
ANNEX 1 Standard Precautions for Hospital Infection Control¹³

Standard Precautions aim to reduce the risk of disease transmission in the health care setting, even when the source of infection is not known. Standard Precautions are designed for use with all patients who present in the health care setting and apply to:

- Blood and most body fluids whether or not they contain blood
- Broken skin
- Mucous membranes.

To reduce the risk of disease transmission in the health care setting, use the following Standard Precautions.

1. Wash hands immediately with soap and water before and after examining patients and after any contact with blood, body fluids and contaminated items — whether or not gloves were worn. Soaps containing an antimicrobial agent are recommended.
2. Wear clean, ordinary thin gloves anytime there is contact with blood, body fluids, mucous membrane, and broken skin. Change gloves between tasks or procedures on the same patient. Before going to another patient, remove gloves promptly and wash hands immediately, and then put on new gloves.
3. Wear a mask, protective eyewear and gown during any patient-care activity when splashes or sprays of body fluids are likely. Remove the soiled gown as soon as possible and wash hands.
4. Handle needles and other sharp instruments safely. Do not recap needles. Make sure contaminated equipment is not reused with another patient until it has been cleaned, disinfected, and sterilized properly. Dispose of non-reusable needles, syringes, and other sharp patient-care instruments in puncture-resistant containers.
5. Routinely clean and disinfect frequently touched surfaces including beds, bed rails, patient examination tables and bedside tables.
6. Clean and disinfect soiled linens and launder them safely. Avoid direct contact with items soiled with blood and body fluids.

13 Adapted from Garner JS, Hospital Infection Control Practices Advisory Committee. *Guideline for Isolation Precautions In Hospitals*, January 1996. Centers for Disease Control and Prevention, Public Health Service, US Department of Health and Human Services, Atlanta, Georgia.

7. Place a patient whose blood or body fluids are likely to contaminate surfaces or other patients in an isolation room or area.
8. Minimize the use of invasive procedures to avoid the potential for injury and accidental exposure. Use oral rather than injectable medications whenever possible.

When a specific diagnosis is made, find out how the disease is transmitted. Use precautions according to the transmission risk.

- *If airborne transmission:*
 1. Place the patient in an isolation room that is not air-conditioned or where air is not circulated to the rest of the health facility. Make sure the room has a door that can be closed.
 2. Wear a HEPA or other biosafety mask when working with the patient and in the patient's room.
 3. Limit movement of the patient from the room to other areas. Place a surgical mask on the patient who must be moved.
- *If droplet transmission:*
 1. Place the patient in an isolation room.
 2. Wear a HEPA or other biosafety mask when working with the patient.
 3. Limit movement of the patient from the room to other areas. If patient must be moved, place a surgical mask on the patient.
- *If contact transmission:*
 1. Place the patient in an isolation room and limit access.
 2. Wear gloves during contact with patient and with infectious body fluids or contaminated items. Reinforce handwashing throughout the health facility.
 3. Wear two layers of protective clothing.
 4. Limit movement of the patient from the isolation room to other areas.
 5. Avoid sharing equipment between patients. Designate equipment for each patient, if supplies allow. If sharing equipment is unavoidable, clean and disinfect it before use with the next patient.

ANNEX 2 Specific Features of VHFs¹⁴

Geographical and epidemiological characteristics of VHFs			
Disease	Geography	Vector/Reservoir	Human Infection
Crimean Congo HF	<ul style="list-style-type: none"> • Africa • Balkans • China (Western) • Former Soviet Union (Southern) • Middle East 	Ticks. Tick-mammal-tick maintenance.	<ul style="list-style-type: none"> • Tick bites. • Squashing ticks. • Exposure to aerosols or fomites from slaughtered cattle and sheep (domestic animals do not show evidence of illness but may become infected when transported to market or when held in pens for slaughter). • Nosocomial epidemics have occurred.
Dengue HF, Dengue Shock Syndrome (DHF/DSS)	All Tropic and subtropical Regions	<i>Aedes aegypti</i> mosquitoes. Mosquito-human-mosquito maintenance. Transmission occurs with the frequent geographic transport of viruses by travellers.	Increased world-wide distribution of the mosquito and the movement of dengue viruses in travellers is increasing the areas that are becoming infected.
Ebola HF and Marburg HF	Africa	Unknown.	<ul style="list-style-type: none"> • Virus is spread by close contact with an infected person. • Route of infection of the first case is unknown. • Infected non-human primates sometimes provide transmission link to humans. • Aerosol transmission is suspected in some monkey infections.
Lassa Fever	West Africa	Mice. The <i>Mastomys</i> genus of the mouse.	<ul style="list-style-type: none"> • Transmitted by aerosols from rodent to man. • Direct contact with infected rodents or their droppings, urine, or saliva. • Person-to-person contact. <p>Note: The reservoir rodent is very common in Africa and the disease is a major cause of severe febrile illness in West Africa.</p>

14 Peters CJ, Zaki SR, Rollin PE. Viral Hemorrhagic Fevers, Chapter 10 in Atlas of Infectious Diseases, vol 8, vol ed Robert Fekety, book ed GL Mandell. Philadelphia: Churchill Livingstone. 1997: pp10.1-10.26.

Geographical and epidemiological characteristics of VHFs

Disease	Geography	Vector/Reservoir	Human Infection
Rift Valley Fever	Sub-Saharan Africa	Floodwater mosquitoes. Maintained between mosquitoes and domestic animals, particularly sheep and cattle.	<ul style="list-style-type: none"> • Mosquito bite. • Contact with blood of infected sheep, cattle, or goats. • Aerosols generated from infected domestic animal blood. • No person-to-person transmission observed.
Yellow Fever	<ul style="list-style-type: none"> • Africa • South America 	<i>Aedes aegypti</i> mosquitoes. Mosquito-monkey-mosquito maintenance. Occasional human infection occurs when unvaccinated humans enter forest. In an urban outbreak, virus maintained in infected <i>Aedes aegypti</i> mosquitoes and humans.	<ul style="list-style-type: none"> • Mosquito bite. • In epidemics, mosquitoes amplify transmission between humans. • Fully developed cases cease to be viremic. Direct person-to-person transmission is not believed to be a problem although the virus is highly infectious (including aerosols) in the laboratory.

Common clinical features of VHF

Disease	Incubation Period	Case Fatality	Characteristic Features
Crimean Congo HF	3-12 days	15% - 30%	Most severe bleeding and ecchymoses (a purplish patch caused by blood coming from a vessel into the skin) of all the HF.
Ebola HF and Marburg HF	2-21 days	25% - 90%	<ul style="list-style-type: none"> • Most fatal of all HF. • Weight loss. • Exhaustion and loss of strength. • A maculopapular (a lesion with a broad base) rash is common • Post infection events have included hepatitis, uveitis and orchitis.
Lassa Fever	5-16 days	Approximately 15%	<ul style="list-style-type: none"> • Exhaustion and loss of strength. • Shock. • Deafness develops during recovery in 20% of cases.
Rift Valley Fever	2-5 days (uncomplicated disease; incubation for HF may differ)	50% of severe cases (about 1.5% of all infections)	<ul style="list-style-type: none"> • Shock. • Bleeding. • Reduced or no urine production. • Jaundice. • Inflammation of the brain. • Inflammation of the blood vessels in the retina of the eye.
Yellow Fever	3-6 days	20%	<ul style="list-style-type: none"> • Acute febrile period followed by a brief period of remission. • Toxic phase follows remission with jaundice and renal failure in severe cases.

Specific clinical findings in different VHFs

Disease	haemorrhage	Thrombocytopenia ¹	leukocyte count ²	rash	icterus ³	renal disease	pulmonary disease	tremor ⁴ , dysarthria ⁵	encephalopathy ⁶	deafness	eye lesions
Crimean Congo HF	+ + +	+ + +	↓↓ ranging to ↑		++		+		+		
Ebola HF and Marburg HF	+ +	+ + +	data not available	+ + +	++		+		+ +	+	Retinitis
Lassa Fever	+ ranging to S	+	no change	+ +			+	+	+ ranging to S	+ +	
Rift Valley Fever	+ + +	+ + +	data not available		++	+	data not available		E		Retinitis
Yellow Fever	+ + +	+ +	no change ranging to ↓↓		+++	++	+		+ +		

¹ abnormally low number of platelets in the circulating blood

² white blood cell count

³ jaundice

⁴ shaking

⁵ difficulty speaking and pronouncing words due to problems with the muscles used for speaking

⁶ disease of the brain

+ occasional or mild

++ commonly seen and may be severe

+++ characteristic

S characteristic and seen in severe cases

↑ occasionally or mildly increased

↓↓ commonly decreased

E May develop true encephalitis

A summary of prevention and treatment of VHF

Disease	Prevention	Treatment
Crimean Congo HF	<ul style="list-style-type: none"> • Tick avoidance. • Avoid contact with acutely infected animals, especially slaughtering. • Use VHF Isolation Precautions when a case is suspected. 	<ul style="list-style-type: none"> • Ribavirin is effective in reducing mortality. • Ribavirin should be used based on in vitro sensitivity and of limited South African experience.
Dengue HF, Dengue Shock Syndrome (DHF/DSS)	<ul style="list-style-type: none"> • Mosquito control of <i>Aedes aegypti</i>. • Vaccines currently under investigation for probable use in travellers but unlikely to be a solution to hyperendemic dengue transmission that leads to dengue HF. 	<ul style="list-style-type: none"> • Supportive care. It is effective and greatly reduces mortality.
Ebola HF and Marburg HF	<ul style="list-style-type: none"> • Standard Precautions including needle sterilization in African hospitals are particularly important. • Use VHF Isolation Precautions when a case is suspected. • Avoid unprotected contact with suspected patients or infectious body fluids. • Avoid contact with monkeys and apes. 	<ul style="list-style-type: none"> • None other than supportive care, which may be of limited utility. • Antiviral therapies urgently needed.
Lassa Fever	<ul style="list-style-type: none"> • Rodent control. • Use VHF Isolation Precautions when a case is suspected. 	<ul style="list-style-type: none"> • Ribavirin is effective in reducing mortality. • Use Ribavirin in higher risk patients, e.g. if aspartate aminotransferase (AST) is greater than 150.
Rift Valley Fever	<ul style="list-style-type: none"> • Vaccination of domestic livestock prevents epidemics in livestock but not sporadic, endemic infections of humans. • Human vaccine safe and effective, but in limited supply. • Veterinarians and virology workers in sub-Saharan Africa are candidates for vaccine. 	<ul style="list-style-type: none"> • Supportive care. • Use Ribavirin in haemorrhage fever patients (based on studies in experimental animals).
Yellow Fever	<ul style="list-style-type: none"> • Mosquito control of <i>Aedes aegypti</i> would eliminate urban transmission but forest transmission remains. • Vaccine is probably the safest and most effective in the world. 	<ul style="list-style-type: none"> • Supportive care.

History of Viral Haemorrhagic Fevers Seen in Your Area	Major Signs and Symptoms	Transmission Route

ANNEX 3 Planning and Setting Up the Isolation Area

Checklist: Supplies for a Changing Room

Storage Outside the Changing Room:

1. Shelf or cabinet with lock _____
2. Supply of clean scrub suits, gowns, aprons, gloves, masks, headcovering, and eyewear _____
3. Covered shelf for storing disinfected boots _____
4. Bucket for collecting non-infectious waste _____

Inside the Changing Room:

1. Hooks, nails, or hangers for hanging reusable gowns, scrub suits _____
2. Roll of plastic tape _____
3. Handwashing supplies: bucket or pan, clean water, soap, one-use towels _____
4. Bucket or pan, 1:100 bleach solution for disinfecting gloved hands _____
5. Container with soapy water for collecting discarded gloves _____
6. Container with soapy water for collecting used instruments to be sterilized* _____
7. Container with soapy water for collecting reusable gowns, masks, sheets to launder* _____

*Place outside the changing room if the changing room is too small

If large amounts of waste on floor:

Sprayer, bucket or shallow pan with 1:100 bleach solution for disinfecting boots _____

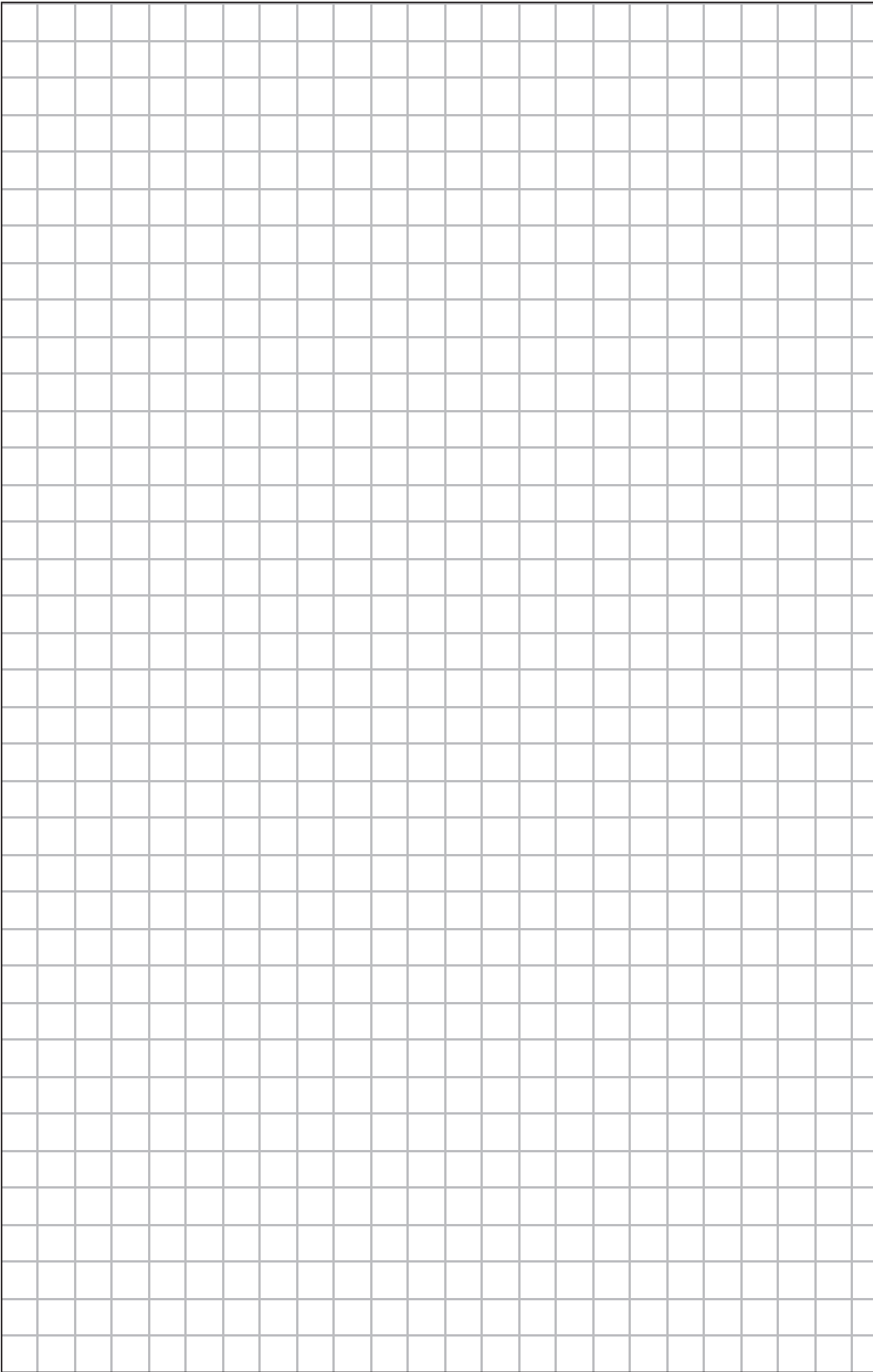
Checklist: Supplies for Patient Area

1. 1 bed with clean mattress or sleeping mat and at least a bottom sheet and blanket for each bed _____
2. Plastic sheeting to cover mattress or sleeping mat _____
3. 1 thermometer, 1 stethoscope, and 1 blood pressure cuff for each patient or for each patient area _____
4. 1 puncture-resistant container for collecting non-reusable needles, syringes, and discarded sharp instruments _____
5. 1 bedside table or shelf _____
6. 1 large wall clock with a second hand _____
7. Pan with 1:100 bleach solution or alcohol and one-use towels for disinfecting the thermometer and stethoscope between use with each patient _____
8. Bucket or pan, 1:100 bleach solution, one-use towels for disinfecting gloved hands between patients _____
9. Supplies for disinfecting patient excreta (bedpan, urinal, 1:10 bleach solution) _____
10. Sprayer, 1:100 bleach solution, clear water, and mop for disinfecting spills on floor and walls _____
11. Container with soapy water for collecting discarded gloves _____
12. Screens (or sheets hung from ropes or lines) placed between VHF patients' beds _____
13. Extra supply of gowns and gloves _____
14. Container for collecting infectious waste to be burned _____

Use the grid on the next page to draw the layout of an isolation area in your own health facility. Be sure to include:

- Area for patient isolation
- Changing room for health care workers to use for changing clothes
- Area for cleaning and laundering VHF-contaminated supplies
- Changing area for cleaning staff who handle VHF-contaminated waste but who do not do direct patient-care activities.

Planning Grid: Layout for Isolation Area in Your Health Facility



ANNEX 4 Adapting VHF Isolation Precautions for a Large Number of Patients

The recommendations in this manual assume 1 or 2 VHF cases have occurred in a non-outbreak situation. When more than 1 or 2 VHF patients present in the health facility, additional precautions need to be taken. When Ebola haemorrhagic fever occurs, initially there may be as many as 10 cases.

When a VHF is suspected, develop a case definition based on the VHF that has occurred. Use it to identify new cases during the outbreak. For example, the current case definition for suspecting Ebola haemorrhagic fever (EHF) is:

Anyone presenting with fever and signs of bleeding such as:

- Bleeding of the gums
- Bleeding from the nose
- Red eyes
- Bleeding into the skin (purple coloured patches in the skin)
- Bloody or dark stools
- Vomiting blood
- Other unexplained signs of bleeding

Whether or not there is a history of contact with a suspected case of EHF.

OR

Anyone living or deceased with:

- Contact with a suspected case of EHF **AND**
- A history of fever, with or without signs of bleeding.

OR

Anyone living or deceased with a history of fever **AND** 3 of the following symptoms:

- Headache
- Vomiting
- Loss of appetite
- Diarrhoea
- Weakness or severe fatigue
- Abdominal pain
- Generalized muscle or joint pain
- Difficulty swallowing
- Difficulty breathing
- Hiccups

OR

Any unexplained death in an area with suspected cases of EHF.

The current case definition for suspecting Lassa fever is:

Unexplained **fever** at least 38°C or 100.4°F for one week or more.

And 1 of the following:

- No response to standard treatment for most likely cause of fever (malaria, typhoid fever)
- Readmitted within 3 weeks of inpatient care for an illness with fever

And 1 of the following:

- Edema or bleeding
- Sore throat and retrosternal pain/vomiting
- Spontaneous abortion following fever
- Hearing loss following fever

Prepare Your Health Facility

If there are more than 2 suspected VHF patients, take steps immediately to adapt the VHF Isolation Precautions for a large number of patients.

1. Reinforce the use of Standard Precautions — especially handwashing — throughout the health facility. Make sure there is a reliable supply of soap and clean water in areas where health facility staff have contact with patients suspected as having a VHF.
2. Make sure adequate supplies of protective clothing are available.
3. Set up a temporary area that is separate from the rest of the facility where febrile patients can wait to be seen by a health care worker. Also use this area for patients who have been seen by a health care worker and who are waiting to go to the isolation area.

Make sure the temporary admission area contains a supply of protective clothing, buckets with disinfectants in them for collecting disposable waste, and disinfectants for cleaning and disinfecting spills of infectious materials.

4. Identify a family liaison person from the health facility staff who can spend time with families to answer questions, provide information about the VHF and its transmission. If family members help provide care when relatives are in hospital, make sure they know how to use protective clothing when they are with the patient in the isolation area. Help families with arrangements for cooking, washing and sleeping.
5. Designate a separate building or ward for placing patients with the same disease together in a single isolation area. Select and isolate a toilet or latrine for disposal of disinfected patient waste and other liquid waste.
6. Restrict access to the building or ward set aside as the isolation area. Set up walkways from the temporary area to the isolation area by tying ropes along the walkway and hanging plastic sheets from them.
7. Prepare a list of health facility staff authorized to enter the isolation area. Station a guard at the entry to the isolation area, and provide the guard with the list of authorized persons. The guard will use the list to limit access to the isolation area to authorized health facility staff and, if necessary, the caregiving family member.
8. Provide the guard with a sign-in sheet for recording who goes into the isolation area and the time of entry and departure.
9. Prepare a large quantity of disinfectant solutions each day (bleach solutions and detergent solutions). Store the disinfectants in large containers. Ask cleaning staff to change the disinfectants when they become bloody or cloudy or when the chlorine odour is no longer detectable.
10. Obtain additional patient supplies. Make sure each patient has a bed and mattress or sleeping mat. Designate medical equipment for use with each VHF patient (for example, a thermometer, a stethoscope, and a blood-pressure cuff for each patient). If there are not enough items available to provide one per patient, be sure to clean and disinfect the items before use with the next patient.
11. Make sure schedules are carried out as planned for collecting, transporting and burning infectious waste daily. Make sure that burning is supervised and that security of the burning site is maintained.
12. Initiate community education activities.

ANNEX 5 Making Protective Clothing

Instruction on Making Headwear

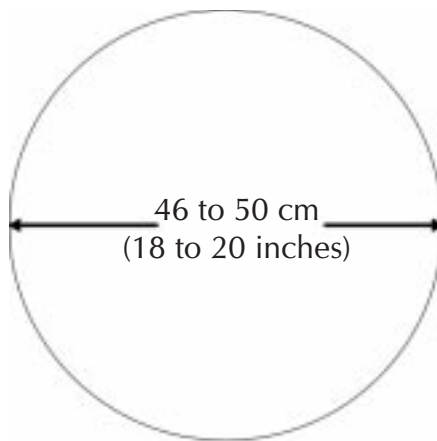
Materials needed:

Elastic $\frac{3}{4}$ meter

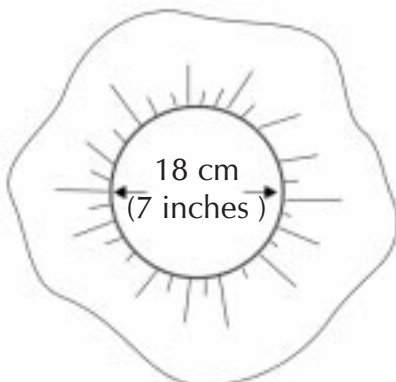
Cotton cloth 51 cm² (20 square inches)



A homemade head cover



1. Cut a round piece of cotton cloth that is 46 to 50 cm (18 to 20 inches) in diameter.

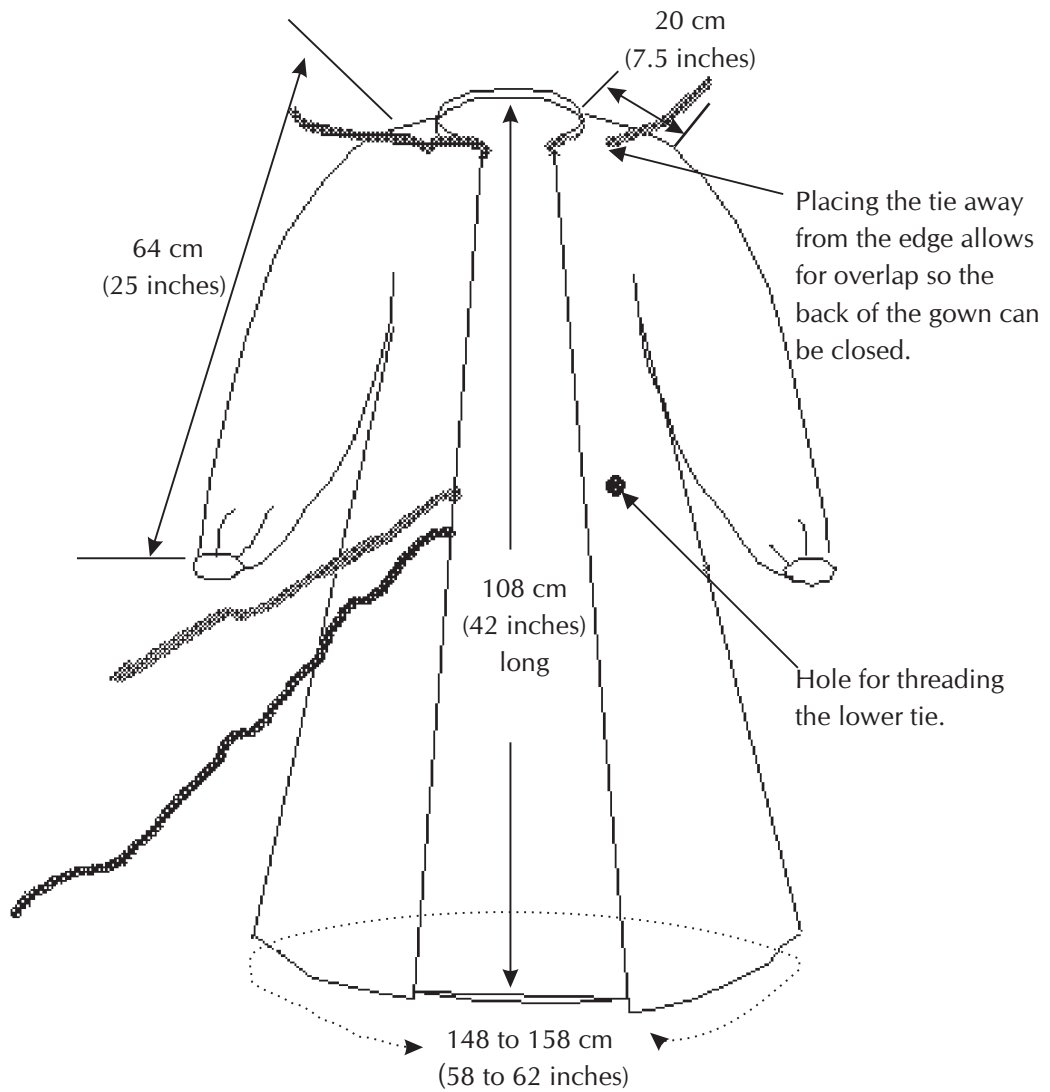


2. Sew elastic on the edge and shape a circle 18 cm (7 inches) in diameter.

Instruction on Making Gown

Materials needed:

1.5 meters cotton cloth to make one gown

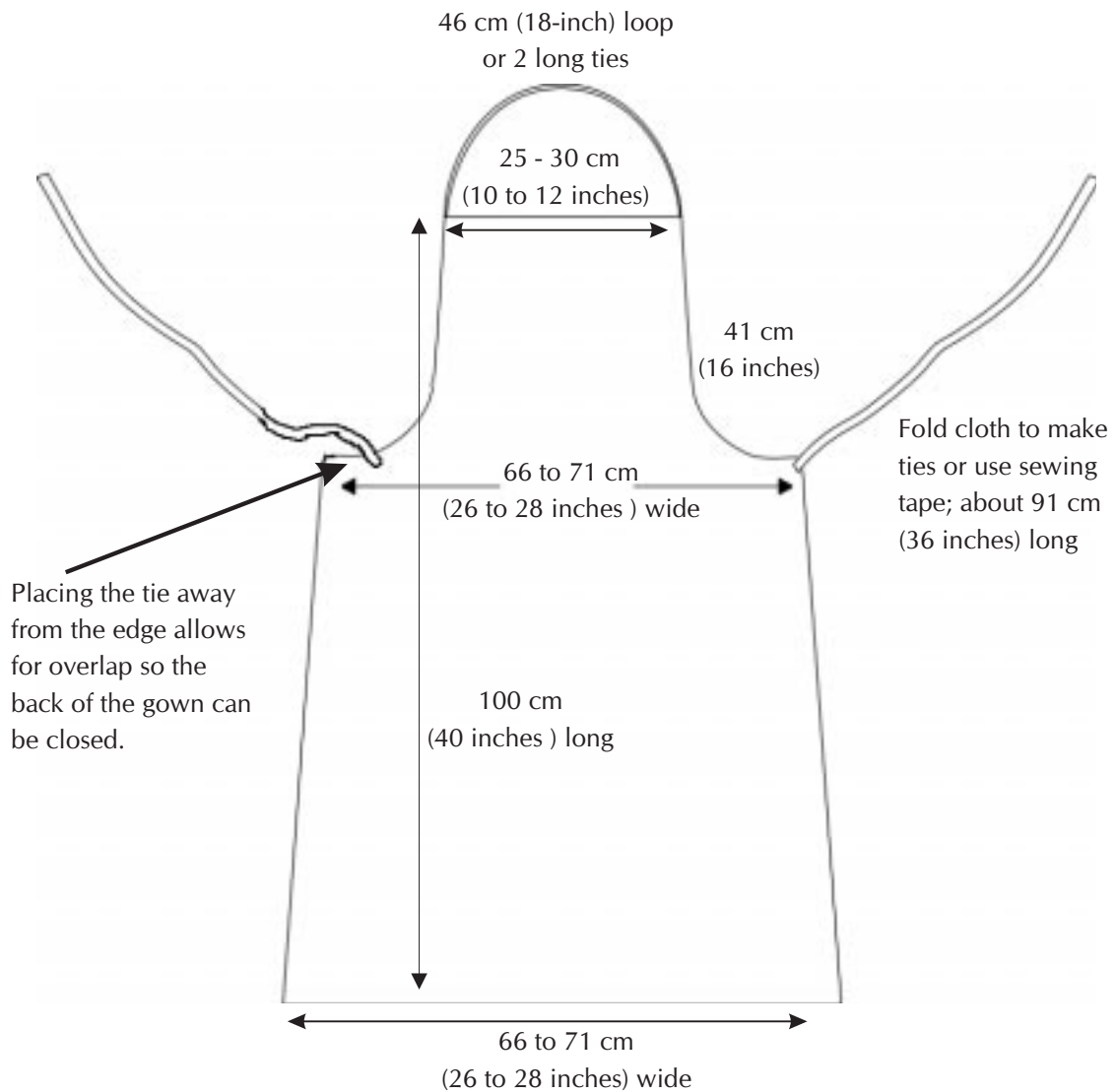


Instruction on Making Aprons

Materials needed (to make 2 aprons):

1 ¼ meters plastic sheeting or plastic cloth used for covering tables

91 cm (36 inches) sewing tape

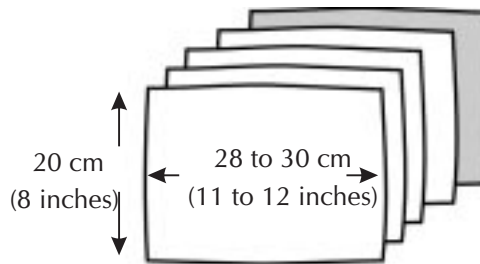


Instruction on Making a Cotton Mask

1 meter cotton cloth to make at least 2 masks

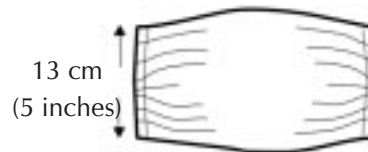
50 cm in second colour to make the inside of the masks

1. Cut 4 pieces of cotton cloth to the size shown.

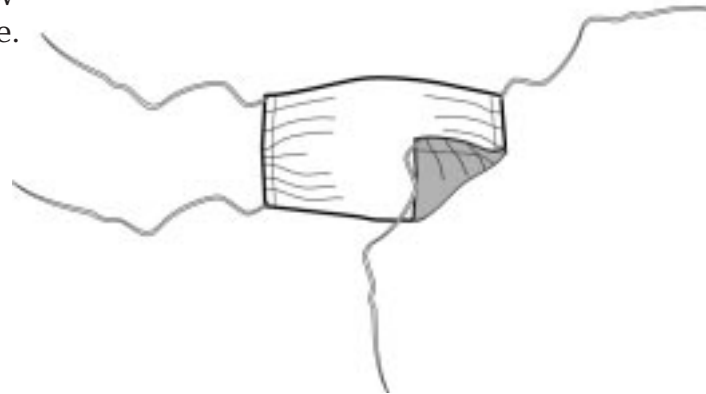


2. Cut 1 piece from a different colour. Use it as the inside of the mask.

3. Sew the 5 pieces together and gather or pleat the vertical sides to 13 cm (5 inches) long. Sew all pieces in place.



4. Sew on ties.



Specifications for Items of Protective Clothing:

This list describes the generic requirements for ordering or purchasing protective clothing from commercial vendors. Record the amounts needed on this list of specifications. The list can be photocopied and provided to donors to make sure that vendor specifications match the recommended specifications. Determine the quantities needed from the recommendations on the chart in Section 9.

Gowns	
Requirements	<p>Made from cotton cloth, cotton blend, or disposable fabric. The requirements are the same for both disposable <i>and</i> reusable gowns.</p> <p>Gowns should have the following requirements:</p> <ul style="list-style-type: none"> — Open at the back with ties at the neck, waist and middle of the back. — Ribbed or elasticized cuffs. — Be long enough to reach the knees. — If only large size is available, larger size can be cut and altered to fit smaller people. <p>If elasticized or ribbed cuffs are not available, attach thumb hooks to the end of the gown's sleeves. The thumb hooks can then be covered with the long wrist-sleeve of the gloves.</p>
Quantity needed	<p>Number of disposable gowns _____ Number of reusable gowns _____</p>

Apron	
Requirements	<p>Aprons are worn if there is risk of direct exposure to body fluids. The aprons are worn by physicians, nurses, corpse carriers, and cleaners. The requirements for the apron are the same for disposable or reusable models.</p> <p>Aprons should have the following requirements:</p> <ul style="list-style-type: none"> — Rubber or plastic apron with hooks or ties around the neck and with ties at the back. — Made from disposable plastic or heavy plastic which can be disinfected for reuse. — Able to fit over gown.
Quantity needed	<p>Number of disposable aprons _____ Number of reusable aprons _____</p>

Caps	
Requirements	To prevent contamination of hair and head from patient's vomit or blood: <ul style="list-style-type: none"> — Use disposable caps. — If disposable caps are not available, use cotton caps that can be laundered and reused.
Quantity needed	Number of disposable caps _____ Number of cotton caps _____

Masks	
Requirements	Worn to protect mouth and nose from splashes or droplets of patient's body fluids. Masks should offer appropriate protection. <ol style="list-style-type: none"> 1. 3M HEPA or N Series Mask: <ul style="list-style-type: none"> — Has preferable exhalation valve — Lightweight — Easy to use 2. Biosafety mask that limits 0.3-μm particles 3. Dust-mist masks 4. Surgical masks only protect from droplets splashed in the face. They are not HEPA rated.
Quantity needed	HEPA mask _____ Biosafety mask _____ Dust-mist mask _____

Thin gloves	
Requirements	Thin gloves to permit fine motor function. They can be surgical glove quality but do not need to be sterile. <ul style="list-style-type: none"> — Must reach well above the wrist, preferably 10 to 15 cm (4" to 6") long, measuring from the wrist up along the arm. — Should be tested for pinholes. — May be powdered or non-powdered.
Quantity needed	Number of pairs _____

Thick gloves	
Requirements	<p>Thick gloves for handling bodies, disinfection, and disposal of infectious waste.</p> <ul style="list-style-type: none"> — Should be made from neoprene or other thick rubber material. — Must reach well above the wrist, preferably about 30 cm (12"), measuring from wrist up along the arm.
Quantity needed	Number of pairs _____

Boots or overboots	
Requirements	<p>The requirements are the same for both latex overboots which can stretch over street shoes, and regular rubber boots</p> <ul style="list-style-type: none"> — Should be 30 cm (12") high and have textured soles. — Provide several sizes to meet size requirements of anyone who might use them (for example, obtain pairs of boots in sizes medium, and large). <p>Overboots are preferable to regular boots. They take up less space, fewer sizes are needed, and they are less expensive.</p>
Quantity needed	<p>Total number of pairs of overboots _____ (medium ____ large ____)</p> <p>Total number of pairs of rubber boots _____ (medium ____ large ____)</p>

Protective eyewear	
Requirements	<ol style="list-style-type: none"> 1. Use non-fogging goggles that are vented at the sides. 2. If non-fogging goggles are not available, purchase clear spectacles locally. <ul style="list-style-type: none"> — Should have ties extending from ear holders that can be tied around the back of the head so glasses will not fall off when health care worker leans over patient.
Quantity needed	<p>Number of pairs of non-fogging goggles _____</p> <p>Number of pairs of clear spectacles _____</p>

Other recommended equipment	Quantity needed
Sprayers: backpack style with hose to use for cleaning and disinfecting spills, rinsing boots, and other decontamination procedures.	
Plastic sheets for mattresses and barriers: can be purchased locally.	
Waterproof mattresses	
Front lamps: to fit over the physician's head to provide light when physician is examining patients.	
Kerosene lamps	
Body bags	

ANNEX 7 Disinfecting Water for Drinking, Cooking and Cleaning

The Standard Precautions and VHF Isolation Precautions described in this manual recommend using a source of clean water. In an emergency situation, health facility staff may not have access to clean running water. For example, if the power supply is cut off, water cannot be pumped to the health facility. Other sources of water could be contaminated.

This Annex describes how to use household bleach to disinfect water when clean running water is not available in the health facility.

Adding a small amount of full strength household bleach to water will disinfect it enough so that it can be safely used for drinking, cooking, and cleaning.¹⁵

1. Locate several containers for storing the disinfected water. They should have:
 - A narrow mouth (to prevent hands being put into the water)
 - A screw top or attached lid
 - A spigot, if possible.

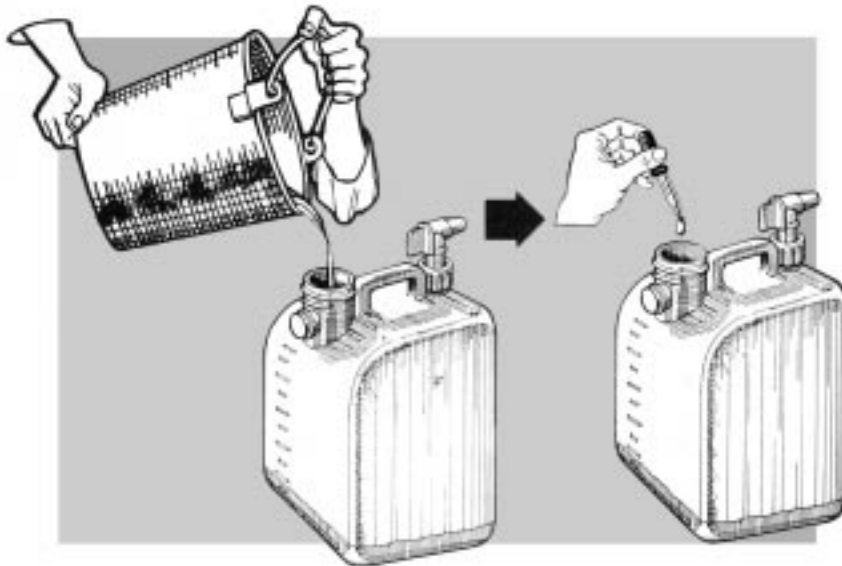


An example of a water container

- Examples include jerry cans, large plastic jugs, or buckets with spigots and lids that can be firmly closed.
2. Make available:
 - At least 1 litre of full strength household bleach. Use the instructions on the package to prepare a full-strength concentration.
 - Pieces of bar soap or powdered soap.
 3. Clean and disinfect the containers. To disinfect the containers, wash them with soap and water, or rinse them with 1:100 bleach solution.
 4. Collect water from the available source (for example, a river, stream, or well used by the village).

15 World Health Organisation: Cholera and other diarrhoeal diseases control – technical cards on environmental sanitation. Document *WHO/EMC/DIS/97.6*. Geneva: 1997.

5. Place the water into the disinfected containers, and add 3 drops of full strength household bleach per litre of water.



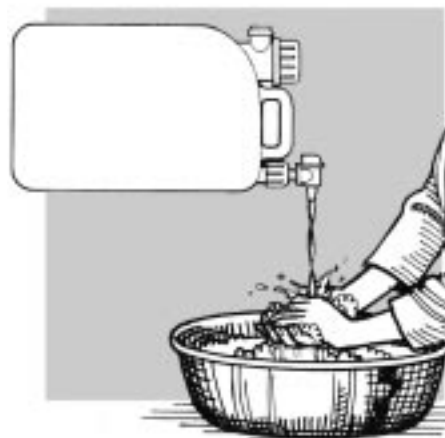
Preparing drinking water

6. Mix the water and bleach drops together.

Let the water stand for 30 minutes. This water is now safe to drink and to use for preparing meals. Clearly label the containers so that the health facility staff will know that the water is for drinking and is available for use. Use a marking pen to write *DRINKING WATER* on the container, or put a sign on it that says *DRINKING WATER*.

7. Provide clean water for the:

- Handwashing stations in areas where health workers are likely to have contact with patients who have fever or with infectious body fluids.
- Disinfection station where reusable needles and syringes are cleaned and disinfected.



Using stored clean water for handwashing

8. Assign the job of collecting and disinfecting water to a specific health facility staff person. Give the health staff person information about how to do the task and why it is important. Make a schedule for collecting and disinfecting water routinely.

To disinfect a large quantity of water:

1. Determine how many litres the container holds.
Example: 25 litres
2. Calculate the amount of bleach that is needed to disinfect the specified quantity of water.
Example: Use 3 drops of bleach per litre of clear water.
 $3 \text{ drops} \times 25 \text{ litres} = 75 \text{ drops}$.
3. Find a spoon, cup or bleach bottle cap that can be used to measure the required amount of bleach. Count the number of drops that the measuring spoon, cup or bottle cap will hold.
Example: 75 drops of bleach = 1 teaspoon
4. Use the measuring spoon or cup to measure the amount of bleach each time the large quantity of water is disinfected.

ANNEX 8

Preparing Disinfectant Solutions by Using Other Chlorine Products

The disinfectants recommended in this manual are made with household bleach. This table describes how to make 1:10 and 1:100 chlorine solutions from other chlorine products.

Preparation and Use of Chlorine Disinfectants

Use a chlorine product to make :	1:10 solution For disinfecting: <ul style="list-style-type: none"> • Excreta • Cadavers • Spills 	1:100 solution For disinfecting: <ul style="list-style-type: none"> • Gloved hands • Bare hands and skin • Floors • Clothing • Equipment • Bedding
Household bleach 5% active chlorine	1 litre bleach per 10 litres of water	100 ml per 10 litres of water or 1 litre 1:10 bleach solution per 9 litres of water
Calcium hypochlorite powder or granules 70% (HTH)	7 grams or ½ tablespoon per 1 litre of water	7 grams or ½ tablespoon per 10 litres of water
Household bleach 30% active chlorine	16 grams or 1 tablespoon per 1 litre of water	16 grams or 1 tablespoon per 10 litres of water

ANNEX 9 Making Supplies: Sharps Container, Incinerator, and Boot Remover

Making a Sharps Container:

If a puncture-resistant container is not available for collecting used disposable needles, syringes and other sharp instruments that have penetrated the patient's skin, make a container using these instructions.

Materials:

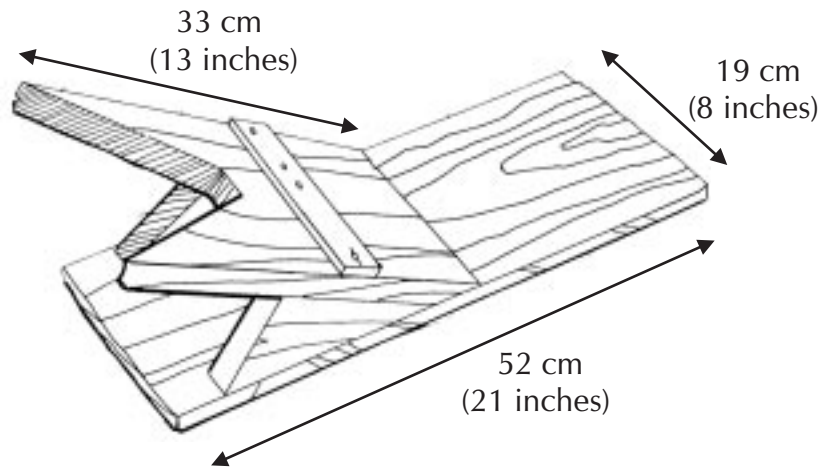
- Plastic bottle or container made from burnable material (empty plastic water bottles, for example)
 - Cardboard box to serve as a stand for holding the plastic bottle
 - Plastic tape.
1. Gather several plastic bottles and boxes made from cardboard or other sturdy, burnable material.
 2. Tape the sides and lid of the cardboard box together so the top side is closed.
 3. Draw a circle on the top of the box that is the same diameter as the plastic bottle.
 4. Cut out the circle and leave a hole in the top of the box.
 5. Place the bottle inside the hole. Fill the bottle 1/3 full with 1:10 bleach solution.
 6. Place the bottle with its stand in the patient's room or where disposable skin-piercing equipment is used.
 7. At the end of the day, when disposable waste is collected, carry the bottle and its stand to the site for burning infectious waste. Place the bottle and box in the pit for burning.



An adapted sharps container

Making an incinerator: See Annex 10.

Making a boot remover:



Please bring this picture to the local carpenter.

ANNEX 10 Sample Job-Aids and Posters for Use in the Health Facility

This section includes a series of sample posters that can be photocopied or hand-copied for use in health facilities. The sample posters and job-aids are pictorial explanations of how to do the steps described in various sections of this manual. For example, posters will remind health workers about:

- Using VHF Isolation Precautions
- How to put on and take off protective clothing
- How to build an incinerator.

Viral Haemorrhagic Fevers Isolation Precautions



Wash hands as needed



Isolate the patient



Wear protective clothing



Dispose of needles and syringes safely



Dispose of waste safely



Use safe burial practices

Steps for Putting On Protective Clothing



1 Wear scrub suit as the first layer of protective clothing.



2 Put on rubber boots.



3 Put on the first pair of gloves.



4 Put on the outer gown.

5 Put on the plastic apron.



6 Put on the second pair of gloves. Place the edge of gloves over the cuff of the gown.



7 Put on the mask.



8 Put on a head cover.



9 Put on the protective eyewear.



Steps for Taking Off Protective Clothing



1 Disinfect the outer pair of gloves.

7 Remove the eyewear.



2 Disinfect the apron and the boots.

8 Remove the head cover.



3 Remove the outer pair of gloves.

9 Remove the mask.



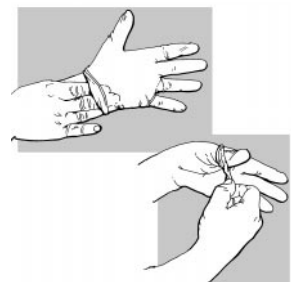
4 Remove the apron.

10 Remove the boots.



5 Remove the outer gown.

11 Remove the inner pair of gloves.



6 Disinfect the gloved hands.

12 Wash hands with soap and clean water.

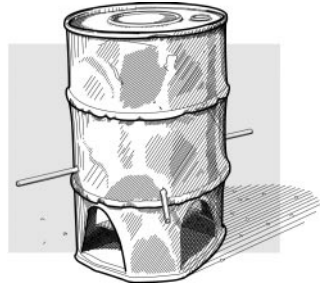


Steps for Building an Incinerator



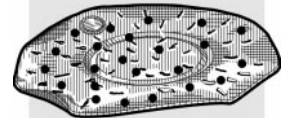
1 Find a 220-litre (55-gallon) drum.

6 Cut 4 holes on the sides of the drum. Thread 2 metal rods through these holes so that they cross inside the drum.



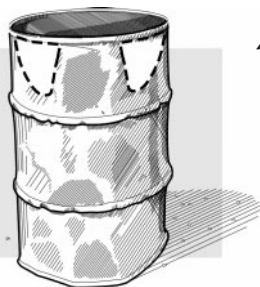
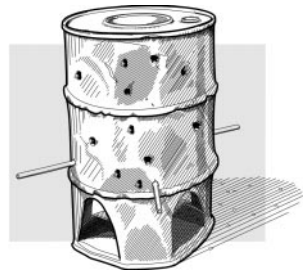
2 Cut open the drum. Remove and save the top cutaway piece.

7 Punch holes in the top cutaway piece to make a platform.



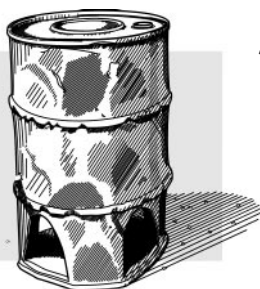
3 Hammer the edges of the drum so they are not sharp.

8 Pierce a series of holes on the side of the drum and above the crossed rods to improve the draw of the fire.



4 Cut 3 half-moon openings just above the top end of the drum.

9 Cut away half of the top. Attach the wire loops to the cutaway half to make a trap door. Attach another loop for a handle to open the trap door.



5 Turn the drum upside down. The bottom of the drum now is the top.

10 Place the platform inside the drum on top of the rods.



Always wear protective clothing when handling specimens from suspected VHF cases. Label all tubes carefully with name, date of collection and hospital number. Provide a patient summary or fill out a clinical signs and symptoms form (Annex 12). Contact your district officer for special instructions about collecting and shipping specimens.

Diagnostic Test	Samples required	Preparation & Storage	Shipping	Viruses to be confirmed
ELISA (Serology) Detects: — Viral antigen — IgM and IgG antibody	Whole blood* Serum or plasma Acute and convalescent**	Freeze or refrigerate (as cold as possible)	Frozen on dry ice or ice packs or both****	Ebola Lassa CCHF Rift Valley Marburg Yellow fever
PCR Detects: DNA, RNA (genetic material) from virus	Whole blood or clot*** Tissues (fresh frozen) Serum/plasma	Refrigerate or freeze Freeze	Frozen on dry ice or ice packs or both****	Ebola Lassa CCHF Rift Valley Marburg Yellow fever
Immunohistochemistry (liver) Detects: Viral antigen in cells	Liver biopsy from fatal cases	Fix in formalin (can be stored up to 6 weeks)	Room temperature (Do not freeze)	Ebola Lassa CCHF Rift Valley Marburg Yellow fever
Immunohistochemistry (skin) Detects: Viral antigen in cells	Skin biopsy from fatal cases (any site)	Fix in formalin (can be stored up to 6 weeks)	Room temperature (Do not freeze)	Ebola Lassa
Immunohistochemistry (other tissues) Detects: Viral antigen in cells	Tissue biopsy from fatal cases (other tissues, spleen, lung, heart, kidney)	Fix in formalin (can be stored up to 6 weeks)	Room temperature (Do not freeze)	<i>Possible detection of</i> Ebola, Lassa, CCHF, Rift Valley, Marburg, Yellow Fever

- * Whole blood can be used for enzyme-linked immunosorbent assay (ELISA) and may be frozen. Do not centrifuge suspected VHF specimens because this increases risk to the lab worker. If serum specimens have already been prepared these can be used. Place specimens in plastic tubes for shipping and storage and be sure that the tubes are sealed and properly labelled.
- ** Collect acute-phase specimen when patient is admitted to hospital or diagnosed as suspected case and collect convalescent-phase specimen at death or when discharged from the hospital.
- *** Whole blood or tissue is preferred, although serum or plasma may provide results.
- **** Use both ice packs and dry ice to provide best results. If dry ice or ice packs are not available, sample may be shipped at room temperature and still provide valid results in most cases.

ANNEX 12 Skin Biopsy on Fatal Cases for Diagnosis of Ebola

Ebola virus can be detected in fatal cases from a skin specimen using an immunohistochemistry test developed by the Centers for Disease Control and Prevention (CDC) Infectious Diseases Pathology Activity. The skin specimen is fixed in formalin which kills the virus. The specimen is no longer infectious once it is placed in formalin and the outside of the vial has been decontaminated. This vial can be shipped by mail or hand carried to the lab without risk. Results are available within a week after the specimen arrives at the CDC.

CDC provides Skin Biopsy Kits for the collection of skin samples in formalin. If these are available in your area, follow the simple instructions that are provided in the kit. An example of the instructions is on the following pages.

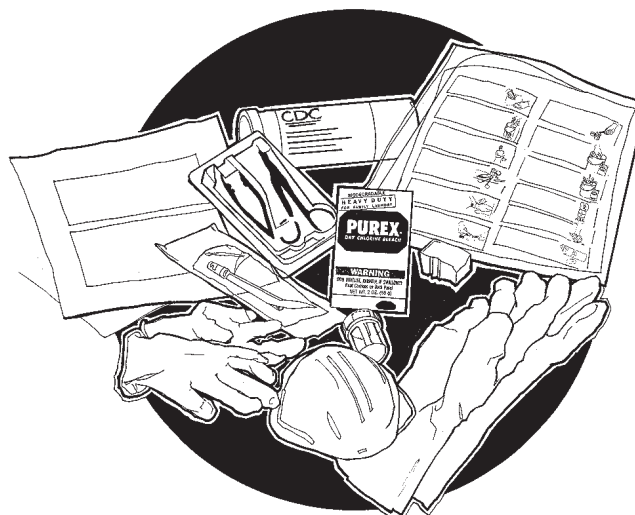
If a kit is not available, the biopsy can still be collected and sent for diagnosis to:

Dr. Sherif Zaki
Centers for Disease Control and Prevention
Infectious Diseases Pathology G-32
1600 Clifton Road, NE
Atlanta, GA 30329-4018



Viral Haemorrhagic Fever

Skin Biopsy Kit For Surveillance



Check the list of equipment and make sure everything is in place before beginning.

Kit Equipment List:

1. Instruction sheet
2. Selection criteria and surveillance forms
3. (1) box powdered bleach
4. (4) pairs latex gloves
5. (2) pairs heavy-duty gloves
6. (2) masks
7. (1) biopsy tool
8. (1) tweezers and scissors set
9. (1) vial with formalin
10. (1) piece hand soap
11. (1) mailing tube
12. (1) set mailing labels

Other items needed:

1. 1 or 2 buckets for disinfectant and handwashing
2. Gowns or plastic aprons
3. 10 litres water

Shipping Instructions:

Be sure to fill out the forms with the name of the patient on each page. Number the vial and put the number on the form. This is very important especially if you have more than one specimen to send. Use a pencil to write on the lid of the vial.

The formalin fixed specimen is not infectious. The vial can be sent by normal mail, carried on a plane or delivered to the U.S. Embassy **without risk** to the carrier.

Put the forms and the vial containing the specimen into the mailing tube. Close the lid tightly and seal with tape if available. Put the label on the tube and send it to CDC either by the U.S. Embassy or by the post. It can be mailed in your country or if someone carries it to the U.S., it can be placed in any U.S. Mailbox.

Please remember to put stamps on the package.

Surveillance for Ebola Haemorrhagic Fever

INSTRUCTION FOR USING THE SKIN BIOPSY KIT

IMPORTANT: For security, all of the equipment used in the biopsy is for one use only and must not be reused.

1 Fill out the patient forms with the patient information. Include your address for sending the results. Check the equipment and make sure you have everything you need.



7 Place the sample in the formalin. Close the cap tightly to prevent leaks.



2 Prepare the disinfectant solution. Mix the contents of the box of bleach in 10 litres of water.



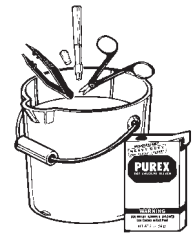
8 Dip the vial in the disinfectant for 1 minute. Set it aside to dry.



3 Put on the protective clothing. Begin with the gown, next the latex gloves, then the kitchen gloves and the mask. Use a plastic apron if one is available.



9 Then place the rest of the equipment in the disinfectant. If you need to move the cadaver, do so while you are still wearing the protective clothing. When you are finished, rinse your exterior gloves in the disinfectant, remove them and drop them in the disinfectant bucket.



4 Take the equipment to the work site. Open the vial of formalin. Open the two packets of instruments: the scissors and the tweezers, and the biopsy tool. Take the cover off the biopsy tool and arrange the equipment for use near the body.



10 Wearing the interior gloves, remove all of the disinfected material and place in the plastic sac. Burn the sac in the incinerator. Remove your gloves and burn.



5 Gently turn the head of the cadaver to expose the nape of the neck. Place the biopsy tool perpendicular to the neck and press down into the skin up to the guard. Rotate gently. Remove the biopsy tool.



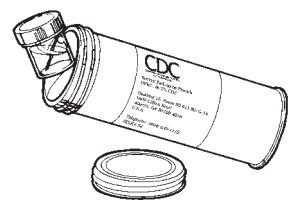
6 With the tweezers, gently lift out the core you cut in the skin and use the scissors to cut the piece away if necessary.



11 Wash your hands with soap and water. The specimen is not infectious after it is placed in formalin and the outside of the vial is disinfected.



12 Place the vial and the patient forms in the mailing tube and send to CDC, Atlanta. Do not freeze the sample.



Haemorrhagic Fever Surveillance Form

Name and location of Health Centre:

Vial Number:

Name of physician or nurse:

Contact address (**Important: to receive results, give a very specific contact address**):

Telephone /Facsimile number:

Patient data

Hospital Number:

Name:

Age:

Sex: Male Female

Address:

Profession or occupation:

Date of first symptoms:

Date of admittance:

Date of death:

Date of biopsy:

If patient was not hospitalized, who cared for the patient?

Are any other family members ill? If yes, relationship:

Symptoms of family member:

If the patient was hospitalized, use the table on the back to mark the symptoms which you observed and any other important observations.

Clinical Signs and Symptoms Form

Name of Patient: _____

Symptoms (Check each one present)	Date of appearance:
<input type="checkbox"/> Fever	
<input type="checkbox"/> Diarrhoea	
<input type="checkbox"/> Extreme weakness after rehydration	
<input type="checkbox"/> Nausea	
<input type="checkbox"/> Vomiting	
<input type="checkbox"/> Sore throat	
<input type="checkbox"/> Headache	
<input type="checkbox"/> Loss of appetite	
<input type="checkbox"/> Muscle pain	
<input type="checkbox"/> Joint pain	
<input type="checkbox"/> Hiccups	
<input type="checkbox"/> Cough	
<input type="checkbox"/> Conjunctivitis (red eye)	
<input type="checkbox"/> Chest pain	
<input type="checkbox"/> Rapid respiration	
<input type="checkbox"/> Recent loss of hearing	
<input type="checkbox"/> Burning sensations of the skin	
Bleeding , specify below:	Date of appearance:
<input type="checkbox"/> Black or bloody vomit	
<input type="checkbox"/> Black or bloody stool	
<input type="checkbox"/> Mouth	
<input type="checkbox"/> Nose	
<input type="checkbox"/> Urine	
<input type="checkbox"/> Skin or puncture site	
<input type="checkbox"/> Other bleeding: specify	
<input type="checkbox"/> Other observations	Date of appearance:

Selection criteria for testing of suspected Ebola haemorrhagic fever (EHF)

Patient's last name, first name: _____

When to take a skin biopsy for testing:

The patient had the following symptoms within two weeks preceding death:

- Fever and
- Diarrhoea and
- One of the following signs:
 - Headache
 - Intense weakness after rehydration
 - Muscle pains
 - Joint pain
 - Back pain



Treatment was given with antibiotics and antimalarials for a minimum of three days.



The patient failed to respond to treatment and died

Or

Died with at least 3 of the following symptoms and no definitive diagnosis:

- Sore throat or difficulty in swallowing
- Red eyes
- Skin eruptions
- Hiccups
- Burning sensation of the skin
- Bleeding: nose, mouth, urine, stools (black or bloody), or vomit (black or bloody)
- Rapid respiration

The diagnosis of haemorrhagic fever is possible and even probable if the patient is bleeding.

If the patient reports another similar death in the family recently, the diagnosis of EHF is even more likely. Measures should be taken to put the family and contacts under surveillance.



Take a skin biopsy, following the instructions given in this annex.

The biopsy is not infectious once in formalin.

Send it to CDC for testing at the address on the back of this form.

Dr. Sherif Zaki

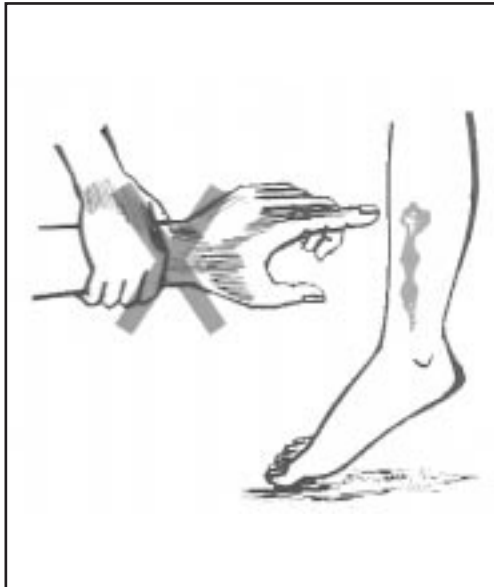
Centers for Disease Control and Prevention

Infectious Diseases Pathology G-32

1600 Clifton Road, NE

Atlanta, GA 30329-4018

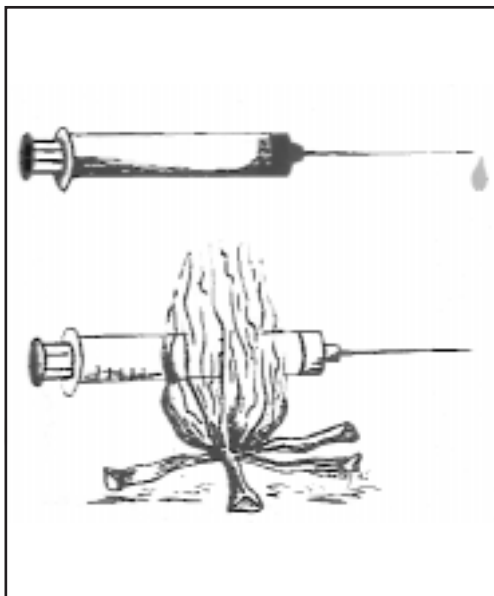
Examples of posters used to provide information to family members of Ebola patients. Kikwit, 1995.



Avoid contact with the patient's blood, urine, and vomit.



Do not touch or wash the bodies of deceased patients.



Burn needles and syringes immediately after use.



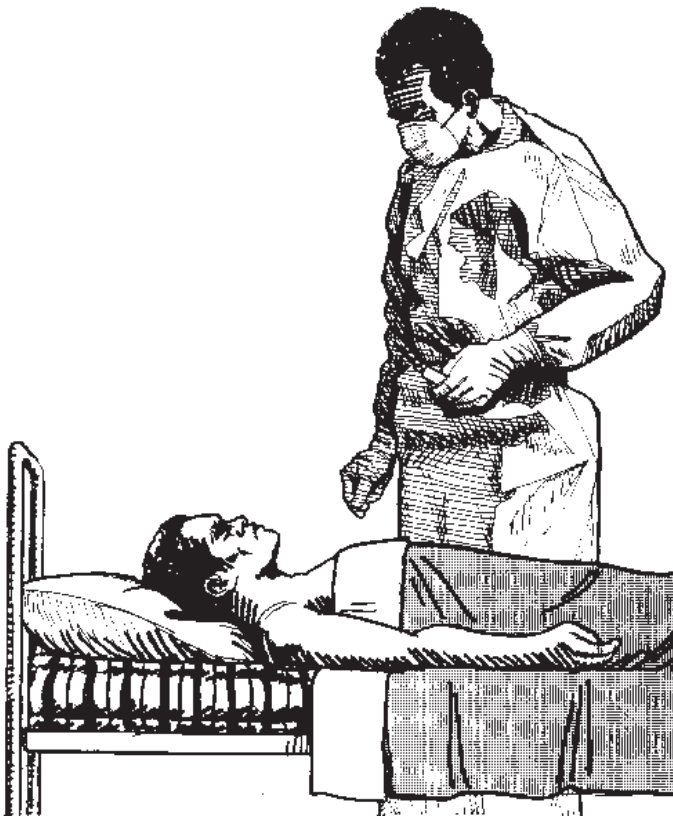
Use gloves to handle the patient's clothing. Boil soiled clothing before washing it.

Examples of posters or teaching aids for viral haemorrhagic fevers

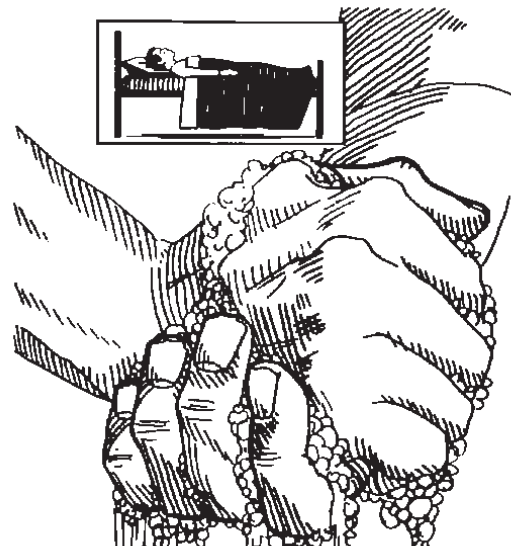
Protect yourself.

Never touch urine, blood, vomit from a patient with fever.

Wash spills with bleach solution or soap and water.



To prevent transmission of Lassa fever, wear a gown, gloves and mask.



Wash your hands if you take care of a patient with fever.



In addition to fever, Lassa fever patient may have: sore throat, back pain, cough, headache, red eyes, vomiting, or chest pain.



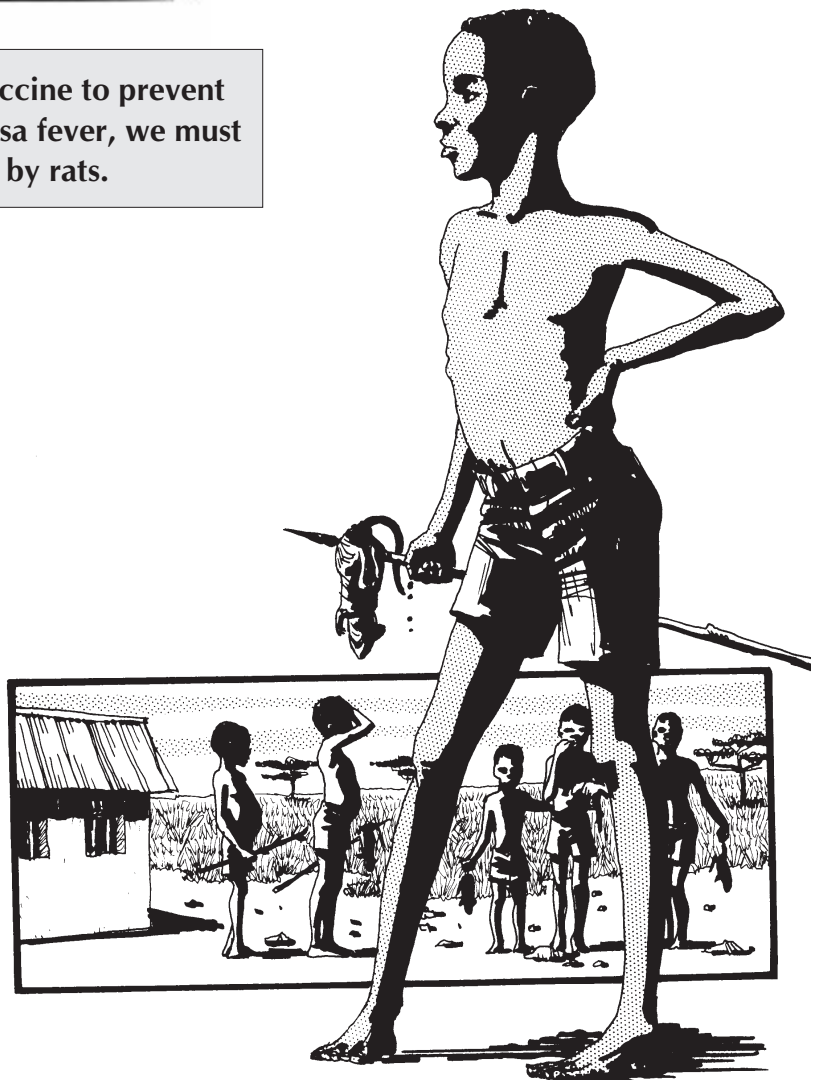
You can get Lassa fever by touching the blood, urine, or vomitus of another person with Lassa fever.



To prevent Lassa fever, keep your food and water covered.



There is no injection or vaccine to prevent Lassa fever. To prevent Lassa fever, we must prevent its spread by rats.



You can get Lassa fever by touching, playing with, or cutting up a rat's dead body.

ANNEX 14 Conducting In-Service Training for VHF Isolation Precautions

In-service training for VHF Isolation Precautions should be ongoing. Provide training about VHF Isolation Precautions during supervisory visits, staff meetings or conferences. Also use other channels such as newsletters, bulletins and job-aids to provide health facility staff with information and reinforce the use of VHF Isolation Precautions.

Training in skills is most effective if health staff receive information, see examples, and have an opportunity to practice the skills they are learning. Make sure that training sessions for each topic include relevant examples and opportunities for meaningful practice.

Conduct training sessions in small groups with each category of health worker.

- Present **information** with charts, pictures, posters or information written on a flipchart or chalkboard. Use drawings from this manual to illustrate the topic you are presenting.
- Give **examples** of the skills you would like the health staff to use. For example, demonstrate the steps for handwashing as you explain aloud what you are doing.
- Provide the materials and supplies that health staff need to **practice** the skill. For example, provide two buckets of clean water, soap and clean, one-use towels. Ask health workers one at a time to practice washing their hands. Ask for feedback from the rest of the group about what was done well and where improvement is needed.
- Provide **feedback** to the health staff and answer questions. Conclude the training by summarizing the steps presented in the session. Provide a job-aid or handout to tape on a wall to remind health facility staff about the skills they learned in the session.
- Routinely monitor supplies and equipment to make sure that the supplies for doing the desired skill are available. During supervisory visits, be sure to acknowledge when you see health staff using the skills well. When problems occur, find out what has caused them, and take steps to solve them so that health staff can continue to use the practices consistently.

The following is a sample agenda for in-service training. It describes how to include topics about VHF Isolation Precautions during monthly staff meetings. Adapt it to the schedule for your health facility.

Month	VHF Isolation Precautions Topic
January	<ol style="list-style-type: none"> 1. Disease Transmission in the Health Care Setting 2. Identifying Viral Haemorrhagic Fevers: When to Suspect a VHF 3. General Information about Standard Precautions 4. Handwashing
February	<ol style="list-style-type: none"> 1. Recommended Protective Clothing for VHF 2. Practice Putting On and Taking Off Protective Clothing
March	<ol style="list-style-type: none"> 1. Preparing Disinfectants 2. Using Disinfectants
April	<ol style="list-style-type: none"> 1. Selecting Disposal Sites and Planning Security Barriers 2. Building an Incinerator
May	<ol style="list-style-type: none"> 1. Maintaining an Incinerator 2. Preparing a Pit for Burning Infectious Waste
June	<ol style="list-style-type: none"> 1. Safe Use and Disposal of Sharp Instruments 2. Making a Sharps Container
July	<ol style="list-style-type: none"> 1. Assessing Inventory of Protective Clothing 2. Identifying Items to Use When Recommended Protective Clothing is not Available
August	<ol style="list-style-type: none"> 1. Sites for Isolation Area (Patient Room and Changing Room); Security Barriers 2. Planning to Set Up an Isolation Area
September	<ol style="list-style-type: none"> 1. Assessing Available Supplies for Isolation Area 2. Identifying Items to Use When Recommended Supplies are not Available
October	<ol style="list-style-type: none"> 1. Selecting and Training Caregiving Family Members: VHF, Protective Clothing
November	<ol style="list-style-type: none"> 1. Using VHF Isolation Precautions during Patient Care 2. Disinfecting Thermometers, Stethoscopes and Blood Pressure Cuffs 3. Disinfecting Used Needles and Syringes
December	<ol style="list-style-type: none"> 1. Procedures for Responding to Accidental Exposures 2. Standard Precautions – Especially Handwashing after Examining Patients with Fever

ANNEX 15 Local Resources for Community Mobilization and Education

Section 8 of this manual describes how to develop community education in an urgent situation. The first step is to identify key community resources such as groups who know the community and already have access to it. Information about each key community resource can be recorded on the following chart. Use the chart as a reference to identify appropriate community resources that can be called upon when a VHF occurs.

Local Resources for Community Mobilization and Education

Organization or Group	Expertise	Representative or Leader and Locating Information	Human Resources	Available Equipment	Contacted?	Task Assigned

ANNEX 16

International and Regional Contacts

SWITZERLAND	<p>World Health Organization (WHO) Division of Emerging and other Communicable Diseases Surveillance and Control (EMC) Dr David L. Heymann 20 Avenue Appia, CH-1211 Genève 27, Switzerland Tel: 41-22-791-2660/41-22-791-2661 Fax: 41-22-791-4198 E-mail: HEYMANND@WHO.CH</p>
ZIMBABWE	<p>WHO Regional Office for Africa Dr D. Barakamfitiye Director, Prevention and Control of Diseases Medical School, C Ward, Parirenyatwa Hospital, Mazoe Street P.O.Box BE 773, Belvedere, Harare, Zimbabwe Tel: 1-407-733-9236 Fax: 1-407-733-9360 E-mail: BARAKAMFITIYED@HTSD.COM at INET</p> <p>Dr A. Ndikuyeze, Regional Adviser, Prevention and Control of Diseases Medical School, C Ward, Parirenyatwa Hospital, Mazoe Street P.O.Box BE 773, Belvedere, Harare, Zimbabwe Tel: 1-407-733-9240 Fax: 263-479-1214 E-mail: NDIKUYEZE@SERVER.WHOAFR.ORG</p>
WHO Collaborating Centres for Viral Haemorrhagic Fevers	
UNITED STATES OF AMERICA	<p>Centers for Disease Control and Prevention (CDC) National Center for Infectious Diseases Division of Viral and Rickettsial Diseases Special Pathogens Branch 1600 Clifton Road, MS G-14 Atlanta, Georgia 30329-4018, USA Telephone: 1-404-639-1115 Fax: 1-404-639-1118 E-Mail: CJP0@CDC.GOV</p>

UNITED STATES OF AMERICA	US Army Medical Research Institute of Infectious Diseases (USAMRIID) Fort Detrick, Maryland 21702-5011, USA Telephone: 1-301-619-4608 Fax: 1-301-619-4625
CENTRAL AFRICAN REPUBLIC	Institut Pasteur de Bangui Boite Postale 923 Bangui, Central African Republic Telephone: 236-614-576 Fax: 236-610-109
FINLAND	University of Helsinki Haartman Institute Department of Virology P.O.Box 21 SF-Helsinki, Finland Telephone: 358-0-434-6490 Fax: 358-0-434-6491
FRANCE	Institut Pasteur à Paris 28, rue du Dr Roux 75724 Paris Cedex 15, France Telephone: 33-1-4061-3088 Fax: 33-1-4061-3151
GERMANY	Philipps-University Institute of Virology Robert-Koch-Str. 17 D-35037 Marburg, Germany Telephone: 49-6421-28-6253 Fax: 49-6421-28-8962
KENYA	Kenya Medical Research Institute Mbagathi Road P.O.Box 54628 Nairobi, Kenya Telephone: 254-2-722-541 Fax: 254-2-725-950

NIGERIA	University of Ibadan College of Medicine Department of Virology Ibadan, Nigeria
SOUTH AFRICA	National Institute for Virology Special Pathogens Unit Private Bag X4 Sandringham 2131, Zaloska 4 Republic of South Africa Telephone: 27-11-882-9910 Fax: 27-11-882-0596
SWEDEN	Swedish Institute for Infectious Disease Control S-105 21 Stockholm, Sweden Telephone: 46-8-735-1300 Fax: 46-8-735-6615
UNITED KINGDOM	Centre for Applied Microbiology and Research Division of Pathology Porton Down, Salisbury, United Kingdom Telephone: 44-198-061-2224 Fax: 44-198-061-2731

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Viral haemorrhagic fevers

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