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About the Author

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DECONTAMINATION

A Quick Look at Decontamination

The OSHA Bloodborne Pathogens (BBP) standard defines “contaminated” as:

“The presence or the reasonably anticipated presence of blood or other potentially infectious materials on an item or surface.”

Decontaminate surfaces that have become contaminated with blood or other potentially infectious material immediately or as soon as possible after contamination.

This section covers all aspects of decontamination in a medical practice, including routine housekeeping procedures, chemical and biological spills and waste, and sterilization of medical instruments.

Routine Housekeeping Procedures

Decontaminating Work Surfaces

Maintain worksites in a clean and sanitary condition. Routinely disinfect work surfaces and equipment after each shift and immediately after contact with blood or other potentially infectious material (OPIM). Decontamination is not automatically required after every patient procedure, but is required after procedures resulting in surface contamination. Any high touch surfaces should be cleaned per the facility’s housekeeping protocols outlined in the BBP Exposure Control Plan.

There may be instances in which “immediate” decontamination of overt contamination and spills may not be practical as in, for example, an operating table during a procedure. In these cases, decontamination must be performed as soon as possible after completion of the procedure.

Use an appropriate EPA-registered disinfectant that is at least tuberculocidal. HBV can survive in dried blood at room temperature on environmental surfaces for at least one week. HCV can survive on environmental surfaces for 16-96 hours and HIV begins to die within 24 hours. Appropriate disinfectants include:

- 1:10 solution of bleach, made fresh daily.
- EPA-registered tuberculocidal/sterilants.
A list of EPA-registered products is available from the national Antimicrobial Information Network on its Web site at http://www.epa.gov/oppad001/chemregindex.htm or at 800-858-7378.

Clean up gross contamination first with a soap-and-water solution to ensure that all organic material is removed. The disinfectant is completely effective only on pre-cleaned surfaces. Never pick up broken glassware by hand. Use a dustpan and brush, tongs, or forceps.

Whatever disinfectant is chosen, follow the manufacturer label’s safety precautions and use directions. The user is required by law to follow all applicable label instructions on EPA-registered products. In selecting contact times different from those on the EPA-registered product label, the user assumes liability for injuries as a result of off-label use and is subject to enforcement under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

If a 10% solution of household bleach is used, make a fresh solution daily. Contact time for bleach is considered to be _____________ * or the time it takes to air-dry, whichever is longer. Note that, although acceptable as a disinfectant, bleach is corrosive and may damage some medical instruments and surfaces.

(*Note: In some states, the Environmental Protection Agency (EPA) mandates longer contact times than the 30 seconds it typically takes for a bleach solution to air-dry. In California and Minnesota, the required contact time is three minutes. Use the contact listing at http://www.epa.gov/osw/wyl/stateprograms.htm to contact your state EPA office for guidance.)

Perform work surface decontamination at the end of the work shift. It’s NOT necessary to maintain a daily cleaning log or checklist. However, a written housekeeping schedule is required. Areas disinfected routinely in most medical facilities are listed on the Sample Housekeeping Schedule that follows. A blank Housekeeping Schedule is located behind Tab 11: Master Record Forms (Form 7).


## SAMPLE HOUSEKEEPING SCHEDULE

*Note: A master copy of this form is located behind Tab 11: Master Record Forms (Form 7)*

<table>
<thead>
<tr>
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<th>SURFACE</th>
<th>DISINFECTANT</th>
<th>FREQUENCY</th>
</tr>
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<td>Exam Room</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Exam table</td>
<td>1:10 bleach</td>
<td>If visible contamination</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low level disinfectant</td>
<td>Daily</td>
</tr>
<tr>
<td></td>
<td>Carpeted floor</td>
<td>Hydrogen peroxide</td>
<td>If visible contamination</td>
</tr>
<tr>
<td></td>
<td>Tile Floor</td>
<td>Low level disinfectant</td>
<td>Daily</td>
</tr>
<tr>
<td></td>
<td>Walls</td>
<td>Low level disinfectant</td>
<td>Annually</td>
</tr>
<tr>
<td></td>
<td>Countertops</td>
<td>Low level disinfectant</td>
<td>Daily</td>
</tr>
<tr>
<td>Rest Room</td>
<td>Diaper Changing Area</td>
<td>1:10 bleach or low level disinfectant</td>
<td>Daily or if visibly contaminated</td>
</tr>
</tbody>
</table>

**Notes on methods used:**

______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
______________________________________________________________________
Spill Containment Plan

Employees must know where to access spill clean-up materials for both BBP and the hazardous chemicals used in the facility. The BBP and hazardous chemical spill kits are very different and both should be readily accessible. Employees must avoid making contact with spilled material, taking care not to step in the spills, since the shoes may absorb the material. Personnel should be alerted to avoid the spill area, and if necessary, non-essential employees may need to be evacuated until the spill has been neutralized and disposed.

When cleaning up spills, employees must wear appropriate protective equipment such as face protection, gloves and a fluid-resistant gown. Read the safety data sheet (SDS) carefully to determine what protective equipment to wear for chemical spills.

BBP Spill Clean-up Procedures

Wear utility gloves with a vinyl barrier and long cuffs for decontamination procedures. Inspect utility gloves prior to use and discard if they are cracked, peeling, torn, punctured, or exhibit other signs of deterioration.

1. Start by containing the spill. Clean up gross contamination first with soap and water solution, then follow with a disinfectant to ensure that the bioburden is not so large as to render the disinfectant ineffective.

2. If the spill is small, use a paper towel to absorb it. If the spill is large, use an absorbing powder (biohazard spill kits often contain these powders, see below). Wipe the contaminated surface with paper towels saturated with a disinfectant, in a way that minimizes splashing.

3. If splashing occurs, consider any new surface affected as contaminated and treat accordingly. If, in the process of decontamination, splashing occurs and soils personal protective clothing or equipment, remove and replace it. Dispose of paper towels in the infectious waste (red bag) receptacle.

4. Decontaminate utility gloves by wiping them down with the same disinfectant, then dry with clean paper towels. Examine them closely to insure that the barrier is not compromised in any way. Discard deteriorated gloves.
**Spills that Contain Broken Glass or Sharp Objects**

To remove spills of blood and body fluids that contain sharp objects, such as needles, scalpels, broken glass and broken capillary tubes, use a biohazard spill kit containing an absorbent powder that solidifies liquid and a disposable broom and dustpan.

1. Wearing rubber utility gloves, sprinkle the powder directly onto the spill until it is congealed.
2. Remove the solidified spill with the rigid scoop provided in the kit. Place the material in a closeable, leakproof biohazard container intended for sharps.
3. Decontaminate the area with an appropriate disinfectant.
4. Never pick up broken glass or sharps with the hands; use mechanical devices such as forceps, tongs, or a dustpan in the unlikely event that a biohazard spill kit is not immediately available.

**Chemical Spill Clean-up Procedures**

1. Act quickly to contain the spill. Cordon off area if an employee or visitor could come in contact with the spill.
2. Check the SDS (yellow and black binder) for precautions and cleanup instructions.
3. Wear protective equipment, including heavy-duty gloves, and if necessary, goggles, mask and gown.
4. Notify Safety Officer to report large or dangerous spills before attempting to clean up.
5. If chemical spill is toxic or gives off strong vapors, evacuate the area and get professional help.
6. Clean up spill following precautions listed in the SDS for that chemical.
7. Use approved absorbent neutralizing materials or spill kit to wipe up if necessary.
8. Disinfect area after cleaning. Allow to air dry.
9. Dispose of all contaminated material in proper hazardous waste container.

**Note:** Depending on the size of the spill and the adequacy of the ventilation, self-contained breathing apparatus may be necessary. If tearing of the eyes and nasal or respiratory irritation occur with a chemical spill, then the room ventilation is inadequate to handle the spill. Vacate the room immediately until a team equipped to handle a larger spill is called to the scene.
Chemical Exposure to Skin

Remove contaminated clothing as quickly as possible. Check the SDS for first aid recommendations.

1. Flush the area of contamination thoroughly with large amounts of water.
2. Wash area with soap and water.
3. Do not use creams, lotions or salves on the skin until asking for medical advice.

Mercury Spills

The Environmental Protection Agency (EPA) and the American Hospital Association (AHA) voluntarily agreed to “virtually eliminate” all mercury-containing waste coming from hospitals by 2005 and to cut in half the volume of all medical waste by 2010. The American Nurses Association also supported these goals. The American Academy of Pediatrics asked pediatricians to stop using mercury thermometers, and encourages parents to do the same.

When a bead of mercury is exposed to air, it vaporizes immediately and may reach harmful levels.

If a mercury thermometer or blood pressure gauge breaks or leaks:

1. Evacuate and restrict access to the room.
2. Put on a mask before beginning cleanup.
3. DO NOT VACUUM! Use one of the following methods to clean up the mercury bead:
   - A commercial mercury spill kit
   - Roll the bead onto a sheet of paper
   - Suck up the bead with an eyedropper
4. Dispose according to the spill kit instructions or call your local Environmental Protection Agency (EPA) or the health department for recommendations.
5. Use a fan to speed ventilation and open a window (if possible). Otherwise, close off the room for at least 1 hour.

For large mercury spills, call the Emergency Response Hotline (open 24 hours) at the Agency for Toxic Substances and Disease Registry: 800-232-4636.
**Cytotoxic (Chemotherapy) Drug Spill Clean-up**

1. Use a cytotoxic drug spill kit. (Refer to pages 9-5 and 9-6)
2. Review the current NIOSH list of cytotoxic drugs on the supplemental following page 9-2. Dispose of spill cleanup equipment in approved EPA-regulated cytotoxic drug container

For large spills of cytotoxic drugs that pose a threat to human health or the environment, contact the EPA Large Chemical Spills Emergency Response Hotline for your area. Region-specific phone numbers can be found online at [http://www2.epa.gov/home/epa-hotlines#RegionSpecificCustomerServiceLines](http://www2.epa.gov/home/epa-hotlines#RegionSpecificCustomerServiceLines). The CDC hotline is 800-232-4636.

**Decontamination of Medical Instruments & Equipment**

Depending on the type of instrument and the procedure to be performed, reusable devices can be decontaminated using one of these methods:

- Sterilization
- High-level disinfection
- Intermediate-level disinfection
- Low-level disinfection

**When to Sterilize**

Sterilization completely eliminates or destroys all microbial life including highly-resistant bacterial spores. Sterilization in physician practices is usually accomplished by autoclaving or by using a dry-heat oven. It is important to follow all the manufacturers’ recommendations for cycle time, loading, cleaning, maintenance and quality assurance. All sterilization runs must be documented with the date and items included in the run.

Any instrument or device that enters the patient’s vascular system or other normally sterile areas of the body is considered a “critical” device and must be sterilized.

Steam autoclaving uses distilled water that reaches a temperature of 121°C to 132°C. Recommended time for exposure of items is 20 minutes for unwrapped instruments and 30 minutes for small packs. Follow the manufacturer’s time and temperature requirements for your model of steam autoclave.

Hot-air oven sterilization is used only for items that cannot be sterilized by autoclaving. The oven temperature should be 170°C for 1 hour or other temperatures and times as required by the manufacturer.
For instruments and devices that touch intact mucous membranes but do not penetrate the patient's body surfaces, sterilize when possible, or use high-level disinfection if they cannot withstand repeated exposure to heat. Examples of these types of semi-critical devices are endoscopes, laryngoscopes, and vaginal specula.

The following chart summarizes decontamination methods for the various types of medical devices:

<table>
<thead>
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<th>Instrument class</th>
<th>Application</th>
<th>Instrument examples</th>
<th>Decontamination method</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Critical</strong></td>
<td>Objects that enter sterile tissue or the patient's vascular system.</td>
<td>Scalpels, surgical instruments, implants, reusable needles.</td>
<td>Sterilize (autoclave).</td>
</tr>
<tr>
<td><strong>Semi-critical</strong></td>
<td>Instruments that contact mucous membranes and cannot be autoclaved.</td>
<td>Endoscopes, sigmoidoscopes, laryngoscopes, endotracheal tubes.</td>
<td>Soak in a high-level disinfectant such as glutaraldehyde orthophthalaldehyde (OPA) or one of the newer peroxide-based solutions.</td>
</tr>
<tr>
<td></td>
<td>Instruments that contact mucous membranes or non-intact skin.</td>
<td>Metal vaginal speculum, anal/nasal/ear speculum.</td>
<td>Sterilize in autoclave. If that is not possible, use a high-level disinfectant.</td>
</tr>
<tr>
<td></td>
<td>Instruments that come in contact with intact skin.</td>
<td>Stethoscopes, foot stirrups, tourniquets, blood pressure cuffs, baby scales, bandage scissors, otoscopes, ophthalmoscopes, reflex hammer.</td>
<td>Immerse in intermediate-level disinfectant, such as 79%–90% alcohol for 20 minutes (1:100 dilution of bleach for plastics).</td>
</tr>
</tbody>
</table>

**Note:** *Clostridium difficile* is an environmentally resistant bacteria that may be found on environmental surfaces and medical equipment. Review the available EPA-registered disinfectants that are effective on C.diff spores. These disinfectants often contain bleach.

**Precleaning Instruments Prior to High-level Disinfection or Sterilization**

Before sterilizing or disinfecting any item, first manually clean with pre-soaking solutions and water to remove organic debris. This is an extremely important step, since organic debris such as pus, mucous, saliva, feces, and blood may dry on the instrument and prevent it from being fully decontaminated.
Follow these steps to ensure an adequate precleaning process:

1. Place contaminated instruments into a presoaking solution as soon as possible after use. Many bacteria and viruses (including the HIV virus) can survive in device lubricants and organic matter. It is critical they are removed before disinfection or sterilization. Although a neutral pH detergent may suffice for this step (don’t use soap since it leaves a scum residue), enzymatic solutions are preferable because they enhance the removal of organic debris and will not harm instruments. Check the manufacturer’s instructions and follow them carefully to avoid pitting, rusting, or other deterioration of medical and surgical instruments. A single generic product might not be suitable for use on several types of instruments. Enzyme solutions should be used in accordance with manufacturer’s instructions, which include proper dilution of the enzymatic detergent and contact with equipment for the amount of time specified on the label. Detergent enzymes can result in asthma or other allergic effects in users. Neutral pH detergent solutions that contain enzymes are compatible with metals and other materials used in medical instruments and are the best choice for cleaning delicate medical instruments, especially flexible endoscopes.

2. Transport instruments to the cleaning area in a covered biohazard-labeled leak-proof container in such a way that no spilling may occur. Wearing a fluid-resistant gown, heavy-duty utility gloves, and full-face protection, remove the instruments from the soaking solution. Do NOT reach into soaking containers with gloved hands. Rather, use tongs or a strainer basket to remove soaking instruments to avoid punctures with contaminated sharps.

3. Manually clean the instruments, using a soft brush to remove any visible organic debris. Avoid using abrasives (scouring powder and pads) that will scratch instruments.

4. Proceed with either sterilization using an autoclave or high-level disinfection using a soaking solution or a washer-disinfector.

**Sterilization**

After precleaning, package items in plastic or paper peel-down pouches or other acceptable forms of packaging material. Place the items in the autoclave. Include a chemical indicator, such as tape, in each load.

Follow the manufacturer’s instructions for autoclave use. Subject wrapped packs to a drying cycle prior to handling for storage. Use unwrapped instruments immediately or aseptically transfer them to a sterile container.

Store the sterilized instruments in a clean, dry, dust-free area, such as in cabinets that are not frequently opened and closed. Be sure that sterile supplies are stored 8 to 10 inches from the floor on a solid bottom shelf, and 5 inches from the ceiling (unless near a sprinkler head, in which case keep them at least 18 inches away). Avoid storing autoclaved items near drains, moisture and vermin. Date muslin- or crepe-wrapped packs and use within a few months.
Recent evidence indicates that pouches will remain sterile indefinitely if the package is heat-sealed in impervious plastic and the seal is still intact, no damage to the package has occurred, and no moisture is present (moisture contaminates items with microorganisms).

Never sterilize or disinfect single-use devices. Examples of these devices are plastic vaginal specula and mouthpieces for pulmonary function testing.

**Quality Checks for Sterilization**

**Chemical Indicators**
After the autoclave cycle is complete, examine the chemical indicator to be sure that the sterilization cycle occurred. If the indicator shows that the cycle has NOT occurred, re-run the cycle for the entire load.

**Biological Indicators**
At least weekly, test autoclaves for proper function using a biological monitoring system. Biological monitors consist of either strips or vials containing spores of *Bacillus stearothermophilus*, which are spore-forming bacteria that are very resistant to heat. After overnight incubation, the biological monitor will provide a visual color change to indicate microorganism (spore) kill.

According to the CDC, *B. atrophies* spores should be used for dry heat sterilizers as the spores are more resistant to drying. Use the organisms and procedures recommended by the manufacturer.

If biological monitoring indicates sterilization failure, take action according to the *CDC Guidelines for Disinfection and Sterilization in Healthcare Facilities, 2008*.

- Take sterilizer out of service.
- Recall implantable object. Other objects do not need to be recalled because of a single positive spore test.
- Repeat biological indicator test for three consecutive sterilizer cycles. If test remains positive, items sterilized since last acceptable test should be considered nonsterile and recalled.
- Check that the sterilizer was used correctly (e.g., with the proper time and temperature settings). If not, repeat test and reprocess inadequately processed items.
- Check facility maintenance for irregularities such as electrical problems.
- Ensure correct biological indicator use and appropriate interpretation.
If these steps resolve the problem:

- If biological indicators from three consecutive cycles are negative, return sterilizer to service.
- If biological indicators remain positive, do one or more of the following until problem is resolved: a) Request inspection by sterilizer manufacturer; b) Inspect steam supply lines if using that type of system; c) discuss abnormalities with sterilizer manufacturer; d) Repeat test using biological indicators from a different manufacturer.
- If the last step fails to correct the problem, close sterilizer down until manufacturer can assure its proper operation and then retest with three consecutive sterilizer cycles.

Document results of weekly biological monitoring on the **Autoclave Log**, located behind **Tab 11: Master Record Forms (Form 2)**. Include information about corrective action taken in the event of a failed test. Maintain this documentation for at least 3 years or for a time required by your state law.

**High-level Disinfection**

High-level disinfectants kill most microbes except bacterial spores. If the soaking time is long enough, most high-level disinfectants can achieve complete sterilization. Since high-level disinfectants require substantial ventilation and are toxic to skin and mucous membranes, sterilization by autoclaving is always preferable to high-level disinfection for instruments that can withstand the heat and pressure of an autoclave. For semi-critical instruments that contain rubber, plastic, or lenses, high-level disinfection is necessary. Always autoclave any instrument or device that enters a patient’s vascular system or other normally sterile areas of the body.

**Using Glutaraldehyde**

Glutaraldehyde is used to disinfect heat-sensitive instruments. Employee exposure leads to a variety of negative health effects including asthma, breathing difficulties, respiratory irritation, and skin rashes. The most serious adverse health effect is occupational asthma. In addition to causing respiratory effects, glutaraldehyde is a contact allergen, giving rise to contact dermatitis, on the hands and occasionally on the face. Skin sensitization from contact with glutaraldehyde has been documented as well.

To avoid skin and mucous membrane contact, use the following personal protective equipment when working with any high-level disinfectant:

- Gloves made of nitrile or butyl rubber (latex gloves do not provide adequate protection). Elbow length gloves are preferred.
- Fluid-resistant aprons or gowns. Use sleeve protectors if forearms are not protected by gloves.
- Goggles and mask or full-face shield with eye protection.
- Always wash hands after handling glutaraldehyde.
- An eyewash station must be available within 10 seconds travel of a potential exposure.

NIOSH recommends that workers not be exposed to glutaraldehyde vapor levels above 0.2 ppm as a time-weighted average. The ACGIH Threshold Value Limit (TLV) is 0.05 ppm as a ceiling limit over which workers should not be exposed at any time. When working with glutaraldehyde, do so in a well-ventilated room with at least 10 room air exchanges per hour or capture velocity of at least 100 feet per minute if working in a hood. With one or two tightly covered soaking solutions in a well-ventilated room (at least 10 air changes per hour) concentrations are most likely from 0.01 ppm to 0.1 ppm, below the NIOSH-recommended exposure limit of 0.2 ppm but may exceed the TLV when pouring solution.

Workers' highest risk for exposure to glutaraldehyde in a medical practice comes when the solution is poured into or out of the soaking bins, and when inserting and removing instruments to be disinfected. Safety nozzles reduce splashing during pouring, thereby reducing glutaraldehyde vapor levels. Be sure nozzles are unscrewed carefully after use to prevent additional aerosols. Using narrow and deep soaking bins reduces the surface area and lessens employee vapor exposure when inserting and removing instruments. Also, consider keeping these rooms cooler, as reduced temperature helps prevent vapor formation.

If glutaraldehyde is used extensively or if soaking bins are not tightly closed, employee exposure may exceed safe limits, at which time employees would be required to wear glutaraldehyde badges for a time to establish baseline air levels. If this initial reading exceeds a safe level, a fume hood or sophisticated ventilation system is necessary to reduce glutaraldehyde vapor levels. Purchasing automated processing equipment, or manual mobile disinfecting stations for manual processing of instruments can also reduce staff exposure levels.

Mobile disinfecting soaking stations are designed specifically for manual high-level disinfecting and provide an enclosed area for sterilizing trays, protecting employees from splashes and spills as well as controlling exposure to vapor from glutaraldehyde through the use of a ductless fume hood with a charcoal filter. Mobile disinfecting soaking stations are designed specifically for manual high-level disinfecting and provide an enclosed area for sterilizing trays, protecting employees from splashes and spills as well as controlling exposure to vapor from glutaraldehyde through the use of a ductless fume hood with a charcoal filter. Mobile stations are relatively inexpensive solutions to ventilation problems.
Sterilant Safety

1. SDS
   - Be aware of the safety precautions on the Safety Data Sheet (SDS)

2. Avoid contact
   - Gloves made of nitrile or butyl rubber (latex gloves do not provide adequate protection)
   - Fluid-resistant apron or gown
   - Goggles and mask or full-face shield
   - Always wash hands after handling

3. Labeling
   - Label the soaking container with name of the chemical & hazard warning

4. Ventilation
   - Use in a well-ventilated area
   - Cover the soaking container at all times except when inserting or removing objects from the solution

5. Symptoms of overexposure
   - Throat and lung irritation
   - Asthma-like symptoms
   - Breathing difficulty
   - Nose irritation, sneezing
   - Wheezing
   - Nosebleed
   - Burning eyes and conjunctivitis
   - Rash—contact and/or allergic dermatitis
   - Staining of the hands (brownish or tan)
   - Hives
   - Headaches
   - Nausea

SAFETY DATA SHEET
METRICIDE 28
28-Day, 2.5% Long-Life Glutaraldehyde

1. IDENTIFICATION

Manufacturer: Metrex Research Corporation
Address: 28210 Wick Road
City, State, Zip: Romulus, MI 48174
Telephone: 1-800-841-1428
Emergency: Chemtrec 1-800-424-9300
Date Prepared: June 2, 2005

Sterilant Supplement
Display as a quick reference guide

8-13
Symptoms of overexposure to glutaraldehyde include:

- Throat and lung irritation
- Asthma-like symptoms
- Breathing difficulty
- Burning eyes and conjunctivitis
- Rash—contact and/or allergic dermatitis
- Wheezing
- Nosebleed
- Headaches
- Nausea
- Staining of the hands (brownish or tan)

Before using glutaraldehyde, be sure employees understand and follow these policies and procedures:

1. Have an SDS on file and be sure all employees who use glutaraldehyde know the safety precautions to take.
2. Place a warning label that states the name and hazard of the chemical on the soaking container.
3. Rinse and clean instruments to be disinfected prior to soaking. This removes bacteria and viruses in device lubricants.
4. Those who rinse instruments must protect themselves from splashes and sprays by wearing gowns, gloves, and face/eye protection.
5. Use in a well-ventilated area, with at least 10 air changes per hour. Cover the soaking container at all times when not inserting or removing objects.
6. After precleaning, rinsing, and drying instruments, precisely follow the manufacturer’s instructions for high-level disinfection.
7. Carefully place precleaned instruments in the disinfectant, making sure they are totally immersed. Use a strainer basket if instruments have sharp edges. Adhere to the manufacturer’s instructions for dilution and immersion time.
8. Wearing heavy-duty utility or nitrile gloves, remove instruments from the solution. Rinse with water according to the manufacturers protocols. Then, visually inspect prior to stocking for reuse or storage. Be vigilant about cleaning areas of the instruments that have serrations and crevices. Store in a clean, dry area.
9. Change solutions at intervals recommended by the manufacturer. See page 8-16.

**Glutaraldehyde Spills**

All glutaraldehyde spills have the potential to create vapor concentrations that exceed recommended exposure limits, according to OSHA’s *Best Practices for the Safe Use of Glutaraldehyde in Health Care*. Employers must create a suitable plan for handling glutaraldehyde spills. The plan should consider the physical characteristics of the area where glutaraldehyde is used (e.g., type and effectiveness of ventilation, room size, and temperature) as well as the quantity and concentration of the solution. Cleanup equipment and personal protective equipment (i.e., eye, hand, body, and respiratory protection) should be readily available.
Whether a spill can be cleaned up safely without the use of neutralizing chemicals and/or a respirator will depend on the factors listed in the previous section. When vapor concentrations are unknown, air-supplied, atmosphere-supplying respirators are appropriate.

OSHA’s *Best Practices* divides glutaraldehyde spills into two categories: drips/splashes and large spills. Drips/splashes can be cleaned up by in-house personnel using the procedures listed on page 8-4.

Large spills require either specially trained in-house personnel or hazmat professionals to take the following steps:

- Evacuate the area until the spill is cleaned up and declared safe.
- If responders are fit-tested for respirator use, don respirators.
- Contain the spill with spill pillows and booms if needed.
- Neutralize the spill with a commercial neutralizer or appropriate chemical agents such as sodium bisulfite or glycine.
- After removal of the spill, thoroughly rinse area and clean up supplies with cold water.
- Dispose of rinse water, disposable supplies, and absorbent mediums according to applicable regulations and the procedures outlined in the facility spill control plan.

**Sources for Chemical Air Monitoring**

There are multiple vendors that can provide badges for chemical monitoring.

**Testing the Potency of Glutaraldehyde**

OSHA does not address “check strips” or “test strips” to verify the potency. Only glutaraldehyde solutions at the appropriate dilution will be effective in providing high level disinfection to the equipment being processed. Follow manufacturer’s instructions for the frequency of checking solutions, or routinely test solution for strength each day of use (or more frequently) using the appropriate chemical indicator and document the results of this testing. Discard the solution if the chemical indicator shows the concentration is less than the minimum effective concentration. Document that each new bottle of test strips when first opened is tested with a “pass and fail” solution according to the manufacturer’s directions. Test strip bottles must be dated when opened. An expiration date based on the manufacturers’ instructions should also be placed on the opened bottles. Test strips are sensitive to moisture in the air and should remain tightly covered when not in use.

**Disposing of Glutaraldehyde**

According to both OSHA and the U.S. Environmental Protection Agency, glutaraldehyde solutions may be disposed of as ordinary domestic waste at the end of their use life.
Wearing protective garments and face/eye protection, carefully pour the used soaking solution down the drain and flush thoroughly with cold water. At concentrations of less than 10 ppm in water, glutaraldehyde is readily degraded by sewage systems. If your facility is on a septic system, do not discard used glutaraldehyde down the drain.

Rinse empty quart and gallon containers before discarding. Do not reuse containers.

There are other high level disinfection products available, including OPA and hydrogen peroxide solutions. Follow all of the manufacturer’s recommendations for pre-cleaning the instruments, disinfection (including soaking time and room temperature/ventilation), monitoring the effectiveness of the solutions, disposal, PPE, first aid and staff training.

**Cleaning Transvaginal and Transrectal Ultrasound Probes**

Even if a probe cover (sheath) is used, high-level disinfection after every procedure is indicated. Latex condoms often fail (6.9%) and visual inspection is inadequate 5% of the time. Discard probe covers after each use. (Always follow all of the manufacturer’s instructions for using high-level disinfectants. Skipped or short cuts have led to infectious disease outbreaks in clinics and hospitals.)

1. Read the manufacturer’s instructions for cleaning and disinfecting the probe.
2. Disconnect the probe from the ultrasound console and remove all coupling gel from the probe by wiping it with a soft cloth and rinsing with flowing water.
3. Wash the probe with mild soap in lukewarm water. Scrub the probe as needed using a soft sponge, gauze, or cloth to remove all visible residue from the probe surface. Prolonged soaking or scrubbing with a soft bristle brush (e.g., a toothbrush) might be necessary if material has dried on probe surface.
4. Rinse the probe with enough water to remove all visible soap residues.
5. Air dry the instrument or dry it with a soft cloth.

**Disinfect Transvaginal and Transrectal Probes after Each Use**

If the probe touches a patient’s mucous membranes, a liquid high-level disinfectant/sterilant/germicide such as glutaraldehyde, hydrogen peroxide, or OPA must be used.

1. Prepare the high-level disinfectant solution according to the manufacturer’s instructions. Follow all precautions for storage, use, room temperature, and disposal. Ensure that check strips to show efficacy are documents prior to each use.
2. Fully immerse the cleaned and dried probe in the solution for the time specified by the manufacturer. Ensure that the room temperature meets the manufacturer’s instructions.
3. After removing from the disinfectant solution, rinse the probe following the manufacturer’s instructions. Flush all visible disinfectant residue from the probe and allow to air dry.
4. Record the lot numbers of test strips, room temperatures (if indicated) and items processed.
Cleaning Ultrasound Transducers

1. Disassemble the transducer and clean all surfaces of reusable components.
2. Using a clean, properly sized, brush for each lumen of the device, clean and thoroughly rinse the channels where biopsy needles pass (and also places that needle guides pass). Loosen all materials, and verify no visible soil remains.
3. Examine all surfaces, visually inspecting the entire device for cleanliness.
4. Steam sterilize all heat-stable, reusable components after each use. If using automatic reprocessing equipment, use the proper connections to the transducer assemblies.
5. Use a chemical, high-level disinfectant for heat-sensitive components that cannot withstand steam sterilization. Flush any lumens or channels with disinfectant to ensure that it reaches all areas inside the lumens.
6. Use sterile water for rinsing or removing residual disinfectants from devices that you have processed using chemical germicides. Dry thoroughly.
7. After sterilization/high-level disinfection, appropriately package and store the devices or components to ensure their sterility/high-level disinfection prior to reuse.

Decontaminating Vaginal Specula

The following is a step-by-step guide to disinfecting vaginal specula safely and expeditiously. Use these same principles for other instruments for which high-level disinfection is chosen.

Step 1: Contain & Transport

Immediately after use, place contaminated specula inside a covered container (labeled with the biohazard symbol) and tightly cover with a lid. Use a container without grooves or seams that is easy to clean and carry. Transport the contaminated specula to a designated cleaning area. Soaking the specula prior to washing will loosen cellular debris and facilitate cleaning, but do not use glutaraldehyde or OPA for this purpose.

Step 2: Clean

The most critical step in the decontamination and sterilization process is cleaning specula to remove debris that interferes with the sterilization or disinfection process. Clean as soon as practically possible after use so that organic material will not dry on the speculum. Until the cleaning process is initiated, minimize the handling of contaminated specula by personnel who are not wearing adequate, or any, protective attire.

Clean by scrubbing the speculum with a detergent solution or use a mechanical device such as an ultrasonic cleaner. When manually washing the speculum, be sure and scrub them beneath the water with a soft-bristled brush; then rinse well under running water. Do not use sponges or wood-handled brushes for this process as these common cleaning tools are easily contaminated and harbor microorganisms.
Step 3: Disinfect or Sterilize

Vaginal specula contact patients’ mucous membranes or non-intact skin, placing them in the “semi-critical” category of items that require special handling and sterilization or high-level disinfection prior to reuse. Autoclaving is the best choice for sterilizing specula, but if an autoclave is not available, use high-level disinfection.

Keeping Employees Safe during Instrument Disinfection

- Designate a specific area for instrument cleaning, away from patient and employee traffic and other clean processes
- Use biohazard-labeled, leak-proof, rigid, covered containers to transport contaminated items to the cleaning area
- Prohibit routine hand washing in the cleaning area
- Cleaning and rinsing instruments will undoubtedly generate splashes and sprays, and high-level disinfectants are harmful to the skin, eyes and respiratory tract
- Provide employees with protective equipment such as face/eye shields, goggles, gowns or aprons, and heavy-duty utility gloves

Decontaminating Semi-Critical Patient Care Equipment

Decontaminate patient care equipment such as pulse oximeters, tympanometers and EKG instruments by following manufacturer’s directions. If the equipment has areas that are difficult or impossible to disinfect, use impervious-backed paper, aluminum foil or plastic wrap to cover surfaces that may be contaminated by blood or other body fluids. Remove the cover and replace after contamination. Consider using disposable equipment whenever possible.

Decontaminate all equipment prior to servicing or shipping. When this is not possible, such as in the case of highly technical or sensitive equipment and/or limited access to contaminated parts, at least partial decontamination such as flushing lines and wiping the exterior must be accomplished. Attach a label to the equipment stating which portions of the equipment remain contaminated in order to inform downstream servicing/repair employees of the hazard and precautions they need to take.

Keep bins, pails, cans, wash basins, emesis basins and similar reusable receptacles clean by decontaminating as soon as feasible after visible contamination with blood or other potentially infectious materials.
**Decontaminating Non-Critical Patient Care Equipment**

Whenever possible, use disposable supplies, such as single-use shields for electronic thermometers. Take care to avoid contaminating the housing of an electronic thermometer and make sure to decontaminate it with alcohol whenever soiled and after measuring the temperature of an infected patient.

Since stethoscopes can become contaminated with multi-drug resistant bacteria, wipe the bell and the diaphragm between patients with a low level disinfectant such as alcohol. Do the same for the handle and body of otoscopes and ophthalmoscopes. Clean ear curettes after each use and, if contaminated with blood, disinfect with a 10% bleach solution. Do not place blood pressure cuffs in direct contact with damaged or nonintact skin.

Ballpoint pens, patient charts, computer keyboards, and the computer mouse can be contaminated with infectious agents that can be transmitted by employee hands to other environmental sources. Because these items are rarely cleaned, wash hands before and after patient contact to minimize potential transfer of bacteria and viruses from equipment to patients and vice versa. Protect equipment from contamination whenever possible by positioning equipment to minimize contamination and using barriers on equipment surfaces that are touched with contaminated gloved hands or when contact with spatter cannot be avoided.

Using excessive cleaning and disinfectant liquids on unsealed electronic equipment may cause electrical fires, equipment malfunctions, and healthcare worker burns. Therefore, identify unsealed electronic equipment by reviewing the labels for any cautions, precautions, or warnings about wetting, immersing, or soaking the equipment.

If equipment is contaminated, clean it in accordance with instructions from both the equipment manufacturer and the cleaning chemical manufacturer. If equipment is not designed for spraying with disinfectants, or wetting with disinfectant-soaked towels, cleaning solution may penetrate the equipment housing causing equipment damage and healthcare worker harm.

**Decontaminating Personal Protective Equipment (PPE)**

Decontaminate reusable PPE such as plastic face shields, goggles, rubber aprons and resuscitation equipment by using a bleach solution or isopropyl alcohol as soon as feasible after visible contamination. For items damaged by bleach, follow manufacturer’s instructions.
Eyewash Stations

Every medical facility with caustic or corrosive hazardous chemicals (e.g., glutaraldehyde or formalin) needs an eyewash to flush the eyes of those who have been exposed through splashes or sprays.

Eyewash specifications from the American National Standards Institute (ANSI Standard Z358.1, 2014) include:

- Eyewashes must supply a controlled flow of tepid water (60–100°F) to both eyes simultaneously at a velocity low enough not to injure the user; OSHA does not regulate specific eyewash temperatures but does require “tepid” water
- Eyewash stations must deliver at least 0.4 gallons per minute for 15 minutes; an eye/face wash station must deliver at least 3 gallons per minutes at a minimum of 30 psi of flow pressure
- Eyewash stations must be large enough to provide room for the eyelids to be held open with the hands while the eyes are in the stream of water
- If the eyewash nozzle has a protective cover, it shouldn’t require a separate action by the operator to activate the wash and remove the cover
- The water flow must remain on without requiring the use of the operator’s hands and until it is intentionally shut off
- The valve that provides water and the sink must be resistant to corrosion

Number & Placement of Eyewash Stations

The number and placement of eyewashes depends on what high-risk activities are performed and where they are performed. Examples of high-risk areas in medical facilities are:

- Some laboratories
- Areas where high-level disinfection occur
- Chemotherapy mixing areas
- Use of potassium hydroxide (KOH) for wet mount procedures

Locate an eyewash station where it requires no more than 10 seconds for employees to reach (55 ft. is a good rule of thumb) from a high-risk area. The eyewash must be on the same floor (level) as the area where employees are exposed to splashes of caustic or corrosive chemicals. Some states (e.g., Washington) require an eyewash station to be available if employees can be exposed to sprays of blood and OPIM. Review your state regulations to ensure that you have the correct number of eye wash stations in your facility. The emergency eyewash station must be in a well-lit area with no sharp projections. The eyewash station must be identified with a sign (a complimentary Eyewash Station Sign is included in the front pocket of this OSHA Program Manual).
Squeeze bottle–type eyewashes may be used as an adjunct at a workstation to support plumbed units but **cannot be used** as a substitute for a centrally located, plumbed eyewash.

Employees are aware of the locations of eyewash stations and know how and when to use them. Eyewashes are located in the following areas:

<table>
<thead>
<tr>
<th>Location</th>
<th>Type of Eyewash (Squeeze bottle or plumbed)</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

**Eyewash Maintenance**

The ANSI *Standard Z358.1* requires weekly and annual checks of eyewash stations and safety showers. Since OSHA relies on other expert bodies to influence its citations, weekly checks and annual checks are required, unless the manufacturer recommends otherwise.

**Weekly Eyewash Checks**

To perform weekly checks, push the handle to the “On” position, and allow the eyewash to run for several minutes until clear (e.g., three minutes.) The flow of water should remove the protective eyepiece caps. Take the water temperature periodically to ensure that it’s tepid (between 60°F and 100°F). During the annual check the pressure is checked and adjusted if necessary to provide a gentle flow of water over the eyes—too much pressure can damage the cornea and too little pressure won’t be effective. The minimum effective pressure for an eyewash station is 0.4 gallons per minute for 15 minutes. When the time is up, turn off the eyewash, rinse out the eyepiece caps with 10% bleach (or per manufacturers recommendations), flush them with water for 15 seconds, and return them to their original positions.

Record these checks on the tag attached to the unit or on the **Eyewash Station Weekly Check Log**, located behind **Tab 11: Master Record Forms (Form 2-A)**.
Waste Disposal

Biomedical Waste Disposal

Regulated waste is also called “biohazardous waste and infectious waste” and is defined by OSHA as:

“Liquid or semi-liquid blood or other potentially infectious materials; contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed; items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling; contaminated sharps; and pathological and microbiological wastes containing blood or other potentially infectious materials.”

Biohazardous Waste Examples

- Gauze bandage saturated with blood
- Tubes containing blood
- Used lab culture plates
- Exam gloves coated with blood or vaginal fluid

Regular Waste Examples

- Urine specimens (without visible blood)
- Used diapers
- One drop of blood on a bandage
- Exam gloves that are not visibly contaminated
- Feminine hygiene products*

*OSHA does not generally consider discarded feminine hygiene products such as sanitary napkins, to fall within the definition of regulated waste, since their intended function is to absorb and contain blood. The absorbent material of which they are composed is expected to prevent the release of liquid or semi-liquid blood or the flaking off of dried blood. Discard used feminine hygiene products into waste containers lined with plastic or wax paper bags to protect employees from physical contact with the contents. OSHA would issue a citation if there were sufficient evidence of regulated waste (e.g., a pool of blood in the bottom of the waste container) in a regular wastebasket.

Place biohazardous waste in a leak-proof container (e.g., a red bag) located at the site of infectious waste generation. The container must be labeled with the biohazard symbol and have a secure lid. If leakage is possible, double-bag or place in a sturdy box. Empty and clean or decontaminate waste containers if plastic liners have leaked or other visible contamination has occurred.

A commercial waste-hauling company that is in compliance with federal and state regulations, removes biohazardous waste from this facility. The waste pickup company used in this facility is:

____________________________________            ________________________
Company name                              Telephone number
**Hazardous Waste Disposal**

Chemical waste may be classified as hazardous if it demonstrates certain characteristics such as being ignitable, corrosive, reactive, or toxic. Waste is considered hazardous if it is listed on one of the EPA's hazardous chemical lists*: the P-list (acutely hazardous) or the U-list (RCRA hazardous). Most chemotherapy drugs (see insert after page 9-2) are on the 2014 NIOSH Hazardous Chemical list. NIOSH recommends handling these cytotoxic chemicals as if they were on the EPA's U-list. Some drugs, like arsenic trioxide, are on the EPA's P-list. Substances listed on the P-list are considered “acute hazardous” waste when determining your generator status below.

Check the product's SDS to determine if a drug/chemical must be treated as a hazardous waste.

*Note: The EPA's P- and U-lists refer to UNUSED drugs. In October 2007 the EPA determined the scope of the epinephrine P042 listing is only epinephrine base, and does not include epinephrine salts. Most, if not all, of the epinephrine used in medical applications is one of several epinephrine salts. Also, while the lists address UNUSED drugs, medication remaining in a syringe or IV system after administration to the patient could still be considered hazardous because it demonstrates the characteristic of being toxic.

Facilities that generate hazardous waste are divided into three categories based upon the quantity of waste they produce per month:

1. Conditionally Exempt Small Quantity Generators (CESQG)
2. Small Quantity Generators (SQG)
3. Large Quantity Generators (LQG)

Requirements for documentation and waste storage vary by which generator category a facility falls under. Clinics and ambulatory medical facilities generally fall into the CESQG or SQG categories.
### Generator Status and Requirements

<table>
<thead>
<tr>
<th>Category</th>
<th>Hazardous</th>
<th>Acute Hazardous</th>
<th>Regulatory Requirements</th>
</tr>
</thead>
</table>
| CESQG    | ≤ 220 lbs. (≤ 100 kg) | ≤ 2.2 lbs. (≤ 1 kg) | ▪ Identify and properly label all hazardous waste generated.  
▪ Never accumulate more than 2,200 lbs. (1,000 kg) of hazardous waste at any time.  
▪ Ensure that hazardous waste is delivered to a person or facility authorized to manage it. |
| SQG      | > 220 lbs. (> 100 kg) **AND** ≤ 2,200 lbs (≤ 1,000 kg) | ≤ 2.2 lbs. (≤ 1 kg) | ▪ Identify and properly label all hazardous waste generated.  
▪ Receive an EPA identification number by applying to the EPA.  
▪ May accumulate hazardous waste on site for 180 days.  
▪ The quantity of hazardous on site waste never exceeds 13,227 lbs. (6,000 kg).  
▪ Always have at least one employee available to respond to an emergency.  
▪ At least weekly, inspect areas where waste containers are stored for leaks or damage. |
| LQG      | > 2,200 lbs. (> 1,000 kg) | > 2.2 lbs. (> 1 kg) | ▪ LQGs are subject to extensive regulatory requirements.  
▪ For details visit the EPA's website at: [http://www.epa.gov/wastes/hazard/generation/resources.htm#lqg](http://www.epa.gov/wastes/hazard/generation/resources.htm#lqg) |

Hazardous waste shipments must be accompanied by a Uniform Hazardous Waste Manifest. The manifest system provides a means of tracking waste, confirming that it has been properly transported, and, finally, that it has arrived at its destination. This process provides a tightly controlled framework in which hazardous waste materials can be tracked from the time of collection to ultimate disposal. The Federal government sets the minimum requirements for the Uniform Hazardous Waste Manifest, but states may impose additional regulations.

Check with your state Environmental Protection Agency (EPA) to determine whether you are subject to state tracking regulations. The state EPA office can be reached by telephone (see local directories) or on the Internet at [www2.epa.gov/aboutepa/visiting-regional-office](http://www2.epa.gov/aboutepa/visiting-regional-office).
Waste Handling & Storage

All biohazardous waste is managed by regulations at the state level. To access your state’s regulations go to [http://www.epa.gov/osw/nonhaz/industrial/medical/programs.htm](http://www.epa.gov/osw/nonhaz/industrial/medical/programs.htm). The federal BBP standard does not address how long biomedical waste can be stored on site. Many state regulations indicate that a facility cannot store biomedical waste onsite for more than 30 days. The 30-day period commences when the first non-sharps item of biomedical waste is placed into a red bag. Sharps containers may be used until the fill line is reached, even if it is over 30 days. (Some state regulations may impose a shorter time frame.) Restrict access to indoor biomedical waste storage areas and locate them away from pedestrian traffic. Maintain storage areas in a sanitary condition, free from vermin and insects. Do not set containers of biohazardous waste directly onto carpeted floors, rather place a rubber mat under the containers to catch any potential leaks or spills.

Remove stored biomedical waste from the facility on a regular basis (usually not longer than 90 days). Label any outdoor storage areas, including containers and trailers, with a biological hazard symbol that is at least 6 inches in diameter. Secure outdoor storage areas against vandalism and unauthorized entry.

The ultimate disposal method (autoclaving prior to land-filling, incineration, etc.) for medical and hazardous waste falls under the purview of the EPA, state and local regulations.