



# Infection Control Management Project

## Volume 4: Guidelines for

## Infection Control in Laboratory

1. Protocols
2. Reference Text
3. Tool for Monitoring

January 2011



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## Infection Control in Laboratory

### **Adapted by AAA From:**

1. WHO Laboratory biosafety manual, third edition, 2004, WHO/CDS/CSR/LYO/2004.11.
2. WHO Biorisk Management: Laboratory Biosecurity Guidance, 2006, WHO/CDS/EPR/2006.6.
3. Pakistan National Infection Control Guidelines 2006
4. Cen Workshop Agreement ICS 07.100.01, (2008) Laboratory biorisk management standard, CWA 15793:2008 (E), European Committee For Standardization, Management Centre: rue de Stassart, 36 B-1050 Brussels.
5. The University of Utah Eccles Health Sciences Library  
<http://library.med.utah.edu/WebPath/TUTORIAL/PHLEB/PHLEB.html>



# Infection Control in Clinical Laboratory - 1

## In Sample Collection Area, **ALWAYS**

1. **Explain the procedure of specimen collection** to the patient/client
2. **Observe hand hygiene** by washing hands with soap and water OR rub hands with antiseptic solution for 15 seconds
3. **Wear gloves** before touching any wet item, broken skin, mucous membrane, blood, body fluid, soiled instrument, dressing and contaminated waste material, or before performing invasive procedures
4. **Use personal protective equipments** goggles, face masks, gowns and aprons if splashes and spills of any body fluids are likely
5. **Cover your nose and mouth** with mask if coughs and sneezes are expected.
6. **Label the tubes** with appropriate identification before specimen collection
7. **Use spirit swab (alcohol swab) for cleansing the skin** THOROUGHLY prior to phlebotomy (vein puncture). For Blood culture and other invasive procedure use Pyodine
8. **Do not recap, cut or bend needle** after sample collection. **Dispose syringe/needle safely** in sharps container and replace it with new container when it is 3/4 filled.
9. **Get help of co-worker** during blood collection of child, seriously ill or mentally unstable person, to hold the person firmly
10. **Avoid eating, drinking, smoking, applying cosmetics or handling contact lenses** while in the working area

11. **After using toilet**, wash hands again thoroughly with soap and water.
12. **Report any accidental needle stick injury (prick) or spill** of patients blood or body fluids on yourself to the supervisor immediately and follow the needle injury/spill handling guidelines

## Infection Control in Clinical Laboratory - 2

Preventive Actions During Sample Sorting, Separation, Packaging, Transport and Processing.

1. **Prohibit entry of unauthorized personnel** in the laboratory
2. **Cover the open cut, wound or puncture mark** on exposed body surface with water proof dressing.
3. **Observe hand hygiene** by washing hands with soap and water OR rub hands with antiseptic solution.
4. **Wear laboratory gown and latex gloves** and pull it over the cuffs of the gown. After wearing gloves, do not touch mobile phone, keyboard, intercom, door knob, etc.
5. **Wear protective mask** (preferably N95). Surgical mask is used in ordinary microbiology laboratory.
6. **Cover your nose and mouth** with mask if coughs and sneezes are expected.
7. **Observe standard precautions** for laboratories for blood and other body fluids, tissues and excreta
8. **Label the tubes before adding the specimen or reagents** with appropriate identification.
9. **Never pipette by mouth**, always use suction bulbs, micro pipettes, etc.
10. **Minimize aerosol generation** when handling the hazardous samples, use safety equipments.

11. **Use plastic or unbreakable leak proof containers with tight lids** for storage, carrying and transportation of specimen. Always carry specimen in carrying container, basket or stand.
12. **Place infectious waste materials in plastic bag** or containers for collection. Make sure that biohazard labels are affixed on waste containers.
13. **Clean work surfaces** with surface disinfectant (bleach) twice daily. Also when contaminated, such as after spills.
14. **Avoid eating, drinking, smoking, applying cosmetics or handling contact lenses** while in the working area
15. **Report any accidental needle/sharp injury (prick) or spill** of patients' blood or body fluids on yourself to the supervisor immediately and follow the needle injury/spill handling guidelines.
16. **Do not keep food or drink in refrigerator** used for chemicals, kits or specimen.
17. **Remove gown** before leaving the laboratory.
18. **Do not take away** any pencil or marker to home, used in laboratory.

## Reference Text

### 1. Prohibit entry of unauthorized personnel in the laboratory

Only the laboratory staff should be allowed in the vicinity. Other health care facility/hospital staff should not freely move in and out of laboratory. Also, only one attendant should be allowed in the sample collection area.

### 2. Cover the open cut, wound or puncture mark

Preferably a laboratory staff with an open cut, wound or puncture mark on exposed body surface should not enter the laboratory. Clinical laboratory handle samples from a variety of sources and all the surfaces may be potentially contaminated. With open puncture, wound or skin break there is a possibility of entry of microorganisms and it is an occupational hazard. Laboratory technician in such situation is temporarily assigned work that does not involve clinical work area. However, if there is only one lab technician posted (such as in RHC) s/he should cover the cut, wound or puncture mark with a water proof dressing.

### 3. Keep the Laboratory Clean

All areas of the laboratory and toilets must be clean. This means that there is no dust, cobwebs, blood, trash, used needles and syringes or bandages, etc on the floor, walls, roof or fixtures and furniture. Routine cleaning is important to ensure a clean and dust-free Laboratory environment. The facility should be cleaned by wet mopping. Dry sweeping (*Jharoo*) is not recommended.

Clean work surfaces with 5% bleach daily and at once if there is any spill or splash. If working surface is of steel then after disinfecting with bleach, clean with spirit after 1 minute. Leaving bleach for longer time will damage steel surface.

There should be no carpeting on the floor. If curtains are needed, then these should be of fluid resistant material.

### 4. Explain the procedure of specimen collection to the patient/client

It has been observed that if patient is unaware of the procedure when phlebotomist apply tourniquet and insert needle patient [females, child, anxious patients) move arm and needle stick injury to phlebotomist or patient may occur.

### 5. Observe Hand Hygiene

**Wash hands** with soap and water for 60 seconds **or** use **hand rub** for 30 seconds, before beginning work, before wearing gloves and immediately after their removal, after handling a batch of specimen, biohazardous material, after using toilet and before leaving the laboratory.



The purpose of handwashing is to mechanically remove soil and debris from the skin, and reduce the number of transient microorganisms. In most situations, thorough washing of hands with ordinary soap and water is sufficient to decontaminate them, but the **use of germicidal soaps is recommended in high-risk situations**. Hands should be thoroughly lathered with soap, using friction, rinsed in clean water and dried, preferably using a clean paper or cloth towel or warm-air hand-dryers, if available. Otherwise dry hands in air.

Foot- or elbow-operated faucets are recommended, if possible.

**Perform Antiseptic Hand Rub.** Use of an antiseptic hand rub is more effective in killing transient and resident flora than handwashing with antimicrobial agents or plain soap and water. It is quick and convenient to perform, and gives a greater initial reduction in hand flora. Antiseptic hand rubs also contain a small amount of an emollient such as glycerin, propylene glycol, or sorbitol that protects and softens skin.

To be effective, an adequate amount of hand rub solution should be used. For example, by increasing the amount of hand rub from 1 ml to 5 ml per application (about 1 teaspoonful), the effectiveness increases significantly.

A non-irritating, antiseptic hand rub can be made by adding glycerin, propylene glycol, or sorbitol to alcohol (2 ml in 100 ml of 60-90 percent ethyl or isopropyl alcohol solution). Use 5 ml (about 1 teaspoonful) for each application and continue rubbing the solution over the hands until they are dry (15-30 seconds).

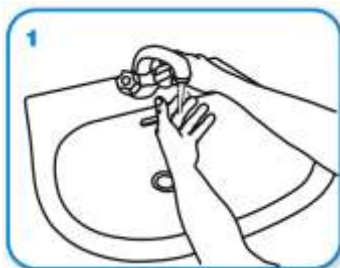
The methods of hand washing and hand rub are presented in the following pages.



## Method of Handwashing

Wash hands only when visibly soiled! Otherwise, use handrub!

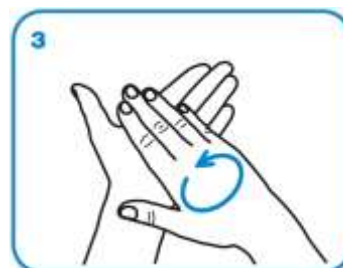
Duration of procedure: 40-60 sec.



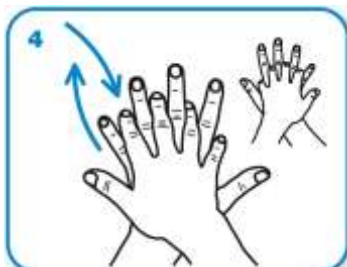
Wet hands with water



Apply enough soap to cover all hand surfaces



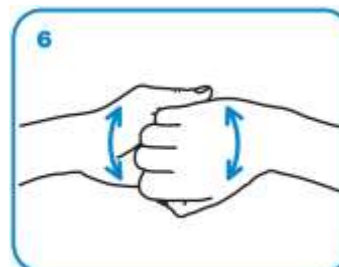
Rub hands palm to palm



Right palm over left dorsum with interlaced fingers and vice versa



Palm to palm fingers interlaced



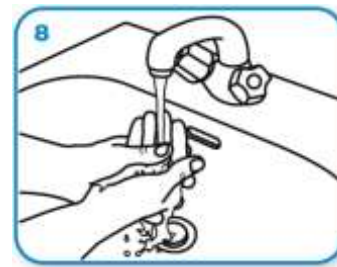
Backs of fingers to opposing palms with fingers interlocked



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



Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa



Rinse hands with water



And your hands are safe

## Method of Handrub

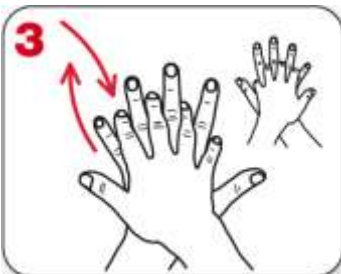
Wash hands only when visibly soiled! Otherwise, use handrub!  
Duration of procedure: 30 sec.



Apply a handful of alcohol handrub in a cupped hand and cover all surfaces



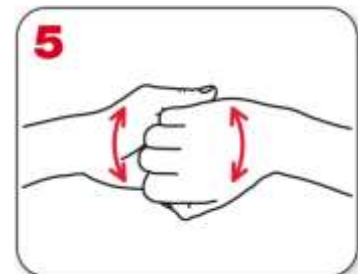
Rub hands palm to palm



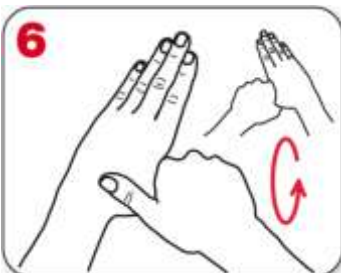
Right palm over left dorsum with interlaced fingers and vice versa



Palm to palm fingers interlaced



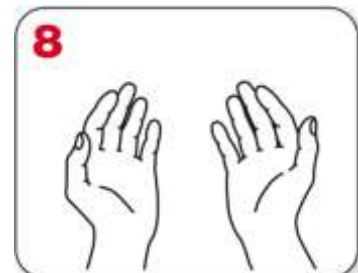
Backs of fingers to opposing palms with fingers interlocked



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



Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa



And your hands are safe

## 6. Use Personal Protective Equipment

Protective barriers, commonly referred to as personal protective equipment (PPE), have been used for many years to protect clients from micro-organisms present on staff working in the health care setting. More recently, with the emergence of AIDS and HCV, use of PPE has become important for protecting the health care staff as well.

PPE includes gloves, masks, eyewear, (face shields, goggles or glasses), caps, gowns, aprons and other items. The laboratory should have available and ready to use PPE at ALL times.

The following principles guide the use of personal protective equipment:

- Do not share personal protective equipment.
- Personal protective equipment should be chosen according to the risk of exposure.
- Discard the used personal protective equipment in appropriate disposal bags



**Gloves** protect hands of health care workers from infectious materials. Change gloves before collecting specimens from different patients. Disposable gloves should not be reused but should be disposed

**Masks** should be large enough to cover the nose, lower face, jaw, and facial hair. They are worn in an attempt to contain the moisture droplets expelled when laboratory staff speak, cough, or sneeze, as well as prevent accidental splashes of blood or other contaminated body fluids from entering the health care provider's nose or mouth. Wear protective mask (N-95) while dealing with sputum samples especially if laboratory is performing TB Culture and Drug Susceptibility Test. Unless the masks are made of fluid-resistant materials, they are not effective in preventing either. Also wear goggles if splash and spray of blood, body fluid or any chemical is likely to occur.

**Eyewear** protects health care providers in the event of an accidental splash of blood or other body fluid by covering the eyes. Eyewear includes clear plastic goggles, safety glasses, etc. Prescription glasses or glasses with plain lenses also are acceptable. Masks and eyewear should be worn when performing any task in which an accidental splash into the face is likely (e.g., Draining an abscess). If disposable, discard appropriately. If they are reusable, decontaminate them according to the manufacturers' instructions.

**Gowns** (clean, non-sterile) should be worn to protect the skin and prevent soiling of clothing during procedures that are likely to generate splashes of blood, body fluids, secretions or excretions (for example when patient is vomiting, bleeding or violent). Impermeable gowns are preferable.

**Shoes** must be worn to protect feet from injury by sharps or fluids on laboratory floor.

## 7. Observe Standard precautions for Laboratories with blood and other body fluids, tissues and excreta

These are designed to reduce the risk of transmission of microorganisms from both recognized and unrecognized sources.

### Collection, labeling and transport of specimens

- Gloves should be worn for all procedures.
- Blood should be collected from patients by trained staff.
- The tubes should be placed in adequate containers for transport to the laboratory within the laboratory facility
- Request forms should be placed in separate waterproof bags or envelopes.
- Reception staff should **not** open these bags.

### Opening specimen tubes and sampling contents

- Specimen tubes should be opened in a biological safety cabinet.
- Gloves must be worn. Eye and mucous membrane protection is also recommended (goggles or face shields).
- Protective clothing should be supplemented with a plastic apron. The stopper should be grasped through a piece of paper or gauze to prevent splashing.

### Glass and “sharps”

- Plastics should replace glass wherever possible. Only laboratory grade (borosilicate) glass should be used, and any article that is chipped or cracked should be discarded.
- Hypodermic needles must not be used as pipettes.

### Films and smears for microscopy

- Fixing and staining of blood, sputum and faecal samples for microscopy do not necessarily kill all organisms or viruses on the smears. These items should be handled with forceps, stored appropriately, and decontaminated and/or autoclaved before disposal.

### Automated equipment (sonicators, vortex mixers)

- Equipment should be of the closed type to avoid dispersion of droplets and aerosols.
- Effluents should be collected in closed vessels for further autoclaving and/or disposal.

- Equipment should be disinfected at the end of each session, following manufacturers' instructions.

### Tissues

- Formalin fixatives should be used.
- Frozen sectioning should be avoided. When necessary, the cryostat should be shielded and the operator should wear a safety face shield. For decontamination, the temperature of the instrument should be raised to at least 20C.

### Decontamination

- Hypochlorites and high-level disinfectants are recommended for decontamination. Freshly prepared hypochlorite solutions should contain available chlorine at 1 g/l for general use and 5 g/l for blood spillages. Glutaraldehyde may be used for decontaminating surfaces.

## 8. Use alcohol or spirit swab for Cleansing Skin

Use alcohol wipes or spirit swab for cleansing the skin THOROUGHLY prior to phlebotomy (vein puncture). For blood culture, lumbar puncture or bone marrow aspiration disinfection with Povidone is preferable.

## 9. Label the tubes before adding the specimen or reagents with appropriate identification

If tubes are labeled after specimen collection soiling of tube with blood/fluid may occur which increases chances of infection or tube may slip and spills occur. However labeling may be done after sample collection if vacuumed plastic tubes are used

## 10. Dispose Syringe and Needle Safely in Containers for Sharps

Sharps are defined as comprising of needles, syringes, scalpels, blades, glass i.e. anything that may cause puncture or cuts. Take care to prevent injuries when using sharps.

- Use needle and syringe only once
- Keep handling to a minimum. DO NOT pass directly from hand to hand.
- **Do not recap or bend needles** prior to disposal.
- Do not disassemble the needle and syringe after use.

- **Mutilate** prior to disposal to prevent any unauthorized reuse by using needle cutters/destroyers using specially designed sharps boxes, or destroyers. Special boxes are being provided by National Hepatitis Control Program.
- Dispose off the used mutilated disposable syringes and needles, scalpel blades and other sharp items in a **puncture-resistant container with a lid that closes.**

The puncture proof sharp containers can be made from cardboard box, used tin box, or hard plastic bottles that are closed.

Make only a small opening in the box for disposing off sharps. These sharp containers should be available in dressing/injection rooms, EPI vaccination rooms, examination rooms, labor and birth rooms, wards and laboratories, i.e. such containers must be located in ALL patient care and laboratory areas where they are very easily accessible to personnel working in these locations. They should be closed and immediately replaced when  $\frac{3}{4}$  full.



## 11. Get Help of Co-workers

Get help of co-worker during blood collection of child, seriously ill or mentally unstable person, to hold the person firmly

## 12. Never Pipette by Mouth, Use Micro-pipettes

Mouth pipetting was done when mechanical aids were not available. It caused serious accidents resulting in ingestion of urine, acids, infectious materials etc. With the easy availability of gadgets such as collapsible bulbs, valves, auto pipettes there is no place of mouth pipetting now in clinical laboratories.

**Syringes should not be used for pipetting.** This incorrect practice is common in some labs to measure and use reagents, etc.





### 13. Minimize Aerosol generation

Aerosol or airborne transmission is well recognized mode of transmission of many human pathogens. Much work has been performed using air-sampling techniques together with culture and molecular detection methods for viruses [particularly varicella zoster virus (VZV)], bacteria [particularly tuberculosis (*Mycobacterium tuberculosis*, TB) and other mycobacteria], and fungi (particularly *Aspergillus* spp.). Transmission has also been documented for HCV, HBV and HIV. Moreover presence of these particles causes contamination especially in molecular diagnostic laboratories.

**Use centrifuge with tight fitting lid** for human blood and body fluids and do not open centrifuge while still in motion.

Use auto micro pipettes, avoiding blowing last droplet from pipette

### 14. Clean up spills carefully

In the event of a spill of infectious or potentially infectious material, the following spill clean-up procedure should be used:

- Everybody should leave the place for 30 minutes (for droplets to settle) and inform the supervisor
- Wear gloves and protective clothing, including face and eye protection if indicated.
- Cover the spill with cloth or paper towels to contain it. Pour an appropriate disinfectant over the paper towels and the immediately surrounding area (generally 5% bleach solution is appropriate). Apply disinfectant concentrically beginning at the outer margin of the spill area, working toward the centre
- After the appropriate amount of time (e.g. 30 min), clear away the materials. If there is broken glass or other sharps involved, use a dustpan or a piece of stiff cardboard to collect the material and deposit it into a puncture-resistant container for disposal.
- Clean and disinfect the area of the spillage (if necessary, repeat steps 2–5).
- After successful disinfection, inform the supervisor that the site has been decontaminated

In case, the spill is on the lab coat of the lab technician, then:

- Immediately take off the lab coat
- Spray disinfectant on the spill area
- Place it in proper area to be taken for washing

## 15. Waste Collection and Disposal

Most glassware, instruments and laboratory clothing will be reused or recycled. The overriding principle is that all infectious materials should be decontaminated, autoclaved or incinerated within the laboratory.

The principal questions to be asked before discharge of any objects or materials from laboratories that deal with potentially infectious microorganisms or tissues are:

- Have the objects or materials been **effectively decontaminated or disinfected by an approved procedure**?
- If not, have they been **packaged in an approved manner** for immediate on-site incineration or transfer to another facility with incineration capacity?
- Does the disposal of the decontaminated objects or materials involve **any additional potential hazards**, biological or otherwise, to those who carry out the immediate disposal procedures or who might come into contact with discarded items outside the facility, including the community?

### Guiding principles

- The foremost guiding principle for waste disposal from the laboratory is to remember that **microorganisms are grown or tested** at the laboratory. This waste carries much higher loads of known and unknown organisms.
- **Decontamination and Neutralization** are hence the first priority in disposal, the final disposal depending on the availability of facilities such as burial and incineration.
- **Appropriate PPE** must be observed by **ALL Laboratory Personnel**. Barriers in the form of PPE should not be compromised. Injuries from sharps, spills and splashes are concerns to be proactively avoided.
- Laboratory waste must be **clearly marked with the biohazard labels**, displayed on waste containers and bags **in local language**.
- **Containers and collection:** Waste should be collected in leak proof containers and waste should be collected when the container is  $\frac{3}{4}$  full.
- The person collecting waste must wash hands with soap and water after removing gloves and other personal protective equipment.
- Also, the waste collection areas must be kept clean and free of spills.



## Handling and Disposal Guidelines at the Laboratory

### Sharps

- Sharps disposal containers must be puncture-proof/-resistant and must not be filled to capacity. When they are three-quarters full they should be placed in “infectious waste” containers and incinerated, with prior autoclaving if possible and/or laboratory practice requires it.
- Sharps disposal containers must not be discarded in community waste sites or landfills.

### Contaminated (potentially infectious) materials for autoclaving and reuse

- No pre-cleaning should be attempted of any contaminated (potentially infectious) materials to be autoclaved and reused. Any necessary cleaning or repair must be done only after autoclaving or disinfection.

### Contaminated (potentially infectious) materials for disposal

- All contaminated (potentially infectious) materials should be autoclaved in leakproof containers, e.g. autoclavable, colour-coded plastic bags, before disposal. After autoclaving, the material may be placed in transfer containers for transport to the incinerator.
- If possible, materials should not be discarded in landfills even after decontamination.
- If an incinerator is available, autoclaving may be omitted: the contaminated waste should be placed in red bins, and transported directly to the incinerator.
- Reusable transfer containers should be leakproof and have tight-fitting covers. They should be disinfected and cleaned before using again.
- When disinfectants are used, waste materials should remain in intimate contact with the disinfectant (i.e. not protected by air bubbles) for the appropriate time, according to the disinfectant used. The discard containers should be decontaminated and washed before reuse.

### Decontamination

- Steam autoclaving is the preferred method for all decontamination processes at the laboratory.
- Materials for decontamination and disposal should be placed in containers, e.g. autoclavable plastic bags, that are colour-coded according to whether the contents are to be autoclaved and/or incinerated.
- Alternative methods such as with Chlorine may be envisaged, with efficacy testing.

## Specific Waste Disposal Guidelines at the Laboratory

The person in charge of waste disposal must wear utility gloves and eye protection. The waste should be disposed of in the following manner:

### Liquid Waste

- Contaminated Liquid Waste from samples (blood, urine, faeces and other body fluids) must be decontaminated before being emptied in a toilet or sink.
- Decontaminate waste by adding bleach 5% and holding for 30 minutes.
- The toilet/sink should be rinsed with water after the waste has been emptied.
- If possible, the waste should drain into a **Neutralization Tank**, where appropriate time should be allowed to decontaminate and neutralize the waste, before being drained into a sewer system. The tank may contain limestone or other appropriate materials.

### Solid Waste: Body parts and Organs

- **Anatomic waste** in the form of gross body parts or organs, after tissue harvesting are to be collected in a large RED bin. The bin should ideally have a self-closing mechanism. Line the bin with an opaque, RED plastic bag.
- Label the Red bag with the name of the body part and sex of the person.
- Tie the red plastic bag when 3/4<sup>th</sup> full, and send for collection and final disposal.
- Final disposal of this waste is by burial for ethical reasons, or incineration if burial is not an option.

### Solid Waste: Pathologic Waste other than Body Parts and Organs

- Small tissues, bandages, cotton, gauze, glass bottles or any other container used for samples should be decontaminated with 0.5% Chlorine Solution, before disposal.
- These should be then collected in a **separate RED Bin**, lined with an opaque Red bag.
- The Red bin must clearly indicate the kind of waste to be collected in local language, and also warn against putting any anatomic waste.
- Potential mixing with any other kind of waste, especially anatomic waste is to be carefully avoided, as anatomic waste has to be preferably buried on ethical grounds.
- Tie the red plastic bag when 3/4<sup>th</sup> full, and send for collection and final disposal.
- Final disposal of this waste is preferably by incineration, or burial as a second option.

- **Sharps, including syringes, glass bottles, vials, broken glass**, should be collected in appropriate containers, which are to be incinerated.

### **Safe Recycling of Plastic and Glass Bottles**

- Bottles containing samples of tissues and body fluids generated as waste may be safely recycled, although the risks must be assessed before this exercise.
- Decontaminate bottles by washing with 0.5% Chlorine solution, detergent and water.
- Bottles must never be re-used, and both glass and plastic bottles can be safely recycled.

### **General Waste**

- Collect general waste in a White bin lined with White Plastic bag.
- Do not mix laboratory waste with general waste consisting of non-infectious materials such as packaging.
- Packaging materials, for example plastic sheets and bags, foam, vial carriers, cardboard boxes, etc can be sent for recycling through rag pickers, taking care that these are kept separate from infectious or potentially infectious material.

**After Disposal, remember that:** cleaning and disinfection of all equipment and its maintenance (PPE, Utensils, carts, trolleys, storage site).

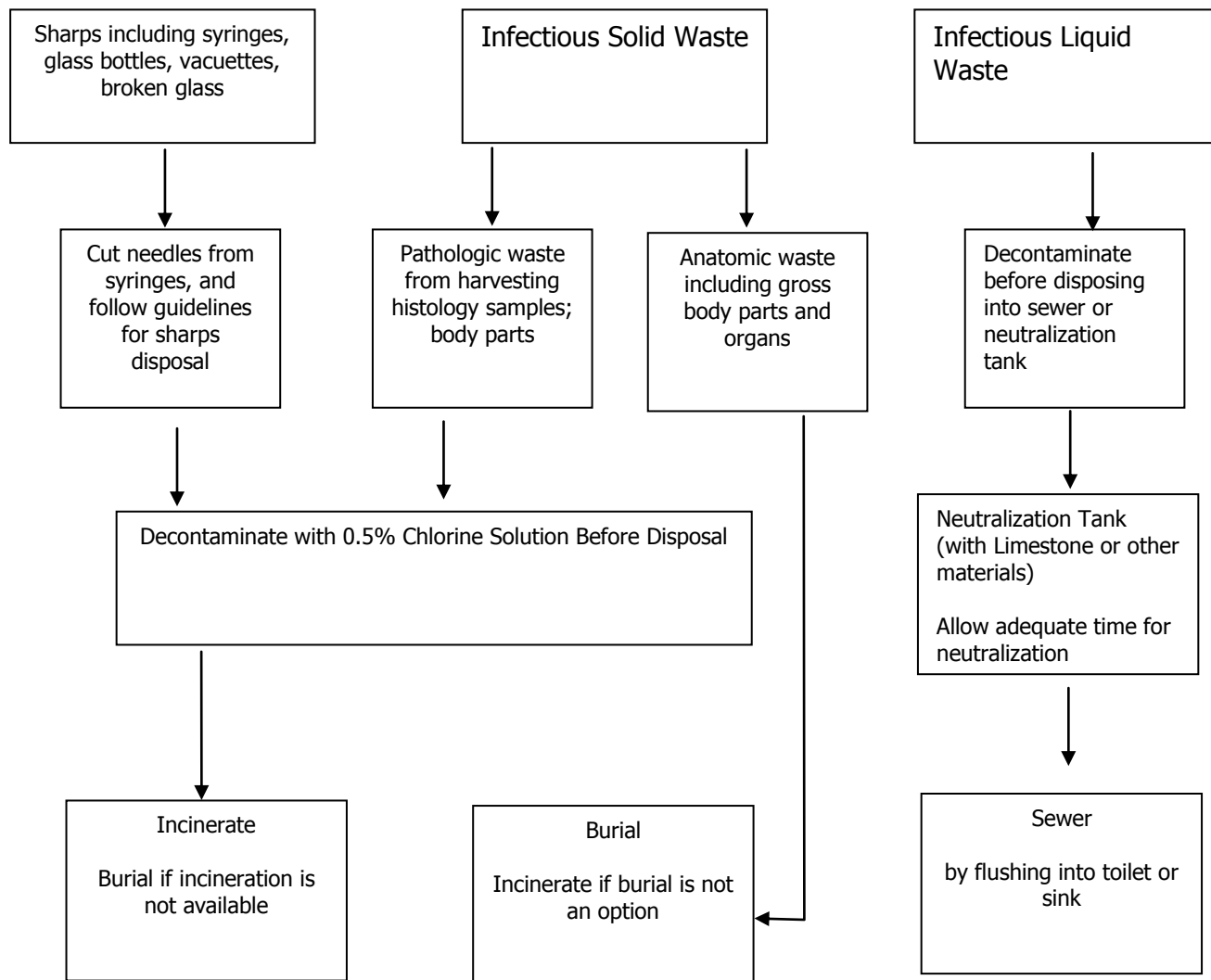
### **Storage of Harvested Tissues and Body Fluids**

- The Microbiologist/lab technician must store tissues in proper bottles with preservatives.
- Tag and store in proper shelves, designated for different tissues.
- Refrigerators and freezers meant for storage should be routinely checked for maintenance of appropriate temperatures.
- Storage refrigerators, freezers, and other equipment storage should be routinely checked, decontaminated and cleaned.
- Instruments must be routinely decontaminated, cleaned and sterilized, as per need and instructions.

### **Transportation of samples to Laboratory**

- A trained person from the lab must transport samples collected from the different wards.
- The person **MUST** ensure PPE, with gloves (double gloving preferred), apron, gown to prevent spillage of blood/body fluids, and face and eye protection.
- Trained personnel must be made responsible for labeling and preparation for testing, if needed.

## Laboratory Waste Disposal Schematic



## 16. Report Accidental needle injury or spill of patients blood/fluids on you

Needlestick injuries are wounds caused by needles that accidentally puncture the skin. These injuries can occur at any time when people use, disassemble, or dispose of needles. Accidental injection of blood-borne viruses is the major hazard of needlestick injuries, especially the HIV virus, hepatitis B, and hepatitis C. The risk of infection after exposure to infected blood varies by bloodborne pathogen. The risk of transmission after exposure to HIV-infected blood is about 0.3%, whereas it is estimated to be up to 100 times greater for hepatitis B virus (30%) and could be as high as 10% for hepatitis C virus.

All health care providers with potential exposure should be vaccinated. For other personnel, the risk of hepatitis B, hepatitis C and HIV infection should be assessed and appropriate immunization or chemo-prophylactic steps taken.

### First aid

- **Contaminated needlestick, sharps injury, bite or scratch** – allow to bleed, wash with soap and running water. Do not squeeze wound or force bleeding.
- **Blood or body fluid in eyes or mouth** - irrigate with copious quantities of cold water
- **Blood or body fluid on broken skin** - encourage bleeding if possible and wash with soap under running water (but without scrubbing).

### Report incident and discuss with consultant immediately

Discuss type of injury, donor HIV status if known, etc. If this urgent preliminary risk assessment considers there is a significant risk of HIV, post-exposure prophylaxis (PEP) for HIV needs to be started as soon as possible - ideally within 1 hour. This reduces risk of transmission by 80%. It may be appropriate to give the first dose of PEP pending a fuller assessment after the HIV status of the 'donor' is known. Where the donor is unknown, epidemiological likelihood of HIV in the source needs to be considered, although in most cases PEP will not be justified.

**PEP for HIV** currently consists of a 28-day course of treatment with a triple combination of antiretroviral drugs, has significant side-effects and needs careful follow-up.

**Hepatitis B immunoglobulin** should be given within 72 hours if the source is known to be HBeAg positive or their status is unknown and the exposed person has negative serology. HBV vaccination should be offered to all health workers who have never been immunized or are non-immune.

The exposed person should also be advised to have safe sex for three months, not to donate blood until all necessary screening tests are clear, and to see their GP if they develop a fever.

## Investigations

- Take blood for virology, (HIV, hepatitis B, hepatitis C) from the injured worker.
- Start PEP where appropriate and consider the need for antibiotic therapy or hepatitis B immunisation. Recheck HIV status 3 months later and hepatitis serology 3 and 6 months later.
- Liver function tests should be performed and repeated at 3 and 6 months.
- Female workers should have a B-hCG check to exclude pregnancy.

## Documentation

Maintain needle stick/sharps injury record, with details of PEP and other follow-up procedures to help in auditing such events, and also to see how to prevent such injuries in the future.

## Follow-up

Ensure there is adequate follow-up of both healthcare provider and donor. They may need specific advice about having to take sick leave if medication is required and the possible requirement for psychological support.

## Monitoring Tools for Laboratory

Performance Standard	Verification Criteria	Y, N	Comments
<b>1. Access is restricted</b>	Verify that Access restricted to only authorized personnel		
<b>2. Laboratory is clean</b>	Verify absence of dust, cobwebs, blood, trash, used needles and syringes in the following areas		
	• Reception/Phlebotomy		
	• Specimen processing area		
	• Toilet areas		
	• Around sinks		
	• Waiting area		
	• No structural defects in floors		
	• Benches, furniture and fittings in good conditions		
	• Bench surfaces resistant to solvents and corrosive chemicals		
• Measures taken to prevent entry and harborage of rodents and arthropods			
<b>3. Hand hygiene is maintained</b>	Verify:		
	• Hand washing sink with running water is present		
	• Germicidal Soap is available		
	• Hand rub is available		

	Foot or elbow operated faucets are available		
	Adequate and washing stations are available for staff collecting samples and staff working inside lab areas		
<b>4. Availability of water</b>	Adequate water supply for medical and drinking purposes		
<b>5. Containers for Sharps</b>	Verify whether:		
	<ul style="list-style-type: none"> <li>The sharps containers are puncture-proof (cardboard box, hard plastic containers or cans that are closed) with only small opening for disposing of syringes with needle</li> <li>Containers have proper labels-signage of bio hazard</li> </ul>		
	<ul style="list-style-type: none"> <li>Sharp containers are less than <math>\frac{3}{4}</math> full</li> </ul>		
	<ul style="list-style-type: none"> <li>Empty and new containers are nearby and ready for use</li> </ul>		
<b>6. Personal protective equipment</b>	Verify whether the following are available and ready for use and properly labelled:		
	<ul style="list-style-type: none"> <li>Appropriate gloves</li> </ul>		
	<ul style="list-style-type: none"> <li>Aprons</li> </ul>		
	<ul style="list-style-type: none"> <li>Close-toed shoes</li> </ul>		
	<ul style="list-style-type: none"> <li>Eye wear</li> </ul>		
	<ul style="list-style-type: none"> <li>Heavy gloves for cleaning instruments and glass ware</li> </ul>		
	<ul style="list-style-type: none"> <li>Protective clothing is of approved design and fabric</li> </ul>		
	<ul style="list-style-type: none"> <li>Emergency showers are present</li> <li>Eyewash stations are present</li> </ul>		



<b>7. Clean supplies</b>	Verify whether:		
	• Gauze and cotton is stored in dry containers		
	• Instruments and other items are stored in dry sterile containers		
	• Pick-up forceps are stored in dry containers		
<b>8. Antiseptics and Disinfectants</b>	Verify whether the following are available:		
	<b>Antiseptics:</b>		
	• Alcohol (spirit), ethyl or isopropyl alcohol		
	• Cyclohexidine (Dettol) Chlorhexidine gluconate (2-4%) (e.g. Salvon) or		
	<b>Disinfectant:</b>		
	• Chlorine sol/powder (Bleach)		
<b>9. Shelf-life System</b>	Verify whether		
	• Sterile packs and/or containers have expiration dates on them		
	• The sterile packs are free of teams. Dampness, dust and grease or oil		
	Samples are not stored above the designated time for testing.		
<b>10. Waste Collection</b>	Verify whether the person collecting waste complies with the following steps:		
	• Wears:		
	○ Utility gloves		
	○ Eye protection		

	<ul style="list-style-type: none"> <li>○ Gumboots or enclosed shoes</li> </ul>		
	<ul style="list-style-type: none"> <li>● Collects waste in leak proof containers</li> </ul>		
	<ul style="list-style-type: none"> <li>● Collects waste the container is <math>\frac{3}{4}</math> full</li> </ul>		
	<ul style="list-style-type: none"> <li>● Assures all tissue samples or placentas are double bagged in leak-proof containers</li> </ul>		
	<ul style="list-style-type: none"> <li>● Sufficient dustbins outside the facility (in the grounds) exist for general waste to avoid littering</li> </ul>		
	<ul style="list-style-type: none"> <li>● The grounds (outside of the facility) are free of hospital waste</li> </ul>		
	<ul style="list-style-type: none"> <li>● Maintains waste collection area clean and free of spills (walls, tables, floors)</li> </ul>		
	<ul style="list-style-type: none"> <li>● Collection person washes hands with soap and water after removing gloves and other personal protective equipment</li> </ul>		
<b>11. Waste Disposal</b>	Verify whether:		
	<ul style="list-style-type: none"> <li>● Contaminated liquid waste (blood, urine, faeces and other body fluids) are disposed of in the following manner:</li> </ul>		
	<ul style="list-style-type: none"> <li>○ Emptied into a toilet or sink (having 5% bleach to decontaminate) from which water can be drained into a sewer system after 30 minutes</li> </ul>		
	<ul style="list-style-type: none"> <li>○ The sink is rinsed with water after the waste has been emptied</li> </ul>		
	<ul style="list-style-type: none"> <li>● Containers with sharps are incinerated</li> </ul>		
	<ul style="list-style-type: none"> <li>● Solid waste (used dressings and other materials contaminated with blood and organic matter) are incinerated/buried</li> </ul>		

	<ul style="list-style-type: none"> <li>The person in charge of waste wears eye protection and utility gloves</li> </ul>		
	<ul style="list-style-type: none"> <li>Decontamination through auto-claving preferred, wherever needed</li> </ul>		
	<ul style="list-style-type: none"> <li>Decontamination using Chlorine of appropriate strength as the second preferred method being used wherever needed.</li> </ul>		
	<ul style="list-style-type: none"> <li>Anatomic waste is properly collected, covered and labelled for collection</li> </ul>		
	<ul style="list-style-type: none"> <li>Anatomic waste containers are readily removed when 3/4<sup>th</sup> full</li> </ul>		
	<ul style="list-style-type: none"> <li>Pathologic waste consisting of tissues is collected for burial</li> </ul>		
	<ul style="list-style-type: none"> <li>Pathologic waste consisting of cotton, gauze, bandages are collected for incineration separately, especially from Phlebotomy areas</li> </ul>		
	<ul style="list-style-type: none"> <li>General waste is collected and stored entirely separately to avoid mixing with any kind of infectious waste, especially from Phlebotomy areas</li> </ul>		
	<ul style="list-style-type: none"> <li>Sharps are collected observing PPE</li> </ul>		
	<ul style="list-style-type: none"> <li>Sharps containers are not on the floor</li> </ul>		
	<ul style="list-style-type: none"> <li>Sharps containers are collected as per routine defined</li> </ul>		
	<ul style="list-style-type: none"> <li>Routine for collection of waste is clearly displayed</li> </ul>		
	<ul style="list-style-type: none"> <li>Routine is monitored for collection and removal, with times each day</li> </ul>		
	<ul style="list-style-type: none"> <li>Staff is educated on the dangers and importance of</li> </ul>		

	segregation of wastes		
	<ul style="list-style-type: none"> <li>Containers are decontaminated as per guidelines</li> </ul>		
	<ul style="list-style-type: none"> <li>Hand hygiene is observed after handling of containers, bags, or waste in any form</li> </ul>		
	<ul style="list-style-type: none"> <li>Glass waste (not broken glass) is decontaminated and sent for recycling</li> </ul>		
	<ul style="list-style-type: none"> <li>Containers are not reused.</li> </ul>		
	<ul style="list-style-type: none"> <li>Plastic waste is decontaminated before sending for recycling</li> </ul>		
<b>Standard precautions for laboratories</b>	<b>Collection, labeling and transport of specimens</b>		
	<ul style="list-style-type: none"> <li>Gloves worn for all procedures.</li> </ul>		
	<ul style="list-style-type: none"> <li>Blood collected from patients by trained staff.</li> </ul>		
	<ul style="list-style-type: none"> <li>Tubes be placed in adequate containers for transport to the laboratory within the laboratory facility</li> </ul>		
	<ul style="list-style-type: none"> <li>Request forms should be placed in separate waterproof bags or envelopes.</li> </ul>		
	<ul style="list-style-type: none"> <li>Reception staff does <b>not</b> open bags.</li> </ul>		
	<b>Opening specimen tubes and sampling contents</b>		
	<ul style="list-style-type: none"> <li>Specimen tubes should opened in a biological safety cabinet.</li> </ul>		
	<ul style="list-style-type: none"> <li>Gloves worn. Eye and mucous membrane protection is observed (goggles or face shields).</li> </ul>		
<ul style="list-style-type: none"> <li>Protective clothing supplemented with a plastic apron.</li> </ul>			

	<ul style="list-style-type: none"> <li>▪ Stopper grasped through a piece of paper or gauze to prevent splashing.</li> </ul>		
	<ul style="list-style-type: none"> <li>▪</li> </ul>		
	<p><b>Glass and “sharps”</b></p> <ul style="list-style-type: none"> <li>▪ Plastics replaced with laboratory grade (borosilicate) glass</li> <li>▪ No chipped or cracked articles observed.</li> <li>▪ Hypodermic needles not being as pipettes.</li> </ul> <p><b>Films and smears for microscopy</b></p> <ul style="list-style-type: none"> <li>▪ Blood, sputum and faecal samples for microscopy are handled with forceps</li> <li>▪ Samples stored appropriately</li> <li>▪ Samples decontaminated and/or autoclaved before disposal.</li> </ul> <p><b>Automated equipment (sonicators, vortex mixers)</b></p> <ul style="list-style-type: none"> <li>▪ Equipment is of the closed type.</li> <li>▪ Effluents collected in closed vessels for further autoclaving and/or disposal.</li> <li>▪ Equipment disinfected at the end of each session, following manufacturers’ instructions.</li> </ul>		
	<p><b>Tissues</b></p> <ul style="list-style-type: none"> <li>▪ Formalin fixatives used.</li> <li>▪ Frozen sectioning avoided.</li> <li>▪ Cryostat shielded</li> </ul>		

	<ul style="list-style-type: none"> <li>▪ Operator wears a safety face shield.</li> <li>▪ Decontamination with temperature of the instrument raised to at least 20C.</li> </ul>		
	<p><b>Decontamination</b></p> <ul style="list-style-type: none"> <li>▪ Hypochlorites and high-level disinfectants are recommended for decontamination. Freshly prepared hypochlorite solutions should contain available chlorine at 1 g/l for general use and 5 g/l for blood spillages. Glutaraldehyde may be used for decontaminating surfaces.</li> </ul>		