the right size with no visible damage.

Step 5: Perform hand hygiene using the techniques for hand hygiene and dry with disposable paper towel.



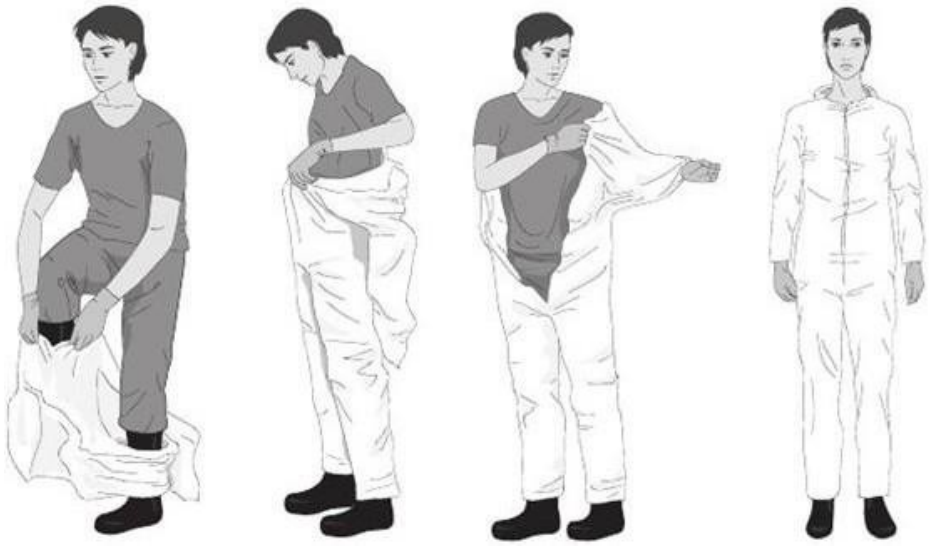
Step 6: Begin the process of putting on the PPE under the guidance of the “PPE buddy”.

Step 7: Put on the first pair of gloves (disposable or examination, nitrile gloves).



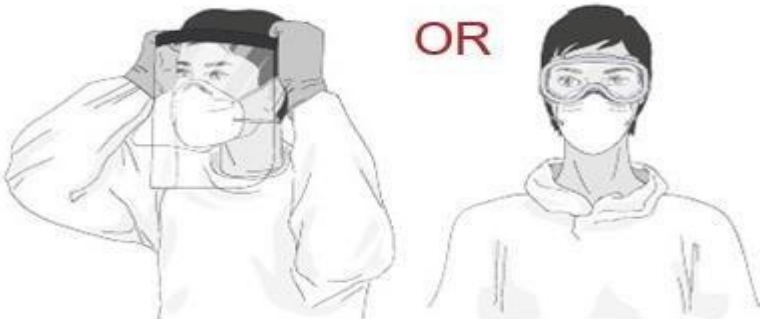
Step 8: Put on the coverall with the gloves under the cuff *(this is better done while seated),*slide the thumb through the thumb hole/finger loop in the coverall sleeve to anchor the gown.

Note: Ensure that the wrist and forearm are not exposed or too tight when arms are fully extended and when making wide movements



Step 9: Put on face mask/N95 respirator and take care to fix the lower string first and then the upper string *(face mask with loops over the ears is recommended).*

Step 10: Put on face shield or goggles.



Step 11: Put on a separate hood to cover any exposed skin and neck completely ***OR*** cover the head with the hood attached to the coverall

Step 12: Put on the disposable fluid proof apron *(if this is not available, use the clean heavy duty reusable waterproof apron)*

Step 13: Put on the second pair of gloves over the coverall cuff (preferably long cuffed gloves) (so second glove goes on last).

Step 14: Self-check in the mirror and ask the buddy to check the face to make sure none of the facial parts is exposed.

Step 15: Let the buddy write your name, function and time that you enter the high-risk zone.

Step 16: *If* buddy is entering high risk zone, guide buddy to dress up in the same order up to step 13.

Step 17: Then if both of you are secure, you are ready to enter the high-risk zone.

CHECKLIST FOR DONNING PPE

Place☑ in the check box ☐ if step/task is performed **satisfactorily**, an "**X**" if it is **not** performed **satisfactorily**, **N/O** if not observed or **N/A** if not applicable.

Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines
Not Observed: Step, task, or skill not performed by learner during evaluation by facilitator
Not Applicable: Step, task, or skill not required to be performed by learner during evaluation.

CHECKLIST FOR DONNING PPE				
STEP/TASK	**EVALUATION**			
	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
Remove all personal items (jewelries, watches, cell phones, street clothes, shoes, pens etc.)				
Put on scrub suit *(ensure elasticated trousers)*, gum boots and head cover in the changing room				
Move to the designated donning area				
Select the appropriate/correctly sized PPE set. Inspect the PPE to ensure that they are of the right size with no external Damage				

Perform hand hygiene using the techniques for hand hygiene (refer to Hand Hygiene SOP appendix 2a)				
Put on the first pair of gloves (disposable or examination, nitrile gloves)				
Put on the coverall or gown with the gloves under the cuff while seated (if there is a chair).				
Slide the thumb through the thumb hole/finger loop in the coverall sleeve to anchor the gown.				
Ensure that the wrist and forearm are not exposed or too tight when arm are fully extended and when making wide movements				
Put on face mask and take care to fix the lower string first and then the upper string.				
Put on face shield or goggles				
Put on a separate hood or coverall hood to cover any exposed skin and neck Completely				
Put on the disposable fluid proof apron (if this is not available, use the clean heavy duty reusable waterproof apron)				
Put on the second pair of gloves over the coverall cuff (preferably long cuffed gloves) such that second glove goes on last.				

Self-check in the mirror and ask the buddy to check the face to make sure none of the facial parts are exposed.				
Let the buddy write your name, function and time that you enter the high-risk zone				
Dress up your buddy in the same order before wearing the outer gloves				
Then if satisfied, enter the high-risk zone				

Appendix 2e:
Standard Operating Procedure (SOP) – Doffing of PPE

Name of Facility:	
SOP Number *(Insert HF SOP number here)*	**SOP Title: Doffing of PPE**
Authorizer:	**Authorization Signature:**
Effective date _____	

Purpose: To ensure PPEs are doffed correctly by health workers after attending to VHF patients or working in VHF isolation/treatment centres.

Scope: This SOP for correct doffing of PPE applies to all health workers at the VHF isolation/ treatment centres.

Definitions: Personal Protective Equipment is any device or clothing worn by a health worker to protect the wearer's skin, eyes, mucous membranes, airways and clothing from coming into contact with infectious agents.

Responsibility: Every health worker

Materials and Equipment: 0.5% chlorine solution, disposable hand towels, knapsack sprayer, running tap, Veronica Buckets and fluid receptacle, biosafety bin bags, liquid soap, Alcohol- Based- Hand- Rub, Mirror.

Procedure:

Step 1: Exit the patient care area and step into the designated doffing area

Step 2: Wash outer gloves with 0.05% chlorine solution. Remove and

place in red bin with liner.

Step 3: Remove Apron

Step 3a: When removing disposable aprons, lean slightly forward, tear it off at the neck and by the side without touching the front area. Then roll the apron forward and dispose into the biohazard bag/drum.

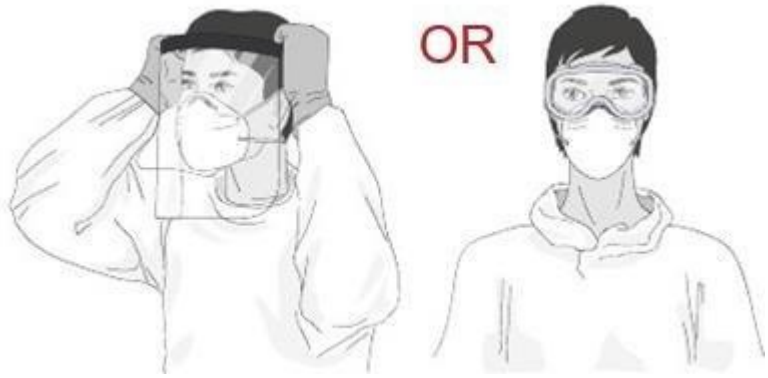
Step 3b: For reusable aprons, lean forward, untie from the back, gently lift the neck loop over the head ensuring you do not touch front of apron and drop gently in container containing 0.5% chlorine solution.

Step 3c: Perform hand hygiene with 0.05% chlorine solution on gloved hand

Step 4 Removal of coveralls

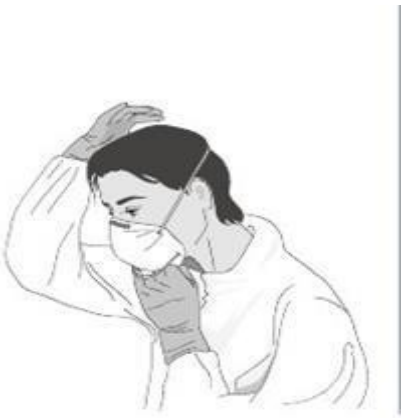
4a For Coveralls with Separate Hood

Step 4ai: Start by removing the goggles or face shield, gently lift band of goggles or face shield over your head forward, taking care to avoid contaminating your face.



Step 4ii: Perform hand hygiene on gloved hands with 0.05% chorine solution

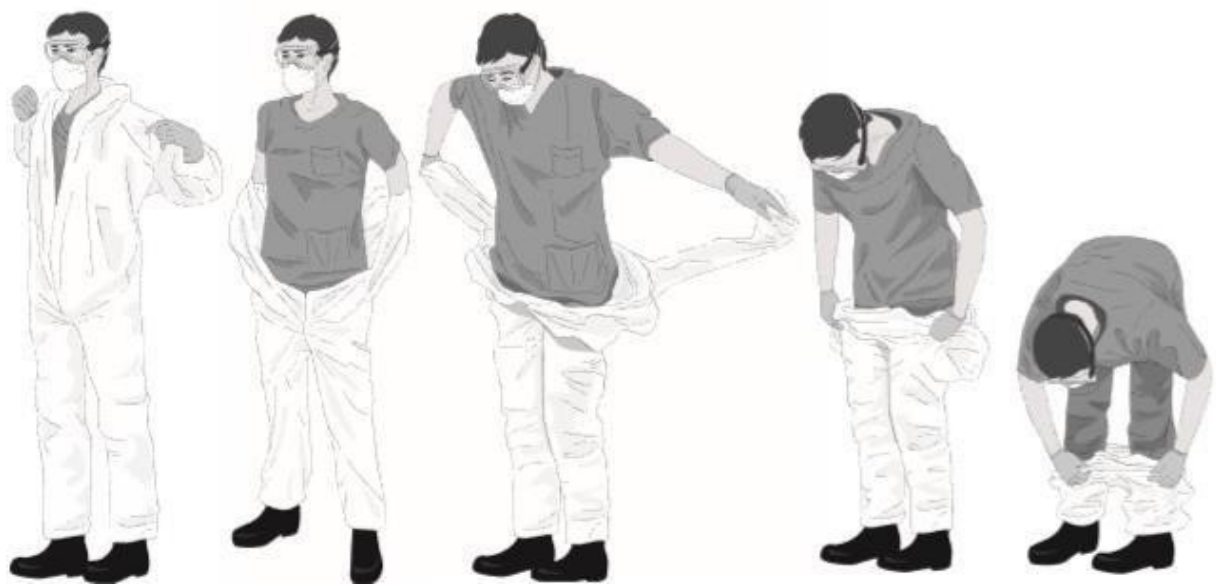
Step 4iii: Remove the hood by gently lifting the bottom from the back and roll it from back to front and from inside to outside. Dispose into the biohazard waste receptacle.



Step 4iv: Perform hand hygiene on gloved hands with 0.05% chorine solution

Step 4v: To remove coverall,

- with the washed gloved hand, reach for the zipper, take hold of the fastener without touching any bare skin of the neck, pull fastener downwards to unzip completely without touching any skin or scrubs.
- Carefully pick both edges of the open zipper, gently ease coverall over shoulder with the downward movement until the upper limbs are free.
- Slowly wriggle out rolling coverall outward being careful to avoid contamination with the outer part of the coverall until it falls below your knees.
- Gently use heels continuously to step on the lower part of the coveralls until you are able to get it off the feet completely.
- Pick up inner part, roll gently and discard into the waste receptacle.
- Perform hand hygiene.



Step 4 b. REMOVAL OF COVERALLS WITH AN ATTACHED HOOD

To remove coverall with an attached hood

Step 4b i: With the washed gloved hand, reach for the back of the hood and gently ease off the head backwards.

Step 4b ii reach for the zipper, take hold of the fastener without touching any bare skin of the neck, pull fastener downwards to unzip completely without touching any skin or scrubs.

Step 4b iii: start removing coverall from the top starting with the attached hood. Free the shoulders by wriggling out of one shoulder at a time with the chest thrust forwards.

Step 4b iv: Now that the shoulders are free, bend forwards and pull the arms out of the sleeves.This turns the sleeves of the coverall inside out (i.e. the clean side out). At the same time, the outer gloves are rolled away with the cuff of the coverall exposing the inner glove.

Step 4b v: With the inner gloves on, roll the coverall from the inside of the coverall from the waist down to the top of the boots.

Step 4b vi: Gently use heels continuously to step on the lower part of the coveralls pushing it downwards until you are able to get it off the feet completely.

Step 4b vii: Pick up inner part, roll gently and discard into the waste

receptacle.

Step 4b viii: Perform hand hygiene on the gloved hand.

Step 5a: Remove the face mask *(if face mask is used)*. Pull the bottom string over the head first and then the top string last; then Perform hand hygiene on gloved hands

Step 5b: Remove the N95 mask/respirator (if used) by lifting the lower loop over the head first and then the upper loop next. Do not touch the front of the mask while removing. Using the loopsof the mask gently drop in the waste receptacle.

Perform hand hygiene on the gloved hands.

Step 7axii: Remove the goggles from the back with the eyes closed to avoid splashes into theeyes. (for people with medicated eye glasses, remove the goggles from the front and also keep the eyes closed)

Step 7bii: Then dip goggles into 0.5% chlorine solution for 30secs. Drop goggles in processing container. Then perform hand hygiene.

Step 8: Remove the head cover and dispose in the waste receptacle; then Perform hand hygiene on gloved hands with 0.5% chlorine solution

Step 9a: Remove the rubber boots *(while seated)* without touching them by stepping on the heel with the other foot/boot and slip foot out carefully, then put on the slip-ons.

Step 9b: Boots should be decontaminated by soaking in 0.5% chlorine solution for 30 minutes once a day then washed with water, rinsed and dried in the sun hanging upside down on stakes.

> *NB: If the same boots are to be used outside of the high-risk zone, (e.g., Ebola treatment centers) keep them on but disinfect them with 0.5% chlorine before leaving the doffing area*

Step 10: Perform hand hygiene on gloved hands with 0.5% chlorine solution.

Step 11: Remove the gloves (i.e., the inner one now remaining)

Step 12: Perform hand hygiene with alcohol-based hand rub (ABHR)

Step 13: Now exit the doffing area

Step 14: Perform hand washing using soap and water when you are now outside the doffing area

CHECKLIST FOR DOFFING OF PPE

Place √ in the check box ☐ if step/task is performed **satisfactorily**, an "**X**" if it is **not** performed **satisfactorily**, **N/O** if not observed or **N/A** if not applicable
Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines
Not Observed: Step, task, or skill not performed by learner during evaluation by facilitator
Not Applicable: Step, task, or skill not required to be performed by learner during evaluation.

CHECKLIST FOR DOFFING OF PPE				
STEP/TASK	**EVALUATION**			
	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
Exit patient care area and step into the designated doffing area				
Wash outer gloves with 0.05% chlorine solution				
Lean slightly forward when removing disposable aprons				
Tear off at the neck and by the side without touching the front area				
Roll the apron forward and dispose into the biohazard bag/drum				
For reusable aprons, lean forward, untie from the back				
Gently lift the neck loop over the head ensuring not to touch the front of apron				
Drop gently in container containing 0.5% chlorine solution				
Perform hand hygiene with 0.05% chlorine solution on gloved hand				
For Coveralls with Separate Hood	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
Start by removing the googles or face shield, gently lift band of googles or face masks over your head forward, taking care to avoid contaminating your face				
Perform hand hygiene with gloved hands using 0.05% chorine solution				
Remove the hood by gently lifting the bottom of the hood from the back and roll it from back to front and from inside to outside				
Dispose into the waste receptacle.				

Wash gloved hands in 0.05% chlorine solution using standardtechnique				
To remove coverall	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
With the washed gloved hand, reach for the zipper, take hold of the fastener without touching any bare skin of the neck, pull fastener downwards to unzip completely without touching any skin or scrubs.				
Carefully pick both edges of the open zipper, gently ease coverall over shoulder with the downward movement until the upper limbs are free				
Slowly wriggle out rolling coverall outward being careful to avoid contamination with the outer part of the coverall until it falls below your knees.				
Gently use heels continuously to step on the lower part of the coveralls until you can get it off the feet completely.				
Pick up inner part, roll gently and discard into the waste receptacle.				
Perform hand hygiene				
Removal of Coveralls with An Attached Hood	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
With the washed gloved hand, reach for the back of the hood and gently ease off the head backwards				
Reach for the zipper, take hold of the fastener without touching any bare skin of the neck, pull fastener downwards to unzip completely without touching any skin or scrubs				
Start removing coverall from the top starting with the attached hood. Free the shoulders by wriggling out of one shoulder at a time with the chest thrust forward.				
Now that the shoulders are free, bend forward and pull the arms out of the sleeves. This turns the sleeves of the coverall inside out (i.e., the clean side out). .				

With the inner gloves on, roll the coverall from the inside of the coverall from the waist down to the top of the boots				
Gently use heels continuously to step on the lower part of the coveralls pushing it downwards until you can get it off the feet completely				
Pick up inner part, roll gently and discard into the waste receptacle.				
Perform hand hygiene on the gloved hand				
Remove the face mask (if used)				
Remove the N95 mask/respirator by lifting the lower loop over the head first and then the upper loop next. Do not touch the front of the mask while removing. Using the loops of the mask gently drop in the waste receptacle.				
Perform hand hygiene on the gloved hands.				
Remove the goggles from the back with the eyes closed to avoid splashes into the eyes. (For people with medicated eye glasses, remove the goggles from the front and also keep the eyes closed)				
Dip goggles into 0.5% chlorine solution for 30 secs. Drop goggles in processing container				
Perform hand hygiene on gloved hands				
Remove the mask or respirator. Pull the bottom string over the head first and then the top string last.				
Perform hand hygiene on gloved hands				
Remove the head cover and dispose in the waste receptacle.				
Perform hand hygiene on gloved hands with 0.05% chlorine solution				
Remove the rubber boots without touching them by stepping on the heel with the other foot/boot and slip foot out carefully, then put on the slip-ons.				
Perform hand hygiene on gloved hands with 0.05% chlorine solution.				
Remove the inner gloves				
Perform hand hygiene with alcohol-based hand rub				
Exit the doffing area				

Perform hand washing using soap and water when you are now outside the doffing area				
Boots disinfected by soaking, spraying them in with 0.5% chlorine solution for 30 minutes once a day then washed with water,rinsed and dried in the sun hanging upside down on stakes. When dry, store in a clean area.				

Appendix 2f:
Standard Operating Procedure (SOP) – Linen Management

Name of Facility:	
SOP Number ***(Insert HF SOP number here)***	**SOP Title: Linen Management**
Authorizer:	**Authorization Signature:**
Effective date _____	

Purpose: To clean and decontaminate blood or body fluid contaminated linen

Scope: This is applicable to linen contaminated with Blood and all kinds of body fluids in the VHF isolation ward.

Responsibility: IPC Team, Health workers, waste managers and contractors

Materials and equipment: Water, detergent, PPEs, buckets, chlorine solution, iron and leak proof bags

Procedure

Step 1: Wear appropriate PPE (Wear full PPE when handling linen (coverall, gloves, boots, mask and goggle or face shield).
Step 2: Remove the linen from patient's bed.
Step 3: Separate grossly contaminated linen from non-contaminated linen in the patient's room for ease of handling in the laundry.
Step 4: Remove gross contamination by scrapping off into the patient's toilet or waste pit. Do not remove excrement by spraying with water.
Step 5: Soiled linen should be placed in clearly-labeled, leak-proof bags or buckets at the site of use and the container surfaces should be disinfected (using 0.5% chlorine solution) before removal from the site.
Step 6: Linen should be transported directly to the laundry area and laundered promptly with water and detergent.

Laundering Linen

Heavy-duty washers and dryers are recommended for the VHF laundry. Decontaminating linen prior to washing it is not necessary unless linen is heavily soiled and will be washed by hand. Consider destroying heavily soiled linen.

Washing Linen by Machine

Step 7: Wash used linen (sheets, cotton blankets) in hot water (70°C to 80°C), disinfectant, and detergent; rinse; and dry, preferably in a dryer or in the sun.
Step 8: If low-temperature water is used for laundry cycles, use chemicals suitable for low temperature washing at the appropriate concentration.

Washing Linen by Hand

Step 9: Soak the linen in clean water and detergent for 30 minutes.

Step 10: Remove and inspect the linen, rub to remove dirt and discard the water.
Step 11: Make up a fresh solution of 0.5% chlorine in water (bleach) and soak the linen in it for another 30 minutes.
Step 12: Remove, rinse in clean water and wring out
If safe cleaning and disinfection of heavily soiled linen is not possible or reliable, it may be better to burn the linen to avoid any unnecessary risks to individuals
Step 13: Wash the domestic gloves with soap and water before removing the PPE.
Step 14: Remove all the PPE safely.
Step 15: Carry out hand hygiene.

Drying, Checking, Ironing, and Folding Linen

Step 17: Spread in the sun to dry. Air dry in direct sunlight, if possible, keeping the fabric off the ground and away from dust and moisture. (Do not spread the linen on shrubs and flower hedges, ensure that there is a well set up clothes line dedicated for linen.
Step 18: Completely air or machine dry before further processing.
Step 19: After linen is totally dry, check for holes and threadbare areas.
Step 20: Iron and fold clean and dry linen.

How should mattresses be disinfected?

Step 21: While wearing full PPE, the mattress must be checked for any damage (there should be no tears or cracks).
Step 22: Fill a bucket with clean water and detergent
Step 23: Use a cloth soaked in the bucket to wipe over the surface of the mattress.
Step 24: Wipe to dry.
Step 25: Wipe over with disinfectant such as 0.05% chlorine solution and allow to dry (preferably in the sun).
Step 26: Remove PPE and dispose of appropriately
Step 27: Perform hand hygiene

Reporting:

CHECKLIST FOR LINEN MANAGEMENT

Place a "□" in case box if step/task is performed **satisfactorily**, an "**X**" if it is **not** performed **satisfactorily**, **N/O** if not observed or **N/A** if not applicable.
Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines
Not Observed: Step, task, or skill not performed by learner during evaluation by facilitator
Not Applicable: Step, task, or skill not required to be performed by learner during evaluation.

CHECKLIST FOR LINEN MANAGEMENT				
STEP/TASK	**EVALUATION**			
	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
Wear appropriate PPE (Wear full PPE when handling linen (coverall, gloves, boots, mask and goggle or face shield)				
Remove the linen from patient's bed.				
Separate grossly contaminated linen from non-contaminated linen in the patient's room for ease of handling in the laundry.				
Remove gross contamination byscrapping off into the patient's toilet orwaste pit. Do not remove excrement by spraying with water				
Soiled linen placed in clearly-labelled, leak-proof bags or buckets at the site of use and the container surfaces should be disinfected (using 0.5%) before removal from the site				
Linen transported directly to the laundry area and laundered promptly with water and detergent				
Washing Linen by Machine	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
Used linen washed (sheets, cotton blankets) in hot water (70°C to 80°C), disinfectant, and detergent; rinse; and dry, preferably in a dryer or in the sun.				
If low-temperature water was used for laundry cycles, chemicals suitable for low temperature washing at the appropriate concentration was used.				
Coloured and white linen washed separately.				
Washing Linen by Hand	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable

Soak the linen in clean water and detergent for 30 minutes				
Remove and inspect the linen, rub to remove dirt and discard the water				
Make up a fresh solution of 0.5% chlorine in water (bleach) and soak the linen in it for another 30 minutes.				
Remove, rinse in clean water and wring Out				
Wash the domestic gloves with soap and water before removing the PPE				
Remove all the PPE safely				
Carry out hand hygiene				
Drying, Checking, Ironing, and Folding Linen	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
Spread in the sun to dry. Air dry in direct sunlight, if possible, keeping the fabric off the ground and away from dust and moisture				
Completely air or machine dry before further processing				
After linen is totally dry, check for holes and threadbare areas				
Iron and fold clean and dry linen				
Disinfecting mattresses	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
While wearing full PPE, the mattress must be checked for any damage (there should be no tears or cracks)				
Fill a bucket with clean water and detergent				
Use a cloth soaked in the bucket to wipe over the surface of the mattress				
Wipe to dry				
Wipe over with disinfectant such as 0.05% chlorine solution and allow to dry (preferably in the sun)				
Remove PPE and dispose of appropriately				
Perform hand hygiene				

Appendix 2g:
Standard Operating Procedure (SOP) – Environmental Cleaning

Name of Facility:	
SOP Number *(Insert HF SOP number here)*	**SOP Title: Environmental Cleaning**
Authorizer:	**Authorization Signature:**
Effective date _____	

Purpose: To prevent microorganisms from coming in contact with patients, visitors, health workers, and the community

Scope: This includes surfaces, equipment, materials, furniture and blinds within the patient care area.

Definitions:
Surfaces: Including floor, walls, ceiling and the coverings of physical objects/structures or materials present in the isolation ward

Furniture and Blinds: Cupboards, narrow storage compartments/dedicated cabinets, chairs/tables, curtains, windows and shades, lighting equipment and other furnishings

Responsibility: IPC focal person, health workers

Materials and Equipment: Water**,** detergent, chlorine solution (0.5% and 0.05%)**,** buckets, detachable mop head, dry clothes and full PPEs.

Procedure:

The patient care areas should be cleaned at least three times daily and after every patient's discharge as follows;

1. Wear full PPE (domestic gloves, gown, face cover, head cover, rubber boots)
2. Prepare a fresh solution of detergent in a clean bucket according to manufacturer's guideline for dilution.
3. Prepare a separate bucket of disinfectant (i.e. 1000 parts per million of hypochlorite solution, 0.5% chlorine), (see SOP for chlorine solution preparation).
4. Use the two buckets from steps 2 and 3 above (preferably of different colours) and two sets of clean dry clothes and mops; one for detergent solution and the other for the disinfectant solution.
5. Start the cleaning process moving from the clean area to the dirty area.
6. Clean the surfaces with detergent solution.
7. Apply the disinfectant to the surfaces using a cloth or mop as appropriate. Do not spray.
8. Pay particular attention to frequently touched areas and horizontal surfaces.
9. Discard dirty solution and replace with clean and freshly made-up solution.
10. At the end of the cleaning session, discard the liquid in the bucket into the sluice (if the sluice is not available, discard into the toilet).
11. Clean and dry the containers and store them inverted.
12. Soak all used clothes in 0.5% chlorine solution or autoclave before reuse.

13. Detachable mop heads are preferred for high contamination areas and should be washed thoroughly in detergent solution before autoclaving. For non-detachable mop heads, disinfect with 0.5% chlorine solution, rinsed and allowed to dry in the sun before reuse.
14. Do not spray (i.e., fog) occupied or unoccupied clinical areas with disinfectant.

CHECKLIST FOR ENVIRONMENTAL CLEANING

Place a "□" in case box if step/task is performed **satisfactorily**, an "**X**" if it is **not** performed **satisfactorily**, **N/O** if not observed or **N/A** if not applicable.
Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines
Not Observed: Step, task, or skill not performed by learner during evaluation by facilitator
Not Applicable: Step, task, or skill not required to be performed by learner during evaluation.

CHECKLIST FOR ENVIRONMENTAL CLEANING				
STEP/TASK	**EVALUATION**			
CLEANING AND DISINFECTING PATIENTCARE AREA	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
Wear full PPE, (domestic gloves, gown, face cover, head cover, rubber boots)				
Prepare a fresh solution of detergent in a clean bucket according to manufacturer's guideline for dilution.				
Prepare a separate bucket of disinfectant (i.e. 1000 parts per million of hypochlorite solution, 0.5% chlorine)				
Use these two buckets/containers (*preferably of different colours*) and two sets of clean dry clothes and mops; one for water and detergent and the other for the disinfectant solution				
Start the cleaning process moving from clean area to dirty area				
Clean the surfaces with detergent solution				
Apply the disinfectant to the surfaces using a clean cloth or				

mop as appropriate (do not spray*)*				
Pay particular attention to frequently touched areas and horizontal surfaces.				
Discard dirty solution and replace with freshly made-up Solution				
Discard the liquid in the bucket into the sluice at the end of the cleaning session (if the sluice is not available, discard into the toilet*)*				
Clean and dry the containers and store them inverted.				
Soak all used clothes in 0.5% chlorine solution or autoclave before reuse				
Use detachable mop heads for high contamination areas and wash thoroughly in detergent solution before autoclaving				
If non-detachable mop heads are used, disinfect with 0.5% chlorine solution, rinse and allow to dry in the sun before reuse.				
Do not spray (*i.e. fog*) occupied or unoccupied clinical areas with disinfectant.				

Appendix 2h:
Standard Operating Procedure (SOP) – Waste Management

Name of Facility:	
SOP Number ***(Insert HF SOP number here)***	**SOP Title: Waste Management**
Authorizer:	**Authorization Signature:**
Effective date _____	

Purpose: To ensure proper and safe disposal of waste generated from treating a patient in the VHF treatment/ isolation centre.

Scope: This procedure applies to all waste management activities at VHF treatment/ isolation centre.

Responsibility: IPC Team, Health workers, waste managers and contractors

Materials and Equipment: Colour coded bins, containers, sharp boxes, covered trolley or wheeled bin, high temperature incinerator, disinfectants, full PPEs, heavy duty hand gloves, rubber boots, thick rubber apron, detergent, soap and water.

General Notes:

- Wastes should be segregated at points of generation to enable appropriate and safe handling.
- Sharp objects and tubing that have been in contact with the blood stream should be placed inside puncture resistant containers/sharps boxes. This should be located as close as practical to the area in which the items are used.
- All solid non-sharp medical waste should be collected in leak-proof red infectious waste bags and covered bins.
- Ensure infectious medical wastes are not disposed in the same location as general waste but to a designated incineration point.

CAUTION!!! Only authorized licensed and trained medical waste management contractors should be used. Ensure monitoring of the activities is done by the IPC team

Procedure:

Waste collection procedure:

Step 1: Wear full PPE

Step 2: Tie the neck of the waste bag and lift the bag gently, ensuring that it does not spill.

Step 3: Place it in another red bag and tie the neck of the second bag.

Step 4: Disinfect the outside of the bag with 0.5% chlorine solution.

Step 5: Place it at the collection point which should be just outside the clinical area.

Step 6: Move to the doffing area and remove PPE following the appropriate procedure.

Step 7: Wash hands thoroughly with soap and water.

Solid Waste transportation procedure (from isolation area to final disposal point).

Step 1a: Use a covered trolley or a wheeled bin with a lid to transport infectious waste to a designated incineration point or pit.

Step 1b: Use wheelbarrow where the use of covered trolley and wheeled bin is difficult due to lack of concrete or level flooring.

Step 1c: Use a labelled and firmly lidded collection bin if none of the above is available

> Note: Infectious solid waste should not be transported by hand due to the risk of accident or injury from infectious material or incorrectly disposed sharps.

Step 2: Disinfect all surfaces of the trollies, bins or wheelbarrows with 0.5% chlorine solution.

Step 3: Incinerate collected waste within 24 hours of collection and storage

Liquid and Semi-solid Waste management procedure

Step 1: Wear full set of PPEs including utility gloves, protective eyewear, and a plastic apron when handling and transporting containers with liquid and semi-solid wastes

Step 2: Disinfect all liquid and semi-solid wastes, such as faeces, urine, vomitus and wastes from washing, with 0.5% chlorine solution and dispose in the sanitary sewer, water closet system or pit latrine

> Note: Dispose liquid and semi-solid waste gently to avoid splashes

Step 3: Place containers in 0.5% chlorine solution for 30 minutes to decontaminate

Step 4: Wash and rinse containers with detergent solution.

Off- Site Waste Management:

Step 1: Package waste in colour coded bags

Step 2: Monitor and ensure waste transportation to the high temperature incineration site

Step 3: Accompany waste with waste note containing source and destination of waste

Step 4: Ensure final destruction of waste.

CHECKLIST FOR WASTE MANAGEMENT

Place a "□" in case box if step/task is performed **satisfactorily**, an "**X**" if it is **not** performed **satisfactorily**, **N/O** if not observed or **N/A** if not applicable.

Satisfactory: Performs the step or task according to the standard procedure or guidelines

Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines

Not Observed: Step, task, or skill not performed by learner during evaluation by facilitator

Not Applicable: Step, task, or skill not required to be performed by learner during evaluation.

CHECKLIST FOR *WASTE MANAGEMENT*				
STEP/TASK	**EVALUATION**			
Waste collection	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
Wear full PPE				
Tie the neck of waste bag and lift bag gently, ensuring that it does not spill				

Place in another red bag and tie neck of the second bag				
Disinfect collected waste with 0.5% chlorine solution				
Place it at the collection point which should be just outside the clinical area				
Remove PPE following the appropriate procedure and wash hands thoroughly with soap and water.				
Solid Waste transportation	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
Use a covered trolley or a wheeled bin with a lid to transport infectious waste to a designated incineration point or pit.				
Use a wheelbarrow where the use of covered trolley or wheeled bin is difficult				
Use a labeled and firmly lidded collection bin if none of the above is available				
Do not transport infectious solid waste by hand				
Disinfect all surfaces of the trolleys, bins or wheelbarrows with 0.5%chlorine solution.				
Incinerate collected waste within 24 hours of collection and storage				
Liquid Waste and semi-solid waste management	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
Wear full set of PPEs including utility gloves, protective eyewear, and a plastic apron when handling and transporting containers with liquid or semi-solid waste				
Disinfect all liquid and semi solid wastes such as faeces, urine, vomitus, and waste from washing with 0.5% chlorine solution and dispose in the sanitary sewer, water closet system or pit latrine				
Dispose liquid or semi-solid waste gently to avoid splashes				
Place containers in 0.5% chlorine solution for 30 minutes to decontaminate				
Wash and rinse containers with detergent solutions				

Off- Site Waste Management	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
Package waste in colour coded bag				
Monitor waste transportation to the high temperature incineration site				
Accompany waste with waste-note containing source and destination of waste				
Ensure final destruction of waste				

Appendix 2i:
Standard Operating Procedure (SOP) – Cleaning and Disinfecting Ambulances

Name of Facility:	
SOP Number *(Insert HF SOP number here)*	**SOP Title: Cleaning and Disinfecting Ambulances**
Authorizer:	**Authorization Signature:**
Effective date _____	

Purpose: To provide a guide on standardized procedure for cleaning and disinfection of an ambulance that has been used for transporting a VHF patient or corpse.

Scope: This is applicable to all ambulances used for the transportation of VHF (suspect and confirmed) cases or corpses.

Definitions

Surfaces: Including floor, door handles, walls, roof, stretcher and the coverings of physical objects/structures or materials in the ambulance

Furniture and Blinds: ambulance seats, narrow storage compartments/dedicated cabinets, curtains, windows and shades, lighting equipment and other furnishings

Responsibility: Ambulance driver, health workers, IPC team.

Materials and Equipment: PPE (Gown, apron, boots, goggles, face mask and domestic gloves), 0.5% chlorine solution, water**,** detergent, knapsack sprayer, disinfectant and bucket

Note:

- Identify a designated donning and doffing area before washing the ambulance

Procedure:
The ambulance should be cleaned immediately a VHF case or corpse is evacuated as follows;
Step 1: Wear full PPE

Step 2: Spray the backside of the ambulance with 0.5% chlorine solution and allow for a contact time of at least 10 minutes (pay attention to door handles and other contact points).

Step 3: Open the back door of the ambulance.

Step 4: Tie up any used garbage bag and place in waste zone of the treatment centre.

Step 5: Spray the entire surface of the ambulance thoroughly especially the roof, floor, walls, stretcher and inside of the door with 0.5% chlorine solution and allow for a contact time of at least 10 minutes.

Step 6: Clean all surfaces of the ambulance especially the roof, floor, walls, stretcher and inside of the door with detergent solution.

Step 7: Carefully rinse the inside of the ambulance with clean water (avoid splashes).

Step 8: Close the door of the ambulance and wash the entire outside surface of the ambulance with detergent solution then spray the entire surface of the outside of the ambulance with 0.5% chlorine solution and allow a contact time of at least 10 minutes.

Step 9: Carefully rinse the backside of the ambulance with clean water and then request the driver to drive out of the decontamination area.

Step 10: Spray the surfaces/environment where the decontamination of the ambulance has taken place with 0.5% chlorine solution.

Step 11: Proceed to the designated doffing area and remove the PPE

Step 12: Perform hand hygiene.

CHECKLIST FOR CLEANING AND DISINFECTING AMBULANCE

Place a "□" in case box if step/task is performed **satisfactorily**, an "**X**" if it is **not** performed **satisfactorily**, **N/O** if not observed or **N/A** if not applicable.
Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines
Not Observed: Step, task, or skill not performed by learner during evaluation by facilitator
Not Applicable: Step, task, or skill not required to be performed by learner during evaluation.

CHECKLIST FOR DISINFECTING AND AMBULANCE				
STEP/TASK	**EVALUATION**			
Wear full PPE	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
Spray the backside of the ambulance with 0.5% chlorine solution and allow for a contact time of 10 minutes (Pay attention to door handles and other contact points)				
Open back door of the ambulance				
Tie up any used garbage bag and place in waste zone of the treatment centre.				
Spray the entire surface of the ambulance thoroughly especially the roof, floor, walls, stretcher and inside of the door with 0.5% chlorine solution and allow for a contact time of at least 10 minutes.				

Clean all surfaces of the ambulance especially the roof, floor, walls, stretcher and inside of the door with detergent solution				
Carefully rinse the inside of the ambulance with clean water (avoid splashes).				
Close door of the ambulance and wash entire outside surface of the ambulance with detergent solution then spray the entire surface of the outside of the ambulance with 0.5% chlorine solution and allow a contact time of at least 10 minutes.				
Carefully rinse the backside of the ambulance with clean water and request driver to drive out of decontamination area.				
Spray the surfaces/environment where decontamination of the ambulance has taken place with 0.5% chlorine solution				
Proceed to the designated doffing area and remove the PPE				
Perform hand hygiene				

Appendix 2j:
Standard Operating Procedure (SOP) –Preparation of Bodies of probable cases of VHF in the Community

Name of Facility:	
SOP Number *(Insert HF SOP number here)*	**SOP Title: Preparation of Bodies of probable cases of VHF in the Community**
Authorizer:	**Authorization Signature:**
Effective date _____	

Purpose: To prevent transmission of VHF infection from persons in the community suspected to have died of VHF (refer to case definition of probable cases)

Scope: This is applicable to bodies of persons suspected to have died of VHFs within the community

Definitions:

- Body: Corpse
- Body bag: Special fluid resistant plastic bag for keeping deceased bodies
- Body holding room: Dedicated place for temporary storage of bodies while awaiting collection by the burial team
- State safe burial team: Dedicated set of trained persons assigned with the responsibility of interring the body
- PPE: Personal protective equipment
- Shroud: a length of cloth or enveloping garment in which a dead person is wrapped for burial

Responsibility: State 'safe' burial team led by ministry of environment

Materials and Equipment: 2 body bags (white for Muslims), full PPE (coverall, plastic apron, fluid resistant mask, goggles, disposable gloves, N95 respirator, heavy duty gloves, rubber boots), disinfectant (0.5% chlorine), fluid and puncture resistant sharps box, two leak-proof infectious waste bags (one for disposable material to be destroyed and one for reusable materials to be disinfected), dedicated ambulance.

General procedure:

- Identify and sensitize the head of the family or representative, who can influence the rest of the family on the VHF probable status of the deceased
- Explain safe burial process to avoid dangerous practices such as washing or touching the body
- Address concerns in a culturally sensitive manner
- Ensure appropriate documentation by the State Epidemiology Unit
- The body should be properly prepared at the site of death and should only be moved after preparation
- Identify an improvised donning and doffing area. Ensure the doffing area is in close proximity to where the body is to be prepared

Step 1: Assemble the necessary materials and PPEs

Step 2: Full body PPE should be worn by at least four members of the burial team in the improvised PPE donning area (See section on how to wear full PPE for managing cases of VHF).

- An apron should be worn over the PPE because of the increased likelihood of significant contamination with blood or other body fluids.
- Use thick rubber gloves as the second pair (or outer layer) of gloves.
- Use rubber boots
- Before a body is handled, use a surgical mask to cover the nose and mouth of the deceased

Step 3: Disinfect body with 0.5% chlorine solution and place the body in the first body bag and close the bag.

Step 4: Change the outer gloves and apron after the body is enclosed in the first bag

Step 5: Disinfect the inner gloves with 0.5% chlorine solution before new outer gloves are donned

Step 6: Disinfect the entire surface of the outside of the bag with 0.5% chlorine solution

Step 7: Place the first bag in the second bag and close the bag

Step 8: Disinfect the entire surface of the outside of the second bag with 0.5% chlorine solution.

Step 9: Place in a coffin and decontaminate the coffin with 0.5% chlorine

Step 10: Move coffin to the ambulance

Step 11: Decontaminate the ambulance with 0.5% chlorine solution

Step 12: Place coffin in the ambulance.

Step 13: Move to the improvised doffing area and doff the PPE. Ensure reusable items are decontaminated appropriately

Step 14: Transport the coffin to the burial place as quickly as possible or to a designated VHF morgue if immediate burial is not possible

Step 15: Disinfect the deceased room/temporary holding area with 0.5% chlorine solution after the body has been moved:

Note: Once the bagged body and coffin have been disinfected, handlers do not need to wear full PPE any more to carry it to the grave site. They should just wear thick rubber gloves and disinfect the gloves and perform hand hygiene after carrying.

Preparing body for Muslim safe burial

Step 1: Provide white body bag for Muslim patients.

Note: Seek permission in advance from the Imam that the body bag can be used to represent a shroud.

Step 2: Cover body by wrapping in a Shroud (plain white cotton sheet) before placing in white body bag if permission is not granted by the Imam to use only white body bag

Step 3: Knot shroud at both ends. (The safe burial team should provide a shroud for the family or they provide one themselves.)

Step 4: A female member of the burial team should shroud deceased female body prior to placing in a body bag (see information for shrouding). Complete from step 3 to 15 above

CHECKLIST FOR HOW TO PREPARE BODIES OF PROBABLE CASES OF VHF IN THE COMMUNITY

Place a "√ OBJ OBJ in the case box if step/task is performed **satisfactorily**, an "**X**" if it is **not** performed
satisfactorily, **N/O** if not observed or **N/A** if not applicable.
Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines
Not Observed: Step, task, or skill not performed by learner during evaluation by facilitator
Not Applicable: Step, task, or skill not required to be performed by learner during evaluation.

CHECKLIST FOR HOW TO PREPARE BODIES OF PROBABLE CASES OF VHF IN THE COMMUNITY				
STEP/TASK	**EVALUATION**			
	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
Assemble the necessary materials and PPEs				
Full body PPE should be worn by at least four members of the burial team in the improvised PPE donning area				
Disinfect body with 0.5% chlorine solution, place the body in the first body bag and close the bag.				
Change outer gloves and apron after the body is enclosed in the first bag				
Disinfect inner gloves with 0.5% chlorine solution before new outer gloves are donned				
Disinfect entire surface of the outside of the bag with 0.5% chlorine solution				
Place first bag in the second bag and close the bag				
Disinfect entire surface of the outside of the second bag with 0.5% chlorine solution.				
Place in a coffin and decontaminate the coffin with 0.5% chlorine solution.				
Move coffin to the ambulance.				
Decontaminate the ambulance with 0.5% chlorine solution				

Move to the improvised doffing area and doff the PPE. Ensure reusable items are decontaminated appropriately				
Transport the coffin to the burial place as quickly as possible or to a designated VHF morgue if immediate burial is not possible				
Disinfect the deceased room/temporary holding area with 0.5% chlorine solution after the body has been moved				
Preparing body for Muslim safe burial	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
Provide white body bag for Muslim patients.				
Cover body by wrapping in a shroud (plain white cotton sheet) before placing in white body bag if permission is not granted by the Imam to use only white body bag.				
Knot shroud at both ends. (The safe burial team should provide a shroud for the family or they provide one themselves.)				
A female member of the burial team should shroud deceased female body prior to placing in a body bag				

Appendix 2k:
Standard Operating Procedure (SOP) – How to prepare the body of VHF patient in the health facility

Name of Facility:	
SOP Number *(Insert HF SOP number here)*	**SOP Title: How to prepare the dead body in the health facility**
Authorizer:	**Authorization Signature:**
Effective date _____	

Purpose: To prevent transmission of VHF infection from persons that died of VHFs

Scope: This is applicable to bodies of patients that died of VHFs within the health facility

Definitions:

- Body: Corpse
- Body bag: Special fluid resistant plastic bag for keeping deceased bodies
- Body holding room: Dedicated place for temporary storage of bodies while awaiting collection by the burial team
- Burial team: Dedicated set of trained persons assigned with the responsibility of interring the body
- VHF treatment centre: A special facility or isolation where VHF patients are nursed
- PPE: Personal protective equipment

Responsibility: Health facility safe burial team

Materials and Equipment: 2 body bags (white for Muslims), coverall, plastic apron, fluid resistant mask, goggles, disposable gloves, N95 respirator, heavy duty gloves, rubber boots, disinfectant (0.5% chlorine), fluid and puncture resistant sharps box, two leak-proof infectious waste bags (one for disposable material to be destroyed and one for reusable materials to be disinfected), dedicated ambulance.

General procedure:

Note:

1. Identify a family head or representative who can influence the rest of the family members and explain safe burial process.
2. If necessary, any person required to identify the body must not have direct contact with the dead body. Any viewing should be done from a separate room through a see-through door or through a window. Anyone entering the room must wear appropriate PPE

Step 1: Assemble the necessary materials and PPEs

Step 2: Before going to bag the body, use an indelible marker to label the top surface of the outer bag with the deceased's name, age, and ID number and clearly indicate that the deceased is a suspected or confirmed case of VHF.

Step 3: At least four members of the burial team should wear full body PPE in the PPE donning area (see appendix 2d).

- An apron should be worn over the coverall because of the increased likelihood of significant contamination with blood or other body fluids.
- Use thick rubber gloves as the second pair (or outer layer) of gloves.
- Use rubber boots.
- The body should be properly prepared at the site of death. It should only be moved after this has been completed, and the outer surface of the body bag or other outer covering has been disinfected.
- Before a body is handled, use a surgical mask to cover the nose and mouth of the deceased.
- The body should not be washed, sprayed or embalmed.

Step 4: Leave any medical devices (tubes, drips) in place on the body (do not attempt to remove them).

Step 5: Place the body in the first body bag and close the bag.

Step 6: Change the outer gloves and apron, once the body is enclosed in the first bag.

Step 7: Disinfect the inner gloves with 0.5% chlorine solution before new outer gloves are donned.

Step 8: Disinfect the entire surface of the outside of the bag with 0.5% chlorine solution.

Step 9: Place the first bag in the second bag and close the bag.

Step 9: Disinfect the entire surface of the outside of the second bag with 0.5% chlorine solution.

Step 10: Move the body to the ambulance exit area, once the second body bag has been disinfected.

Step 11: Place in a coffin and decontaminate the coffin with 0.5% chlorine.

Step 12: Move to doffing area and doff the PPE.

Step 13: Decontaminate the boots with 0.5% chlorine solution.

Step 14: Transport the body to the burial place as quickly as possible or a designated morgue in the treatment centre if immediate burial is not possible.

Step 15: Disinfected patient care area thoroughly with 0.5% chlorine solution after the body has been moved, using full PPE.

Step 16: Restrict entry into the morgue to staff and burial team members wearing appropriate PPE only.

Step 17: Body bag with the body should not be touched or handled by family members.

Note: Once the bagged body and coffin have been disinfected, handlers do not need to wear full PPE any more to carry it to the grave site. They should just wear thick rubber gloves and disinfect the gloves and perform hand hygiene after carrying.

Preparing body for Muslim safe burial

Step 1: Provide white body bag for Muslim patients

Note: Seek permission in advance from the Imam that the body bag can be used to represent a shroud

Step 2: Cover body by wrapping in a Shroud (plain white cotton sheet) before placing in white body bag if permission is not granted by the Imam to use only white body bag.

Step 4: Knot shroud at both ends (The safe burial team should provide a shroud for the family or they provide one themselves)

Step 5: A female member of the burial team should shroud deceased female body prior to placing in a body bag (see information for shrouding). Complete from step 4 to 17 above

CHECKLIST FOR PREPARING DEAD BODY IN THE HEALTH FACILITY

Place a "☐" in case box if step/task is performed **satisfactorily**, an "**X**" if it is **not** performed **satisfactorily**, **N/O** if not observed or **N/A** if not applicable.
Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines
Not Observed: Step, task, or skill not performed by learner during evaluation by facilitator
Not Applicable: Step, task, or skill not required to be performed by learner during evaluation.

CHECKLIST FOR HOW TO PREPARE THE DEAD BODY IN THE HEALTH FACILITY				
STEP/TASK	**EVALUATION**			
	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
Identify the family head or representative who caninfluence the rest of the family members and explain safe burial				
Prepare body at the site of death.				
Assemble the necessary materials and PPEs, 2 body bags, disinfectant (0.5% chlorine), leak proof puncture resistant sharps box, two leak-proof infectious waste bags:(one for disposable material to be destroyed and one for reusable materials to be disinfection) and dedicated ambulance				
Use an indelible marker to mark the top surface of the outer bag with the deceased's name, age, and ID number and clearly mark it to show that the deceased is a suspected or confirmed case of VHF before going in to bag the body,				
Full body PPE should be worn by at least four members of the				

burial team in the PPE donning area				
An apron should be worn over the PPE				
Use thick rubber gloves as the second pair (or outer layer) of gloves				
Avoid direct contact with the body during identification. View body through see-through door or through a window from a separate room.				
Cover nose and mouth of the deceased with a surgical mask before handling				
Do not wash, spray or embalm body.				
Leave medical devices (tubes, drips) in place on body (do not attempt to remove them)				
Place the body in the first body bag and close the bag				
Change the outer gloves and apron once the body is enclosed in the first bag,				
Disinfect the inner gloves with 0.5% chlorine solution before new outer gloves are donned.				
Disinfect the entire surface of the outside of the bag with 0.5% chlorine solution				
Place the first bag in the second bag and close the bag				
Disinfect the entire surface of the outside of the second bag with 0.5% chlorine solution				
Move body to the ambulance exit area once the second body bag has been disinfected, place in a coffin and decontaminate the coffin with 0.5% chlorine solution				
Move to doffing area and doff the PPE				
Decontaminate the boots with 0.5% chlorine solution				
Transport the body to the burial place as quickly as possible or to the designated morgue in the treatment centre if immediate burial is not possible				

Disinfect patient care area thoroughly with 0.5% chlorine solution after the body has been moved using full PPE				
Restrict entry into the morgue to health-facility staff and burial team members wearing appropriate PPE only				
Body bag with the dead body should not be touched or handled by family members				
Preparing body for Muslim safe burial	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
Provide white body bag for Muslim patients				
Cover body by wrapping in a shroud (plain white cotton sheet) before placing in white body bag if permission is not granted by the Imam to use only white body bag.				
Knot shroud at both ends (The safe burial team should provide a shroud for the family or they provide one themselves)				
A female member of the burial team should shroud deceased female body prior to placing in a body bag				

Appendix 2I:
Standard Operating Procedure (SOP) – Safe and Dignified Burial

Name of Facility:	
SOP Number ***(Insert HF SOP number here)***	**SOP Title: Safe and Dignified Burial**
Authorizer:	**Authorization Signature:**
Effective date _____	

Purpose: To define requirement and procedure for performing safe burial practices of deceased VHF patient or probable cases. This is to control transmission of VHF infection and ensure compliance with cultural and religious norms.

Scope: This is applicable to bodies of confirmed and probable cases of VHF

Definitions:

- Body: Corpse
- Body bag: Special water proof plastic bag for keeping deceased bodies
- Body holding room: Dedicated place for temporary storage of bodies while awaiting collection by the burial team
- State 'safe' burial team: Dedicated set of trained persons assigned with the responsibility of interring the body
- PPE: Personal protective equipment
- Safe burial practices: Burial practices associated with minimal risk to the burial team and the community members where the burial is taking place
- Burial team should ensure items identified by the family to be buried with the corpse are buried as requested without family members handling any item that has been in contact with the deceased

Responsibility: State 'safe' burial team

Materials and Equipment: full PPE (coverall, plastic apron, fluid resistant mask, goggles, disposable gloves, N95 respirator, heavy duty gloves, rubber boots), disinfectant (0.5% chlorine), dedicated ambulance, corpse carrier.

Note: Once the bagged body and coffin have been disinfected, handlers do not need to wear full PPE any more to carry it to the grave site. They should just wear thick rubber gloves and disinfect the gloves and perform hand hygiene after carrying.

General procedure:

Step 1: Explain the process of a dignified burial to the head of the family or representative

Step 2: Address concerns as may be required

Step 3: Identify a burial site the family can accept

Note: burial site should be at least 30 meters from water source and grave should be at least 2meters deep.

Step 4: Allow the family members the opportunity to be involved in the digging/preparation of the grave, if that is their custom or preference

Step 5a: Place coffin in the grave and bury

Step 5b: Place body on a corpse carrier for Islamic burial

Step 6: A memorial service can be held at a later date or different location, as per custom and /or preference.

Step 7: Decontaminate the vehicle (see procedure for ambulance of decontamination)

Reporting:

CHECKLIST FOR CONDUCTING SAFE AND DIGNIFIED BURIAL OF A PATIENT WHO DIED FROM VHF

Place a "☐" in case box if step/task is performed **satisfactorily**, an "**X**" if it is **not** performed **satisfactorily**, **N/O** if not observed or **N/A** if not applicable.
Satisfactory: Performs the step or task according to the standard procedure or guidelines
Unsatisfactory: Unable to perform the step or task according to the standard procedure or guidelines
Not Observed: Step, task, or skill not performed by learner during evaluation by facilitator
Not Applicable: Step, task, or skill not required to be performed by learner during evaluation.

CHECKLIST FOR CONDUCTING SAFE AND DIGNIFIED BURIAL OF A PATIENT WHO DIED FROM VHF				
STEP/TASK	**EVALUATION**			
	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
The safe burial team has been Informed				
The necessary material has been assembled				
Indelible marker was used to mark the top surface of the outer bag with the deceased's name, age, and ID number clearly marked to show that the deceased is a suspected or confirmed case of VHF				
Burial team wore full body PPE				
Body was prepared at the site of death.				
An identified influential person from the family identified the body				
Surgical mask was used to cover the nose and mouth of the Deceased				
No member of the family touched the corpse				

Medical devices (tubes, drips) were left in place and no attempt to remove them.				
Prayers were said for the corpseby the family member as desired. For Muslim, only dry ablutionwas performed (see guideline)				
Body was placed in the first body bag and closed				
Changed outer gloves and apron				
Inner gloves were disinfected with 0.5% chlorine solution before new outer gloves was donned				
The entire surface of the outside of the bag was sprayed with 0.5% chlorine solution				
The first bag was placed in the second bag and close				
The entire surface of the outside of the second bag was wiped with 0.5% chlorine solution				
Body was moved to the ambulance through the exit area				
The body was placed in a coffin and decontaminate with 0.5% chlorine. If no coffin is available, the body bag				
The body was gently placed in the ambulance.				
Safe burial team moved to doffing area and doffed the PPE				
Boots were decontaminated				
Body was transported to the burial place as quickly as possible or to the morgue in the treatment centre for immediate burial				
Preparing body for Muslim safe burial	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
White body bag was provided for Muslim patients.				
Permission was sort in advance from the Imam for the body bag to be used to represent a shroud.				
If permission is not granted by the Imam - the deceased was shrouded by wrapping in a plain white cotton sheet before placed in the body bag.				

Shroud was knotted at both ends. (The safe burial team provided a shroud for the family or the family provide one themselves.)				
Female member of the burial team shrouded deceased female patients prior to placing in a body bag (see information for shrouding).				
Burial Process for Muslim Patient	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
The safe and dignified process of burial was explained to the family				
The family was asked if there are any specific requests in regard to the process of a dignified burial, for example, do they want to perform a dry ablution on the body prior to burial?				
A safe burial site was identified for the family which they accepted, and the grave was appropriately dug and labeled.				
Family members were allowed the opportunity to be involved in the digging/preparation of the grave ***(if that is their custom or preference).***				
The body was put on corpse carrier and the family members allowed the option to throw the first soil in/on the grave according to local practice, hierarchy or tradition.				
The family was allowed to include certain items to be buried with the deceased. They identified them with the Burial Team who ensured this was done. ***(Family must not handle items themselves that have been in recent close contact with the deceased).***				
The family was invited to prepare or place the label / religious symbol at the grave e.g., a cross.				
A memorial service was agreed to be held later, as per custom and /or preference				

Burial Process for Christian Patient	Satisfactorily	Unsatisfactorily	Not Observed	Not Applicable
Process of a dignified Christian burial explained to the family Members				
Asked the family if there are any specific requests with regard to a dignified burial.				
Identified a burial site which the family accepted and ensured the grave is appropriately labeled.				
Allowed the family members the opportunity to be involved in the digging/preparation of the grave ***(if that is their custom or preference)***				
The body/coffin was put in the grave and the family members allowed the option to throw the first soil in/on the grave according to local practice, hierarchy or tradition.				
If the family would like certain items to be buried with the deceased, they should identify them to the Burial Team. The team ensured this was done. (***Family did not handle items themselves that have been in recent close contact with the deceased).***				
Invited the family to prepare or place the label / religious symbol at the grave e.g., a cross.				
A memorial service was agreed to be held later, as per custom and /or preference				

Appendix 3:
Guide to Local Production: WHO-recommended Hand rub Formulations

GUIDE TO LOCAL PRODUCTION

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

Materials required (small volume production)

REAGENTS FOR FORMULATION 1:
- Ethanol 96%
- Hydrogen peroxide 3%
- Glycerol 98%
- Sterile distilled or boiled cold water

REAGENTS FOR FORMULATION 2:
- 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)
- Plastic or metal funnel
- 100 ml and 500 ml plastic bottles with leak-proof tops (7)
- An alcoholometer: the temperature scale is at the bottom and the ethanol concentration (percentage v/v and w/w) at the top (8)

NOTE

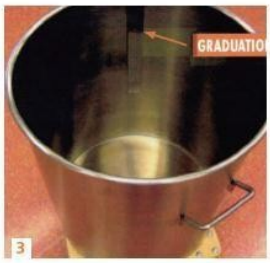
- Glycerol: used as humectant, but other emollients may be used for skin care, provided that they are cheap, widely available and miscible in water and alcohol and do not add to toxicity, or promote allergy.
- Hydrogen peroxide: used to inactivate contaminating bacterial spores in the solution and is not an active substance for hand antisepsis.
- 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.

General information

Labelling should be in accordance with national guidelines and should include the following:
- Name of institution, date of production and batch number
- WHO-recommended handrub solution
- For external use only
- Avoid contact with eyes
- Keep out of the reach of children
- Use: Apply a palmful of alcohol-based handrub and cover all surfaces of the hands. Rub hands until dry
- Composition: ethanol or isopropanol, glycerol and hydrogen peroxide
- Flammable: keep away from flame and heat


1

2



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Production and storage facilities:

- Production and storage facilities should ideally be air conditioned or cool rooms. ***No naked flames or smoking should be permitted in these areas***.
- WHO-recommended handrub formulations should not be produced in quantities exceeding 50-litres locally or in central pharmacies lacking specialised air conditioning and ventilation.
- Since undiluted ethanol is highly flammable and may ignite at temperatures as low as 10°C, production facilities should directly dilute it to the above-mentioned concentration. The flashpoints of ethanol 80% (v/v) and of isopropyl alcohol 75% (v/v) are 17.5°C and 19°C, respectively.
- National safety guidelines and local legal requirements must be adhered to the storage of ingredients and the final product.

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
- 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.

. 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.

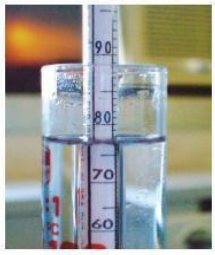
6. The solution is mixed by shaking gently where appropriate or by using a paddle.

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 ± 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% (± 1%) on the scale at 25°C.

Source: Guide to Local Production: WHO-recommended Handrub Formulations, http://www.who.int/gpsc/5may/tools/system_change/en/

Appendix 4
Screening Criteria for Lassa Fever

On patient arrival trained staff to:

Measure temperature- at least one meter (one arm's length) away from patient

ASK: the following:
Fever of 38ºC for more than 48hrs and less than 3 weeks;
AND
Unresponsiveness to standard treatment for malaria and other common infectious causes of fever within 48-72 hours

PLUS

Any one of these symptoms:

- abdominal pain,
- sore throat,
- malaise,
- headache,
- cough,
- myalgia,
- nausea,
- vomiting,
- diarrhea,
- retrosternal pain,
- hearing loss,
- woman with abnormal vaginal bleeding;

OR
History of recent contact with a probable or confirmed case of Lassa fever within 21 days of onset of fever;
OR
Patient with history of fever and history of travel to high risk/burden area of Lassa fever;
OR
Contact with body fluids or tissues of a dead patient with a febrile illness, symptoms and signs highly suggestive of Lassa fever leading to death;
OR
Travel to endemic area within past 21 days plus contact with rodents or their excrement.

- Once identified at screening as a suspected VHF case, the patient should be moved immediately to a holding area for further evaluation
- If patient does not meet the case definition for suspect case of VHF, then he/she should continue to access care in the healthcare facility

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