

CONTROL OF INFECTION

Principles of infection control are based on research and should be implemented to prevent avoidable infections and control existing ones. Infection control is especially important within the healthcare settings, where the risk of infection to patients is greatly increased. Good infection control techniques adopted during patient care can assist greatly in preventing or reducing avoidable hospital-acquired infections.

Hospital-acquired (nosocomial) infections are infections that were not present or incubating on admission of a patient to hospital. These infections appear in patients who have appeared free of signs and symptoms of infection on admission and have then gone on to develop infection.

Prevention of infection

There are two tiers in the prevention of infection within the healthcare setting. The first tier includes universal precautions and other standard precautions. These are intended to reduce the risk of transmission of bloodborne viruses and other organisms found within the healthcare settings, therefore these should be used at all times (these will be tackled in this chapter).

The second tier is the use of isolation, or transmission-based precautions. These are implemented only when more pathogenic organisms are of concern.

Universal precautions

Blood and body fluids precautions should be implemented consistently for all patients regardless of their bloodborne infection status, as this would not always be known (Centres for Disease Control and Prevention, 1987).

Universal precaution measures include: -

1. Gloves

- ♦ Non-sterile gloves should be well-fitting and available for use whenever contact with blood and body fluids is anticipated.
- ♦ Gloves cannot prevent penetrating injuries from sharp instruments and equipment, but they can reduce the incidence of hand contamination from blood and body fluids.
- ♦ Broken skin on the hands of healthcare staff should be covered, ideally with a waterproof and breathable barrier.
- ♦ Change gloves immediately if contamination with blood or body fluids occurs, or if they are no longer intact.
- ♦ Change gloves between patients.
- ♦ Gloves should be single use and made of latex or vinyl.
- ♦ Sterile surgical gloves should be used for procedures involving sterile areas of the body and for direct contact with non-intact skin, such as open non-infected wounds. Therefore sterile gloves should only be used when the procedure undertaken carries a risk of an infection to the patient. These should not be washed or disinfected as these can cause deterioration or disintegration, causing holes which may not be visible.
- ♦ The use of gloves does not reduce the need for handwashing.

2. Mucous membranes
 - ♦ Glasses, visors or shields can be used for the eyes. These should be available for use, especially during procedures with increased risk of splashes.
 - ♦ Masks should also be worn during procedures with increased risk of splashes.
 - ♦ Masks must be changed if they become contaminated or if they are intact.
 - ♦ Decontamination of reusable visors should be carried out frequently.
3. Protective clothing (plastic aprons or gowns)
 - ♦ These should be worn in all situations where there is direct patient contact or contact with body fluids, bed linen, excreta, clinical waste etc., or with items that have been in contact with infectious diseases.
4. Proper handling of contaminated instruments
 - ♦ Sharp instruments should be handled with care in order to avoid inoculation injuries or contamination onto mucous membranes.
 - ♦ Care should be taken during use, cleaning and on disposal of sharp instruments.
 - ♦ Needles should never be recapped, never be removed from the syringes and never be bent or broken. If recapping is necessary, this should be done using a one handed scoop technique or by using a mechanical device.
 - ♦ The number of sharp instruments should be kept to a minimum during procedures, and should always be kept in sight.
 - ♦ After use, all single use sharps should be placed in puncture resistant containers such as sharp boxes.
 - ♦ Sharp boxes should be kept close to where sharps are used, ensuring minimal handling of contaminated objects and safe and quick disposal of them.
 - ♦ Hands should never be put inside the container, nor should any items in the container be retrieved from it.
 - ♦ Containers should be changed whenever they become two thirds full, or if they become contaminated on the outside, to avoid potential inoculation injuries or contamination on disposal.
 - ♦ Disposal of all sharp instruments should be by incineration.
5. Handling and disposal of linen
 - ♦ Linen contaminated with blood or body fluids should be disposed of immediately and put in a water-soluble bag. The use of protective clothing is advised.
 - ♦ To decontaminate linen, it should be washed at a high temperature (at least 70°C), or on a heat disinfection cycle.
 - ♦ If a temperature of 70°C is not possible, thorough washing, rinsing and drying, at lower temperatures (preferably using a disinfectant) should be carried out.
6. Proper handling of clinical wastes
 - ♦ Clinical waste includes any materials generated from patient care. This includes waste that could potentially transmit microorganisms.
 - ♦ Clinical waste includes soiled dressings, cotton swabs, and catheter drainage bags.
 - ♦ Disposal of clinical waste, including waste contaminated with blood or body fluids, should be carried out immediately, with the wastes put into clearly marked bags.
 - ♦ Gloves and protective clothing should always be used when handling clinical waste.
 - ♦ Bags should have a covering lid and should not be overfilled.
 - ♦ They should be sent for incineration.

7. Cleaning of spillages of blood and body fluids
 - ◆ Spillages of blood and potentially infected body fluids onto the floor, on equipment, or other surfaces must be cleaned as soon as they occur, in order to prevent further unnecessary exposure.
 - ◆ It is important for health staff to wear gloves and other protective clothing during cleanup.

Additional standard precautions

Cross infection of organisms can be greatly reduced when additional precautions are used. These simple measures include: -

Handwashing
Asepsis; and
Decontamination

1. Handwashing

◆

2. Asepsis

- ◆ **Aseptic** means "without microorganisms." **Aseptic technique** refers to practices that help reduce the risk of post procedure infections in clients by decreasing the likelihood that microorganisms will enter the body during clinical procedures. Some of these practices are also designed to reduce service providers' risk of exposure to potentially infectious blood and tissue during clinical procedures.
- ◆ Aseptic technique is a method of preventing microorganisms from reaching vulnerable sites.
- ◆ Effective antiseptics for aseptic procedures include alcohol, iodophor, chlorohexidine and triclosan.
- ◆ Alcohol solutions should not be used on mucous membranes as they cause irritation.
- ◆ When preparing a site for a procedure, the site should be fully covered with the antiseptic, in order to thoroughly disinfect the area and substantially reduce the normal flora on the skin.
- ◆ The antiseptic should be applied vigorously and left to dry, particularly alcoholic solutions.
- ◆ Drying takes approximately 30 seconds.
- ◆ Intravenous sites should not be palpated after disinfection has taken place.
- ◆ Sterile gloves are required for some aseptic procedures, for example, the insertion of central venous catheters.

Components of aseptic technique.

Aseptic technique refers to the practices performed immediately before and during a clinical procedure to reduce postoperative infection. These include:

- ◆ Hand washing.
- ◆ Surgical scrub.
- ◆ Protective clothing.
- ◆ Preparing patients for clinical procedures.
- ◆ Maintaining a sterile field.

- ♦ Using safe operative technique (making small incisions, avoiding trauma to tissue and surrounding structures and controlling bleeding).
- ♦ Maintaining a safer environment in the surgical/procedure area.

The following are examples of standard aseptic techniques for specific procedures.

Skin preparation for surgical/clinical procedures:

- ♦ First, make sure the surgical/procedure site has been cleaned with soap and water. (The patient can do this, either at home or at the clinic/hospital).
- ♦ Apply antiseptic and gently scrub the skin in a circular motion, starting from the centre of the site and moving out, using sterile cotton balls, cotton wool, or gauze sponges held by a sponge forceps.

NOTE: Shaving is no longer recommended because it causes small nicks and breaks in the skin where bacteria can grow and multiply. Hair around the site may be clipped short if it might interfere with the procedure. Two large studies (one with nearly 63,000 subjects) showed that clients who had not been shaved had significantly fewer postoperative infections than clients who had been shaved.

Preparation for the vagina, cervix, and other mucous membranes:

Using sterile cotton balls, cotton wool, or gauze sponges held by a sponge forceps, apply an antiseptic liberally to the vagina and cervix before instrumentation of the uterus. Alcohol and alcohol-based antiseptics should not be used on the vagina, cervix, or other mucous membranes because they easily irritate these tissues.

Before giving an intramuscular injection:

- ♦ Wipe the patient's skin at the intended injection site with an antiseptic solution to minimize the number of microorganisms and reduce the risk of infection.
- ♦ If there is visible dirt, wash the injection site with soap and water.
- ♦ Using a fresh swab, wipe the site with an antiseptic, wiping in a circular motion from the center outward.
- ♦ If alcohol is used, allow the alcohol to dry, to allow maximum effectiveness in the reduction of microorganisms.

Proper use of multi-dose vials

- ♦ Multi-dose vials of medication or other fluids can become vehicles for transmitting infections between clients. Before filling a syringe from a multi-dose vial:
 - ♦ Check the vial to be sure there are no leaks or cracks.
 - ♦ Check the solution to be sure it is not cloudy and that there is no particulate matter in the vial. Most solutions that come in vials are clear.
 - ♦ Wipe the top of the vial with a fresh cotton swab soaked with 60-70% alcohol, and allow it to dry.

Always use a new or correctly processed hypodermic needle *and* syringe every time fluid is withdrawn from a multi-dose vial. Reusing the same syringe to give injections to multiple clients, even if the needle is changed, is not a safe practice, because infections can contaminate the multi-dose vial and be transmitted from client to client.

Never leave one needle inserted in the vial cap for multiple use. This provides a direct route for microorganisms to enter the vial and contaminate the fluid between each use.

3. Decontamination

- ♦ **Cleaning** means the removal of visible dust, soil, other foreign material and removal of sufficient numbers of microorganisms to reduce risks for those who handle the object or an area. Effective methods of cleaning and drying have been proven to limit cross infection in all healthcare settings, and should be performed on all items before disinfection and sterilisation.
- ♦ **Disinfection** is a process that eliminates many, or all, microorganisms on inanimate objects. Disinfectants may damage living tissue and are not intended for use as antiseptics. Some disinfectants may be inactivated by soilage found on objects and therefore soilage must be cleaned off first.
- ♦ **Sterilisation** is the complete elimination or destruction of all types of microbial life. Sterilisation is accomplished by a variety of methods, including steam under pressure or moist heat (autoclaving); gas (ethylene oxide); dry heat (hot air oven); and low temperature steam and formaldehyde.

Items that require decontamination are divided into three categories, based upon the degree of risk involved in their use:

- ♦ **Critical items** are those, which come into close contact with a break in the skin or mucous membranes, or those, which are introduced into a sterile body area, for example tissues or the vascular system. Any items used for these purposes should be purchased sterile and sterilised subsequently before further use, using methods already described.
- ♦ **Semi-critical items** are items that come into contact with intact skin, mucous membranes, or body fluids, particularly if the items are used on immunocompromised patients or those being cared for under isolation or transmission-based precautions.
- ♦ **Non-critical items** are those that come into contact with healthy skin or mucous membranes, or have no contact with patients at all. These items include general equipment and the patient's environment. Cleaning is usually adequate for non-critical items.

Guidelines for Aseptic Technique

Wound Management

- 1) Explain procedure to the patient
- 2) Prepare patient comfortably for better accessibility without unnecessary exposure of the patient.
- 3) Prepare environment. Ensure privacy, draw curtains, close windows, switch off fans and remove flowers.
- 4) Allow ten minutes from preparation of environment and the performance of the actual procedure.
- 5) Go to treatment room to prepare trolley and equipment.
- 6) Wash trolley with soap and water. Then clean with alcohol based solution. The trolley should be washed from top down not forgetting the sides.

- 7) No specific technique in the washing of the trolley so long as trolley is cleaned adequately.
- 8) Place needed equipment for the procedure on the bottom shelf of the trolley. Sterile equipment used should be checked for sterility, expiry date, moisture, any tears in packaging. Lotion containers and solution should also be checked for sterility, punctures in plastic bottles, discolouration, haziness and particulate matter when applicable.

The basic equipment usually includes:

- 1) Sterile dressing pack. An extra pack may be placed just in case of a mishap.
- 2) Lotion for cleansing is usually normal saline. Use a bowl with moderately hot water to warm cleansing solution to body temperature.
- 3) Hypoallergenic tape and scissors.
- 4) Appropriate hand hygiene preparation e.g.: Hibisol.
- 5) Plastic disposable apron to be worn near bedside.
- 6) Other materials may be needed according to the individual needs of the patient. These may include: -
 - ♦ Incopad to prevent soiling patient's bedclothes
 - ♦ Specific kind of lotion/spray e.g. Betadine
 - ♦ Extra swabs, dressings and bandages
 - ♦ Debriding products/equipment
 - ♦ Specific kind of dressing e.g. Mepore, Opsite , Hydrocolloid dressing
 - ♦ Syringe for irrigation
 - ♦ Sharps box
 - ♦ Equipment for taking a wound swab
 - ♦ Suture/staple removal pack
 - ♦ Wound assessment tools/chart

Procedure:

- 1) Wash hands before leaving treatment room.
- 2) Take trolley near bedside by pushing from front side poles. Once near bedside ensure comfort of the patient.
- 3) Put on apron.
- 4) Refrain from body contact with trolley
- 5) If one is working alone cleanse hands with hibisol and loosen patient s dressing leaving dressing in position. If one has an assistant the assistant could do this.
- 6) Talking during the procedure should be kept to a minimum. However one should be sensible and practical.
- 7) (If working alone) open the sterile pack by opening the outer cover. This is done by separating edge of paper on sterile pack and tears it, pulling away from one's body and sliding the contents on to the top shelf of the trolley. One should not touch the inside of the pack. If one has an assistant the assistant could do this.
- 8) Rub hands with hibisol if one is working alone.
- 9) Open sterile pack holding underside of corners taking note not to contaminate inside of pack.
- 10) Take the yellow bag and use it as a glove, the contents of the tray can be assembled on the sterile field easily. At the same time the old dressing can be then removed still using

the gloved hand. Once dressing is removed the bag is inverted inside out and attached to the side of the trolley below the sterile field.

- 11) Once Cleansing is done an appropriate dressing is applied according to individual needs of the patient.
- 12) Dressings are applied with forceps or gloved hands.
- 13) Once wound is covered forceps or gloves can be discarded.
- 14) Dressing is fixed by hypoallergenic tape or there may be need for the application of a bandage or the dressing used may be self-adhesive.
- 15) Prior to leaving, sterile field is folded and equipment used should be put in disposal bag, sealed with tag provided and then disposed appropriately.
- 16) Take trolley back to treatment.
- 17) Dispose of equipment.
- 18) Leave trolley clean
- 19) Wash hands after finishing procedure.