Patient Care

Infection Control and Isolation Techniques

Medical Radiologic Technology Program

Medical and Surgical Asepsis

- **Medical Asepsis** - microorganisms have been eliminated/reduced through the use of soap, water, friction and various chemical disinfectants.

- **Surgical Asepsis** - microorganisms and their spores have been completely destroyed by means of heat or by a chemical process.

Hand Washing

- By frequently washing your hands, you wash away germs that you have picked up from other people, contaminated surfaces or from animals or animal waste.

- Microbes are most commonly spread from one person to another by human hands.

When to Wash Your Hands

- Before and after handling supplies used for patient care
- Before and after each patient contact, even if gloves have been worn
- Before and after wearing gloves
- Before and after completing an invasive procedure
- Before and after eating
- After using the restroom
- At the start and end of your shift

How to Wash Your Hands

1. Turn on the sink and wet your hands with warm water.
2. Use plenty of soap and rub hands together vigorously for at least 15-20 seconds.
3. Wash palms, backs of hands, wrists, fingers and under fingernails.
4. Rinse hands thoroughly with warm water.
5. Dry hands with a clean towel or paper towel.
6. Turn off the sink with the towel—this prevents re-contaminating your hands.
7. Entire procedure takes 30-60 seconds

Alcohol-Based Hand Rubs

Benefits include:

- More accessible than a sink
- Quicker—only takes about 15 seconds
- More effective in reducing nosocomial infections
- Less irritating to the skin

Alcohol-Based Hand Rubs (cont'd)

When to use:

- Before and after patient contact as long as the hands are not visibly soiled or contaminated
- Before donning gloves
- After removal of gloves (not obviously soiled)
- After contact with inanimate objects (including medical equipment)

Gloving

- In addition to hand washing, gloves play an important role in reducing the risks of disease transmission.

- Gloves are worn for three important reasons:
  - To provide a protective barrier and to prevent gross contamination of the hands.
  - To reduce the risk of microorganisms being transmitted from healthcare workers to patients.
  - To reduce the risk of microorganisms being transmitted from one patient to another.

Gloving (cont'd)

- Must be worn during procedures that may involve contact with any patient's *body fluids, blood, secretions, excretions, mucous membranes, non intact skin and contaminated items.*

- Single-use gloves are to be used for medical aseptic purposes and may be pulled on after hand washing.

- Gloves must be promptly removed after use, **before** touching non-contaminated surfaces and, of course, between patients.

Remove Gloves-"Opened gloving"

NOTE-there is no gown with this method

1. With gloved right hand, take hold of the upper, outside portion of the left glove and pull it off, turning it inside out as you do so.
2. Hold the glove that you have just removed in the palm of the remaining gloved hand.
3. With the clean, bare index and middle fingers, reach *inside the top of the soiled glove and pull it off, turning it inside out* and folding the first glove inside it as you do so. Be careful to touch only the inside of the glove.
4. Drop the soiled gloves into a receptacle for contaminated waste.
5. Wash your hands.

Bio Spills

- WHMIS guidelines are applicable.
- To clean bio spills, gloves and appropriate personal protective equipment must be worn.
- Paper towels can be used, but must be discarded into a designated medical waste container.
- Contaminated area can be cleaned with a bleach solution or a hospital-grade disinfectant.

Nosocomial Infections-also called Health care Acquired Infection (HAI)

- **Nosocomial infections** are infections patients acquire while staying the hospital.
- They usually occur in an *acute care* hospital setting.
- Can be contracted at birth by infants of an infected mother.
- The urinary tract is the *most common site* of nosocomial infections, due to catheters.
- Also includes *infections in wounds* after surgical procedures and respiratory infections.

Infection Control

- *Standard Precautions* – designed to reduce the risk of transmission of unrecognized sources of blood-borne and other pathogens in healthcare institutions.

- *Transmission-Based Precautions* – used when isolating patients in addition to standard precautions. Transmission-based precautions include airborne, droplet and contact variations.

Infection Control (cont'd)

- As a radiographer, you must correctly perform the required isolation techniques at all times.

- You are legally and ethically responsible for practicing these procedures to prevent the spread of infectious diseases.

- *Correct cleaning of equipment, proper hand washing and proper disposal of contaminated waste* must be part of every procedure in diagnostic imaging to guard against the spread of infection.

Infection Transmission

For infections to be transmitted there must be:

- An infectious agent
- An environment in which the pathogenic microbes can live and multiply (reservoir)
- A port of exit from the reservoir
- A means of transmission
- A port of entry into a new host

Standard Precautions

- Designed to reduce the risk of transmission of unrecognized sources of blood-borne and other pathogens in healthcare institutions.

  - Also called **Tier #1**

- *Standard precautions* apply to:
  - Blood
  - All body fluids
  - Secretions and excretions (except sweat), regardless of whether they contain visible blood
  - Non-intact skin
  - Mucous membranes

Standard Precautions Practices

- Hand washing
- Gloving
- Personal Protective Equipment (PPE)
- Proper handling of soiled patient-care equipment
- Proper environmental cleaning
- Minimal handling of soiled linen
- Proper disposal of needles and other sharps
- Use of private rooms/isolation

Personal Protective Equipment

- Includes gloves, fluid-repellent gowns, masks, face shields, protective eyewear (goggles), etc.
- PPEs used when there is contact with body fluids, blood, secretions and excretions.
- Purpose of PPE is to provide a barrier between the patient and the healthcare provider to prevent exposure to the skin and mucous membranes.

Transmission-Based Precautions

- Designed to place a barrier between persons with highly infectious diseases and the persons caring for them.
- Based on routes of transmission
  - Airborne precautions
  - Droplet precaution
  - Contact precautions
- Some conditions require two types of precautions.
- Can also be referred to as Tier #2

Airborne Precautions

- Pathogenic organisms that remain suspended in the *air for long periods on aerosol droplets or dust (5 microns or less).*

- Examples include:
  - Tuberculosis (TB)
  - Measles (rubeola)
  - Chickenpox (varicella)
  - SARS

Airborne Precautions (cont'd)

- Patients are placed in a negative-pressure isolation room with the door closed.
- An infected patient leaving their room should wear the appropriate type of mask.
- Healthcare workers should wear respiratory protection (N95) when entering the room.

Droplet Precautions

- Occurs when droplets contaminated with pathogenic microorganisms are placed in the air (5 microns or greater)
- Happens when a *patient sneezes, coughs, talks or deposits infection from his or her eyes, nose or mouth in other ways*.
- Examples include:
  - Influenza
  - Rubella (German measles)
  - Pneumonia
  - Meningococcal meningitis
  - Mumps
  - Mononucleosis
  - Diphtheria

Droplet Precautions (cont'd)

- Patients are placed in a private room or with a patient infected with the same disease.
- Door can remain open because large droplets typically travel only three feet before dropping to the ground.
- Healthcare workers should protect themselves by wearing a surgical mask within three feet of the patient.
- Special ventilation precautions are not necessary.
- When leaving the room, the patient should wear a surgical mask with nose and mouth covered.

Contact Precautions

- Designed to reduce the risk of transmitting pathogens by *direct skin-to-skin contact or indirect contact with contaminated objects*

- Examples include:
  - MRSA and VRE
  - E. coli
  - Various skin infections (impetigo)
  - Hepatitis A
  - Varicella

Contact Precautions (cont'd)

- Patient should be placed in a private room or a room with another patient infected with the same disease.
- When leaving the room the patient must wear appropriate barriers (e.g., mask, gloves).
- DI staff should be notified or inquire if the patient is on isolation before receiving the patient in the DI department (written on patient's requisition).
- All radiographic equipment should be decontaminated with an antiseptic after the procedure is complete.

Contact Precautions (cont'd)

- Healthcare workers should don gloves before entering the room.
- Gloves will be removed and hands washed before leaving the room.
- A gown should be worn if the worker anticipates contact with the patient or their environment.

Types of Isolation

Strict or infectious isolation

- Used to protect the healthcare workers from the patient.

Protective or reverse isolation

- Used to protect the patient from the healthcare worker.

NOTE: *an object that has been in contact with pathogenic organisms is called a fomite* (e.g., urinary catheter).

Strict Isolation

- Must adhere to a strict method of entering and exiting the isolation unit.
- Encompasses airborne, droplet and contact precautions.
- Special room used for patients in strict isolation.
- At the entrance, there is a sink for hand washing, gowns, masks, caps and gloves.
- Before entering the isolation room, you must have the mobile prepared with as many image receptors (IRs) as will be needed.
- Also called "Expanded" precautions

Strict Isolation (cont'd)

- IR should be covered with a protective case.
- Place extra pairs of clean gloves on the mobile.
- Patients often feel rejected and "untouchable."
- Alleviate patient concerns by expressing a friendly interest in the patient and by avoiding any display of fear.
- Use a **two-person team** to complete the radiographs (Clean tech/Dirty tech).

Isolation Attire

- Each site will have their may sequence/instructions for how to Don and Doff isolation attire.
- Please check the site's protocol/procedure regarding donning/doffing practices when in practicum.
- For testing purposes, the sequence of donning and doffing isolation attire will follow that found in Ehrlich, R. A., & Coakes. *Patient care in radiography: With an introduction to medical imaging* (9th &10 ed.). St. Louis, MO: Mosby Elsevier.

DONNING Protective Attire

- Perform hand hygiene
- Don cap or hood, covering all hair
- Don mask, making certain that nose and mouth are completely covered and nose piece fits snugly
- Put on gown
  - *Put one arm on and then the other*
  - *Fasten gown securely, making sure that the uniform is completely covered*
  - *Tie at the neck, then at the waist*
- Don gloves
  - *Cuffs of gown should be covered by gloves*

Reference Ehrlich 10th ed pg. 178-179 or 9th ed pg.163-165

Clean Tech/Dirty Tech Procedure

How to complete an exam on a Strict Isolation patient.

- Both team members must follow all designated isolation precautions (*posted outside patient room)*
- Don lead apron and PPE based on specific patient precautions.
- Decide which tech will be "dirty" and who will be "clean." but not in front of pt.
- Before you and your team member enter the isolation room, prepare the necessary IR by placing it in a smooth-fitting plastic bag or pillowcase.

Clean Tech/Dirty Tech (cont'd)

- Greet the patient, check ID, verify exam, make introductions and explain the procedure.
- Dirty *tech positions the patient and anything else which has contact with the patient.*
- Clean *tech handles the x-ray equipment and has no direct contact with the patient, the bed or any items the patient may have touched.*
- Team method minimizes contamination of x-ray equipment, which is difficult to disinfect completely.

Clean Tech/Dirty Tech (cont'd)

- After each exposure, the dirty tech removes the IR from behind the patient.
- The IR protective cover is partially removed and offered to the clean tech.
- The dirty tech keeps the contaminated cover and disposes of it in the proper container.
- The clean tech wipes the cassette off with an antibacterial cloth and sets it aside or on the mobile.
- When the examination is complete, make certain the patient is comfortable before removing contaminated isolation attire.

DOFFING Protective Attire

- Gloves are removed
- Untie the gown. Neck first then waist
- Remove gloves as gown sleeves are pulled off.
- Fold contamination surface of gown inward and discard.
- Remove mask (do not touch contaminated face portion) handle the ties/strings on the rubber band only, and place in container
- Remove cap or hood. Careful not to touch outer surface if possible.
- Perform hand hygiene

Reference 10th ed pg. 181-182 or 9th ed pg. 166-167

Isolation Patients in X-ray

- Patient must be transported by wheelchair or stretcher.
- Identify the isolation category involved and prepare for the procedure.
- Patients often have a mask on.
- Isolation patients should be given priority. Why?
- Implement the clean tech dirty tech procedure.
- Don protective apparel.
- Place a protective sheet on the radiographic table before transferring the patient.

Isolation Patients in X-ray (cont'd)

- Be prepared so the procedure can be performed in a timely manner.
- How can we prepare? What does that entail?
- Return the patient to the wheelchair or stretcher and wrap a blanket around them.
- Discard any contaminated linens/materials in the appropriate container.
- Clean room with approved cleaner.
  - *Clean table, tube, detector, transfer equipment or any object that the patient or dirty tech may have come into contact with.*
- After cleaning, remove gloves and perform hand hygiene.

Reverse/Protective Isolation

- Used when a patient's immunity is compromised.
  - E.g., *chemotherapy patients, organ transplants, those taking immunosuppressant medication, burn patients, neonates, etc.*
- Used to protect the patient from the healthcare worker.
- The clean/dirty tech roles are opposite to strict isolation (i.e., clean tech touches patient).
- Equipment is always cleaned before entering the patients room. Why?

Reverse/Protective Isolation (cont'd)

- Hand hygiene is required before touching the patient, the bed or any items that come in contact with the patient.
- Masks, caps, sterile gowns and gloves may be worn in the same manner used in the OR
- Specific precautions are posted outside the patient's room.

Clean/Dirty Tech-Protective/Reverse

- Don your lead apron and protective clothing.
- Greet the patient, make introductions and explain the procedure.
- Clean tech positions the patient.
- Dirty tech handles the equipment.
- Both team members must follow designated isolation precautions.
- To cover the cassettes, the clean tech folds back the edges of a sterile cover and holds it open while the dirty tech places the cassette inside.
- Care must be taken not to contaminate the outside of the cover.
- Perform medical asepsis and conclude exam