NIGERIA CENTRE
FOR DISEASE CONTROL

National Guidelines on

Infection Prevention and Control of Viral Haemorrhagic Fevers

Prepared by the
Nigeria Centre for Disease Control
For Healthcare Workers
April, 2017

National Guidelines on Infection Prevention and Control of Viral Haemorrhagic Fevers

Contents

About NCDC

Nigeria Centre for Disease Control (NCDC) is Nigeria's national public health institute with the mandate to provide a healthier and safer Nigeria through the prevention and control of diseases of public health importance. It is focused on protecting 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.

NCDC operations and activities are guided by five key goals:

- Accurately measure the burden of infectious diseases in Nigeria
- Ensure Nigeria is able to meet its international obligations as a member of the World Health Assembly
- Develop a Public Health laboratory service network to support the detection, prevention and response to critical infectious diseases
- Reduce the adverse impact of predictable and unpredicted public health emergencies
- Create an efficiently managed and evidence based organisation with a clear focus of health promotion and disease prevention.

NCDC operates through five directorates: Surveillance and Epidemiology, Public Health Laboratory Services, Emergency Preparedness and Response, Prevention and Programmes Coordination and Administration.

NCDC is the host for the ECOWAS Regional Centre for Disease Control (RCDC) and the regional hub for the Africa Centres for Disease Control (ACDC).

Foreword

The last decade has seen the emergence and re-emergence of Viral Haemorrhagic Fevers (VHFs) in Nigeria and indeed in the West African sub-region. VHFs pose a great challenge to public health globally due to the high infectivity, morbidity and mortality associated with this group of diseases.

Seasonal outbreaks of Lassa fever have continued in Nigeria with cases now being recorded in states that have not reported these in the past. This situation has presented challenges in case management and infection prevention and control especially among health care workers with attendant health care worker infection being recorded, mainly due to the general ability of VHFs to spread readily in health facilities

Prevention of human to human transmission of VHFs through standard infection prevention and control measures during the care and management of suspected or confirmed VHF patients in the community and within health facilities remains the mainstay of control of VHF outbreaks.

With the aim of eliminating or minimising the risk of transmission to health care workers and others coming into contact with an infected person, this document has been developed to provide clear guidance to health care workers and health authorities involved in patient care and management as well as the response to VHF outbreaks in Nigeria.

These standard operating procedures provide healthcare workers a clear and easy guide to manage patients with Lassa fever in Nigeria.

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We appreciate the contribution of Dr.Tochi Joy Okwor of the Department of Community Health, Lagos University Teaching Hospital.

Index Of Acronyms

CDC	Centers for Disease Control and Prevention
CCHF	Crimean-Congo Haemorrhagic Fever
ELISA	Enzyme-linked Immunosorbent Assay
FFP	Filtering Face Pieces
FMOH	Federal Ministry of Health
HEPA	High-efficiency Particulate Air Respirator
HAI	Hospital Acquired Infection
HCW	Health Care Workers
IFA	Immunofluorescence Assay
IgG	Immunoglobulin G
IgM	Immunoglobulin M
IPC	Infection Prevention and Control
NCDC	Nigeria Centre for Disease Control
NIOSH	National Institute for Occupational Safety and Health
PAPR	Powered Air Purifying Respirators
PCR	Polymerase Chain Reaction
PPE	Personal Protective Equipment
PPM	Parts Per Million
SOP	Standard Operating Procedure
VHF	Viral Haemorrhagic Fevers
WHO	World Health Organization

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1 Background

1.1 VIRAL HAEMORRHAGIC FEVERS

The threat of endemic, emerging, and re-emerging infectious diseases, especially the Viral Haemorrhagic Fevers (VHFs) demands effective infection control practices among health care workers and other care givers

VHF is a general term for a group of severe illnesses, sometimes associated with bleeding, that may be caused by a number of viruses. The term is usually applied to diseases caused by four viral families namely:

- Arenaviridae (Lassa fever, Junin and Machupo),
- Bunyaviridae (Crimean-Congo Haemorrhagic Fever (CCHF), Rift Valley Fever, Hantaan haemorrhagic fevers),
- Filoviridae (Ebola and Marburg),
- Flaviviridae (Yellow Fever, Dengue, Omsk haemorrhagic fever, Kyasanur forest disease).

Haemorrhagic fever viruses are usually transmitted among animal or arthropod hosts; however, the viruses carried in these animal or arthropods can be transmitted to humans when humans come in contact with the urine, faeces, saliva, or other bodily fluids of infected animals or arthropods. In some instances, once the viruses infect humans, person-to-person transmission can occur when an uninfected person comes in contact with bodily fluids of an infected person (as occurs with Lassa, Ebola, Marburg and CCHF viruses). Transmission can also occur through the bite

of an arthropod vector such as mosquitoes and ticks (e.g. Yellow fever, Dengue and Rift valley fever).

Symptoms of VHFs include fatigue, fever, weakness, dizziness, and muscle pain. Patients with more severe infections show bleeding under the skin, and in internal organs, or even from body orifices such as the mouth, eyes, and ears. Some patients develop severe diarrhoea that may also be bloody, whilst severely ill patients present with shock, delirium, seizures, kidney failure, and coma that often ends in death.

Viruses causing VHFs are considered very virulent organisms as the virus spreads to blood vessels and many organs in the body resulting in highly infectious body fluids e.g. blood, urine, vomitus etc. This in itself poses a serious risk to caregivers who may come in contact with these body fluids in health facilities and in the community

The transmission risk of VHFs in health care (including laboratory) settings is well documented. During the 2014 Ebola Virus disease outbreak in Nigeria, eleven out of the nineteen infected persons were health care workers (HCW) who managed the index case. Four were immediate relatives of these HCWs and one was a patient who was admitted in the same ward as the index case. Following the institution of a good surveillance system and infection control practices as part of the outbreak response, the transmission was brought to a halt and no new case was reported among health care workers who managed the cases. Several cases of Lassa fever infections have also been recorded in health workers who managed individuals with febrile illnesses as well as confirmed cases of Lassa fever.

There are currently no vaccines available for routine or

large-scale use for the prevention of most VHFs except Yellow fever, though there are on-going efforts towards the production of vaccines for some of these diseases. Preventive efforts are concentrated on avoiding contact with the host species, vectors, and humans infected with the viruses.

This guideline focuses mainly on the prevention and control of VHFs that are transmitted through contact with infected persons or their blood and other body fluids, such as Ebola Virus disease and Lassa fever.

1.2 CASE DEFINITIONS OF COMMON VIRAL HAEMORRHAGIC FEVERS TRANSMITTED BY PERSON-PERSON CONTACT

1.2.1 LASSA FEVER

1. Alert case

   Any person who has an unexplained fever (i.e. Malaria and other likely 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

2. Suspected case:

   An illness of gradual onset with one or more of the following: malaise, fever, headache, sore throat, cough, nausea, vomiting, diarrhoea, myalgia (muscle pain), central chest pain or retrosternal pain, hearing loss and either

   a. History of contact with excreta or urine of rodents

      OR

   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/haemorrhaging

3. Probable case

Any suspected case as defined above but who died without collection of specimen for laboratory testing.

4. Confirmed case

Any suspected case with laboratory confirmation (positive IgM antibody, PCR or virus isolation).

1.2.2 EBOLA VIRUS DISEASE AND MARBURG FEVER

1. Suspected case

An illness with onset of fever and no response to treatment of usual causes of fever in the area, and at least one of the following signs: bloody diarrhoea, bleeding from gums, bleeding into skin (purpura), bleeding into eyes and urine.

2. 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

3. Probable case

Any deceased suspected case (where it has not been possible to collect specimens for laboratory confirmation) having an epidemiological link with a confirmed case

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

1.2.3 CRIMEAN CONGO HEMORRHAGIC FEVER (CCHF)

1. Suspected case

   An illness with sudden onset of fever, malaise, weakness, irritability, headache, severe pain in limbs and loins and marked anorexia. Early development of flush on the face and chest and conjunctival infection, haemorrhagic exanthema of soft palate, uvula and pharynx, and often fine petechial rash spreading from the chest and abdomen to the rest of the body, sometimes with large purpuric areas.

2. Confirmed case

   A suspected case with laboratory confirmation (positive IgM antibody, PCR, viral isolation or IgG seroconversion by ELISA or IFA) or epidemiological link to confirmed cases or an outbreak

3. Probable case

   Any deceased suspected case (where it has not been possible to collect specimens for laboratory confirmation) having an epidemiological link with a confirmed case

2 Infection Prevention and Control Standard Operating Procedures During the Management of Viral Haemorrhagic Fevers

Diseases that are transmitted through contact with blood or other body fluids pose a significant risk in the health care setting. A patient with such an infectious disease may come to the health facility at any point in his or her illness often when the possibility of exposure to transmission is highest and before the specific cause of the illness is known. Standard precautions are designed to prevent direct contact between the health care worker and blood, all other body fluids (whether or not they contain blood) and mucous membranes. Given that a health worker cannot always know when a patient's body fluids are infectious, standard precautions should be used by all staff with all patients in the health care setting, regardless of their infection status to ensure the safety of those being cared for as well as staff and visitors in the healthcare environment.

Standard precautions include:

- Hand hygiene
- Appropriate Personal Protective Equipment (PPE)
- Safe use and disposal of sharps

- Respiratory hygiene and cough etiquette
- Aseptic technique
- Environmental cleaning
- Linen management
- Patient care equipment
- Waste management.

Standard precautions require that health care workers assume that blood and all body fluids, of all patients are potential sources of infection, regardless of the diagnosis or presumed infectious status of the individual. Additionally, more specific precautions are needed for some diseases depending on the mode of transmission and the organisms involved.

Patients with VHF require stringent precautions due to the increased risk of person-to-person secondary transmission and the virulence of the organisms involved.

Infection prevention and control in VHFs management is important at every point of contact with the patient especially at the symptomatic phase of the disease. Therefore, these measures are discussed in the following sections by the different stages of contact with the patient.

2.1 PRE-ADMISSION

2.1.1 TRIAGE

2.1.1.1 Community Triage

- During an outbreak of VHF, cases are identified in the community by case finding and contact tracing. Health 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 metre (about 3 feet) should be maintained between interviewer and interviewee irrespective of whether patient is symptomatic or not. Protective equipment is not required if this distance is assured.
  - Avoid touching 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 (see Section 2.2.1 and Annex 3).
  - If a VHF patient or a symptomatic contact is identified, he/she should be evacuated to an isolation or treatment centre following standard procedure as described below.

2.1.1.2 Hospital Triage

In an outbreak situation, triaging of all patients presenting to all health care facilities and treatment centres is very important and mandatory

- Patients should be screened and asked questions related to symptoms, close contacts and travel history.
- Fever is an important criteria used for triaging patients. Patients who are feverish should be kept

in a separate holding area.

- Admit in the isolation unit if the patient meets the case definition for VHF suspected case or transfer to a designated treatment centre.
- Patients must be given a filtering face piece (FFP) or surgical mask for the transfer to the isolation ward (FFP without expiratory valve is recommended as the mask with valve may compromise breathing for the patient)
- Transfer routes have to be disinfected immediately with 0.5% chlorine solution.

2.1.2 TRANSPORT OF PATIENTS FROM THE COMMUNITY OR HEALTH FACILITY TO TREATMENT CENTRE

Transport of patients should be done in a way that prevents the evacuation team from having contact with the patient's body fluid or body. The procedure will depend on the clinical condition of the patient as detailed below.

1. The patient is ambulatory and can walk alone
   - The patient should be instructed to go into the back of the vehicle, preferably an ambulance.
   - The surveillance team need not wear full PPE (see section 2.2.2 for details on PPE) since the patient will not be touched and a distance is kept.
   - Avoid touching anything touched by the patient, but when this happens for example when closing the back of the ambulance, examination gloves should be used and these should be sprayed with 0.5% chlorine solution before removal and disposed of safely
2. The patient is too weak to walk and needs to be

transported with a stretcher

- Two members of the team should be in full PPE and help position the patient on the stretcher and put in the back of the vehicle together with the caretaker.
- Dressing and undressing by the team should take place in front of the community in a transparent way to avoid suspicion from the community members
- If the patient is heavy, more people in PPE may be needed.

UNDER NO CONDITION SHOULD A SUSPECTED VHF PATIENT BE ALLOWED OR MADE TO TRAVEL IN A COMMERCIAL VEHICLE

2.1.3 DISINFECTION OF THE HOUSE

- The residence of the sick patient needs to be sprayed with 0.5% chlorine solution by the environmental health team.
- It is advisable to spray the houses of all suspected cases immediately after evacuation.
- The ambulance team can spray the house before transporting the patient to the treatment unit or the burial/spraying team can be called.
- Exceptions can be made if laboratory results can be expected quickly (e.g. < 1 day) and if the house can be locked when waiting for the results.
- If the house cannot be sprayed immediately, then the door of the house needs to be locked and no one allowed entry into the house until the arrival of the environmental health team.

2.1.4 ARRIVAL AT THE VHF TREATMENT UNIT

- The ambulance or the team should inform the treatment unit prior to the patient getting to the treatment centre.
- The ambulance should drive up to the patients' entrance of the ward.
- The staff of the isolation unit dressed in full PPE should take over the movement of the patient into the ward.
- The staff should be sprayed/disinfected at the patients' entrance, walk to and open the back of the vehicle and guide (if patient can walk) or carry the patient with the stretcher into the suspect ward or the treatment ward if it is a confirmed case.
- The area where the patient and the staff have walked should be disinfected. The burnable waste, reusable protection material and the bucket for vomiting (if used) needs to be taken by the staff dressed in PPE into the ward for burning, proper disinfection and washing respectively.

2.1.5 DISINFECTION OF TRANSPORT VEHICLE

- The back of the vehicle used for transport of the VHF patient, the mattress/stretcher, the bucket for vomitus (if unused), and other items used by the patient need to be properly disinfected with a 0.5% chlorine solution. One person can do the spraying on the spot and after disinfection; the items should be dried in the sun before reuse. Used buckets should be disposed of.

2.2 ADMISSION

2.2.1 ISOLATION

Isolation of VHF cases should be done based on classification of the disease as follows:

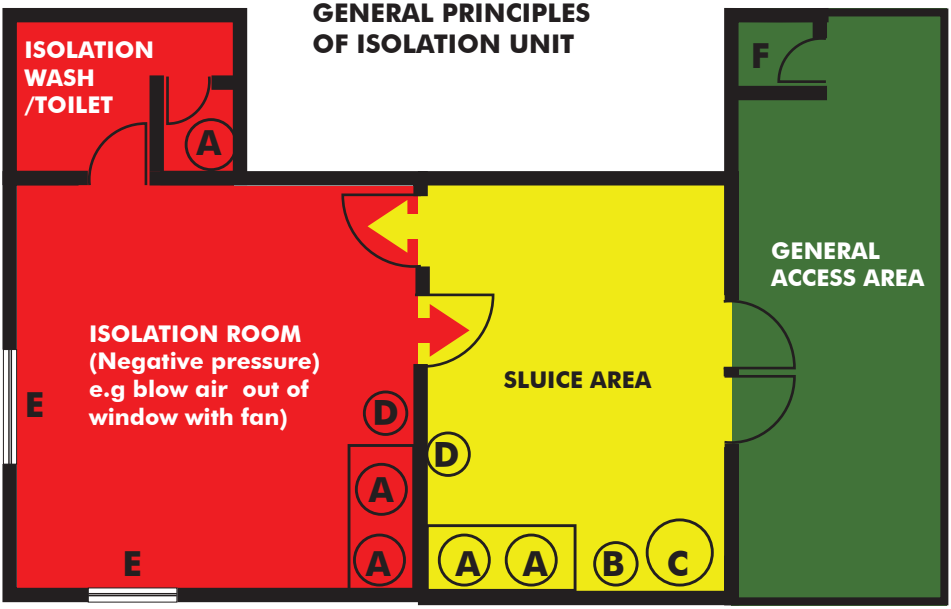
- Suspected Cases: patients should be placed in a single room or a partitioned area.

- Probable Cases: patients should be placed in a single room or partitioned area
- Confirmed Cases: Two or more patients may be managed in the same room. Placement of patients should be considered with the distance between patients' beds being at least 1–2metres.

2.2.1.1 Prerequisites for an Isolation Unit

- The facility must be isolated from other patients with high consideration for staff movement to and from the place.
- It must be well ventilated. Air movement within the facility should be from the corridor to the rooms, and then outdoors. (See figure 1 below)
- Air conditioning systems are not allowed in an isolation unit. In cases where a central air-conditioning system is in place, the system must be turned off or preferably; the room should be isolated from the system.
- The facility should have sinks and constant running water.
- There should be adequate bathroom facilities
- The facility must have the capacity to handle waste and laundry appropriately.
- There should be sufficient rooms for expected number of patients.
- A contingency plan should be in place as the need to convert other areas to isolation facilities may arise.

The figure below shows how an isolation unit treatment centre can be designed as well as specific requirements for such.



A. Disinfection Station
B. Container for disinfection of reusable items e.g Goggles
C. Biohazard bag for used PPE disposal
D. Wall-mounted alcohol handwash dsipensers
E. Windows - external only. Keep clear of public
F. Storage for general ward clothes, new PPE

Figure 1: Requirements and Layout Of The Isolation Treament Centre

2.2.1.2 Considerations for an Isolation Unit

In an Isolation Unit, the following considerations are important:

- Isolation room: this is where patient care and management is carried out. Each isolation unit should be en-suite with bathroom and toilet. Direction of airflow is important and should be structured in a way that allows for air to be blown out of the room through a window. Movement of healthcare personnel into this room should be unidirectional. Staff should enter the patient treatment area through the PPE donning area and exit through the doffing area.
- Change room: this is the room next to the isolation/treatment room where healthcare workers can pull off already used PPE after providing care to the patients. Decontamination with chlorine solution and hand hygiene also takes place here.
- General Access Area: this is a low risk zone and includes areas like small pharmacy and store, doctors room or resting area, area for the preparation of chlorine solutions.

2.2.1.3 Administrative Controls in an Isolation Unit

The objectives of implementing administrative controls in an isolation unit include:

- To enforce access restrictions
- To determine patient placement within the unit
- To oversee implementation and enforcement of infection control measures

- To ensure surveillance of Health Care Workers

2.2.1.3.1 Implementing Administrative Controls in the Isolation Unit

1. Hand washing with Chlorine (0.05%) should be done at the gate of the isolation unit where cases (confirmed and suspected) are being received.
2. Patient placement: Put suspected or confirmed cases in single isolation rooms with an adjoining toilet, showers, sinks equipped with running water, soap and single-use towels, alcohol-based hand rub dispensers, stocks of personal protective equipment (PPE), stocks of medicine, good ventilation, screened windows, doors closed and access restricted. If isolation rooms are unavailable, cohort these patients in specific confined areas while rigorously keeping suspected and confirmed cases separate and ensure the items listed here for isolation rooms are readily available. Make sure that there is at least a 1-metre (3 feet) distance between patient beds.
3. Staff allocation:
   - Restrict all non-essential staff from VHF patient care areas.
   - Ensure that clinical and non-clinical personnel are assigned exclusively to VHF patient care areas and that members of staff do not move freely between the VHF isolation areas and other clinical areas during an outbreak.
   - Maintain a log of persons entering the patient's room.

- Temperature checks for all health care workers – done twice daily (before and after shift duties)

4. Visitors:
   - Limit the number of visitors allowed access to the patient to include only those necessary for the patient's well-being and care, such as a child's parent.
   - Ensure that all visitors use Personal Protective Equipment (PPE).
   - Any visitors wishing to observe the patient should do so from an adequate distance from the care area (approximately 15m or 50 feet).
5. Hand hygiene:
   - Apply infection control precautions to avoid any possible unprotected direct contact with blood and body fluids when providing care to any VHF patient, including suspected cases.
   - Ensure hand hygiene before and after direct patient care, after any contact with potentially contaminated surfaces, and after removal of PPE. Neglecting to perform hand hygiene after removing PPE will reduce or negate any benefits of the protective equipment.
   - Perform hand hygiene:
     – Before donning gloves and wearing PPE on entry to the isolation room/area
     – Before any clean/aseptic procedures being performed on a patient
     – After any exposure risk or actual exposure to

patient's blood and body fluids

- After touching (even potentially) contaminated surfaces/items/equipment in the patient's surroundings
- After removal of PPE, upon leaving the care area

- When caring for patients in the same room, it is essential to organize the complete care to each patient before moving to the next and to perform hand hygiene between touching the same patient

6. Personal Protective Equipment:

   Ensure the use of full PPE and careful removal and disposal of PPE, which includes respirator after each procedure in the isolation/treatment area

7. Carefully clean and decontaminate reusable equipment. Adhere rigorously to using dedicated equipment (e.g. stethoscopes) on a single patient only. When this is not possible, decontaminate the items between each patient contact. All waste generated during this decontamination process should be treated as infectious waste (see Section 2.2.4.2). Items and equipment should not be moved between isolation rooms/areas and other areas of the health facility.

8. Injection safety and management of sharps

   - Limit phlebotomy and laboratory testing to the minimum necessary for essential diagnostic evaluation and patient care.
   - Use of needles and other sharp objects should

be avoided. If use is necessary, ensure the following precautions are taken:

i. Each patient should have exclusively dedicated injection and parenteral medication equipment, which should be disposed of at the point of care and never re-used.

ii. NEVER replace the cap on needle. NEVER direct point at self or colleagues. NEVER try to bend or break needles.

iii. NEVER re-use syringes or needles.

iv. Dispose of syringes, needles, scalpel blades and other sharp objects in appropriate, puncture-resistant containers.

v. Ensure that containers for sharp objects are placed as close as possible to the immediate area where the objects are being used and should remain upright at all times.

vi. Ensure that the containers are securely sealed with a lid and replaced when ¾ full.

vii. Keep containers in a restricted place.

2.2.2 HAND HYGIENE

Hand hygiene is one of the most important ways to reduce the transmission of infections in healthcare settings. Included in the term hand hygiene is any activity that reduces the level of contamination with micro-organisms, for example hand washing, antiseptic hand wash, alcohol-based hand rub and surgical hand scrub.

Hand washing should be carried out during the following moments:

- Before touching a patient
- Before clean/aseptic procedures
- After body fluid exposure
- After touching a patient
- After touching patient surroundings
- In–between procedures
- When moving from one patient to another.

Hand washing after contact with the patient's surroundings, is often missed or poorly understood by healthcare workers. The healthcare environment includes anything in the immediate patient's surroundings (e.g. bed, heart/saturation monitors, patient charts, and bedside tables). Healthcare workers should take particular care to perform hand hygiene after touching these objects or surfaces.

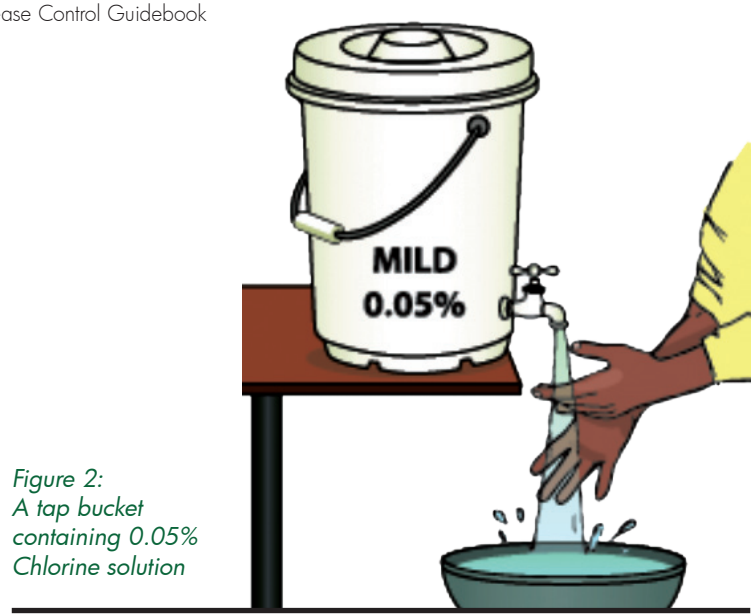


Figure 2:
A tap bucket containing 0.05% Chlorine solution

In carrying out hand hygiene,

- All HCWs (including aides and cleaners) and visitors should be trained/instructed in hand hygiene. Instructions should be displayed at the point of entry into the isolation unit/room.
- Perform hand hygiene with an alcohol-based hand-rub solution (20-30 seconds) or soap (preferably liquid soap), running water and single-use towels (40-60 seconds), applying recommended techniques (see Annex 3).
- 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.

2.2.3 PERSONAL PROTECTIVE EQUIPMENT (PPE)

The PPE reduces the risk of becoming infected while working in a contaminated area or managing suspected or confirmed patients.

- Before entering care areas, don PPE according to the expected level of risk and following the steps recommended by WHO (See Annex 6 for steps).

Full or complete PPE for use in care area and high risk zones includes:

1. Scrub suit. This should be worn under the PPE as no personal clothes should be worn in the isolation or treatment area.
2. Coverall: Disposable, long-sleeve, impermeable overall to cover clothing and body completely.
3. Gloves: The hands are likely to become very contaminated and therefore gloves are essential. Two pairs of gloves need to be worn:

   1st pair: Examination gloves for all staff.

   2nd pair: Depends on the work that will be performed:

   Surgical gloves: medical staff.

   Rubber cleaning gloves: cleaning staff.

   Latex protection gloves: waste handling, burial team
4. Head cover: This include the hair cap and hood. Head covers should be waterproof and completely cover the head, hair, ears, neck and any part of the face not covered by the mask and goggles.
5. High filtration mask or Particulate Respirator (FFP2 / FFP3 or EN certified equivalent or US NIOSH-certified N95).
6. Eye protection (goggles or face shield): Goggles must fit comfortably and securely. Goggles need to be disinfected after use, washed with water and then hung outside the changing room to dry. When dry,

the goggles can be reused.

7. Closed, puncture and fluid resistant shoes (e.g. rubber boots)

8. Waterproof apron: This provides extra protection of the front part of the body. Aprons need to be disinfected by the after use, then hung to dry outside the changing room in the sun. They can be reused when dry.

Additional PPE, depending on performed tasks and risk assessment, may include:

- o Disposable overshoes and leg coverings
- o Heavy duty (rubber) gloves, when performing environmental cleaning or handling waste
- o Particulate respirator (FFP2 /FFP3 or EN certified equivalent or US NIOSH-certified N95), when performing procedures that promote generation of aerosols.

- In the general access Area or low risk zone, scrub suit and boot should be worn as personal clothes are not allowed in any are of the isolation unit.
- After leaving the care area, ensure that the PPE is sprayed before removal. Carefully remove and dispose of PPE (including boots) into waste containers and perform hand hygiene.
- When removing PPE, be careful to avoid any contact between the soiled items (e.g. gloves, gowns) and any area of the body.
- Wash hands after every step of PPE removal with 0.5 % chlorine solution.
- Do not re-use disposable PPE.

- Wash bare hands with 0.05% chlorine solution after doffing.
- PPE should be worn for a maximum of 45-60 minutes because
  - o The respirator creates an inspiratory resistance
  - o It leads to loss of fluid due to sweating
  - o The time for doffing takes the respirator at least 15 minutes

2.2.4 SAMPLE AND SPECIMEN MANAGEMENT

2.2.4.1 Specimen Collection and Transportation

- Treat all specimen as highly infectious
- Wear full PPE during sample collection.
- Use leak proof containers for sample collection
- Avoid contaminating the outside of specimen container(s)
- Label the clinical samples clearly.
- Write clinical details on laboratory request forms
- Change PPE between patients (new gloves)
- Discard all disposable materials in a biohazard bag
- Transport specimen in leak-proof outer container e.g. a sealed plastic bag. Triple packaging is recommended.

2.2.4.1.1 Triple Packaging

This is a system that ensures safe transport of infectious materials/samples from point of collection to the laboratory where it is utilised or stored. The system consists of three layers as follows:

1. Primary receptacle/specimen bottle

A labelled 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.

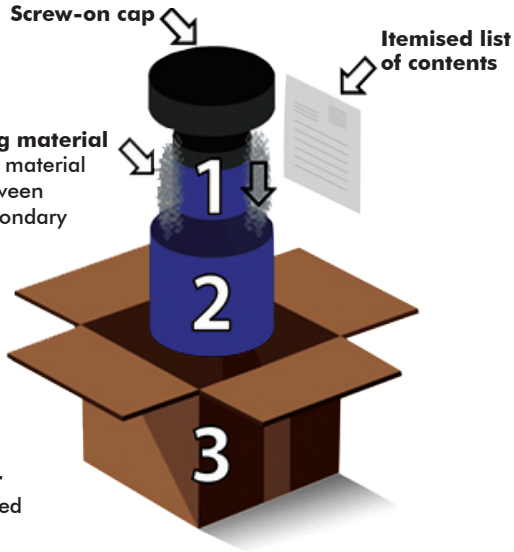
2. Secondary receptacle

A second durable, watertight, leak-proof receptacle to enclose and protect the primary receptacle(s). 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 plastic container may be used.

3. Outer shipping package.

The secondary receptacle is placed in an outer shipping package, which protects it and its contents from outside influences such as physical damage and water while in transit. 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 secondary receptacle. Ziploc bags may be used as second and third layers or receptacles

Figure 3: Triple Packing System 1



Absorbent packing material
Sufficient absorbent material must be placed between the primary and secondary receptacles

1. **Primary Receptacle** (leakproof 95kPa)
2. **Primary Receptacle** (leakproof)
3. **Outer container** (with list of itemised content)

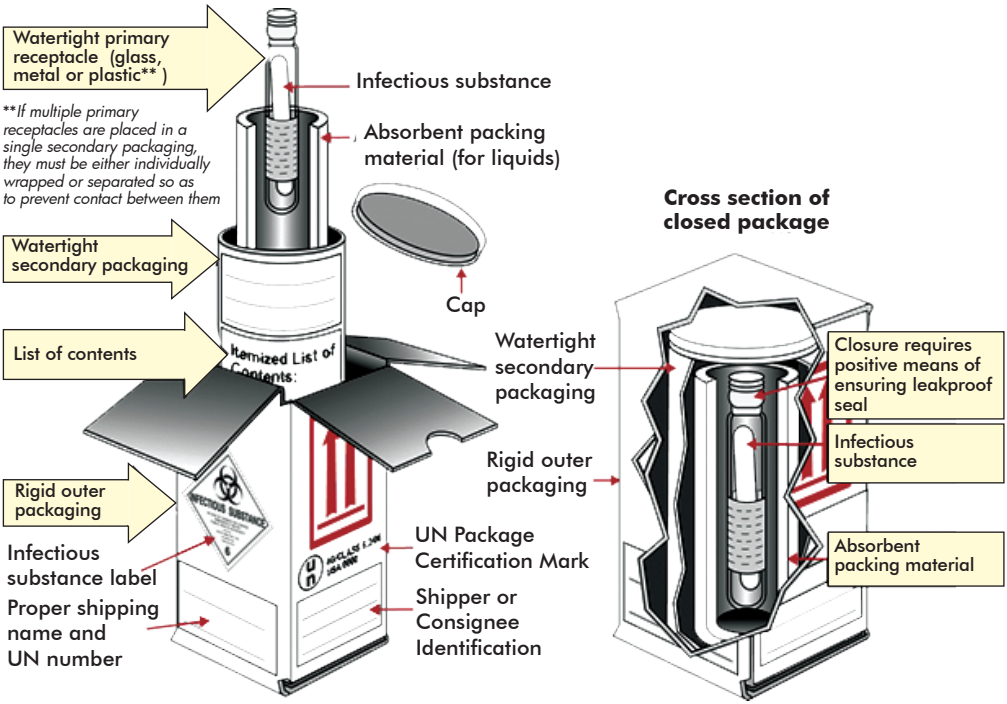


Figure 4: Triple Packing System 2

Source: WHO: Guidance on regulations for the Transport of Infectious Substances 2015–2016,

2.2.4.2 Diagnostic Laboratory Activities

- Activities such as micro-pipetting and centrifugation can mechanically generate fine aerosols that might pose a risk of transmission of infection through inhalation.
- Laboratory personnel handling potential VHF clinical specimens should wear the appropriate PPE and use particulate respirators (e.g., FFP2/FFP3, or EN certified equivalent, or US NIOSH-certified N95), or powered air purifying respirators (PAPR) when aliquotting, performing centrifugation or undertaking any other procedure that may generate aerosols.
- All laboratory sample processing should take place under a safety cabinet or at least a fume cabinet with exhaust ventilation
- When removing protective equipment, avoid any contact with the soiled items (e.g. gloves, gowns).
- Perform hand hygiene immediately after the removal of protective equipment.
- Place specimens in clearly-labelled, non-glass, leak-proof containers and deliver directly to designated specimen-handling areas.
- Disinfect all external surfaces of specimen containers thoroughly (using an effective disinfectant) prior to transport. Example of effective disinfectant: sodium hypochlorite at 0.05%, 500-ppm available chlorine (i.e. 1:100 dilution of household bleach at initial concentration of 5%).
- Designated laboratories should carry out planning in advance to ensure that specimen handling,

transportation and storage is managed according to recommendations.

2.2.5 EQUIPMENT DISINFECTION AND ENVIRONMENTAL CLEANING

- Cleaners should wear heavy-duty rubber gloves, impermeable gown and boots and in addition, facial protection when undertaking activities with increased risk of splashes or in which contact with blood and body fluids is anticipated.
- Contaminated environmental surfaces or objects should be cleaned and disinfected as soon as possible using standard hospital detergents/ disinfectants (e.g. a 0.5% chlorine solution).
- Floors and horizontal work surfaces should be cleaned at least once a day with clean water and detergent and 0.5% chlorine solution.
- Cleaning should always be carried out from "clean" areas to "dirty" areas, in order to avoid contaminant transfer.
- Spraying (i.e. fog) occupied or unoccupied clinical areas with disinfectant should not be done because it is a potentially dangerous practice with no proven disease-control benefit.

Solution	Uses
0.5%	o Disinfection of body fluids o Disinfection of corpses o Disinfection of toilet and bathrooms o Disinfection of gloved hands o Disinfection of floors o Disinfection of beds and mattress covers o Disinfection of footbaths
0.05%	o Disinfection of bare hands and skin o Disinfection of medical equipment o Disinfection of laundry o Washing up of plates and eating utensils

Table 1: Uses Of Chlorine Solutions For Disinfection

2.2.5.1 Management of Linen

- Healthcare workers and laundry staff must understand the importance of handling linen correctly to prevent the spread of potentially infectious microorganisms
- All contaminated or soiled linen are potentially highly infectious
- Wear full PPE when handling linen (coverall, gloves, boots, mask and goggle or face shield).
- Separate grossly contaminated linen from non-contaminated linen in the patient's room for ease of handling in the laundry.
- Linen can be washed using routine disinfection and laundry practices.
- Soiled linen should be placed in clearly labelled, leak-proof bags or buckets at the site of use and the

container surfaces should be disinfected (with an effective disinfectant) before removal from the site.

- Linen should be transported directly to the laundry area and laundered promptly with water and detergent. For low-temperature laundering, wash linen with detergent and water, rinse and then soak in 0.05% chlorine for approximately 30 minutes.
- Linen should then be dried according to routine standards and procedures.
- Washing contaminated linen by hand should be discouraged. However, if washing machines are not available or power is not ensured, take the soiled linen out of the container and empty into a large drum container of hot water and soap. Soak the linen in this drum and make sure it is totally covered with water. Use a stick to stir, then throw out the water and refill the drum with clean water and add bleach 1000ppm and allow to soak for 10-15 minutes. Remove the linen and then rinse in clean water. Remove excess water and spread out to dry. Avoid as much splashing as possible.
- Caution should be taken when laundering linen that has been heavily contaminated with body fluids (e.g. blood, vomitus) as splashes may result during handling.
- If disinfection of heavily soiled linen is not possible or reliable, it may be prudent to burn the linen to avoid any unnecessary risks to individuals handling these items.

2.2.5.2 Waste management

- All waste should be considered as highly infectious and necessary precautions should be taken when

handling waste

- Wear a full set of PPE and heavy duty/rubber gloves, when handling infectious waste (e.g. solid waste or any secretion or excretion with visible blood). Goggles provide greater protection than visors from splashes that may come from below when pouring liquid waste from a bucket. Avoid splashing when disposing of liquid infectious waste.
- Waste should be segregated at point of generation to enable appropriate and safe handling.
- Sharp objects (e.g. needles, syringes, glass articles) and tubing that has been in contact with the bloodstream should be placed inside puncture resistant containers. These should be located as close as is practical to the area in which the items were used.
- Collect all solid, non-sharp, medical waste using leak-proof waste bags and covered bins.
- Infectious solid waste should not be transported by hand due to the risk of accident or injury from infectious material or incorrectly disposed sharps. Use of a covered trolley or a wheeled bin with a lid will reduce the potential for exposure. In facilities where use of such items is difficult due to a lack of concrete or level flooring, a wheelbarrow may be used. If none are available, a labeled and lidded collection bin can be used. After each use, all surfaces of the trollies or bins should be disinfected with chlorine 0.5 % (a solution containing 5000 ppm available free chlorine).
- Waste should be disinfected with 0.5% chlorine solution before disposal.

- Waste should be placed in a designated pit of appropriate depth (e.g. 2m deep and filled to a depth of 1–1.5m). After each waste load, the waste should be covered with a layer of soil 10–15cm deep.
- An incinerator may be used for short periods during an outbreak to destroy solid waste.
- Placenta and anatomical samples should be buried in a separate pit.
- The area designated for the final treatment and disposal of waste should be highly restricted to animals and humans including children.
- Waste such as faeces, urine, vomitus and liquid waste from washing, can be disposed of in the sanitary sewer or pit latrine. No further treatment is necessary.

  Use of authorised Medical waste management system or authority is also allowed.

2.3 SAFE MANAGEMENT OF BODIES

2.3.1 PREPARATION OF THE BODY AT THE HOSPITAL

- Wear full protective clothing as recommended for members of staff of the isolation area (see section 2.2.3); wear a second pair of thick rubber gloves.
- Disinfect the body by spraying household bleach (0.5% solution) on the body and adjacent regions.
- Put the body in a body bag, which should be tightly closed. Spray with household bleach (0.5% solution)
- If there is no body bag, wrap the body in two thick cotton materials, which should be soaked with

household bleach diluted at 0.5% solution. Then, wrap the body in plastic (plastic kitchen table cloth), which can be held in place with a plastic adhesive tape. Spray with household bleach diluted at 0.5% solution. Place the body in a coffin, where appropriate.

- Transport the body to the burial place as quickly as possible. Designate a health worker or a member of staff of the establishment to accompany the remains in order to be sure that all safety precautions are observed.

2.3.2 POST-MORTEM EXAMINATION

- Post-mortem examination of the remains of a VHF patient should be limited to essential evaluations only and should be performed by trained personnel.
- Personnel examining remains should wear full and appropriate PPE.
- In addition, personnel performing autopsies of confirmed or suspected VHF fever patients should wear a particulate respirator and eye protection or face shield, or a powered air purifying respirator (PAPR).
- When removing PPE, avoid any contact between soiled gloves or equipment and the body especially the face (i.e. eyes, nose or mouth).
- Hand hygiene should be performed immediately following the removal of protective equipment
- Place specimens in clearly-labelled, non-glass, leak-proof containers and deliver directly to designated specimen-handling areas.
- All external surfaces of specimen containers should

be thoroughly disinfected prior to transport.

- Tissue or body fluids for disposal should be carefully placed in clearly marked, sealed containers and taken for incineration.

2.3.3 MOVEMENT OF HUMAN REMAINS

The handling of human remains should be kept to a minimum.

The following precautions should be used (with some adaptations according to cultural and religious habits, if needed):

- Only trained personnel should handle remains during an outbreak.
- Personnel must wear appropriate PPE
- Remains should not be sprayed, washed or embalmed.
- PPE should be put on at the site of collection of human remains and worn during the process of collection and placement in a body bag.
- Protective equipment should be removed immediately after remains have been placed in a body bag and then placed inside a coffin.
- After wrapping in sealed, leak-proof bags, human remains should be placed inside a coffin if possible, and buried promptly.
- Remains can also be cremated if a crematorium in available and if culturally accepted.

2.3.4 TRANSPORTATION OF THE BODY

Control measures for the prevention of VHF should be ensured during the transportation of the body to the burial site as follows:

- Ensure one vehicle for transport of the body
- A separate vehicle for the transport of the burial team.
- Take the shortest route possible for safety reasons and also to limit any possibility of transmission through accidental contact.
- Any member of the safe burial team who is to touch or handle the-body during the transportation should wear the same protective clothes as those worn in the isolation area. If s/he has had no contact with the body, the driver of the vehicle does not need to wear protective clothes.
  - Take a spray containing household bleach at 5% solution for use in case of accidental contact with the body or infectious body fluids and also for cleaning any potential fluid spill in the vehicle.

2.3.5 SAFE BURIAL

During outbreaks, any unprotected handling of the dead bodies of infected patients constitutes a biosafety hazard. This poses a major risk of transmission, as the dead body remains contagious several days after death. The management of the burial is therefore the responsibility of the clinical management and burial teams.

The family and members of the community are also at risk, if the burial rites involve manipulation and cleaning of the body.

The burial team is to oversee the safe burial of the victims. This team must adhere to the following key

principles:

- Verbally convey condolences and sympathy to the victim's family
- Clearly but emphatically explain the procedure for handling of remains and outline how and why the procedure for body preparation and burial will differ from the normal/local tradition.
- If a psychologist is available, collaborate with him/her in engaging with the family.
- If necessary, employ the support of security agents.
- Avoid conduct of funeral ceremonies during the burial
- Ensure that the patient's home is disinfected.

The burial must take place as soon as possible after preparation of the remains at the hospital. The Safe Burial team should:

- Prepare the body with care in order to avoid the risk of transmission.
- Strive to respect the cultural practices and religious beliefs of the family, as long as they do not result in a risk of transmission. Let the family understand that certain practices that entail a risk of transmission will be abandoned.
- Advise the family and the community on actions to take in order to protect themselves against the disease.
- If the body is prepared without information or support to the family and the community, the members of the community would not be willing to bring other relatives to the hospital for fear of not receiving the dead body once the patient has died.
- Find and use an influential member of the family in

ensuring that dangerous practices like touching and washing the dead body are avoided.

2.3.5.1 Preparation of the burial site

- The tomb must be at least 2 metres deep.
- Explain to the family that it is not possible to see the body and help the family to understand why the burial ceremony should be restricted to the family alone.

2.3.5.2 Disinfection of the vehicle after transporting the body

- The safe burial team should disinfect the vehicle and will need to wear PPE while doing this.
- Wash the interior of the vehicle where the body was placed with a household bleach at 0.5% solution
- Leave the bleach solution to act for 10 minutes.
- Rinse abundantly with clean water and let it dry.

2.4 POST EXPOSURE MANAGEMENT

- Persons including HCWs with per-cutaneous or muco-cutaneous exposure to blood, body fluids, secretions, or excretions from a patient with suspected VHF should immediately wash the affected skin surfaces with soap and water. Mucous membranes e.g. conjunctiva should be irrigated with copious amounts of water or eyewash solution.
- Exposed persons should be medically evaluated and receive follow-up care, twice daily for 21 days after exposure.

- HCWs suspected of being infected should be isolated, and guidelines for managing a suspected case adhered to until a negative diagnosis is confirmed.
- Contact tracing and follow-up of family, friends, co-workers and other patients, who may have been exposed to a VHF virus through close contact with the infected HCW is mandatory.

2.5 DISCHARGE

2.5.1 PATIENT DECONTAMINATION

- The decision to discharge patients should be on clinical grounds supported by negative laboratory result.
- All patients should take a bath with 0.05% chlorine solution (Happy shower) for 15minutes at discharge before leaving the treatment centre.
- Decontaminate patient's belongings for 30 minutes
- It is preferable for patients to change into new clothes, othewise launder clothes for 30 minutes and dry in the general access area (green area in Figure 1)
- The patient can then proceed to the patient exit where hands and feet should be sprayed

2.5.2 DISCHARGE DISINFECTION

The following precautions should be taken prior to discharging a confirmed case who has completed treatment.

- Disinfect all clothes by soaking them for 30 minutes in a 0.05% chlorine solution, then wash with soap, rinse with water and then air-dry.
- Severely dirty clothes should be burnt. It is useful for replacement clothing to be brought by family members.

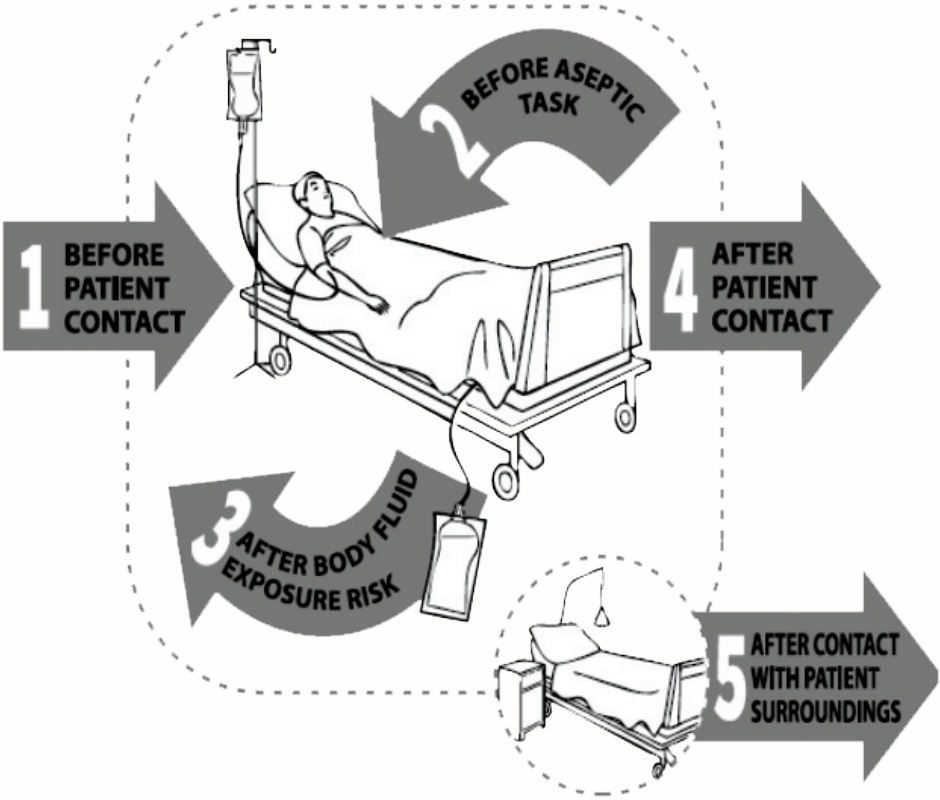
- Disinfect with 0.5% chlorine solution and return other washable belongings to the patient.
- The hospital belongings like the bed, mattress (with plastic protection) and buckets should be disinfected and may be reused by another patient.
- Sheets should be burnt and eating utensils destroyed.

ANNEX 1: REGULATORY LIST OF PERSONAL PROTECTIVE CLOTHING AND OTHER CONSUMABLES

1. Personal protective clothing
   - Scrub suit or working cloth
   - Examination gloves
   - A pair of surgical gloves.
   - Heavy duty gloves
   - Fluid resistant head cover
   - Rubber boots.
   - Shoe protectors.
   - An overall or an outside dress (surgical overall or single-use long sleeves overall with cuffs).
   - A plastic apron
   - A HEPA (High Efficiency Particulate Air Respirator) mask or other biosafety mask (if these are not available, use a surgical mask).
   - Anti-mist protective goggles or non-corrective glasses.
2. Other equipment and consumables.
   - Heat gun for taking temperature. (should be calibrated)
   - Sprayers
   - Overalls
   - Overshoe in polyethylene
   - Demister spray
   - Adhesive tape
   - Body bags
   - Water tanks with taps
   - Chlorination trays
   - Disinfectants.

ANNEX 2: MOMENTS FOR HAND HYGIENE

YOUR 5 MOMENTS FOR **HAND HYGIENE**



ANNEX 3: MOMENTS FOR HAND HYGIENE

HOW TO **HANDWASH?**

WASH HANDS WHEN VISIBLY SOILED! OTHERWISE, USE HANDRUB

Duration of entire procedure: **40-60 seconds**

Wet hands with water;

Apply enough soap to cover all hand surface;

Rub hands palm to palm;

Right palm over left dorsum, with interfaced fingers and vice versa;

Palm to palm with fingers interlaced;

Backs of fingers to opposing palm with fingers interlocked;

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

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

Rinse hands with water;

Dry hands thoroughly with a single use towel;

Use towel to turn off faucet;

Your hands are now safe.

World Health Organization | Patient Safety | SAVE LIVES Clean Your Hands

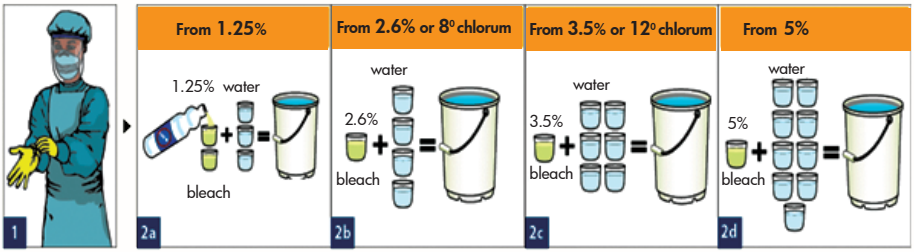
ANNEX 4: HOW TO PREPARE CHLORINE SOLUTION FROM COMMON HOUSEHOLD BLEACH (3.5%)

Target Solution	Formula	Bleach	Water
0.05%	$\frac{3.5\%}{0.05\%} - 1 = 70 - 1 = 69$	1	69
0.2%	$\frac{3.5\%}{0.2\%} - 1 = 17.5 - 1 = 16.5$	2	33
0.5%	$\frac{3.5\%}{0.5\%} - 1 = 7 - 1 = 6$	1	6
2.0%	$\frac{3.5\%}{2.0\%} - 1 = 1.75 - 1 = 0.75$	4	3

ANNEX 5: PREPARATION OF CHLORINE SOLUTION

HOW TO MAKE STRONG (0.05%) CHLORINE SOLUTION FROM LIQUID BLEACH?

Use strong (0.5%) Chlorine solutuion to clean and disinfect surfaces, objects fluid spills. Make new strong (0.5%) chlorine solution everyday. Throw away any left over solution from the day before



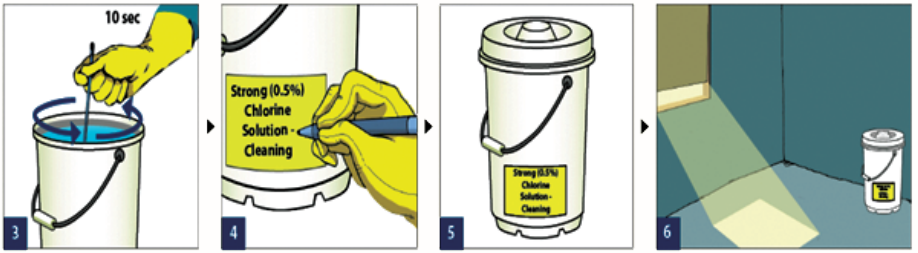
Make sure you are wearing extended PPE

Pour 2 parts liquid bleach and 3 parts water into a bucket. Repeat until full.

Pour 1 part liquid bleach and 4 parts water into a bucket. Repeat until full.

Pour 1 part liquid bleach and 6 parts water into a bucket. Repeat until full.

Pour 1 part liquid bleach and 9 parts water into a bucket. Repeat until full.



Stir well for 10seconds

Label bucket "**Strong Chlorine Solution - Cleaning**"

Cover bucket with lid

Store in shade. Do not store in direct sunlight

WARNING!

Do NOT drink chlorine water

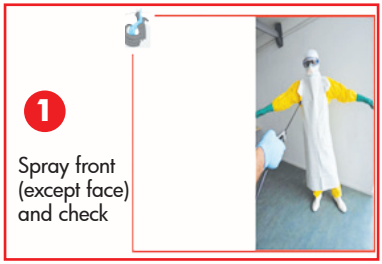
Do NOT put chlorine water in your mouth or eyes

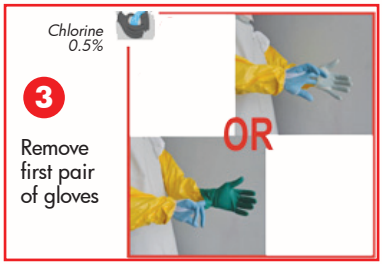
ANNEX 6: HOW TO DON PPE

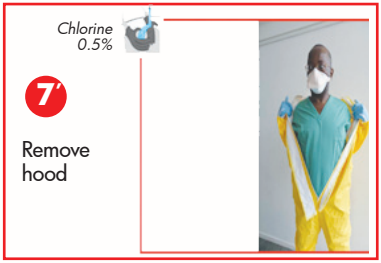
DONNING PERSONAL PROTECTIVE EQUIPMENT (PPE)?

ANNEX 7: DOFFING PPE

HOW TO UNDRESS PERSONAL PROTECTIVE EQUIPMENT (PPE)?







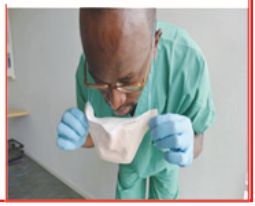
Chlorine 0.5%

7" Finish with feet

8 Spray coverall

Chlorine 0.5%

9 Remove respirator



Chlorine 0.5%

10 Remove second pair of gloves

11 Spray boots

12 Spray boot soles and then move to low-risk area

Bare hand chlorine 0.05%

LOW RISK AREA

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NIGERIA CENTRE FOR DISEASE CONTROL

NATIONAL GUIDELINES ON PREVENTION AND CONTROL OF VIRAL HAEMORRHAGIC FEVERS

The National Guidelines on Prevention and Control of Viral Haemorrhagic Fevers was prepared by the Nigeria Centre for Disease Control for healthcare workers. It highlights the standard requirements needed for instituting infection prevention and control measures in a VHF isolation unit or during a VHF outbreak response. It provides guidance on infection prevention and control measures to be taken to reduce morbidity and mortality among patients, healthcare workers and the general public

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