Section 5

Disinfect Reusable Supplies and Equipment

This section describes how to:

- Prepare disinfectants.
- Clean and disinfect used gloves before reuse.
- Clean and disinfect used medical instruments and supplies.
- Disinfect patient waste and spills of infectious body fluids.
- Disinfect and discard infectious waste and non-reusable supplies.
- Clean and disinfect protective clothing, boots, and patients' sheets.
- Give first aid for accidental exposures.

Section 5 Disinfect Reusable Supplies and Equipment

What to Disinfect: Disinfection kills almost all bacteria, fungi, viruses, and protozoa. It reduces the number of microorganisms to make equipment and surfaces safer for use. When VHF is suspected in the health facility, **all medical, nursing, laboratory and cleaning staff** should disinfect:

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

Note: All health facility staff — including cleaning, waste disposal, and laundry staff — who handle, disinfect, or clean VHF-contaminated supplies and equipment should ***wear the same protective clothing as health care workers who provide direct patient care.*** Wear thick gloves for the second pair of gloves. Follow the steps in Section 4 for putting on and taking off protective clothing.

5.1 Prepare Bleach Solutions

In a central place in the health facility, prepare two solutions of ordinary household bleach. Normally, ordinary household bleach has a 5.0% chlorine concentration.[7]

- 1:10 bleach solution[8] is a strong solution used to disinfect excreta and bodies. It is also used to prepare the 1:100 bleach solution.

- 1:100 bleach solution[9] is used to disinfect:

  — Surfaces

  — Medical equipment

  — Patient bedding

  — Reusable protective clothing before it is laundered.

  It is also recommended for:

  — Rinsing gloves between contact with each patient

  — Rinsing gloves, apron, and boots before leaving the patient's room

  — Disinfecting contaminated waste for disposal.

Bleach solutions must be prepared daily. They lose their strength after 24 hours. Anytime the odour of chlorine is not present, discard the solution.

Note: 1:10 bleach solution is caustic. Avoid direct contact with skin and eyes. Prepare the bleach solutions in a well-ventilated area.

7 The recommendations in this section assume ordinary bleach solution has a 5% chlorine concentration. Annex 8 contains a table describing quantities to use when preparing chlorine solutions from other chlorine products.

8 This is a solution with 0.5% chlorine concentration.

9 This is a solution with 0.05% chlorine concentration.

To prepare the bleach solutions

1. Gather the necessary supplies:

   - 1 container that holds 10 measures (for example, 10 litres) to make the base 1:10 bleach solution
   - 1 large or several smaller containers (1 for each station) with covers or lids to hold the 1:100 bleach solutions. These containers should be a different colour than the container holding the 1:10 bleach solution, or they should be clearly labelled "1:100."
   - Chlorine bleach (for example, 1 litre of Javel)
   - Clean water
   - A measuring cup or other container (for example, a bottle that holds 1 litre).

2. To prepare the containers for mixing the bleach solutions, determine where to mark the measurements for "9 parts" and "1 part" on each container.

   - Pour 9 measures of water into the container. Mark a line where "9 parts" has filled the container. For example, use a nail to scratch a line on a metal or plastic bucket.
   - Add 1 measure of water to the first 9 parts. Using a nail, mark a line at the point where the total volume has filled the container.

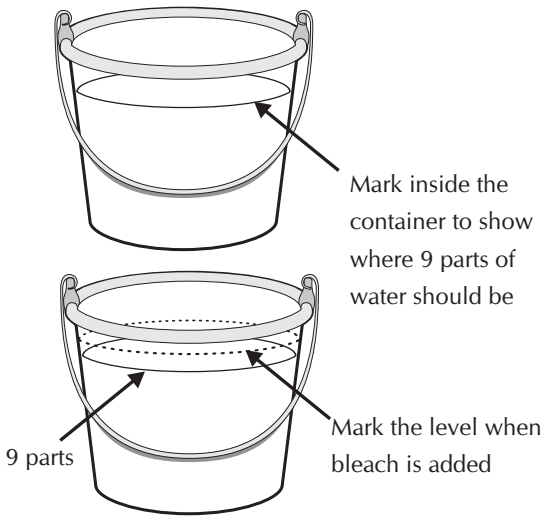

Fig. 45. Marking container for mixing 1:10 bleach solutions

3. To prepare 1:10 bleach solution:

   - Fill the marked container with water up to the mark for 9 parts.
   - Then pour the ordinary household bleach into the container up to the top mark.

4. To prepare 1:100 bleach solution:

   - Measure and pour 9 parts of water into the large container. Then measure and pour 1 part of 1:10 bleach solution into the water to make 1:100 bleach solution.

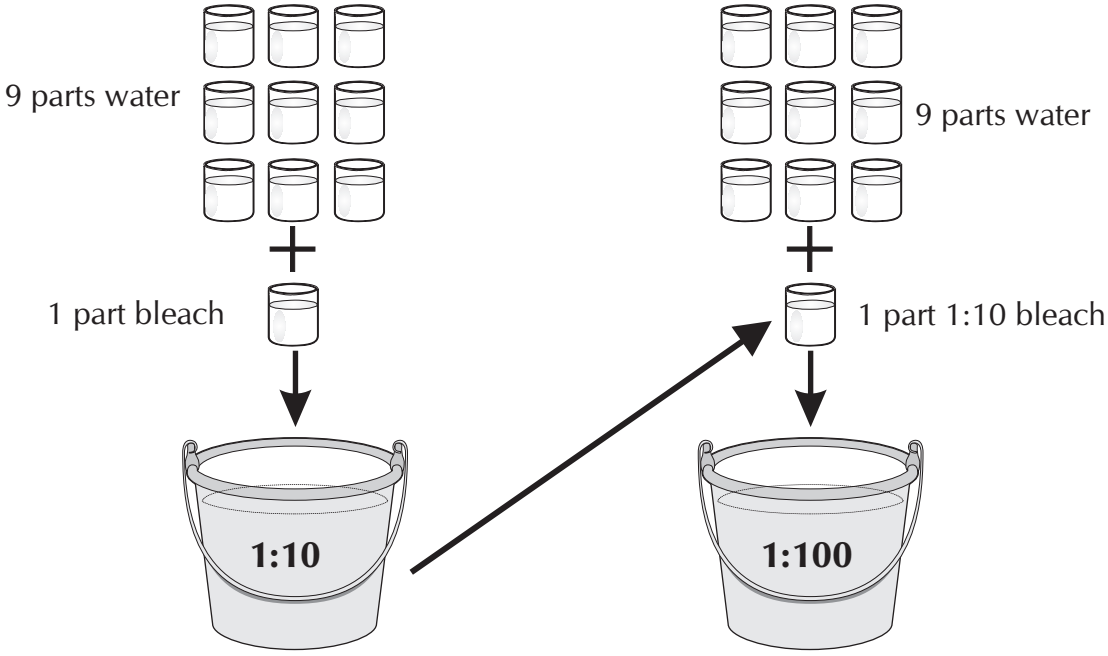

Fig. 46. Preparing bleach solutions

   - Distribute a container to each station.
   - Fill the container at each station in the isolation area with the 1:100 bleach solution as shown in Section 3.2.
   - Place the remaining 1:10 bleach solution in the isolation area to disinfect spills and excreta.
   - When there is a large outbreak, make larger quantities of bleach solutions. Prepare the disinfectants daily and distribute them as described in Section 3.
   - ***Remove the disinfectants everyday or whenever the solutions become cloudy or bloody.*** Replace the solution with a fresh supply. Safe disposal of bleach solutions is described in Section 6.1.

- ***If you cannot smell chlorine in the bleach solution, the concentration is no longer strong enough for disinfection.*** Replace the solution with a fresh supply.

- Make a schedule for the cleaning staff so they know when to bring a fresh solution into the isolation area, when to change them, and when to remove them.

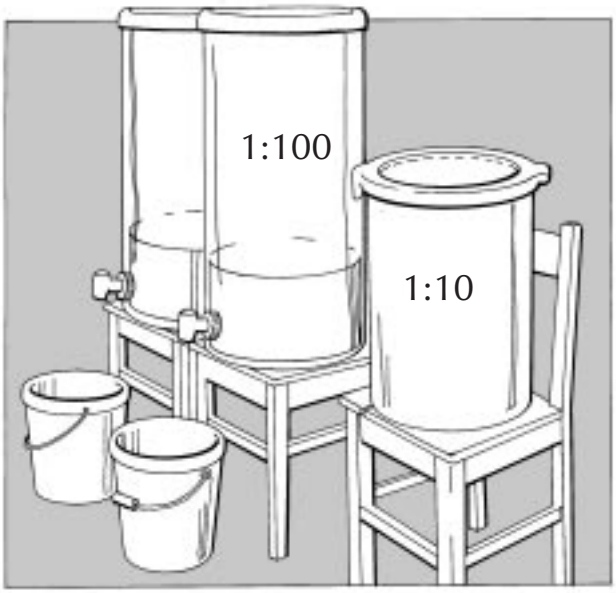

Fig. 47. Preparing bleach solutions during an outbreak

5.2 Prepare Supply of Soapy Water

Prepare a daily supply of soapy water.

1. Gather the necessary supplies:

   - Ordinary cake soap or powdered laundry detergent
   - Supply of clean water
   - Large bucket
   - Container for measuring 1 litre.

2. Cut a small piece of cake soap.

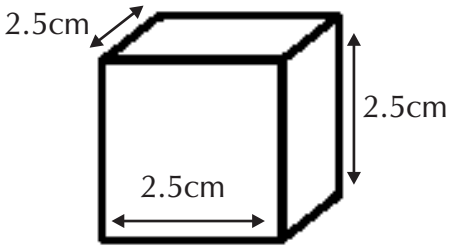

Fig. 48. Small piece of cake soap

3. Mix one piece of cake soap with 4 litres (1 gallon) of water.

4. Make sure the soap is well mixed with the water so there are suds. Pour into pan or bucket for use in cleaning (see Section 3.3).

OR

5. Mix powdered laundry detergent according to instructions on packet.

5.3 Disinfect Gloved Hands between Patients

Health care workers should change outer gloves between each patient.

If there are not enough gloves to allow health care workers to change to a new pair of outer gloves after examining or treating each patient, disinfect gloved hands in 1:100 bleach solution after working with each patient.

To disinfect gloved hands:

1. Place a bucket of 1:100 bleach solution in the isolation room.

2. If gloved hands are visibly soiled, wash them first in soap and water.

3. Dip the gloved hands into the 1:100 bleach solution for 1 minute.

4. Dry the gloved hands with a one-use (or paper) towel, or let the gloved hands air-dry.

5. If a bleach solution is not available, wash gloved hands with soap and water.

6. After several rinses in bleach solution, the gloves may become sticky and will need to be changed.

7. If gloves will be reused, place gloves in a bucket of soapy water. See Section 5.4 for instructions about washing used gloves.

   If gloves are not going to be reused, discard them in the container for disposable infectious waste.

5.4 Disinfect Used Gloves before Reuse

Reusing gloves is ***not*** recommended. If it is necessary to reuse gloves because the supply in the health facility is limited, clean and disinfect them. Also check them for holes.

When cleaning staff handle contaminated supplies, make sure they wear the same protective clothing as health care workers. They should wear thick gloves as the second pair of gloves.

To clean and disinfect gloves for reuse:

1. Take the bucket with soaking gloves to the VHF laundry area. Carefully move the gloves to a bucket with fresh soapy water.

2. Gently rub the gloves to remove visible soiling and cover with water.

3. Soak them overnight.

4. Wearing at least an apron and thick gloves, rinse the gloves in clean water. To check for holes, fill each glove with rinse water. If any water squirts out, there is a hole in the glove. Discard any gloves with holes.

5. Air-dry the remaining gloves.

6. If available, put talcum powder in dry gloves.

Fig. 49. Checking gloves for holes

7. Return clean gloves to the storage shelf in the entry to the isolation area.

5.5 Disinfect Reusable Medical Instruments

In the isolation room, each time health care workers wash their hands between patients, they should also disinfect thermometers and stethoscopes they have used to examine the patient.

To disinfect thermometers and stethoscopes with alcohol:

1. Use rubbing alcohol (70% isopropyl).

2. Place the alcohol in a covered container and put it in the patient's room. Change the alcohol at least once a week.

3. Use a clean cloth or paper towel and dip it in the alcohol solution.

4. Carefully wipe the thermometer with the alcohol solution and hold the cloth around it for 30 seconds. Discard the cloth. Let the thermometer air-dry.

5. Use another clean cloth and dip it in the alcohol solution.

6. Carefully wipe the metal part of the stethoscope and hold the cloth against the surface for 30 seconds. Let it air-dry.

7. Discard the cloth in the laundry container. Discard paper towels in the bucket for waste to be burned.

To disinfect thermometers and stethoscopes with bleach solution:

1. Place a covered container of 1:100 bleach solution in the isolation room. Change the bleach solution each day.

2. Use a clean cloth or paper towel and dip it in the bleach solution. Never dip a soiled cloth back into the bleach solution. Use a cup or dipper to pour the bleach solution on a soiled cloth.

3. Wipe the thermometer with the cloth soaked in bleach solution. Or, soak the thermometer for 10 minutes in the bleach solution. Let the thermometer air-dry.

4. Use a clean cloth or new paper towel and dip it in the bleach solution.

5. Wipe the metal part of the stethoscope with 1:100 bleach solution. Let it air-dry.

6. Discard the cloth in the laundry container. Discard paper towels in the bucket for waste to be burned.

How to disinfect and dispose of used needles and syringes is described in Sections 1.4 through 1.6.

5.6 Disinfect Bedpan or Waste Bucket

1. Cover the contents with 1:10 bleach. Empty the bedpan contents directly into the isolated toilet or latrine.

2. Clean the bedpan with soap and water to remove solid waste. Pour into toilet or latrine. Rinse the bedpan in 1:100 bleach solution and return it to patient's room.

If a family member is responsible for carrying out this task, make sure the family member wears protective clothing.

5.7 Disinfect Patient's Utensils

If families will assist with patient care, provide 1:100 bleach solution and soap and water so the family member can wash the patient's eating utensils. After washing the utensils, rinse them in 1:100 bleach solution, and let them air-dry.

5.8 Disinfect Spills of Infectious Body Fluids

Place a bucket containing 1:100 bleach solution in the isolation area.

To disinfect spills of infectious body fluids:

1. Use a cup or dipper to pour bleach solution on spills. Cover the spill completely with 1:100 bleach solution. If the spill is heavy or dense, cover with 1:10 bleach solution. Take care to prevent drops or splashes of the contaminated body fluid from reaching anyone when pouring bleach solution on the spill.

Fig. 50. Disinfecting a spill on the floor

2. Soak the spill for at least 15 minutes.

3. Remove the disinfected blood or spilled material with a cloth soaked with 1:100 bleach solution.

4. Discard any waste in the container for collecting disposable infectious waste or in the isolated latrine or toilet.

5. Wash area as usual with soap and clean water.

To clean the walls or other surfaces:

Surfaces such as tabletops, sinks, walls and floors are not generally involved in disease transmission. However, in a VHF patient's room, if walls are visibly soiled with blood or other body fluids, clean them as follows:[10]

Fig. 51. Disinfecting a spill on the wall

1. Use a sprayer or mop to wash the walls with 1:100 bleach solution. Rinse the mop in a fresh supply of 1:100 bleach solution. (If using a sprayer, apply the spray close to the surface to minimize splashing and aerosols.)

2. Wash the wall as usual with soap and clean water to remove visible soil.

3. Discard any waste in container for collecting infectious waste or in the isolated latrine or toilet.

5.9 Disinfect Infectious Waste and Non-Reusable Supplies for Burning

Place a bucket or other container containing 1:100 bleach solution in the patient's room. Use it to collect infectious waste, contaminated items, and non-reusable supplies that will be burned.

How to carry out safe waste disposal is described in Section 6.

10 Favero, MS, and Bond, WW. Sterilization, disinfection, and antisepsis in the hospital. In: Murray PR ed. Manual of Clinical Microbiology. Washinton, D.C.: American Society for Microbiology. pp. 183-200, 1991

5.10 Clean and Disinfect Protective Clothing

Set aside a special part of the laundry or cleaning area for laundry from suspected VHF patients. Make sure health facility staff who handle contaminated laundry wear protective clothing, including thick gloves as the second pair of gloves.

1. Transfer laundry as soon as possible to area set aside for VHF laundry.

2. Carefully move the laundry to a bucket with fresh 1:100 bleach solution.

3. Soak laundry in 1:100 bleach solution for 30 minutes. Be sure that all items are completely soaked.

4. Remove items from the bleach solution and place in soapy water.

Fig. 52. Transferring laundry to the cleaning area

5. Soak overnight in soapy water.

6. Scrub thoroughly to remove stains. Rinse and line-dry.

7. Use a needle and thread to repair any holes or torn areas.

8. The clean clothing is now ready for use. It can be ironed although this is not necessary. (It is not necessary to wear protective clothing when ironing cleaned clothing.)

Items that are very worn out should be discarded or used as cleaning rags.

5.11 Clean and Disinfect Boots

Place a sprayer or pan with 1:100 bleach solution at the exit of the patient's room. Change the pan often. Steps for disinfecting boots are described in Section 4.4.

5.12 Clean and Disinfect Patient's Bedding

For plastic sheeting:

1. If the plastic sheeting becomes soiled during its use with the same patient, remove liquid or solid waste with absorbent towels. Discard them in the container for collecting infectious waste for burning. Then, wash the plastic sheeting with 1:100 bleach solution.

2. Change the plastic sheeting between patients.

3. If the plastic sheeting cannot be changed between patients, wash it with 1:100 bleach solution after each patient.

Fig. 53. Cleaning patient's bedding

For patient's sheets:

1. Remove sheets from bed. Put them in a container (plastic bag or bucket) in the patient's room.

2. Take the container directly to the laundry area.

3. Soak in 1:100 bleach solution for 30 minutes. Be sure all items are completely soaked.

4. Remove items from the bleach solution and place them in soapy water. Soak overnight.

5. Scrub thoroughly to remove stains. Rinse and line-dry.

Mattresses:

If a mattress is heavily soiled, remove it from the isolation area to the outdoors and burn it. Make sure health facility staff wear protective clothing and gloves when touching and carrying the soiled mattress.

If mattresses must be reused:

1. Pour 1:10 bleach solution directly on the mattress. Let the solution soak through completely to the other side.

2. Flood the soiled area with soapy water and rinse with clean water.

3. Let the mattress dry in the sun for several days.

4. Turn the mattress often so it dries on both sides.

5.13 Give First Aid for Accidental Exposures

Accidental needlestick injury: Assume any needlestick injury is a suspected contact for VHF whether or not a break in the skin can be seen. If an accidental needlestick injury occurs, treat the exposure site.

1. Immerse the exposed site in 70% alcohol for 20 to 30 seconds, and wash with soap and clean water.

2. Flush the site in running water for 20 to 30 seconds.

3. If needed, cover with a dressing.

4. Report the incident to a supervisor or the physician-in-charge.

The purpose of notifying the physician-in-charge is:

- To identify what caused the problem

- To take corrective action to solve the problem and prevent accidental transmission

- To provide appropriate care for the possible case of VHF.

Remind the health facility staff that accidents do happen even when every precaution to prevent them has been taken. Reassure health facility staff that reporting the accidental exposure will have no negative consequences. Explain that reporting the accidental exposure is essential for protecting themselves, their families, other health workers and patients.

Accidental contact with infectious body fluids: An accidental contact can occur if there is unprotected contact between infectious body fluids and broken skin or the mouth, nose or eye. For example, vomit may run under a glove, a patient might cough blood which runs into the health care worker's eye, or coughed blood may run underneath a health care worker's mask and get into the mouth. Treat any accidental contact as a suspected contact with VHF. As soon as the contact occurs:

1. Flush the area in the most appropriate manner with soap and clean water. If a splash occurs in the eye, flush it with clean water.

2. Leave the isolation area and remove the protective clothing as recommended.

3. Take a shower and put on street clothes.

4. Report the exposure to a supervisor or the physician-in-charge. Complete the necessary forms.

Follow up accidental exposures:

1. Monitor the condition of the health facility staff. Take a measured temperature two times per day.

2. If a fever occurs -- temperature is 38.5°C (101°F) or higher -- the health facility staff should not do patient care activities. Treat as a suspected case of VHF if the health facility staff's signs and symptoms meet the case definition (Please see page 23 and Annex 4).

Section 6

Dispose of Waste Safely

This section describes how to:

- Dispose of liquid waste and patient excreta in an isolated latrine or toilet.
- Use an incinerator to burn contaminated waste.
- Use a pit to burn contaminated waste.
- Maintain security of the disposal site.

Section 6 Dispose of Waste Safely

Direct, unprotected contact during disposal of infectious waste can result in accidental transmission of VHF. For this reason, all contaminated waste produced in the care of the VHF patient must be disposed of safely. All non-reusable items should be destroyed so they cannot be used again. Burning should be carried out at least daily.

6.1 What Needs Disposal

When VHF is suspected, disinfect and dispose of:

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

Recommended Disposal Methods: Liquid waste, including patient excreta, can be disposed of in an isolated latrine or toilet set aside for VHF cases. Burning is the recommended method for disposal of other VHF-contaminated waste. A safe and inexpensive disposal system can be made by using an incinerator or a pit for burning.

- A latrine or toilet that joins the patient's isolation room can be used to receive the disinfected bedpan contents from the VHF patient. The latrine or toilet should be isolated. Access should be restricted to health facility staff trained to work in the VHF isolation area. Isolating the patient area is described in Section 3.5.

- Incinerators are containers with holes for ventilation to allow air to enter and exit the container. This allows the fire to reach temperatures high enough to completely destroy all biological materials. Use flammable fuel (such as diesel fuel) to speed the burning process and keep the temperatures high.

  Incineration is recommended for disposal of:

  — Needles and syringes

  — Used treatment materials and dressings

  — Non-reusable protective clothing

  — Laboratory supplies.

- When an incinerator is not available, burn waste in a pit. Use fuel to accelerate the burning and ensure that all waste is completely destroyed.

  Use a pit to dispose of:

  — Disinfected body fluids such as urine, faeces, and vomitus when no designated latrine or toilet is available.

  — Used disinfectants. If it is not possible to dispose of used disinfectants in a latrine or toilet, burn the used disinfectant together with flammable items (disposable gowns or masks, for example). Burning with the flammable items will help keep the temperature of the fire hot enough to boil off the liquids.

Note: All staff who are likely to handle infectious material should know and use VHF Isolation Precautions. Reinforce with all health facility staff the importance of handling infectious waste safely.

6.2 Select Staff to Supervise Waste Disposal and Burning

Select a person with authority who will:

- Oversee all the disposal procedures, including preparation of the incinerator and pit.
- Train and supervise the staff who carry out waste disposal.
- Make a schedule for collecting and burning disposable waste.
- Supervise the collection and burning to make sure it is carried out safely.

6.3 Train and Supervise Staff to Carry Out Waste Disposal

The cleaning staff who do the disposal tasks should understand the purpose of safe disposal, know how to wear protective clothing, and know clearly how to carry out waste disposal safely.

After the cleaning staff is selected:

1. Describe the risks of VHF transmission. Explain that health facility staff who carry out waste disposal should wear protective clothing including a plastic apron and at least two pairs of gloves. Wear thick gloves as the outer pair of gloves.

2. Describe the disposal procedures that cleaning staff will carry out:

    - Bring the containers of infectious waste from the isolation and cleaning areas to the disposal site. Discard the items in the incinerator or burning pit.
    - Pour fuel on the waste in the incinerator or over the pit. Light the fire.

- Watch the burning carefully.

  — Move waste frequently as it burns to be sure all items burn completely.

  — If any items remain, repeat the burning procedures.

- When burning ends, remove ashes from incinerator and bury them in a pit.

- When the pit is nearly full of ash, cover it with soil. Waste should not be near the surface. It should take about half a meter of soil to close the pit.

- Build a new pit when the old pit is full.

3. Show the cleaning staff how to:

- Wear protective clothing with one pair of thick or kitchen gloves over an inner pair of thin gloves.

- Collect and carry the buckets of infectious waste from the isolation area to the disposal area.

- Collect and dispose of liquid waste in an isolated latrine or toilet. If no latrine or toilet can be isolated, burn the liquid waste in the pit.

- Place the infectious waste in the incinerator or pit for burning.

- Dowse the infectious waste with fuel (such as diesel fuel) and burn it.

- Watch the burning from beginning to end to make sure all the waste items are burned before letting the fire go out.

6.4 Select Site for Burning VHF-Contaminated Waste

Select a burning site on the health facility grounds. It should be located away from the normal traffic flow. To help maintain security and prevent unauthorized access, the site should not be in public view or in an area where it will attract a crowd. The ash from the burning is not infectious, and it can be placed in a pit and buried.

6.5 Use Incinerator to Burn VHF-Contaminated Waste

If an incinerator is available on the health facility's grounds, and it can be set aside for VHF-contaminated waste, use diesel fuel during burning to make sure all the waste is completely destroyed.

If no incinerator is available, make one from an empty 220-litre (55-gallon) oil or fuel drum.

1. Gather the following supplies:

   - 220-litre (55-gallon) drum
   - Chisel or other sharp instrument (an awl, for example) to cut metal
   - Hammer
   - 0.5 mm or 1.0 mm metal wire
   - The piece cut out from the top of the drum or a wire screen or grill about 1 cm thick
   - Metal rods or bars 4 cm or 5 cm x 2 cm.

Fig. 54. A 220-litre drum

2. Cut open the drum by removing the top in one piece. Save the top cutaway piece.

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

4. Cut three half-moon openings just below the open end of the drum.

5. Turn the drum and put the open end on the ground. The bottom of the drum is now the top.

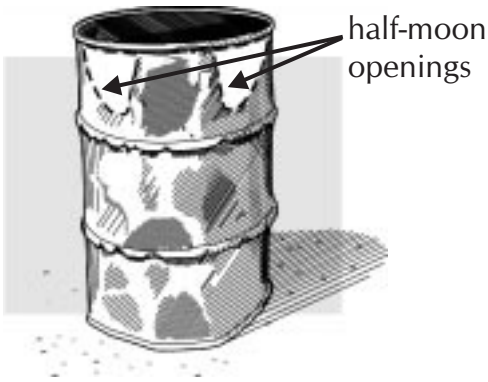

Fig. 55. Turn the drum and put the open end on the ground

6. Cut four holes on the sides of the drum. These holes are for threading the two metal rods through the drum so that they form an X or cross inside the drum. The crossed rods will support a platform used for holding the infectious material to be burned.

   To cut the holes for the rods: Just above the half moon openings (about one-third of the height of the drum), cut a hole the same size as the diameter of the metal rod. Directly across from the hole, on the other side of the drum, cut a second hole so that a rod can be threaded through the two holes. Repeat the steps and make two more holes on opposite sides of the drum. Thread each rod through the holes to make an X or cross.

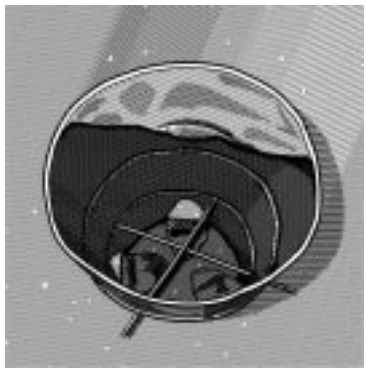

Fig. 56. Place the rods across the drum

7. Use the top piece of the drum that was cut away in step 2 to make the platform. It will rest on the crossed rods and hold the infectious material to be burned. The platform also lets air come in from the bottom of the drum so that the temperatures at the bottom are high enough to completely burn the material.

   To make the platform: Punch holes in the cutaway top piece of the drum. Make enough holes so it looks like a sieve. Save the platform to use in Step 10.

8. Pierce a series of holes (about 0.5 cm in diameter) on the sides of the drum and above the crossed rods to improve the draw of the fire.

9. Cut away half of the bottom of the drum (which is now the top of the incinerator and is facing up). Attach the wire loops to the cutaway half. Attach another loop for a handle to open the trap door. Items to be burned will be put in the incinerator through this door.

10. Place the platform you made in Step 7 inside the drum on top of the rods. Replace the incinerator if, as a result of the heat, large holes appear in the sides.

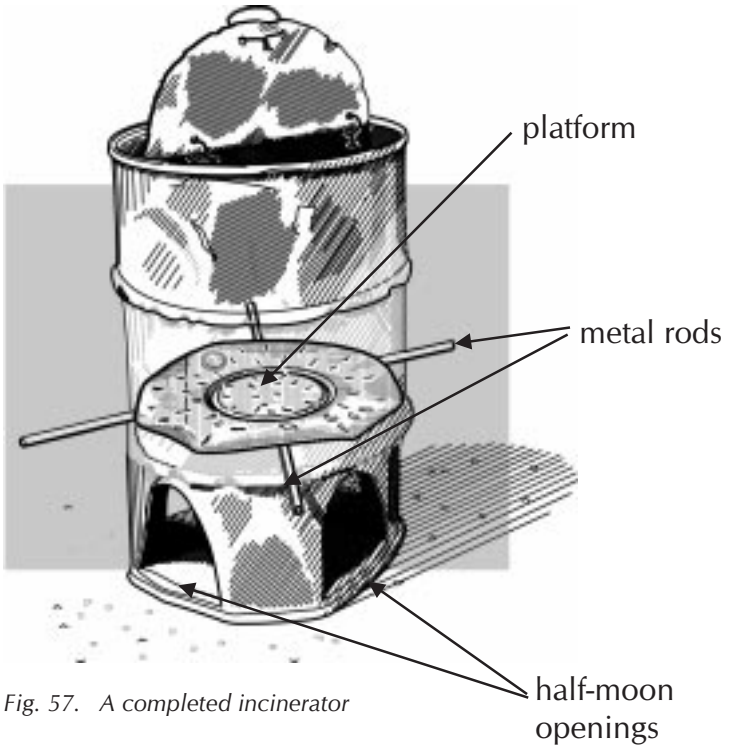

Fig. 57. A completed incinerator

To burn waste in the incinerator:

1. Place the infectious waste inside the top of the drum. Soak the waste in one litre of fuel.

2. Light the fire carefully.

3. Watch the fire and frequently mix the waste with the metal bars to be sure all of the waste is burned.

4. When the fire has gone out, empty the ashes into a pit.

6.6 Use Pit to Burn VHF-Contaminated Waste

If an incinerator is not available, make a pit for burning infectious waste.

1. Locate the pit far from the normal traffic flow of the health facility.

2. Dig a pit that is 2 meters deep. It should be wide enough to hold all contaminated waste material, including discarded liquids.

To burn waste in the pit:

1. Place the disinfected waste in the pit, including disinfected liquid waste that was not discarded in an isolated latrine or toilet.

2. Pour fuel (such as diesel fuel) on the waste. Carefully start the fire.

3. Watch the burning to make sure all the waste is completely destroyed.

4. When the fire has gone out, if any waste remains, repeat the steps for burning.

5. When no waste remains and the fire goes out, cover the ashes with soil.

6. Before the pit becomes completely full, cover it with soil so that no pieces of waste are visible or are too close to the surface. The pit should be closed when it can be covered by one-half meter of soil.

7. Dig a new pit.

6.7 Take Steps to Ensure Security of Burning Site

Maintain the security of the burning site to limit access to contaminated items. This is important since children could be tempted to pick up the interesting waste materials and use them for toys. Dogs, cats, and other animals may carry items beyond the health facility boundaries.

Tie a rope around the disposal area. Hang warning signs from the rope that tell people this is a dangerous area. Also station a guard to prevent unauthorized access to the disposal area.

Never leave unburned waste in the incinerator or the pit.