Health care waste management
For voluntary medical male circumcision services

A quick guide

Published in 2015
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## Acronyms

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<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>AIDS</td>
<td>Acquired immunodeficiency syndrome</td>
</tr>
<tr>
<td>HCW</td>
<td>Health care waste</td>
</tr>
<tr>
<td>HCWM</td>
<td>Health care waste management</td>
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<tr>
<td>HIV</td>
<td>Human immunodeficiency virus</td>
</tr>
<tr>
<td>HLD</td>
<td>High-level disinfection</td>
</tr>
<tr>
<td>IPC</td>
<td>Infection prevention and control</td>
</tr>
<tr>
<td>MOHSW</td>
<td>Ministry of Health and Social Welfare</td>
</tr>
<tr>
<td>MC</td>
<td>Male circumcision</td>
</tr>
<tr>
<td>NACP</td>
<td>National AIDS Control Programme</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-governmental organization</td>
</tr>
<tr>
<td>PPE</td>
<td>Personal protective equipment</td>
</tr>
<tr>
<td>VMMC</td>
<td>Voluntary medical male circumcision</td>
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</tbody>
</table>
Terms and definitions

Arm’s length: Distance approximately equal to the length of the human arm (30 cm).

Autoclave: A device designed to sterilize equipment/materials by using steam under pressure within a chamber.

Autoclaving: The method of sterilizing equipment, such as surgical or laboratory equipment, using an autoclave.

Chlorine solution: Disinfectants widely used for decontaminating surgical instruments and laboratory equipment and for spot-disinfection of countertops and floors in health care facilities (e.g., sodium hypochlorite and calcium hypochlorite).

Collection: The act of removing accumulated waste from the point of generation for the purpose of delivering it to its next destination along the way to final disposal.

Decontamination: To neutralize or remove dangerous substances, radioactivity, or infectious agents from an area, surface, object, or person.

Disinfect: To destroy pathogens but not necessarily all microbial life.

Disinfection: A process by which viable biohazardous agents are reduced to a level unlikely to produce disease in healthy people, plants, or animals.

Disposal: The burial, deposit, discharge, abandoning, dumping, placing, or release of any waste into the environment.

General/non-infectious waste: Any waste that is non-hazardous and not classified as being within any of the categories of the clinical and related waste streams.

Hand hygiene: A general term referring to any action of hand cleansing.

Hand rub: Surgical hand preparation with a waterless, chemical-based hand rub.

Hand scrub: Surgical hand preparation with antimicrobial soap and water.

Hazard: A danger or risk that has the potential to cause harm.

Hazardous waste: Waste that may have a significant adverse effect on public health and/or the environment by circumstances of use, quantity, concentration, or inherent physical, chemical, or toxicological characteristics.
**Health care waste:** All waste generated by health care facilities, including hazardous waste and general waste. Waste that is generated during health care delivery (e.g., during treatment, diagnostics, immunization, or operation) and from patients and visitors.

**Highly infectious waste:** Waste consisting of tissues, organs, body parts, blood, body fluids, and other wastes from surgery and autopsies. Also includes human fetuses and infected animal carcasses, as well as all viable biological and pathological agents artificially cultivated in significant elevated numbers, cultures, and stocks, and dishes and devices used to transfer, inoculate, and mix cultures of infectious agents.

**High-level disinfection:** The process of killing all microorganisms with the exception of high numbers of bacterial spores.

**Incinerator:** An engineered apparatus used to burn waste substances and in which all the factors of combustion (e.g., temperature, retention time, and turbulence) can be controlled.

**Infection prevention and control:** Placing a physical, mechanical, or chemical barrier between the host and microorganisms to help prevent the spread of these microorganisms from client to client, staff to client, and client to staff.

**Infectious waste:** All biomedical and health care waste with the potential of transmitting infectious agents to humans or animals.

**Kilopascal (kPa):** The Standard International (SI) unit measuring pressure. It is the SI-derived unit of pressure, internal pressure, stress, Young’s modulus, and ultimate tensile strength (kilopascal = 1,000 pascals).

**Landfill:** A waste facility used for the purpose of disposing of general waste in land.

**Liquid soap:** Detergent that contains very low concentrations of antimicrobial agents, effective solely as preservatives.

**Low-level disinfection:** A process able to kill some bacteria, viruses, and fungi but not relied on to kill resistant microorganisms (e.g., mycobacterium tuberculosis or bacterial spores). It should be used only to decontaminate the environment (e.g., surfaces, floors, furniture, and walls). It must not be used for processing instruments and other items.

**Non-infectious (general) waste:** Waste that does not pose a risk of infection. This waste is similar to normal household or municipal waste and can be managed by municipal waste services. It includes paper, cardboard, non-contaminated plastic or metal, cans, glass, and leftover food.

**Occupational health and safety:** Techniques designed to eliminate or significantly reduce the risk of infection and injury to health service providers.
On-site transportation: Procedures and processes for transferring health care waste from the point of generation to a storage location or from the storage location to a treatment or disposal site within the health facility.

Packaging: Often used interchangeably with the word “containerization.” Refers to wrapping and safely containing relevant waste streams to prevent exposure during transport (e.g., rigid plastic containers, flexible plastic bags, or lined fiberboard box sets).

Parts per million (ppm): Used to define the concentration of something in water or soil. One ppm is equivalent to 1 milligram of something per liter of water (mg/l) or 1 milligram of something per kilogram of soil (mg/kg).

Personal protective equipment (PPE): Specialized clothing or equipment worn by employees for protection against hazards (e.g., head protection, goggles/glasses, masks, aprons, gloves, and footwear). This clothing must be taken off and disinfected or disposed of when work with waste is completed.

Physical barrier: Any equipment, facilities, or devices (e.g., fermenters, factories, filters, or thermal oxidizers) that are designed to achieve containment or exclusion.

Processing area(s): Area(s) of a health care facility in which decontaminated, clean instruments and other medical and surgical supplies are inspected, assembled into sets and trays, and wrapped, packaged, or placed into rigid sterilization container systems for subsequent sterilization.

Re-use: To use articles from the waste stream again for a similar or different purpose without changing the form or properties of the articles.

Sanitary landfill: A waste facility in which an engineered method of disposing of solid waste is applied on land in a manner that protects the environment. This is done by spreading the waste in thin layers, compacting it to the smallest practical volume, and covering it with soil by the end of each working day, constructing barriers to collect infiltration and evacuate the gases produced.

Segregation: Systematic separation of different wastes into designated categories at the point of generation for subsequent containment, transportation, treatment, and disposal.

Sharps injury: Injury with any sharp object—such as syringes with needles, prickers, blades, or broken glass—that may have the potential to transmit infectious agents, in particular blood-borne viruses.

Sharps safety box: A box designed for disposing of needles with syringes and other sharps.
**Sharps waste:** Waste that poses a potential risk of injury and infection due to its puncture or cutting properties (e.g., syringes with needles, blades, or broken glass). For this reason, sharps are considered one of the most hazardous categories of waste generated during medical activities and must be managed with the utmost care.

**Shelf life:** When referring to sterilized medical devices, it is the period of time during which the item is considered safe for use.

**Sorting:** The practice of separating different waste/materials from a facility to reduce the volume of waste for collection and disposal (non-infectious) and to promote recycling and re-use of resources.

**Steam sterilization:** The process that uses saturated steam under pressure—for a specified exposure time and at a specified temperature—as the sterilizing agent.

**Sterilization:** A validated physical or chemical process that completely destroys or removes all microbial life, including bacterial spores. It is usually achieved by using devices that sterilize through steam under pressure (autoclaves), dry heat, ethylene oxide (ETO) and other gases, or liquid chemicals for prolonged soaking times. Items that are sterilized are considered to remain sterile until such time that the packaging is torn, wet, or damaged. Sterility is a function of intact packaging.

**Treatment:** Any method, technique, or process designed to change the physical, biological, or chemical character or composition of waste. Also includes any method used to remove, separate, concentrate, or recover hazardous, toxic, or infectious components of waste to reduce the toxicity or infectiousness of the waste and minimize the impact on the environment.

**Visibly soiled hands:** Hands on which dirt, body fluids, or contamination can be seen with the naked eye.

**Waste:** Unwanted or unused materials generated from human activities.

**Waste identification:** The process of visually recognizing relevant health care waste streams at the point of generation.

**Waste minimization:** The application of activities such as waste avoidance, reduction, re-use, and recycling to minimize the amount of waste requiring disposal.

**Waste segregation:** Systematic separation of different wastes into designated categories at the point of generation for subsequent containment, transportation, and disposal.

**Waste treatment facility:** Any facility that treats waste.

**Water bath:** A bucket 3/4 full of cold/room-temperature water. (This definition is specific to this document.)
How to use the quick guide

Introduction
The practices described in this quick guide are based on national guidelines of infection prevention and control and health care waste management standards drafted by the Ministry of Health and Social Welfare. The guide is intended for use in all types of health care facilities in Tanzania providing medical procedures, including voluntary medical male circumcision.

Health care waste management (HCWM) and basic infection prevention and control (IPC) in health care facilities have four primary objectives:

- Prevent health care related infections
- Prevent occupational health and safety injuries
- Protect the community from infectious diseases
- Prevent environmental contamination

How to use the quick guide
The materials in this quick guide are divided into the four topic areas. Each topic stands on its own and is arranged in a way that the reader can understand basic principles of HCWM and IPC. The principles are arranged from personal protection to treatment and/or disposal. The reader is strongly advised to read the guide in the order in which the topics are presented.

User of the guide
The expected users of this guide include:

- Health service providers, facility staff, and trainers from government, faith-based, private, and NGO health facilities and institutions
- Individuals, groups, and organizations engaging in health care provision
- Policymakers, health managers, program officers, and health administrators
- Various health teams including regional and council health management teams
Health care waste management for voluntary medical male circumcision services
Occupational health and safety

Hand hygiene

Personal protective equipment

Injection safety and sharps safety

Know your hazard symbols
Hand hygiene

Hand washing should be done:

- Before and after eating, after using the toilet, and when soiled.
- Immediately on arrival to and before leaving work.
- Before and after each patient contact.
- After gloves are removed.
- Before putting on gloves for performing clinical and invasive procedures.
- Before preparing, handling, serving, or eating food, and before feeding a patient.
- Before preparing medication.
- Whenever there is a chance of contamination.
When washing your hands, be careful not to miss these areas:
Hand washing with liquid soap and clean water

1. Apply enough soap to cover all hand surfaces.
2. Rotate rubbing hands palm to palm seven times.
3. Rub right palm over left dorsum with interlaced fingers and vice versa seven times.
4. Rub palm to palm with fingers interlaced seven times.
5. Rub back of fingers to opposing palms with fingers and vice versa seven times.
6. Rotate rubbing of left thumb clasped in palm and vice versa seven times.
7. Rotate rubbing backwards and forwards with clasped fingers of right hand in palm and vice versa seven times.
8. Rinse hands with clean water; keep water running.
9. Dry hands thoroughly with single-use towel.
10. Use towel to turn off faucet and open door, then discard towel into a waste receptacle.
11. Your hands are now clean.

Washing should last 40-60 seconds.
How to use alcohol hand rub*

1. Washing should last 20-30 seconds.

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

   1. Rub hands palm to palm.

   2. Rub right palm over left dorsum with interlaced fingers and vice versa.

   3. Rub palm to palm with fingers interlaced.

   4. Rub back of fingers to opposing palms with fingers interlocked.

   5. Rotate rubbing of left thumb clasped in palm and vice versa.

   6. Rotate rubbing backwards and forwards with clasped fingers of right hand in palm and vice versa.

   7. Once dry, your hands are now clean.

*Alcohol rub should only be used on visibly clean and dry hands to remove contaminants that cannot be seen.
Personal protective equipment

PPE for waste handlers

- Goggles
- Mask
- Cap
- Scrubs or coveralls
- Utility gloves
- Plastic or rubber apron
- Rubber boots
PPE for incinerator operators

- Face shield or goggles
- Coveralls
- Leather gloves
- Mask with filter
- Leather apron
- Thick-soled, steel-toed safety boots
Injection safety and sharps safety

Injection safety
Health service provider should have arm’s length, unobstructed access to all equipment. There should be no obstructions between patient and health service provider.
Sharps safety

Place sharps in yellow sharps safety box.

Seal off securely when 3/4 full.

Deposit syringe with needle down.

Do not recap.
Know your hazard symbols

1.1, 1.2, 1.4, 1.5, 1.6: Explosives

2.1: Flammable gases

2.2: Non-flammable, non-toxic gases

2.3: Toxic gases

3: Flammable liquids
Liquids with a closed cup flash point not exceeding 60.5° C

4.1: Flammable solids

4.2: Substances liable to spontaneously combust

4.3: Substances that, on contact with water, emit flammable gases

5.1: Oxidizing substances

5.2: Organic peroxides
6.1: Toxic substances

6.2: Infectious substances

7.1: Radioactive material/Level 1
Materials that spontaneously emit ionizing radiation.

7.2: Radioactive material/Level 2
Materials that spontaneously emit ionizing radiation.

7.3: Radioactive material/Level 3
Materials that spontaneously emit ionizing radiation.

8: Corrosives
Substances that, by chemical action, cause damage to living tissue, to commonly used metals, or to other packaging.

9: Miscellaneous dangerous substances
Any substance not covered by all the other classes, but that has been or could be shown by experience to be of such dangerous character that the provisions of this class should apply to it.

Caution

Biological hazards

Cytotoxic or genotoxic waste
Health care waste management

Waste segregation
Color coding
Collection of waste
Waste storage area recommendations
On-site transporting best practices
Spill management
Treatment of waste
**Waste segregation**

**Highly infectious**

- Bin liner should be sealed with a cable-tie when 3/4 full.

**Infectious**

- Containers filled with hazardous items should be appropriately labeled.

- Disposal should follow thereafter according to the recommended disposal procedure for each category.
Infectious
Highly infectious
Non-infectious
Chemical
Sharps

WASTE SEGREGATION

Health care waste management for voluntary medical male circumcision services
Color coding

- **Highly infectious**
  - Pathological waste
  - Anatomical waste
  - Blood or body fluids
  - Bloody dressings
  - Bin liner
Infectious

- Plastic container trays
- Plastic forceps
- Test strips
- Alcohol swabs
- Gauze or dressings
- Plastic aprons
- Specimen receptacles
- Bin liner
Sharps

- Scalpels
- Blades
- Lancets
- Needles
- Syringes
- Retractable syringes
- Sutures
- Prickers
- Broken glass (pipettes, ampoules, vials)
Chemical waste includes:

- Unusable pharmaceuticals
- Unusable chemical
- Damaged pharmaceuticals
- Expired pharmaceuticals
- Bin liner

Health care waste management for voluntary medical male circumcision services
Non-infectious (general)

- Bin liner
- Food
- Glass or plastic bottles
- Office supplies
- Boxes
- Beverage containers
- Packaging
- Cling wrap
- Hand towels
- Cardboard
- Food

COLOR CODING

NON-INFECTIONOUS
Collection of waste

Do not allow waste to accumulate at the point of production.

Collect waste daily or as frequently as possible.

Do not remove bags from the segregation point unless they are labeled.

Replace the bags or containers immediately with new ones of the same type.

Keep a readily available supply of fresh collection bags or containers at all locations where waste is produced.
Waste storage area recommendations

The area must:

1. Be enclosed, convenient, easy to use, accessible, and of low public visibility

2. Be well ventilated

3. Be well lit

4. Have an impermeable, slip-resistant, hard-standing floor

5. Have access to a water source with good drainage for cleaning

6. Be equipped with a fire extinguisher

7. Be kept clean

8. Have a lockable door

9. Be labeled with recommended signage:

![DANGER: Health Care Waste Storage Area No Unauthorized Personnel]

Note: Storage times for health care waste (i.e., the delay between production and treatment) should not exceed two days.
WASTE STORAGE AREA RECOMMENDATIONS
On-site transporting best practices
Handling hazardous health care waste

Look before you touch:

- Properly sealed, with no needles protruding
- Overfilled and/or not properly closed
- Sealed off securely when at 3/4 full
- Showing leakage or spill
- Correctly sealed
- Torn or broken
Lifting and carrying bags

**Right**
Ensure that the bag has been closed correctly and is no more than 3/4 full to maintain a stub for carrying.

**Do not lift**
If you see a bag that has leaks, breaks, tears, or penetrating sharps, refer to the spill management section for how to safely clean up the spill.

Grab the bag by the stub and carry far away from the body only if safe to do so and while wearing the correct PPE.
Carrying sharps safety boxes

Right
Box is properly sealed

Wrong
Sharps protrude; box is unsealed and overfilled

Right
Sharps held away from body

Wrong
Sharps held close to body

Avoid shaking the sharps safety boxes when they are full.
Guidance for stacking and packing

Stack no higher than shoulder level.

Place large container on the bottom, smaller on top.

Stack for stability; stabilize with straps if necessary.

Line up irregular, unstackable items along the floor.
Health care waste management for voluntary medical male circumcision services

Equipment used for hazardous health care waste transport

Hazardous waste may be transported from source location to the site’s temporary storage location by hand or with wheelbarrows, trolleys, wheelie-bins, or other wheeled containers or carts that are not used for any other purpose.

Equipment should:

- Be easy to load and unload.
- Be free of sharp edges that could damage, perforate, or tear bin liners during loading and unloading.
- Be easy to clean and disinfect as needed (proper records should be kept of these activities).
- Have side walls or barriers to safely enclose the waste containers during transport to prevent toppling, breakage, and spillage.
Spill management

Responding to a spill:

1. Remain calm. Do not panic.
2. Evacuate all unnecessary personnel and quarantine the spill area.
3. Assess the nature of the spill (see the following pages).
4. Contact management and/or emergency services.
5. Put on necessary PPE.
6. Follow protocol for your type of spill.
7. Work efficiently and carefully.
8. Be aware of the surroundings at all times.
9. Once the emergency has been identified, contact the appropriate departments.

SEEK IMMEDIATE MEDICAL ATTENTION IF EXPOSED TO HAZARDOUS SUBSTANCES

- Only staff trained in spill management can conduct these procedures.
- Personal protective equipment (PPE) must be used as part of infection prevention and control.

Cap
Goggles
Mask
Plastic or rubber apron
Utility gloves
Rubber boots
**Infectious waste**

**Dry spill**

1. Collect dry spill with brushes, pans, or suitable equipment.

2. Place collected dry spill into a yellow bag.

3. Decontaminate spill area by carefully spraying with a chlorine solution and wiping the area dry with cloths or paper towels. Repeat until all contaminants are visibly removed and the area is dry.

4. Place used cloths or paper towels into a yellow bag, close securely, and label.

5. Take yellow bags to designated waste storage area.

6. Dispose of or decontaminate all PPE or equipment used.
Highly infectious waste
Wet spill

1. Gently pour chlorine solution directly onto the wet spill. Allow solution to sit for 10 minutes before swabbing up, but do not create a hazard where someone might slip.

2. Place cloth or paper towels or suitable absorbent on wet spill to absorb it (approximately 5 minutes).

3. Carefully collect saturated cloth or paper towels or absorbent material and place into a red bag.

4. Continue to carefully wipe the area with the cloth or paper towels until all visible contaminants are removed.

5. Place used cloth or paper towels into red bag.

6. Decontaminate spill area by carefully spraying with a chlorine solution and wiping the area dry with a cloth or paper towel. Repeat until all contaminants are visibly removed and the area is dry.

7. Place used cloth or paper towels into the red bag, close securely, and label correctly.

8. Take red bags to designated waste storage area.

9. Dispose of or decontaminate all PPE or equipment used.
**Infectious waste (sharps)**

**Sharps spill**

1. Collect the sharps with a brush and long-handled dust pan or other suitable equipment. Never pick up sharps with hands. Use forceps or tweezers where necessary.

2. Place collected sharps into a sharps safety box and close securely.

3. Decontaminate spill area by carefully spraying with a chlorine solution and wiping the area dry with cloth or paper towels. Repeat until all contaminants are visibly removed and the area is dry.

4. Place used cloth or paper towels into a red bag, close securely, and label correctly.

5. Take the sharps safety box(es) and red bag to designated waste storage area.

6. Dispose of or decontaminate all PPE or equipment used.
## Treatment of waste

<table>
<thead>
<tr>
<th>Treatment technology</th>
<th>Highly infectious</th>
<th>Infectious</th>
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</thead>
<tbody>
<tr>
<td><strong>Thermal</strong></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Rotary kiln and/or incinerator</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Autoclaving</strong></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Steam or wet sterilization</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Chemical disinfection</strong></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Microwave radiation</strong></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Sanitary landfill</strong></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Burning</strong></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Pit or bury</strong></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Sharps</td>
<td>Chemical</td>
<td>Non-infectious (General)</td>
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Infection prevention and control

Treating water for cleaning
Housekeeping
Processing reusable metal instruments
Treating water for cleaning

When there is no access to clean water or if the supply has been made unsafe because of untreated surface water (from floods, streams, or lakes), boil the water to treat it. Cloudy water should be filtered before boiling.

Filtration method

1. Cut off the base of a plastic bottle just above the curve of the bottle.

2. Cover the mouth of the bottle with six or more layers of fine cloth (e.g., cheesecloth) and use a rubber band to secure them.

3. Turn the bottle upside down and support the bottle from falling over.

4. Place a pan under the bottle. Make sure the mouth of the bottle is not submerged in the pan.

5. Add 5 cm to 8 cm of crushed charcoal.

6. Add 8 cm to 10 cm of fine sand.

7. Add 5 cm to 8 cm of gravel.

8. Pour the water into the filter slowly.

9. After the water is filtered, immediately boil the water for 20 minutes.

Boiling method*

1. Bring the water to a rolling boil for 20 minutes.

2. Let the water cool before using.

*Do not use the boiling method if the water is cloudy.
Health care waste management for voluntary medical male circumcision services

TREATING WATER FOR CLEANING
Housekeeping

Making chlorine solution from liquid bleach

1. Put on required personal protective equipment (PPE), including: reusable utility gloves, apron, rubber boots, hairnet, and face protection (goggles or full-length face shield).

2. Determine the percentage of active chlorine solution by reading the active ingredients on the label of the bottle. (Note: Chlorine solution concentration will vary from approximately 2.4% to 15%.)

Mixing chlorine solution

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<thead>
<tr>
<th>CHLORINE % AVAILABLE</th>
<th>PARTS OF CLEAN WATER TO 1 PART OF BLEACH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.5% SOLUTION</td>
</tr>
<tr>
<td>2.4%</td>
<td>4</td>
</tr>
<tr>
<td>3.5%</td>
<td>6</td>
</tr>
<tr>
<td>3.6%</td>
<td>6</td>
</tr>
<tr>
<td>5%</td>
<td>9</td>
</tr>
<tr>
<td>6%</td>
<td>11</td>
</tr>
<tr>
<td>8%</td>
<td>15</td>
</tr>
<tr>
<td>10%</td>
<td>19</td>
</tr>
<tr>
<td>15%</td>
<td>29</td>
</tr>
</tbody>
</table>

Using the table above, determine the correct amounts of concentrated bleach and clean water required to make the decontamination solution.
Measure the appropriate clean water as indicated in Step 3.

Carefully pour the clean water into the bucket.

Measure the appropriate volume of chlorine solution found on the chart in Step 3.

Carefully pour corresponding amount of chlorine solution concentrate into the bucket that contains the measured clean water. Use caution to avoid spillage.

Use a mixing spoon to gently mix the solution. Solution is now ready for use.

To properly dispose of the solution, dilute by adding clean water to top off the bucket. Carefully pour diluted chlorine solution down a utility sink drain or latrine or into a flushable toilet. Avoid splashing. Rinse the toilet or sink carefully and thoroughly with clean water to remove residual wastes.

Note: The chlorine solution should not be reused; a new solution must be made for each cleaning. If visibly contaminated, the solution should be replaced.
Making chlorine solution from powders

1. Put on required personal protective equipment (PPE), including: reusable utility gloves, apron, rubber boots, hairnet, and face protection (goggles or full-length face shield).

2. Determine the percentage of active hypochlorite by reading the active ingredients on the label of the container. (Note: Hypochlorite concentration will vary from approximately 2.4% to 15%.)

   - Check concentration of the powder you are using.
   - Grams/Liter = \( \frac{\text{% Dilute}}{\text{% Concentrate}} \) x 1,000

   - Mix measured amount of bleach with 1 liter of clean water.
   - **Example**: Make a dilute chlorine-releasing solution (0.5%) from a concentrated powder (35%).

     - **Step A**: Grams/Liter = \( \frac{0.5\%}{35\%} \) x 1,000 = 14.2 g/L
     - **Step B**: Add 14.2 grams to 1 liter of water.

3. Using the table above, determine the correct amounts of concentrated bleach and clean water required to make the decontamination solution.

---

### Mixing chlorine solution

<table>
<thead>
<tr>
<th>CHLORINE % AVAILABLE</th>
<th>Grams of chlorine powder per liter of water</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.5% SOLUTION</td>
</tr>
<tr>
<td>Calcium hypochlorite (70%)</td>
<td>7.1 g/L^a</td>
</tr>
<tr>
<td>Calcium hypochlorite (35%)</td>
<td>14.2 g/L</td>
</tr>
<tr>
<td>NaDCC^c (60%)</td>
<td>8.3 g/L</td>
</tr>
<tr>
<td>Chloramine tablets (1 g per tablet)</td>
<td>20 (tablets) g/L^d</td>
</tr>
<tr>
<td>NaDCC tablets (1.5 g per tablet)</td>
<td>4 tablets/L</td>
</tr>
</tbody>
</table>

^a For dry powders, read x grams per liter (example: Calcium hypochlorite 7.1 grams mixed with 1 liter water).

^b Use boiled clean water when preparing a 0.1% chlorine solution for high-level disinfection (HLD) because tap water contains microscopic organic matter that inactivates chlorine.

^c Sodium dichloroisocyanurate.

^d Chloromine releases chlorine at a slower rate than does hypochlorite. Before using the solution, be sure the tablet is completely dissolved.
Measure the appropriate clean water as indicated in Step 3.

Carefully pour the clean water into the bucket.

Measure the appropriate number of grams of powder found in Step 3.

Carefully add corresponding amount of powder into the bucket that contains the measured clean water. Use caution to avoid spilling.

Use a mixing spoon to gently mix the solution. Solution is now ready for use.

After use, dilute the solution by adding water to top off the bucket.

Note: The chlorine solution should not be reused; a new solution must be made for each cleaning. If visibly contaminated, the solution should be replaced.

Carefully pour diluted chlorine solution down a utility sink drain or latrine, or into a flushable toilet. Avoid splashing. Rinse the toilet or sink carefully and thoroughly with clean water to remove residual waste.
Cleaning, rinsing, and disinfecting countertops, floors, and walls

1. **Clean using detergent.**
   Remove dirt or contamination that you can see.

2. **Rinse using clean water.**
   Rinse away dirt or contamination and detergents.

3. **Disinfect using approved disinfectant.**
   Remove contamination that you cannot see and provide future protection.

*It is recommended to use three buckets when cleaning in health care facilities: The first bucket contains a chlorine solution, the second bucket contains clean water (used for rinsing the mop), and the third bucket is empty (used for wringing out the mop).
Cleaning best practice

1. Use the right product.
   Make sure the product is suitable for the surface you need to clean.

2. Prepare and apply as directed.
   Read instructions carefully.

3. Use the right equipment.
   Make sure the equipment is suitable for the job and kept clean.

4. Increase contact time and temperature.
   Increase detergent contact time and clean water temperature for hard-to-remove dirt or contamination.
Rinsing best practice

1. Use clean water.

2. Use jet force if necessary to lift dirt.

3. Rinse to remove lifted dirt and residual detergent.

4. Use hot, clean water to help lift oil or greasy residues.
Disinfecting best practice

1. Use the right product.
   Make sure the product is suitable for the surface you need to disinfect.

2. Prepare the product as directed.
   Read instructions carefully.

3. Apply the product as directed.

4. Follow product usage instructions for proper contact time.
**Processing linens**

**What is hospital linen?**

- Bedding
- Towels
- Patient gowns
- Cleaning cloths
- Surgical gowns
- Reusable wrappers
- Scrub suits
- Reusable caps
- Drapes
- Reusable masks

**Staff requirements**

- Cap
- Goggles
- Mask
- Plastic or rubber apron
- Utility gloves
- Rubber boots
- Training
Linen processing best practices

*Linen processing areas should be separated by physical barriers.*

1. Receive and store soiled linen.
2. Sort and prepare soiled linen.
3. Decontaminate, clean, and disinfect soiled linen. Hand wash or machine wash as per National Guidelines (IPC 69).
4. Dry, iron, fold, and store clean linen. Air dry or machine dry per directions.
Processing reusable metal instruments

1. Receive the instruments
2. Decontaminate
3. Wrap the instruments
4. Sterilize
5. Store
Receiving area

Place contaminated instruments in an identified container. Place container on counter.

Never place items on the floor.

Ensure proper caution signage is present.

Wear proper PPE when handling contaminated instruments.
Process for decontamination of reusable metal instruments

1. Put on required personal protective equipment (PPE), including: reusable utility gloves, apron, rubber boots, hairnet, and face protection (goggles or full-length face shield).

2. Determine the proper procedure for mixing the chlorine solution.

3. Mix chlorine solution according to procedures found on pages 40 and 42.

4. Place reusable metal instruments in the prepared decontamination solution for 20 minutes to pre-soak the instruments.

5. Fill a second bucket 3/4 full with water and detergent. Fill a third bucket 3/4 full with clean water.
To scrub the instruments, place the three buckets next to each other: one bucket with pre-soaked instruments, one bucket with detergent and clean water, and one bucket with clean water for the bath.

Remove half the instruments from the pre-soak solution and place them in the bucket of detergent and clean water. One by one, scrub the instruments thoroughly with a nylon bristle brush until all signs of contaminants have been removed.

Place the scrubbed instruments into the clean water bath for rinsing. Repeat this process until all reusable metal instruments have been scrubbed and are placed in the clean water bath.

Remove instruments from clean water bath and place them on a clean, dry towel. Inspect instruments for rust, blunting, or residual contamination.

After use, dilute the solution by adding water to top off the bucket. Note: The chlorine solution should not be reused; a new solution must be made for each cleaning. If visibly contaminated, the solution should be replaced.

Carefully pour diluted chlorine solution down a utility sink drain or latrine, or into a flushable toilet. Avoid splashing. Rinse the toilet or sink carefully and thoroughly with clean water to remove residual waste.
Wrapping of instruments

1. Inspect instruments for contamination and verify that all required instruments are present for kit assembly.

2. Place instruments in autoclave container or carton.

3. Placed closed container or carton in center of steam sterilization wrapper.

4. Lift one corner of wrapper, fold over, and tuck under long side of container or carton.
Lift left corner of wrapper and fold over container or carton so that the wrapper is flush against the short side.

Fold extended wrapper inward to make a long V shape.

Secure this fold with sterilization indicator tape.

Lift right corner of wrapper and fold over container or carton until wrapper is flush against the short side.

Fold long V back over top of container or carton and tuck underneath into folds.

Secure both sides of the wrapper with sterilization indicator tape. Do not use other tape, pins, clips, staples, or sharp objects.
Basic sterilization
Autoclave

1. Properly decontaminate instrument(s) and/or carton or autoclave storage box per instructions, and wrap instruments per instructions.

2. Place correctly wrapped instruments in an autoclave cart or shelf.

3. Place autoclave cart or shelf in autoclave chamber to allow free circulation and penetration of steam to all surfaces.


5. Wait until pressure gauge reads zero before opening the lid or door.

6. Allow packs to dry completely before removal; this may take up to 30 minutes. If damp or wet packs come into contact with any non-sterilized instruments or surfaces, they must be reprocessed.

7. Place sterilized packs on a surface covered with paper or fabric to verify that the pack was properly sterilized by checking the indicator; if it was not, it must be reprocessed.

8. Label the pack with the date sterilized, time, and expiry date.

9. Record sterilization conditions (time, temperature, and pressure) in the logbook.

10. Allow packs to reach room temperature before storing them.

11. Test autoclave daily with biological indicator.

*Note: If autoclave is not available, use high-level disinfection methods for instruments.
PROCESSING REUSABLE METAL INSTRUMENTS

High-level disinfection
Boiling

1. Properly decontaminate instrument(s) and/or carton or autoclave container per instructions.

2. Completely immerse instruments in purified clean water with at least 2.5 cm of clean water above the instruments and/or instruments carton.

3. Place lid on pot and bring purified clean water to a rolling boil. (Boiling too vigorously wastes fuel, rapidly evaporates water, and may damage instruments over time.)

4. Once the clean water is at a rolling boil, start timing for 20 minutes and note the time in the high-level disinfection (HLD) logbook.

5. Do not open the pot, remove instruments, or add instruments once the time has begun.

6. After 20 minutes, remove the instruments using forceps or pickups and place in an HLD instrument carton for drying or on a cloth or paper-covered instrument tray for immediate use; never leave instruments in water that has stopped boiling.

7. Once the instruments are dry in the HLD instrument carton, wrap and store them properly.

Chemical (e.g., chlorine solution)

1. Properly decontaminate instrument(s) and/or carton or autoclave container per instructions.

2. Prepare fresh solution of chemical disinfectant (chlorine solution).

3. Submerge clean, dried instruments in chemical disinfectant.

4. Cover container and soak for 20 minutes.

5. Remove instruments from chemical disinfectant with forceps or pickups.

6. Rinse instruments thoroughly with purified water (clean water that has been boiled for 20 minutes) to remove all traces of chemical disinfectant.

7. Place disinfected instruments in a carton and cover to air dry.

8. Use immediately or wrap and label pack for storage.
Storage

Sterilized instruments

Check pack’s indicator tape to see if it has changed color, according to the manufacturer’s directions.

Place date and time on packs before storing.

Limit access to the storage room and/or store items in closed cabinets or shelves. (Enclosed shelves or cabinets are preferred as they protect packs and containers from dust and debris.)

Date and rotate the supplies (first in first out). This process serves as a reminder that the package is susceptible to contamination and conserves storage space, but it does not guarantee sterility.

Keep the storage area clean, dry, and dust and lint free. To do this, follow a regular housekeeping schedule.

Store packs and containers with sterile or high-level disinfected items 20 to 25 cm off the floor, 45 to 50 cm from the ceiling, and 15 to 20 cm from an outside wall.

Do not use cardboard boxes for storage, as they shed dust and debris and may harbor insects.
The shelf life of a wrapped sterile item is event related. Events that can compromise the integrity and effectiveness of the wrapping, destroying sterility, include:

- Multiple handling
- Moisture penetration and airborne contamination
- Loss of package integrity; developing holes or rupture of seals and/or taping
- Becoming dusty, dirty, or wet

*Note: If there is no label with date and time, you must resterilize. If the sterilized instruments have not been used, sterilization should be done again after 1 week (7 days) as long as the pack remains intact and dry.*
VMMC single-use instruments

Processing single-use metal instruments
Processing single-use metal instruments

1. Receive the instruments

2. Decontaminate

3. Store the instruments in a plastic drum
   When full, seal off the container and prepare it for the disposal process.
Receiving area

Place contaminated instruments in an identified container. Place container on counter.

Never place items on the floor.

Ensure proper caution signage is present.

Wear proper PPE when handling contaminated instruments.
Process for decontamination of single-use instruments

1. Put on required personal protective equipment (PPE), including: reusable utility gloves, apron, rubber boots, hairnet, and face protection (goggles or full-length face shield).

2. Determine the proper procedure for mixing the chlorine solution.

3. Mix chlorine solution according to procedures found on pages 40 and 42.

4. Place single-use metal instruments in the prepared decontamination solution for 20 minutes to pre-soak them.

5. Fill a second bucket 3/4 full with water and detergent. Fill a third bucket 3/4 full with clean water.
PROCESSING SINGLE-USE METAL INSTRUMENTS

To scrub the instruments, place the three buckets next to each other: one bucket with pre-soaked instruments, one bucket with detergent and clean water, and one bucket with clean water for the bath.

Remove half the instruments from the pre-soak solution and place them in the bucket of detergent and clean water. One by one, scrub the instruments thoroughly with a nylon bristle brush until all signs of contaminants have been removed.

Place the scrubbed instrument into the clean water bath for rinsing. Repeat this process until all single-use metal instruments have been scrubbed and are placed in the clean water bath.

Remove instruments from water bath and place them on a clean, dry towel.

After use, dilute the solution by adding clean water to top off the bucket. Note: The chlorine solution should not be reused; a new solution must be made for each cleaning. If visibly contaminated, the solution should be replaced.

Carefully pour diluted chlorine solution down a utility sink drain or latrine, or into a flushable toilet. Avoid splashing. Rinse the toilet or sink carefully and thoroughly with clean water to remove residual waste.

Place properly decontaminated instruments in an appropriately labeled drum.
Packaging single-use metal instruments

Transport scrap metal in drums to a processing facility. For additional information, refer to the document “Supplementary guidance on VMMC single-use instrument management.”
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