

Infection Prevention & Waste Management for Merrygold Health Network

Participant's Manual
2008



Uttar Pradesh Social Franchising Project

A project supported by USAID & SIFPSA. Implemented by HLFPPT



Preface

HLFPPT is an organization committed to work with various partners pioneering innovations for bettering health outcomes for the poor. Merrygold Health Network is one of such innovations in the field of Social Franchising.

Merrygold Health Network, aims towards achieving an objective of improving Maternal and Child Health through increased access to low cost – high quality healthcare services, for rural and urban working poor in Uttar Pradesh. In U.P. Social Franchising Project (supported by USAID and SIFPSA), HLPPT as an implementing agency, will be establishing 70 fully franchised Merrygold Hospitals at district level, 700 partially franchised Merrysilver Clinics at block level and will be working with more than 10,000 Tarang partners (ASHAs, Chemists, Fare price shop owners, Tarang health committee members, Opinion leaders, Anganwadi workers, Depot holders) and AYUSH practitioners at the village level by 2010. Two model hospitals are already established in Kanpur and Agra focusing on maternal and child health care.

Infection Prevention and Waste Management is a critical issue in every health care setting. To address this concern and improve the quality of service delivery, it was conceptualized that entire health care staff needs to be equipped with appropriate knowledge and skill.

This training manual on “*Infection Prevention and Waste Management in Merrygold Health Network - 2008*” is designed to meet the above objectives. It has been pre-tested with Merrygold L0 hospital staff at Kanpur and Agra. The inputs and feedbacks from the hospital staff and comments of review committee members from SIFPSA and ITAP, has given this manual the present shape.

I am sure that this manual, when used by hospitals and clinics in the Social Franchising Project will as an enabling tool towards excellent service delivery.

HLFPPT

Acknowledgement

Infection Prevention and Waste Management is a crucial challenge faced by every health care setting. I present this manual on “*Infection Prevention and Waste Management in Merrygold Health Network – 2008*”, as the first step towards sensitizing the health care professionals and support staff, about this aspect of health care service delivery. This manual is the result of sincere intent, aspirations and hard work of all those who are an integral part of the network.

I am grateful to Mr. G. Manoj, (CEO, HLPPT) who has shown faith in my entire team to undertake the task of preparing this manual.

My sincere thanks to Mr. Rajeev Kapoor I.A.S. (Executive Director - SIFPSA & Mission Director - NRHM), Mr. S. Krishnaswamy (General Manager Private Sector - SIFPSA), Dr. M. K. Sinha (General Manager Public Sector – SIFPSA), Ms. Savita Chauhan (Dy. General Manager Private Sector - SIFPSA), Dr. Lovleen Johari (Senior Reproductive Health Advisor, USAID) and Ms. Shuvi Sharma (Manager - Social Marketing & Franchising, ITAP) for their support and encouragement for developing this manual.

I thank Ms. Shobhana Tewari from HLPPT, for developing and designing this manual. My sincere thanks to Dr. Jyoti Vajpayee (Country Director, Engenderhealth) and her team, for their support and guidance in the development of this manual. I also thank Ms. Divya Babbar for providing secretarial assistance.

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This manual has been pre tested by UPSF training team at both the LO hospitals at Kanpur and Agra. Efforts made by Mr. Alok Tabelabux, Mr. B. K. Mishra from HLPPT in organizing the trainings and involvement of entire Merrygold hospital staff in trainings, was commendable.

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About the Manual

With the emergence of various new diseases, in past few decades, Infection Prevention and Waste Management has become important in health care settings. Although we do not often think about it but, health care facilities are potential settings for transmission of diseases.

This manual “*Infection Prevention and Waste Management in Merrygold Health Network*” contains two modules describing the ways to control infection in hospital settings and to manage different type of waste material generated in a hospital. If used correctly, this manual will serve as a reference guide for Merrygold Health Network.

MODULE 1

Infection Prevention

- Unit 1.1 Importance and Purpose of Infection Prevention
- Unit 1.2 Standard Universal Precautions
- Unit 1.3 Antiseptics and Disinfectants
- Unit 1.4 Surgical Hand Scrub and Attire
- Unit 1.5 Reducing Risk of Infection during Clinical Procedure
- Unit 1.6 Processing Instruments and Other Reusable Items
- Unit 1.7 Decontamination and Cleaning
- Unit 1.8 Sterilization, HLD (High Level Disinfection) and Storage
- Unit 1.9 Infection Prevention in Housekeeping

About this Module -

This module focuses upon the importance and the purpose of infection prevention. It also discusses the standard precautions to be maintained while working in health care settings.

Unit 1.1 Importance and Purpose of Infection Prevention

Learning Objectives:

- To appreciate the importance and purpose of Infection Prevention and Waste Management in hospitals.

Many of the health care settings have poor infection control and fewer infection control programs, giving rise to transmission of infections in settings. Infection Prevention practices are important to -

- Provide high quality, safe services to clients
- Prevent post procedure infections in clients
- Prevent infections in service providers and staff
- Lower the cost of health care facilities
- Protect the community from the infections which may occur from health care facilities.

- ❖ Every one who is present at a health care facility is potentially at the risk of getting infections.
- ❖ Not only the doctors and nurses, who have direct contact with clients, but those who wash instrument, clean, mop and dispose waste are also at the equal risk.
- ❖ Infection Prevention is everyone's need and responsibility.

Infection transmission can occur between clients, staff and the community by –

Client to Health Care Worker – Such transmission can occur through exposure to infected blood and other body fluid:

- When a healthcare worker's skin is pierced or cut by contaminated needles or sharp instruments.
- When splashed on mucous membrane (like eyes, nose or mouth) of the health care worker.
- Through broken skin due to cuts, scratches, rashes, acne, fungal infections etc.

Client to Client – Client to client transmission occurs via indirect routes such as when healthcare workers do not wash their hands after some procedure with one Client and

carry infection from one client to another. Example: By using infected instruments, linen on clients etc.

Health Care Worker to Client – Transmission of blood borne infections such as human immunodeficiency virus (HIV) and Hepatitis virus from health care worker to client is extremely rare especially when appropriate infection prevention practices are followed.

Unit 1.2 Standard Universal Precautions

Learning Objectives:

- Know about the Standard Universal Precautions to be followed in health care settings.

1.2.1 Standard Universal Precautions for Client Care

1. Washing hands
2. Wearing gloves and other attires/protective barriers
3. Correctly processing the instruments and client care equipments.
4. Maintaining environmental cleanliness
5. Proper waste disposal practices.
6. Preventing injuries with sharps.

1.2.2 Hand Washing

Hand washing is the **simplest** and the **most cost effective** way of preventing the transmission of infection and thus reducing the incidence of health-care associated infections. Hand washing is necessary before and after doing any procedure or in between the contacts of two clients.

Hand washing could be of two types:

- Hand washing before general procedures which is called Routine Hand Washing.
- Hand scrubbing before surgical procedure. The surgical hand scrubbing has been described in the section ‘Surgical Handscrub and Attire’.

Routine Hand Washing is indicated:

- Immediately after arriving at work
- Before examining a client
- After examining a client
- Before putting on gloves for clinical/ surgical procedures
- After removing gloves (hands can become contaminated if gloves contain invisible holes or tears)

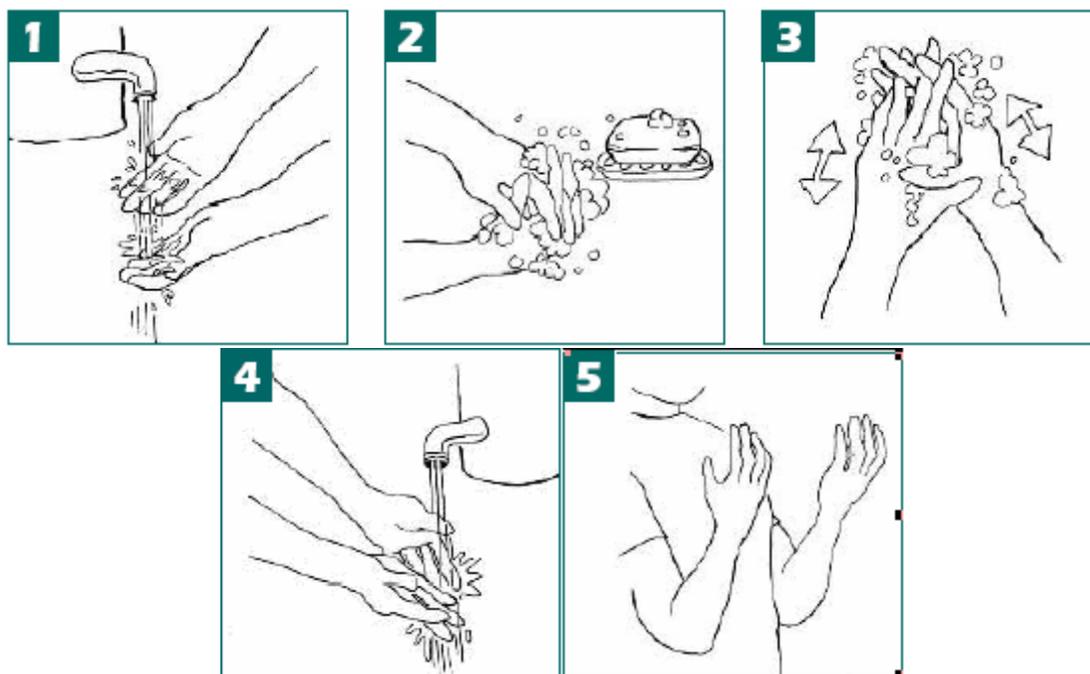
- After using toilet or latrine
- Before leaving work at the end of the day.

Preparation: Water, soap, nail brush, Towel.

Process: Routine Hand Washing

1. Remove wrist watch, jewellery and make sure nails are clipped short; then wet hands and wrist with running water. Do not wash hands in stagnant water.
2. Apply soap (or any other lather forming detergent) and rub hands together to make lather. Rinse soap and replace it back to soap dish.
3. Rub the palm, back of the hand, finger webs, finger tips and nail beds, knuckles, thumb and wrist for at least 15 -30 seconds.
4. Rinse the lather completely in the stream of running water.
5. Dry hands in air.

Fig 1: Routine Hand Washing



- ❖ Rinsing hands in a bowl of antiseptic is not a substitute for hand washing.
- ❖ If bar soap is used, it should be kept in a self drying soap dish as the water collected around the soap might give rise to bacterial growth.
- ❖ Liquid soap solutions are better as it prevents chances of reuse and contamination.
- ❖ **Do not use common hand towel after hand washing and prefer air drying hands.**

Unit 1.3 Antiseptics and Disinfectants

This unit discusses about different types of antiseptics and disinfectants being used by hospitals and other health care settings.

Learning Objectives:

- Understand about various antiseptics and disinfectants.
- Protecting antiseptics and disinfectants from getting contaminated.

1.3.1 Definitions and Common Use

Antiseptic: A chemical agent used on skin and mucous membranes, to reduce the number of microorganisms, with out causing any irritation or damage to skin. Antiseptics are not meant to be used on inanimate/ non-living objects such as instrument, surfaces etc. The common examples of antiseptics are – Savlon ®, Dettol ®, Betadine ®, Alcohol etc.

Antiseptic solutions should **never** be used for non-living objects because it does not have the same killing power as disinfectant.

Disinfectant: A chemical agent used to kill microorganisms on inanimate/ non-living objects like instruments, floor, slabs, sheets etc. The common examples of disinfectants are Lysol, Phenyl etc.

Disinfectants are of two types:

- a. High level disinfectants (HLD)** – High level disinfectant kills bacteria, viruses and fungi and few bacterial endospores. High-level disinfectants are used to process instruments, gloves or any other material which come in contact with broken skin/ mucous membrane. e.g. chlorine solution, gluteraldehyde
- b. Low level disinfectants** – Low level disinfectants may be used for cleaning of surfaces however high level disinfectants are preferred and should not be used for processing any instrument. e.g lysol, phenyl

1.3.2 Protecting Antiseptics and Disinfectants from Contamination

Although antiseptics and disinfectants are used for killing microorganisms, they can easily get infected if proper care is not taken. Antiseptics and disinfectants can become infected when –

- The water used for it's dilution is contaminated.
- Containers, in which the solution is placed is contaminated.
- The area where solution is prepared is not clean.

- Container of antiseptic or disinfectant is left open for long.
- Microorganism, from provider's skin or instruments, comes in contact with the solution.

To prevent contamination –

- Use only boiled water to prepare the diluted solution of antiseptic.
- Pour solution into small containers for being used during service delivery, to avoid contamination of the whole stock.
- Pour small quantity of antiseptic needed for one client into a small bowl prior to the procedure. Discard any remaining amount at the end of procedure.
- Do not pour back any remaining antiseptic solution in the whole stock.
- Avoid storing gauze, cotton wool or cotton balls in antiseptic solutions. This increases the likelihood of the solution becoming infected.
- Always pour solutions out of the container without touching the rim, or the solution itself from hands, a cotton swab, gauze etc. Never wipe the rim of the solution bottle after pouring.
- Store antiseptics and disinfectants in a cool, dark area and not in excessive light or heat as this reduces their strength.
- Cap the bottles tightly.

1.3.3 Antiseptics

- **Alcohol (Spirit)** – has a drying effect, cannot be used on broken skin or mucous membrane.
- **Chlorhexidine gluconate with cetrimide (Savlon)** – recommended for surgical hand scrubbing and client preparation. Savlon products containing at least 4% Chlorhexidine are appropriate for use as antiseptic.
- **Aqueous iodine preparations (tincture of iodine)** – avoid using directly on skin as it is too irritating on skin or mucous membrane. E.g. tincture of iodine
- **Iodophores (Betadine)** – recommended antiseptic for surgical Handwashing and part preparation of client in surgical procedures. E.g. Povidone iodine, (Betadine).
- **Para-chloro-meta-xyleneol (Dettol)** – less effective than Chlorhexidine and Iodophors; not recommended for surgical use.

1.3.4 Disinfectants

- **Chlorine Solution** – Cheapest effective disinfectant, fast acting and available in liquid, powder and tablet forms. Should be changed daily / after 24 hours. Causes irritation to skin, eyes, and respiratory tract.
- **Glutaraldehyde (Cidex)** – Used mostly in processing the medical equipments which can not be heat sterilized like laparoscope. 10 hours of immersing in Cidex leads to sterilization of equipment. It is an irritant to eye, skin and respiratory tract.

- **Formaldehyde (8%)** – Routine use of formaldehyde for processing instrument or for disinfecting of environmental surface is not recommended. It is also highly irritating to eye, skin and respiratory tract.

Unit 1.4 Surgical Hand Scrub and Attire

This unit in detail deals with the technique of hand scrubbing and use of surgical attire and how to prevent it from getting unsterile while working in a hospital setting.

Learning Objectives:

- Understand and practice the accurate technique of surgical hand washing and donning or removal of gloves.
- Learn to maintain sterility of the attire.

1.4.1 Surgical Hand Scrubbing

The aim of surgical hand scrubbing with antiseptic agent is to minimize the number of microorganisms, on hands under the gloves. This reduces the risk of infection to client, if gloves develop small hole, tears or nicks during the procedure.

1. Remove all jewellery on hands and wrists.
2. Hold the hands above the waist level and wet hands in warm water.
3. Clean under each finger nail with brush or stick and make sure the nails are short.
4. Apply sufficient soap or antiseptic, use firm, circular motions to wash hands and arms up to the wrists, covering all areas including palms, back of the hands, fingers, between fingers and lateral side of thumb, knuckles, and wrists for at least 3 - 5 minutes by watch. Nail brush must be used to clean the nail buds.
5. Rinse both hands one by one and keep the hands above the waist level.
6. Air dry the hands keeping them above waist level.
7. Do not touch anything except the gloves after washing hands for surgical procedure.

- | |
|---|
| <ul style="list-style-type: none">❖ The tap should be close using elbow and hands should be kept upright in the air and the water should not drip down to fingers after washing hands.❖ Always air-dry the hands or use a sterile towel. |
|---|

Fig 2: Surgical Hand Washing

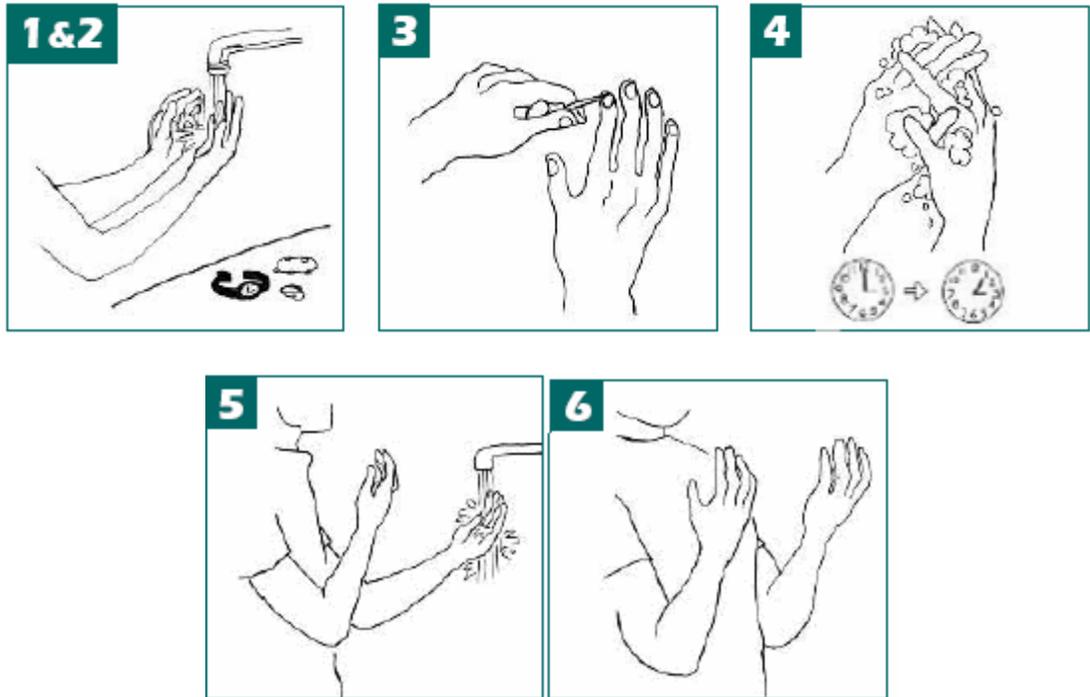
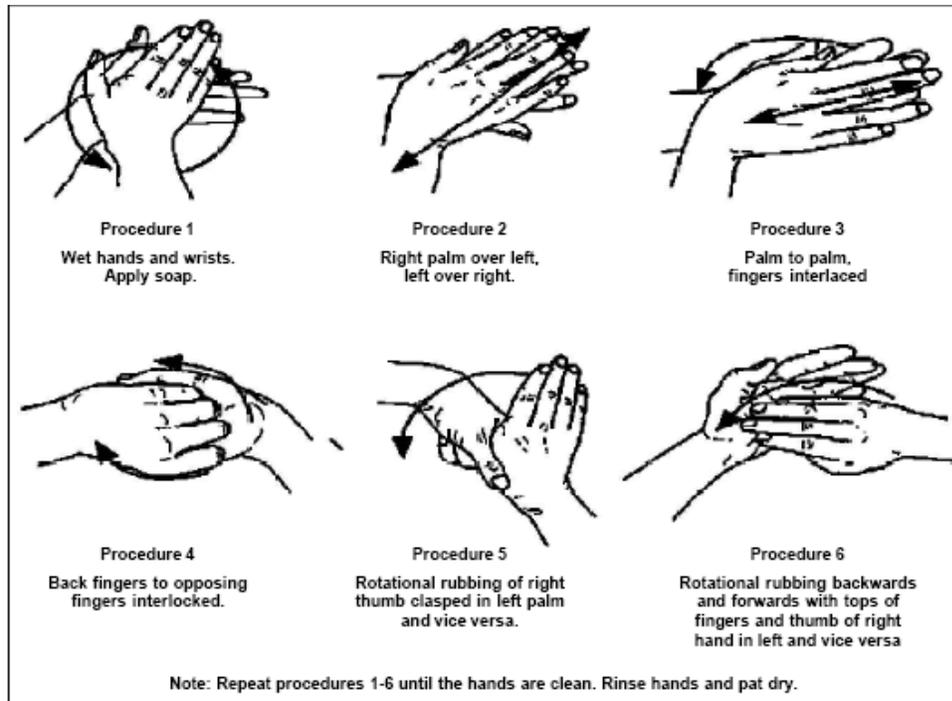


Fig 3: Different Motions to be executed for Surgical Hand Washing



1.4.2 Antiseptic Hand Scrubbing Agents

As described above, antiseptics are chemical agents used on skin and mucous membranes to reduce the number of microorganisms without causing damage or irritation to skin. Few antiseptics are used for surgical hand scrub also. Most recommended antiseptics used for hand scrubbing are –

1. Clorhexinine gluconate with cetrimide (Savlon®)

- Antimicrobial spectrum: A good broad spectrum agent, but minimal effect on acid fast bacilli and fungi.
- Advantage: Has good persistent effect for at least 6 hours.
- Disadvantage: Activity can be reduced by hard water, hand creams and natural soaps.
- Comments: Recommended antiseptic for surgical hand scrubbing and client preparation.

2. Iodophors (Povidine iodine, Betadine®)

- Antimicrobial spectrum: A good broad spectrum activity.
- Advantage: Less irritating than iodine.
- Disadvantage: Activity moderately affected by blood or other organic material.
- Comments: Recommended antiseptic for surgical hand scrubbing and client preparation.

1.4.3 Wearing and Removing Sterile Gloves

Before going into the details of donning and removal of gloves, it is necessary to know the types of gloves. There are three types of gloves generally being used in hospital settings. These are –

Surgical gloves – Surgical gloves are used to protect the client as well as the care giver from any kind of infection and maintain asepsis. These are used while touching any sterile article or when coming in contact of blood or tissue under the skin (e.g. while per vaginal; examination, surgery, handling child birth, dressing etc.)

Examination gloves – These gloves are used for the purpose of protecting the care provider from contaminated fluid or mucous membrane. These can be thin plastic or rubber gloves but are disposed off after one use. Examination gloves are generally used, when coming in contact with intact mucous membrane like during vaginal examination etc.

Heavy duty household gloves – These gloves are used for cleaning purposes or for handling contaminated items waste etc. These gloves should always be decontaminated

with chlorine solution and washed with soap and water before being removed and should be dried in the shade.

Preparation for wearing sterile gloves: A pair of sterile gloves (appropriate size should be chosen), article needed for hand washing.

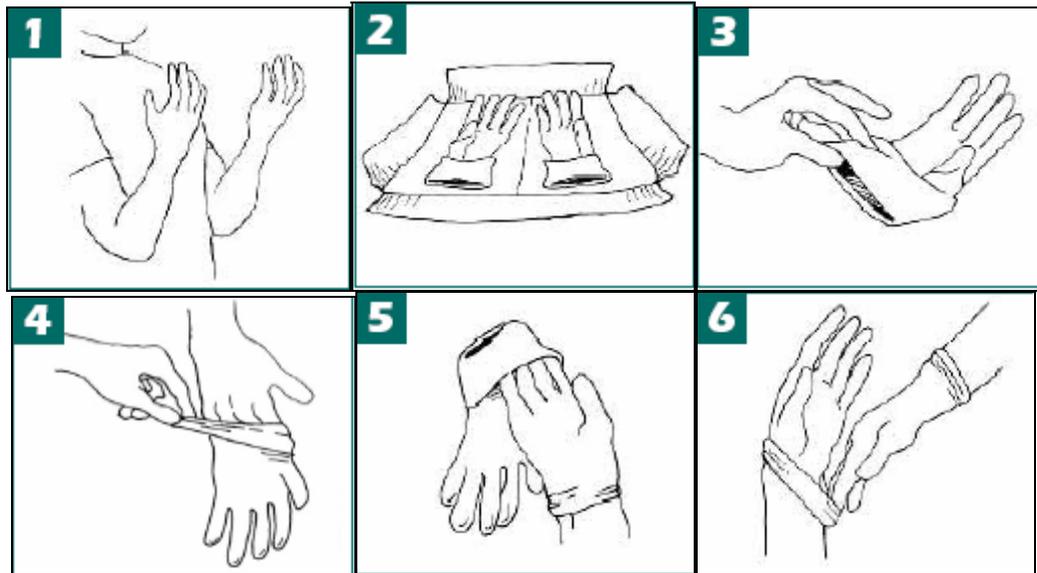
Process: General instructions

- Gloves protect staff from blood and body fluids, non-intact skin and mucous membranes as well as the clients from nosocomial infections.
- Gloves do not replace the need for hand cleansing with rubs or soap and water.
- Remove gloves after caring for a client. Do not use the same pair of gloves for more than one client.
- Change or remove gloves if moving from a contaminated body site to a clean site on the same client.

Wearing sterile gloves:

- Wash hands following the steps of surgical hand washing and dry completely.
- Ask someone to tear open the outside cover of gloves and make the inner pack visible without touching it. Remove the inner pack carefully without touching anything else.
- Place inner sterile glove pack on clean surface above the waist level.
- Carefully open the inner package and expose the sterile gloves with cuff end close to your body.
- With the thumb and forefinger of non-dominant hand, grasp the folded cuff of sterile glove for dominant hand.
- Hold the glove with its fingers down, carefully insert the dominant hand into the glove and pull the glove on, but leave the cuff folded. Be careful it does not touch any unsterile object.
- Holding thumb outward, slide fingers of gloved hand under cuff of the other glove and lift it upward.
- Carefully insert non-dominant hand into glove. Adjust gloves on both hands touching only sterile areas.

Fig 4: Wearing sterile gloves

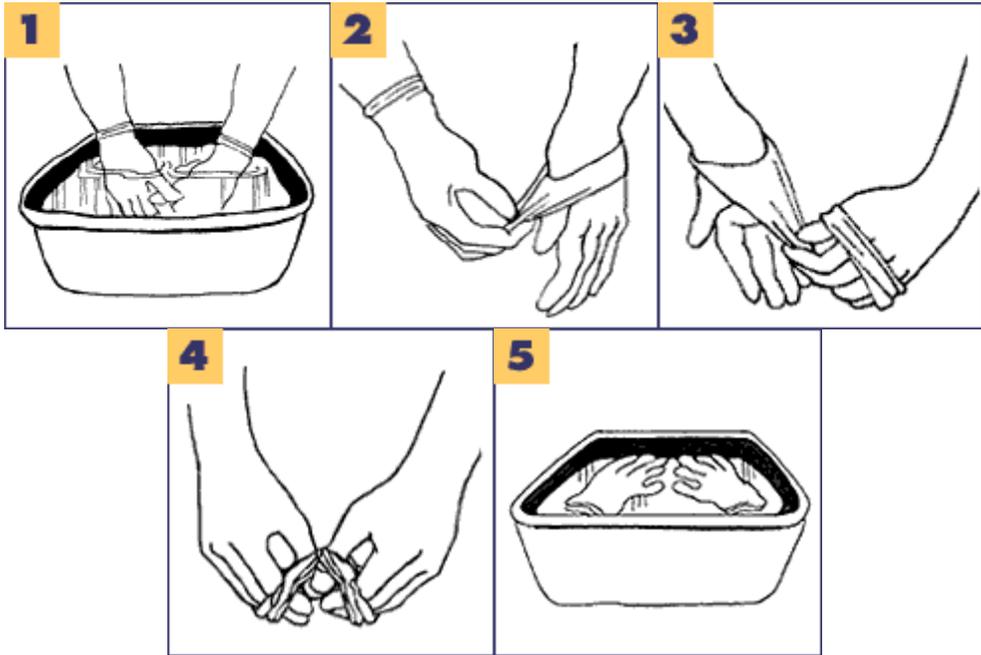


Removing gloves:

As the gloves are removed, the precautions should be taken that the skin should not come in contact of the outside surface of gloves. Also avoid pulling and snapping the gloves so as to prevent the splash of contaminants into eyes, mouth, and skin or on other people.

- Before removing gloves after use, rinse gloved hands in a basin of chlorine solution to remove blood or other body fluid.
- Grasp one of the gloves near the cuff and pull it partway off. The glove will turn inside out
- Leaving the first glove over fingers, grasp the second glove near the cuff and pull it part of the way off. The glove will turn inside out. It is important to keep the second glove partially on hand, to protect from touching the outside surface of the first glove with bare hands.
- Remove the two gloves at the same time, being careful to touch only the inside surfaces of the gloves with bare hands.
- If the gloves are disposable or are not intact, dispose of them properly.
- If they are to be processed for reuse, place them in a container of decontamination solution of 0.5% bleaching powder or hypochlorite solution for at least 10 minutes and clean with detergent solution and checked for holes before re-sterilizing.
- Wash hands immediately after gloves are removed, since gloves may contain tiny holes or tears that leave the person, at risk of exposure to contaminated blood and other fluids.

Fig 5: Removing Gloves



1.4.4 Surgical Attire

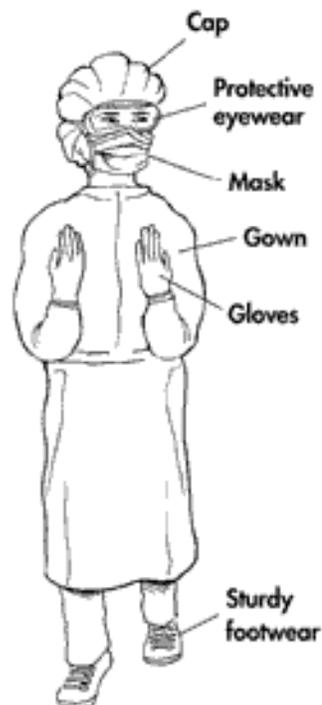
The human body is a major source of micro-organisms that can cause infections to the clients. Shedding of bacteria from hair, skin, as well as organisms expelled from nose and mouth during talking, sneezing breathing etc. can lead to severe post procedure infections.

Surgical attire includes caps, mask, goggles, water proof apron, gown, gloves, footwear/shoe covers etc. Just wearing the attire is not enough to completely protect the provider as well as client from infections; the technique of wearing surgical attire should be absolutely aseptic to maintain its effectiveness.

- ❖ Only clean, dry and intact attire will be an effective barrier against microorganisms.
- ❖ It is not necessary to sterilize the caps and masks, as they do not come in direct contact with the client.

All the precautions should be taken not to touch the outside of any sterile clothing while wearing it.

Fig 6: Complete Surgical Attire



Unit 1.5 Reducing Risk of Infection during Clinical Procedure

This unit talks about various techniques to maintain asepsis in hospital settings by maintaining sterile field, safe environment and safe disposal of infected article.

Learning Objectives:

- To maintain sterility or high level disinfection in desired areas and articles.
- Maintaining safe environment in surgical area.

1.5.1 Aseptic Technique

Aseptic technique refers to the practices performed during a clinical procedure that help to reduce the risk of post procedure infections in clients.

Aseptic techniques includes –

- Handwashing and surgical hand scrub
- Using barriers
- Preparing a client for clinical procedure
- Maintaining a sterile/ high-level disinfected field
- Performing safe operative technique
- Maintaining a safe environment in the surgical/ procedure area.

Handwashing and surgical hand scrub

The details of Handwashing and scrubbing have been described in the earlier sections.

Using barriers

Appropriate use of barrier helps reducing risk of infections to client as well as health care provider. The details of barrier techniques are covered in earlier sections.

Preparing a client for clinical procedure

Client preparation is done to reduce the number of microorganisms from client's skin, vagina or cervix by using an antiseptic solution.

Shaving the surgical / procedure site is no longer recommended, since shaving causes small nicks and breaks in the skin and then these might become ideal places for bacterial growth. Hair around the surgical/ procedure site may be clipped very short. If shaving has to be done, use antimicrobial soap and water or shave dry. Shaving should be done immediately before the procedure to reduce the risk of infection.

For part preparation, use sterile cotton balls or pieces of gauze held by a sterile sponge forceps, wipe the procedure site in circular motion, moving outward from the center, with any of the following antiseptics –

- 1 – 3 % iodine, followed by 60 – 90 % alcohol; allow to air dry.
- An iodophor (e.g. Betadine); wait for two minutes, then wipe off the excess with dry cotton or gauze
- 60 – 90% alcohol (ethyl or isopropyl); allow to air-dry.
- 4% Chlorhexidine; wipe off the excess amount with sterile gauze.

- ❖ Cotton balls, gauze or cotton layer should never be left soaked in an antiseptic solution, since repeated dipping of the forceps into the container, to pick up the gauze or cotton will contaminate the solution and remaining cotton / gauze.
- ❖ Avoid contaminating the stock antiseptic and always pour the required solution in a bowl.
- ❖ Throw off the remaining solution from the bowl after procedure.
- ❖ Never dip cotton/gauze directly into the stock solution.

1.5.2 Maintaining a Sterile/ High-Level Disinfected field

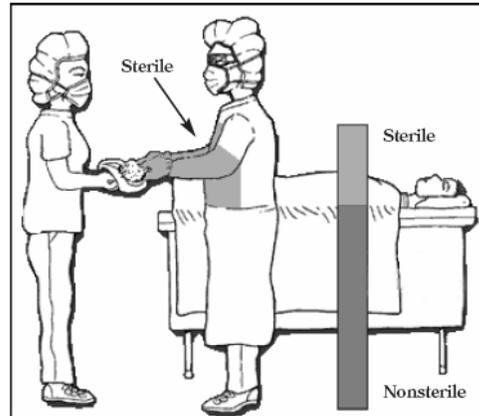
Before working in any sterile area, it is necessary to be thorough with the principles of asepsis and the way any sterile supply is handled. A few principles of surgical asepsis are

Principles of Surgical Asepsis:

- All objects used in the sterile field must be sterile.
- Sterile objects, when touched by non-sterile objects are no longer sterile.
- Sterile objects can become non-sterile by prolonged exposure to air.
- Sterile objects that are out of vision or below waist level are not sterile.
- Always face the sterile field. Do not turn your back or side on a sterile field.
- Do not speak, cough or sneeze over a sterile field. If it is necessary to do so, turn your head away from the sterile field.
- Do not reach over the sterile field.
- Only scrubbed persons function within a sterile field.
- The edges of a sterile field are considered non-sterile (1” surrounding).
- The skin cannot be sterilized & is non-sterile.
- Keep the sterile field dry and avoid sweeping and dusting if sterile articles are opened.
- Each sterile supply should be clearly labeled as to its contents, time and date of sterilization.
- Never assume that an object is sterile unless expiration date is checked.
- Prevent excessive air currents around the sterile areas.
- All surgical team members must wear scrub-attire, sterile surgical gown, mask, cap and gloves within the sterile field to establish bacterial barriers.
- Be conscious of where your body is at all times and while moving within or around the sterile areas maintain sterility status.

- ❖ Surgical gowns are considered sterile in front, from the chest to the level of sterile field and sleeves are sterile from two inches above the elbow to the cuff.
- ❖ The necklines, shoulders, under the arm and back are unsterile areas in a gown.
- ❖ When in doubt about the sterility of any item, area, cloth; consider it unsterile

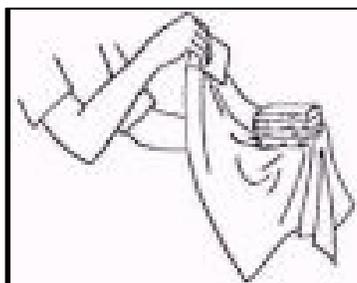
Fig 7: Sterile and Unsterile areas.



Opening sterile wrapped articles/supply over a sterile area:

- Place the article or supply, in center of work area.
- Hold the wrapped supply in such a way, that the first flap of the wrapper opens away from you.
- Reaching around (not over it!), pinch 1st flap on outside of wrapper and open it.
- Repeat the same for side flaps.
- Pull the 4th flap toward you grasping the turned down corner.
- Establish sterile field using a drape- pluck the back of the drape & allow it to open freely without touching anything.
- Use sterile forceps to handle sterile supplies.
- If the sterile areas already exist, other sterile contents can be added in that area by opening sterile packages and dropping contents on sterile field without contaminating sterile field.

Fig 8: Opening Sterile Wrapped Articles



Handling sterile Chettle's Forceps:

- Always hold the forceps pointing downwards.
- When removing the forceps from its container, lift it carefully without touching the sides and rim of the container.
- **NEVER FILL THE CONTAINER WITH ANTESEPTIC SOLUTION AND COTTON LINING.**
- Sterilize the container and forceps daily and store it dry

Adding solution to a sterile bowl:

- Before pouring any liquid, read label 3 times to ensure correct solution & concentration.
- Open the lid of bottle.
- If previously opened, check date/time, contents are generally good for 24 hours.
- Pour solution gently to prevent splashing.

Removing sterile articles from sterile container:

- Do not keep open the lid of sterile container for long
- Do not touch the inner surface of the lid or container, if this happens, the container should be considered as unsterile.
- Do not replace back the items

1.5.3 Maintaining a Safe Environment in the Surgical/ Procedure area

Specific rooms should be designated for performing clinical procedures and surgery like OT for surgeries, Labour room for deliveries and an examination room for examinations.

- Close the surgical/procedure area to minimize dust, insects etc.
- Limit the entry of unauthorized individuals.
- Ensure all persons enter the area, after changing their clothes, wearing gowns, mask, cap, shoe cover etc.
- Disinfect and clean examination and surgery tables, counters, instrument trolleys, light handles and any other surfaces with 0.5% chlorine solution that may have been contaminated with blood or other body fluid during the procedure before any new client is brought in.

1.5.4 Use and Disposal of Needles and Other Sharps

The number one cause of occupational exposure to blood borne pathogens is, by injury from needles, blades or other sharp objects. All staff that comes in contact with sharps – the doctors, nurses, ayahs, sweepers and ones who dispose off the waste – is at risk of infection.

To Prevent Injuries due to Sharps:

- Use extreme care while handling sharps.
- Handle needles, syringes, blades and other sharps minimally after use.
- Dispose off sharps in puncture resistant containers immediately after use.
- Always wear thick utility gloves while washing or disposing sharp objects.
- Do not bend or break the needles before destroying. Do not detach or recap. Most preferred way of destroying used needles is, use of a needle destroyer which burns the tip of the needle.
- If needle destroyer is not available or is non-functioning, collect the used needles and other sharps in a puncture proof cardboard and burn or bury the box in deep pit.

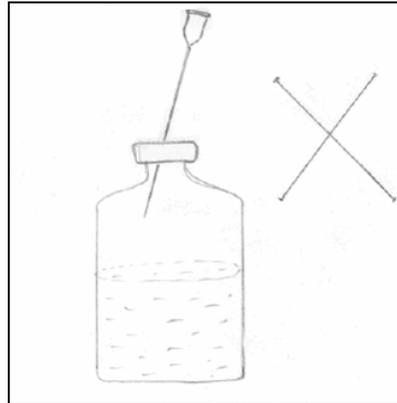
Fig 9: Needle destroyer and syringe cutter



Use of Multidose Vial:

- Always use new needle and syringe every time an injection is given or medication is withdrawn from a multidose vial.
- Never change the needle without also changing the syringe, between the clients. Reusing the same syringe to give injection to multiple people – even if the needle is changed – is not a safe practice.
- Never leave one needle inserted in the vial cap for multiple uses; this provides a direct route for microorganisms to enter the vial and contaminates the medicine.
- Always wipe the top of the vial, with fresh cotton swab with 60 - 90 % alcohol and allow drying before inserting needle to withdraw medicine.

Fig 10: Incorrect way of using Multidose Vial



Management of Injuries from Needles and Other Sharps

All the staff, which is at risk of exposure to blood or other blood fluids should get vaccination against Hepatitis B but this does not reduce the importance or not an alternative to standard precautions

If accidental exposure to blood or other body fluids occurs;

- Wash thoroughly the part where needle sticks and cuts with soap and water.
- Flush splashes to the nose, mouth or skin with water.
- Irrigate splashes to the eyes with water or saline.

Post Exposure Prophylaxis

Post exposure prophylaxis with drugs or other therapy can reduce the risk of transmission of blood borne pathogens. Therapy includes:

For Hepatitis B – Hepatitis B immunoglobulin and Hepatitis B vaccine can reduce the risk of infection after exposure to blood or other body fluids containing hepatitis B virus.

For Human immunodeficiency virus (HIV) – If exposure occurs, a physician should be consulted immediately and antiretroviral drugs, either alone or in combination can be started to reduce the risk of Human Immunodeficiency Virus (HIV) transmission. Follow post exposure prophylaxis as per National Aids Control Organization (NACO) guidelines.

Unit 1.6 Processing Instruments and Other Reusable Items

This unit discusses the steps of processing articles, equipments and instruments, after surgical use.

Learning Objectives:

- Understand the steps of processing an equipment / instrument/article after being used for a client.

Processing instruments and other articles after use is really necessary to protect clients as well as health workers from infections. It involves various steps which are –

1. **Decontamination** – It is a very first step in processing instruments and other articles for reuse. Decontamination kills the microorganisms, making the items safer to handle by staffs, who will clean them. In addition, it prevents the blood, other body fluids and tissues particles, from drying on the instrument.
2. **Cleaning** – After decontamination and before sterilizing the items, scrubbing with detergent, water and brush is essential to remove blood, other body fluids, tissue particles and dirt from items. Sterilization or high level disinfection will not be effective unless the instruments or other articles are thoroughly cleaned first as microorganisms trapped in the organic material may survive.

Thorough cleaning drastically reduces the number of bacterial endospores on instrument and other items.
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3. **Sterilization** – Eliminates all microorganisms (bacteria, viruses, fungi and parasites) and bacterial endospores. Sterilization can be done with heat or chemicals.

OR

High level disinfection (HLD) – Eliminates all microorganisms (bacteria, viruses, fungi and parasites) but does not reliably kill all bacterial endospores. If sterilization is not available or feasible, HLD is the only acceptable alternative.

4. **Storage** – All instruments and other items should be stored in high level disinfection (HLD) container with tight fitting lid or sterilized container after drying.

Unit 1.7 Decontamination and Cleaning

This unit discusses about the initial two steps of processing an article i.e. Decontamination and Cleaning.

Learning Objectives:

- Understand in detail about processing an article after use by decontamination and cleaning.
- Prepare disinfectant chlorine solution, for decontamination of articles.

1.7.1 Decontamination

As described earlier, decontamination is a very first step in processing the items. It kills the microorganisms and few bacterial endospores also. Decontamination is done by soaking instruments and other items in a 0.5% chlorine solution for 10 minutes immediately after use.

1.7.2 Preparing Chlorine Solution

Chlorine is one of the oldest and most widely used compounds for preventing infections in healthcare settings. A chlorine solution can be made from liquid household bleach, from powder or chlorine tablets. 0.5% chlorine solution should be used for decontamination of items as much of the chlorine is inactivated by the organic matter in the water.

Using Bleach Powder:

The percentage of chlorine in bleaching powder is commonly 30 – 35 %. If using bleach powder, calculate the ratio of bleach to water using following formula:

$$\frac{[\% \text{ chlorine desired}] \times 1000}{[\% \text{ chlorine in bleach Powder}]} = \text{number of grams of powder for each liter of water for each part bleach}$$

To make the calculation easier,

Use 15 grams of bleaching powder in 1 liter of water.

Prepare chlorine solution only in plastic containers. Always prepare a paste of bleaching powder before mixing with water.

1.7.3 Steps of Decontaminating Items

- Immediately after use, decontaminate instruments, reusable gloves and other items by placing them in a plastic bucket containing 0.5% chlorine solution for 10 minutes. Never use a metallic bucket to prepare and keep chlorine solution.
- After 10 minutes, remove the items from chlorine water and rinse with water or clean immediately. Excessive soaking of instruments, can damage them. Always wear thick utility gloves when removing items from chlorine water or while making chlorine solution.
- Prepare a new chlorine solution at the beginning of each day or when solution gets visibly dirty during the day.

1.7.4 Cleaning

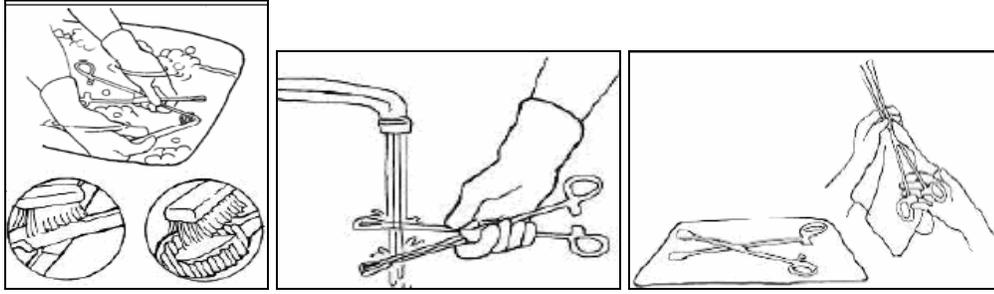
Cleaning of instruments and other items, physically removes organic matter, such as blood and other body fluids, tissues dirt etc. which could make further sterilization / high level disinfection (HLD) process ineffective. Through cleaning by scrubbing also helps in reducing the number of bacterial endospores significantly.

1.7.5 Steps of cleaning

1. Wear utility gloves.
2. With the help of soft brush or old tooth brush, scrub the items vigorously using detergent and water to completely remove all blood, body fluid, issues, dirt etc. Be sure to brush in the grooves, teeth and joints of the instruments, where the chances of blood being collected are more.
3. Rinse the items thoroughly under clean running water to remove all detergent
4. Allow the items to air-dry or dry with a clean soft towel. It is important to dry the instruments or other items, especially if putting into chemical for high level disinfection (HLD), because the water in instruments will dilute the chemical's concentration, making it ineffective.

Avoid using steel wool to scrub or abrasive cleaners like Vim or comet as detergents. These products can scratch the metal or stainless steel of instrument resulting in grooves, which can become a nesting place for microorganisms.
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Fig 11: Steps of Cleaning



Unit 1.8 Sterilization, HLD (High Level Disinfection) and Storage

This unit describes in detail the other two steps used in processing an article after use. These steps are Sterilization / HLD and storage of sterile / HLD material.

Learning Objectives:

- Appreciate the importance of the steps Sterilization / HLD and storage while processing any article.
- Understand the intricacies of sterilizing any article.

1.8.1 Definition and Methods of Sterilization

As discussed above, sterilization eliminates all microorganisms and bacterial endospores. Sterilization is recommended when instruments or other items will come in contact with bloodstream or tissues under the skin.

Sterilization can be accomplished by any of these two methods –

1. Steam sterilization (often known as autoclaving or moist heat under pressure).
2. Soaking in chemicals (referred as cold sterilization).

- ❖ Boiling and flaming are **not** effective sterilization techniques because they do not effectively kill all microorganisms.
- ❖ Sterilization is preferable to high level disinfection (HLD).

1.8.2 Autoclaving (Steam Sterilization)

Autoclaving or steam sterilization requires moist heat under pressure.

Steps of autoclaving –

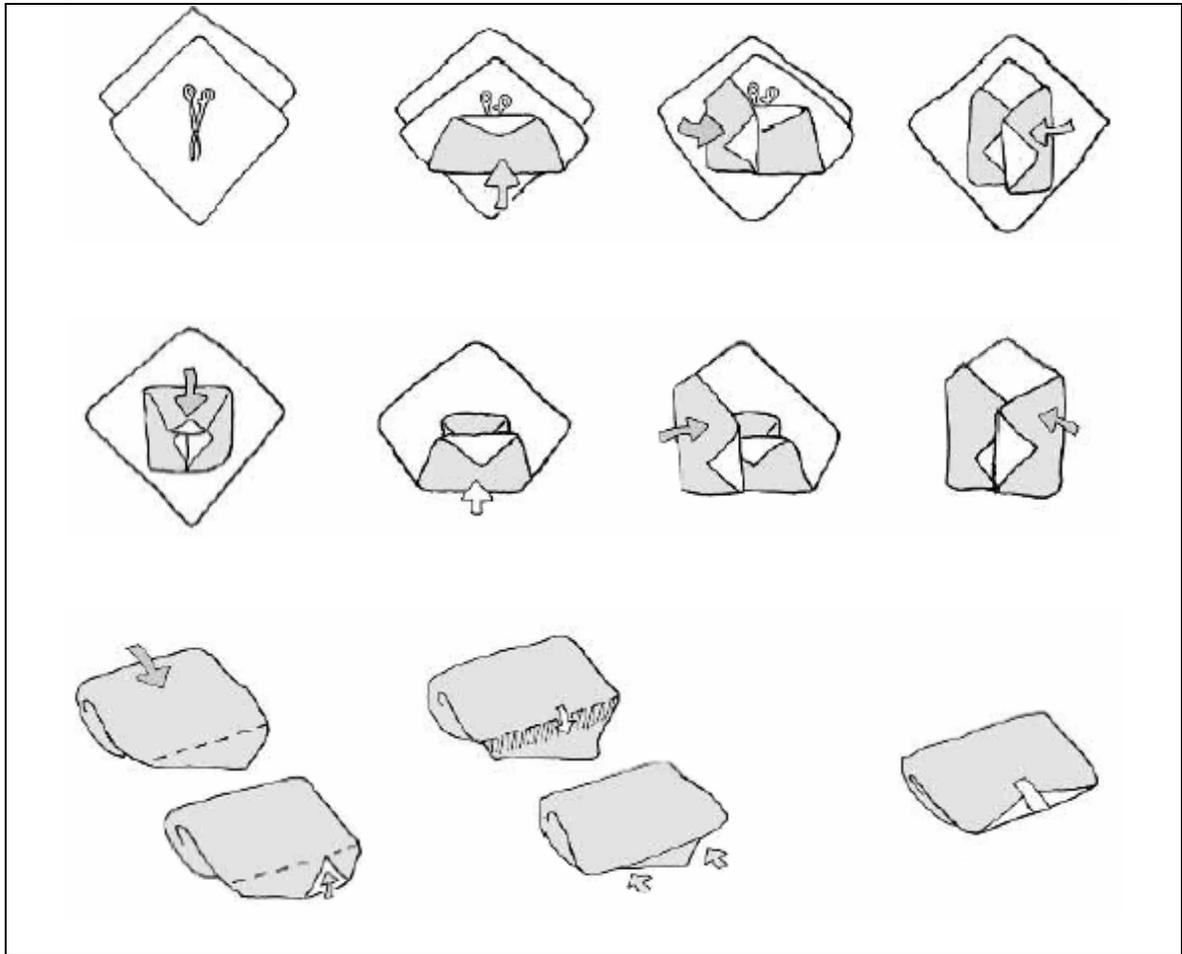
1. Decontaminate, clean and dry all instruments and other items to be sterilized.
2. Open and unlock all joined instruments or other items and disassemble those with sliding or multiple parts. This will allow steam to reach all surfaces of the item. Avoid tying the articles together tightly, which will prevent steam from reaching in between. **Do not wrap gloves into tight balls.**
3. Items can not remain open in the environment after being sterilized, so wrapping of the instruments and other items in paper or cloth, is necessary before sterilization. Wrapping, in detail is explained below. Else autoclave drums can be used.

4. If drums are being used, position items in drum to allow free circulation of steam. Items should not be kept in close containers inside the drum and the holes of the autoclave drum should be kept open while sterilizing.
5. Arrange all packs or drums in autoclave and autoclave should be adjusted on 121°C temperature and 15lbs/m² pressure for 30 minutes.
6. Time with a clock or watch for 30 minutes. **Do not begin timing unless the desired temperature and pressure are achieved.**
7. After sterilization is complete, slowly release the steam and wait till the pressure gauge reaches zero and carefully open the lid of the autoclave maintaining a distance from the hot steam. Leave instrument packs or items in the autoclave until they dry completely (which could take up to 30 minutes).
8. Remove packets from autoclave, checking for dryness (Damp packs draw microorganisms from the environment and should be considered contaminated).
9. Storage: Sterilized items that are wrapped are considered sterile till one week if kept dry. Unwrapped items if kept in a covered container should be used within 24 hours or should be kept in sterile airtight covered container up till one week. Before using any item, its wrapper should be checked for tears or holes. The items with torn wrappers should be considered as unsterile.

Wrapping Instruments Gloves and other items for autoclaving

- First, make sure that the instrument being wrapped is clean.
- Take correct size wrapper for the instrument or item being wrapped.
- Check the wrapper for holes, tears, lint, residue and defects using proper light.
- Wrappers have to completely enclose the instrument or item being wrapped.
- The edges need to be properly folded so the tool can be aseptically presented during a procedure.
- While the edges and corners of the wrapper need to be tucked in, there should not be excessive wrapping material on and around the item as this interferes with the sterilant's penetration.
- Pins, staples, paperclips and other sharp objects should never be used to secure a wrapped item. All sterile packages should be handled as little as possible.

Fig 12: Steps of wrapping of an instrument in paper or cloth



Cleaning and maintenance of the Autoclave

- To ensure that sterilization is achieved, the autoclave should be checked each time it is used, to make sure it is working properly.
- If any repair is necessary they should be made before the autoclave is being used again.
- Routine maintenance and cleaning should become a standard procedure and someone should be assigned particularly for the task. Records should also be maintained in maintenance book.

The general instructions for routine maintenance are –

Clean the inside of the chamber daily using a cloth. This will prevent build-up of scale and will allow the sterilizer to operate more efficiently. To clean the inside chamber, follow these steps:

- Turn the unit off and allow chamber to cool.
- Remove all trays and racks.
- Using towels soak and remove any water lying in the bottom of the autoclave.
- Wipe the inside of autoclave with clean towels.
- Finally, using a moist towel, wipe the gasket clean on the inside of the door.

1.8.3 Chemical Sterilization

Chemical sterilization is used for instruments and other items which are heat sensitive or when heat sterilization is unavailable. Items can be sterilized by soaking in 2% glutaraldehyde for 8 -10 hours followed by rinsing with sterile water. As glutaraldehyde is an irritant to eyes, skin and respiratory tract, use, mask and glove while exposed.

Commercially available glutaraldehyde (Cidex®) can be used for 14 days and should be discarded after that. Solutions must also be replaced whenever become cloudy.

Steps of Sterilizing the Items through Chemical Sterilization –

1. Decontaminate, clean and thoroughly dry all the items to be sterilized. Water from wet instruments or other items, can dilute the chemical thereby reducing its effectiveness.
2. Prepare chemical solution by following the manufacture's instruction or use solution which is already prepared as long as it is clear and has not expired.
3. Pour the solution in a clean container with a lid. Open all hinged instruments, disassemble those with sliding or multiple parts and dip them completely in the solution. No part of the item should remain outside the solution.
4. Remove instrument with a large sterile forceps after 8 – 10 hours.
5. Residue of chemical solution should be washed off by rinsing the item with sterile water. **Boiled water is not sterile** as it does not kill the bacterial endospores. sterile water can be obtained from the autoclave and stored in sterile bottles.
6. Place instruments and other items on a sterile tray or sterile container and allow air-drying before use or storage for 24 hours.

1.8.4 High Level Disinfection (HLD)

Eliminates all microorganisms (bacteria, viruses, fungi and parasites) but does not reliably kill all bacterial endospores. If sterilization is not available or feasible, HLD is the only acceptable alternative for instruments and other items that will come in contact with bloodstream or tissues under the skin. There are two methods of high-level disinfection:

- Boiling and

- Using chemicals

Chemicals appropriate for High-Level Disinfection:

Chlorine:

- The cheapest and effective disinfectant
- Fast acting and effective against a broad range of microorganisms
- Should be changed daily to maintain it's effectively.
- Can be corrosive to metals after prolonged contact (more than 20 minutes), also can be irritating to eyes, skin and respiratory tract.
- Leaves a residue; therefore all items must be rinsed thoroughly with boiled water after HLD.

Gluteraldehyde 2% (Cidex ®):

- Follow the manufacture's direction for dilution.
- Can be used for 14 days still should be replaced anytime if becomes cloudy.
- Leaves a residue; therefore all items must be rinsed thoroughly with boiled water after HLD.
- Not corrosive for instruments and other items.
- Can be irritating to eyes, skin and respiratory tract. When preparing the solution wear gloves, prepare in open /well ventilated space and limit exposure to the chemical.

Steps of HLD by Boiling:

1. Decontaminate and clean all instruments and other items to be high-level disinfected.
2. Completely submerge all instruments and other items in water, in a pot or boiler. As for HLD, water must touch all surfaces, open all hinged instrument and disassemble the sliding parts. Bowls and containers should be placed upright and filled with water, not upside down.
3. Cover the pan or close the lid and bring the water to a gentle boil. When water starts boiling, start timing for 20 minutes. **From this time on, no additional water, instruments or items should be added.**
4. Lower the heat to keep the water at a gentle, rolling boil; too vigorous a boil will cause the water to evaporate and may cause damage to the instruments.
5. After 20 minutes, remove instruments and other items, using and HLD forceps and place them on a HLD tray /container. Allow to air-dry before use or storage. **Never leave boiled instruments and other items in water that has stopped boiling;** they can become contaminated in the cooling down process.
6. **Storage:** Use instruments and other items immediately or keep in a dry, HLD container with a tightly fitting cover and use within one week.

Steps of HLD by using Chemicals:

1. Decontaminate, clean and thoroughly dry all instruments and other items to be high-level disinfected. Water from wet instruments and other items can dilute the chemical thereby reducing its effectiveness.
2. When using a **2% gluteraldehyde solution:**
 - Prepare the solution as per manufacture's instructions or use previously prepared solution after confirming its expiry date.
 - Open all parts and hinged instruments and completely immerse in the solution for 20 minutes.
 - Remove instruments or items with the help of a HLD forceps from the solution and rinse with boiled water before use.
3. When using **0.5% Chlorine Solution:**
 - Prepare 0.5% chlorine solution as described before. Fresh solution should be made each day or sooner if the solution becomes dirty.
 - Open all parts and hinged instruments and completely immerse in the solution for 20 minutes. **Do not add any items to the solution once the time has begun.**
 - Remove instruments or items from the solution and rinse with boiled water before use.
4. **Storage:** Use instruments and other items immediately or keep in a dry, HLD container with a tightly fitting cover and use within one week.

Unit 1.9 Infection Prevention in Housekeeping

This unit explains about the importance and need of housekeeping for infection prevention in any health care facility. Apart from giving some general guidelines for housekeeping personals, this unit also emphasizes upon special care to be taken in client care and non-care area by housekeeping personnel.

Learning Objectives:

- Understand the role of Housekeeping in infection prevention.
- Understand the guidelines and activities to be followed by housekeeping personnel in client care and non-care areas.

1.9.1 Role of Housekeeping in Infection Prevention

The cleanliness of a facility is often the first thing a client or visitor notices. It reflects the behavioral pattern of the service providers and staff's concern for their client.

Housekeeping is the general cleaning and maintenance of cleanliness in the clinical environment. In addition to cleaning, the purpose of housekeeping is also to reduce the number of microorganisms in the environment and provide an appealing workspace.

General Guidelines for Housekeeping

- Cleaning schedule should be formulated and closely maintained. It should be pasted at a place, where all staff responsible for housekeeping can see it.
- Staff should be provided with utility gloves, which can be worn while cleaning.
- Cleaning should be done in a way that minimizes the scattering of dust and dirt that may contain microorganisms. Using a wet/ damp mop or duster is preferred over dry dusting in hospitals.
- As scrubbing is the most effective way to remove dirt and microorganisms, scrubbing should be a part of every cleaning procedure.
- Start cleaning of the surfaces from top to bottom, so that debris will fall to the floor and be cleaned up last.
- Change cleaning solutions, when they appear dirty.

❖ The equipment used for cleaning also needs thorough cleaning before reuse, to prevent spread of infection. The mops, wipes, clothes and buckets etc, should be decontaminated, cleaned in detergent and water, rinsed in clean water, and dried before reuse.

Housekeeping Activities in Client Care Areas and Non-Care Areas:

In the areas of the hospital, where direct client care or processing of instruments is not done, e.g. waiting space, administrator's room, store, reception, kitchen, nurse's room

etc. are called **non-care areas**. Here a routine cleaning – as done in homes – is satisfactory.

For cleaning such areas, sweeping of floor, followed by damp mopping of the table, slabs, and all other surfaces then followed by wet mopping of floors should be done daily.

The areas, where health care procedures take place like Operation Theater, Labour room, Wards, OPD Rooms, Toilets and Bathrooms and all other areas where processing of instruments take place, are considered as **client care areas**. These have more potential to get contaminated with microorganisms; hence special attention must be paid for the cleaning of these areas.

Cleaning client care areas –

Each morning:

- At the beginning of each day, damp wipe or mop countertops, tables, trolley, lamps and floors with 0.5% chlorine solution with detergent to remove dust and dirt and microorganisms.

Between Clients:

- Decontaminate procedure room, instruments, and other items, examination trolleys, stands, countertops, lamps and lamp handles and other potentially contaminated surfaces with a cloth dampened with a 0.5% chlorine solution.
- Clean blood or other body fluid spills with 0.5% chlorine solution.
- Segregate waste in leak proof containers, according to the policies of the hospital and empty the bins when it is three quarters full.

At the end of the procedure or clinic day:

- Remove contaminated waste and put them in segregate waste collection containers.
- Wipe down all surfaces including countertops, slabs, examination table, trolleys, table, chair, lights, doorknobs and area around the sink with a cloth soaked with a 0.5% chlorine solution. Do not forget to wear utility gloves and other attires before cleaning and start wiping from top to bottom.
- Particular attention should be paid to the procedure table making sure to thoroughly clean the sides, base and legs with disinfectant solution.
- Clean the floors with a mop dampened with 0.5% chlorine cleaning solution.

1.9.2 Preparing a Disinfectant Cleaning Solution

A disinfectant cleaning solution contains a disinfectant with detergent and water. This solution is used when the cleaning areas are potentially contaminated with blood, or other body fluids. This can be prepared by adding detergent to 0.5% chlorine solution

Steps of Preparing a Disinfectant Cleaning Solution –

Step 1 – Prepare a 0.5% chlorine solution as told before, in the unit 1.6.

Step 2 – Add some detergent to the 0.5% chlorine solution or other disinfectant, to make it a bit soapy.

Module 2

Waste Management

Unit 2.1 Waste Management

Unit 2.1 Waste Management

This unit describes about how proper handling and disposal of waste can minimize the spread of infection and reduce the risk of accidental injuries to the hospital staff, clients, visitors and the local community.

Learning Objectives:

- Different type of waste in health care settings.
- Treatment and disposal of different types of waste.

2.1.1 Types of waste

There are three main categories of waste –

- General waste
- Medical waste
- Hazardous waste

General Waste – It is non- hazardous waste that poses no risk of infection it includes paper, wrappers, documents, floor sweepings and food related trash.

Medical Waste – It is the waste generated during the diagnosis, treatment, and/ or immunization of clients. This waste can be infectious, sharp and non-infectious.

Hazardous Waste – Waste that is potentially poisonous and toxic including cleaning products, disinfectants, cytotoxic drugs and radio active compounds.

As there are different types of waste, it becomes necessary to segregate before disposing. The four aspects of Waste Management are –

2.1.2 Solid and Semi solid Waste Disposal

- **Sorting** – The infected and non-infected waste should be sorted at source. Since 90% of the waste is non-infectious, it can be easily disposed into the municipal bins. Poor separation of waste makes the non-infectious waste also infectious which needs to be handled carefully. For sorting, separate bins should be available at the point of waste generation and those should be marked well for identification.
- **Handling** – Careful handling of infectious waste is the next essential part of Waste Management. When handling medical/ infectious waste always wear utility gloves and other attires. Nurses should make sure, that the utility gloves are available in the stock in sufficient supply and instruct / supervise the sweepers for wearing gloves and other attires while handling waste. The containers should be emptied before they are completely full.

- **Transportation** – The waste should be transferred into covered containers/ carts to the waste collection area. Routes and timings of transporting waste should be such to avoid client care areas and waiting areas.
- **Storage** – Place the waste in an area which is away from the Client care area and the waste should be stored in separate covered bins. The place or room should be kept free from insects, rodents and other animals.
- **Disposal** – The waste should be disposed to the waste collection agency everyday or as decided in the contract with agency and proper record should be maintained for disposal.

2.1.3 Sharp Waste Disposal

Dispose all the sharp items in **puncture proof containers**. For puncture proof containers, boxes of heavy cardboard, tin can with lid, thick plastic bottles with small opening can be used. These containers should be kept close to all the points where some procedure is being performed and one such container should also be kept in the laundry, for disposal of sharps found in linen. It should be seen that –

- Containers should be emptied when three-quarters full.
- Always wear thick utility gloves while handling the sharps.
- Sharps should not be destroyed by burning, except in large incinerators.
- Dispose the containers either by giving it to the waste disposal agency or by deep burial.
- To reduce needle stick injuries, do not recap, bend, or break needles or remove the needles from syringes before disposal. Needles should either be burnt in needle burners or should be disposed as described above.

2.1.4 Liquid Medical Waste Disposal

Liquid waste can be blood, urine, vomit or any other body fluid.

- Always wear thick utility gloves when handling or transporting liquid medical waste of any kind.
- When carrying or disposing liquid medical waste, be careful to avoid splashing the waste on yourself, others or surfaces.
- Carefully pour liquid waste down the toilet or latrine.
- Rinse the toilet or sink thoroughly with water to remove residual waste.
- Clean with a disinfectant cleaning solution at the end of each day.
- Decontaminate the container that held the liquid waste by soaking it for 10 minutes in a 0.5% chlorine solution before washing.
- Wash hands, decontaminate gloves and wash them.

Hazardous Waste:

- Cleaning solutions and disinfectants such as glutaraldehyde should be handled as described above as liquid medical waste.
- Rinse containers thoroughly and reuse after washing with detergent and water.

A part of Gazette notification related to category of bio medical waste and its disposal is given below.

2.1.5 Category of hospital waste, their treatment and disposal

THE GAZETTE OF INDIA, EXTRAORDINARY – PART II – SECTION – SUB SECTION (H)

SCHEDULE - I

Table 1: Category of Biomedical Waste

Option	Waste Category	Treatment and disposal
Category No. 1	Human Anatomical Waste (Human tissues, organs, body parts)	Incineration, @ deep burial*
Category No. 2	Animal Waste (Animal tissues, organs, body parts, carcasses, bleeding parts, fluid, blood and experimental animals, used in research, waste generated by veterinary hospitals, colleges, discharges from hospitals, animal houses)	Incineration, @ deep burial*
Category No. 3	Microbiology and biotechnology waste (Waste from laboratory cultures, stocks or microorganisms live or vaccines, human and animal cell culture used in research and infectious agents from research and industrial laboratories, waste from production of biological, toxin, dishes and devices used for transfer of cultures)	Local autoclaving, microwaving / incineration @
Category No. 4	Waste Sharps (Needles, syringes, scalpels, blades, glass etc. that may cause puncture and cuts. This includes both used and unused sharps)	Disinfection by chemical treatment @@/autoclaving / microwaving and mutilation / shredding ##
Category No. 5	Discarded medicines and cytotoxic drugs (Waste comprising of outdated, contaminated and discarded medicines.)	Incineration @ destruction and drug disposal in secured land fills
Category No. 6	Solid waste (items contaminated with blood, and body fluids including cotton, dressings, soiled plaster casts, lines bleeding, other material contaminated with blood)	Incineration @ / autoclaving / microwaving
Category No. 7	Solid waste (disposable) (waste generated from disposable items)	Disinfection by chemical treatment @@ / autoclaving /

	other than sharps such as tubing, catheters, intravenous sets, etc.	microwaving and mutilation / shredding ##
Category No. 8	Liquid waste (waste generated from laboratory and washing cleaning house keeping and disinfecting activities)	Disinfection by chemical treatment @@ and discharge into drains
Category No. 9	Incinerator ash (Ash from incinerator of any bio-medical waste)	Disposal in municipal land fills
Category No. 10	Chemical waste (Chemicals used in production of biologicals, chemicals used in disinfection, as insecticides, etc.	Chemical treatment @@ and discharge into drains for liquids

@@ Chemical treatment using at least 1% hypochlorite solution or any other equivalent chemical reagent. It must be ensured that chemical treatment ensures disinfection, as insecticides, etc.)

Mutilation / shredding must be such so as to prevent unauthorized reuse.

SCHEDULE II

Table 2: Colour Coding and the Type of Containers for Disposal of Bio-Medical Waste

Colour coding	Type of containers	Waste category	Treatment options as per schedule 1
Yellow	Plastic bag	Category 1, 2, 3 6	Incineration, deep burial
Red	Disinfected container / plastic bag	Category 3, 6, 7	Autoclaving / microwaving/ chemical treatment
Blue / white translucent	Plastic bag / puncture proof container	Category 4, 7	Autoclaving / microwaving / chemical treatment and destruction / shredding
black	Plastic bag	Category 5, 9, 10 (solid)	Disposal in secured land fills.

Conclusion

As has been emphasized throughout this training manual, implementing adequate infection prevention practices do not need fancy or expensive equipments and supplies. The internationally excepted practices covered in these manual, uses low tech approaches that are practical, simple, easy to use, and generally inexpensive.

Although supplies and equipments are needed for maintaining good infection prevention practices, it's staff more than the material, that makes a difference. Well trained, interested and motivated staff can serve as a backbone for maintaining good services in any health facility.

Infection prevention is everybody's responsibility and has a major role to play in preventing spread of infection and injuries. So, each staff member doing his/her part for preventing infections in health care facility, will be able to create a safe environment.

References

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