Aseptic Technique

Why learn Aseptic Technique?

- To reduce infection & prevent disease transmission
- *Healthcare-Associated Infection (HAI):* infections that patients acquire during the course of receiving healthcare treatment for other conditions.

Diseases & Organisms in Healthcare Settings

- **MRSA** – methicillin resistant staphylococcus aureus
- **VRE** – vancomycin resistant enterococci
- **CDIF** – clostridium difficile
- **CRE** – carbapenam resistant enterobacteriaceae
- **Staphylococcus aureus**
- **Hepatitis**
- **HIV/AIDS** – Human immunodeficiency virus
- **Influenza**
- **TB** – tuberculosis
Diseases & Organisms in Healthcare Settings continued

- **MRSA:**
  - type of staph bacteria that is resistant to certain antibiotics (methicillin, oxacillin, penicillin, and amoxicillin) in the community, most MRSA infections are skin infections. More severe or potentially life-threatening MRSA infections occur most frequently among patients in Healthcare Settings.

- **VRE:**
  - specific types of antimicrobial-resistant bacteria that are resistant to vancomycin, the drug often used to treat infections caused by enterococci. Enterococci are bacteria that are normally present in the human intestines and are often found in the environment. These bacteria can sometimes cause infections. Most vancomycin-resistant Enterococci infections occur in hospitals.


Diseases & Organisms in Healthcare Settings continued

- **CDIF:**
  - a bacterium that causes an inflammation of the colon; this condition is called colitis. Diarrhea and fever are the most common symptoms of *Clostridium difficile* infection. Overuse of antibiotics is the most important risk for getting *Clostridium difficile* infection.

- **CRE:**
  - a family of germs that are difficult to treat because they have high levels of resistance to antibiotics. *Escherichia coli* (E. coli) Patients whose care requires devices like ventilators (breathing machines), urinary (bladder) catheters, or intravenous (vein) catheters, and patients who are taking long courses of certain antibiotics are most at risk for CRE infections.


Diseases & Organisms in Healthcare Settings continued

- **Staph:**
  - a bacterium commonly found on the skin and in the nose of about 30% of individuals. Most of the time, staph does not cause any harm. These infections can look like pimples, boils, or other skin conditions and most are able to be treated.

- **Hepatitis:**
  - The word hepatitis means inflammation of the liver and also refers to a group of viral infections that affect the liver. The most common types are hepatitis A, hepatitis B, and hepatitis C. The delivery of healthcare has the potential to transmit hepatitis to both healthcare workers and patients.

Diseases & Organisms in Healthcare Settings continued

- **HIV/AIDS:**
  - Human immunodeficiency virus (HIV) is the virus that can lead to acquired immune deficiency syndrome (AIDS). HIV destroys blood cells called CD4+ T cells, which are crucial to helping the body fight disease. This results in a weakened immune system, making persons with HIV or AIDS at risk for many different types of infections. Transmission of HIV to patients while in Healthcare Settings is rare. Most exposures do not result in infection.

- **Influenza:**
  - settings. Each year, 5% to 20% of U.S. residents acquire an influenza virus infection, and many will seek medical care in ambulatory healthcare settings

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Diseases & Organisms in Healthcare Settings continued

- **TB:**
  - Transmission of *Mycobacterium tuberculosis* in Healthcare Settings has been associated with close contact with persons who have infectious tuberculosis, particularly during the performance of cough-inducing procedures such as bronchoscopy and sputum induction. *Mycobacterium Tuberculosis* is spread through air and can travel long distances.

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Modes of Transmission of Infection

- **Contact**: the most important and frequent mode of nosocomial infection transmission
  - Direct: direct body surface to body surface contact (i.e. touching a patient, transferring a patient, etc)
  - Indirect: a contaminated intermediate object transmits the infection (i.e. unchanged whirlpool water, re-use of self adhesive electrodes on more than one patient, gloves not changed or hands not washed between patients)

- **Droplet**: when infected droplets are propelled a short distance through the air and land on someone else’s mouth, conjunctivae, or nasal mucosa

- **Airborne**: very very small droplets that are evaporated and remain suspended in the air for long periods of time

  [Johansson, p83]
Three Levels of Cleanliness

- **Cleaning**: the physical removal of soil from objects usually done with water, with or without detergents. It is the least rigorous of the three levels and it removes microorganisms instead of killing them.
- **Disinfection**: intermediate level; usually using pasteurized or chemical germicides.
- **Sterilization**: the highest level of cleanliness. It is the destruction of all forms of microbial life by steam under pressure, liquid or gaseous chemicals, or dry heat.

**Universal Precautions**

- "**Universal precautions**, as defined by CDC, are a set of precautions designed to prevent transmission of human immunodeficiency virus (HIV), hepatitis B virus (HBV), and other bloodborne pathogens when providing first aid or health care.
- Under universal precautions, blood and certain body fluids of all patients are considered potentially infectious for HIV, HBV and other bloodborne pathogens.

**Standard Precautions**

- 1. Hand Hygiene
- 2. Personal Protective Equipment (PPE)
- 3. Respiratory Hygiene (Cough etiquette)
- 4. Care of equipment and Environment
1. Hand Hygiene

- Visibly soiled or dirty hands are washed with antimicrobial soap and water

Hand Hygiene Continued

- Both the CDC and the WHO recommend that in healthcare settings the PRIMARY MODE of hand hygiene be the use of alcohol-based rubs EXCEPT when:
  - Hands are visibly soiled (dirt, blood, body fluids)
  - Or after caring for a patient with known or suspected infectious diarrhea (CDIF, norovirus)
  - After multiple applications of alcohol based hand sanitizer
- Why do you think that is?

When to Perform Hand Hygiene

- 1. before direct contact with patients
- 2. after contact with bodily fluids or wound dressings
- 3. after contact with intact skin (ex. taking a pulse)
- 4. when moving hands from a contaminated body site to a clean body site during patient care
- 5. after contact with inanimate objects in the immediate vicinity of the patient
- 6. after removing gloves

Johansson, p84

Minor, p94
Steps to Proper Hand Washing

1. Hands should be washed with soap and warm running water
2. Hands should be rubbed vigorously during washing (with soap!) for at least 15 seconds
3. Hands should be rinsed well while leaving the water running
4. With the water running, hands should be dried with a single use towel
5. Turn off the water using a paper towel, covering washed hands to prevent recontamination

Minor, p94

Dry Your Hands Thoroughly!

Organisms are transferred to various types of surfaces in much larger numbers (i.e., >10^4) from wet hands than from hands that are thoroughly dried (65).

http://www.cdc.gov/mmwr/PDF/rr/rr5116.pdf

Fingernails

Fingernails should be kept short and clean

Artificial nails should not be worn when having direct contact with patients at high risk for infection.

Jewelry

Johansson, p82
2. Personal Protective Equipment (PPE)

- Wear PPE when anticipating contact with bodily fluids or contaminated skin/surfaces
- Prevent contamination of clothing and skin while removing the PPE
- Before leaving the patient’s room, remove and discard PPE

Types:
- A. Gloves
- B. Gowns
- C. Mouth, nose, eye protection

Order of Donning/Doffing

- Donning PPE
  - Caps > face mask > booties > wash hands > gown > gloves
- Doffing PPE
  - Gloves > gowns > mask > cap > booties > wash hands

PPE – Gloves

A. Gloves
- Wear when anticipating contact with bodily fluids, non-intact skin, or potentially contaminated intact skin
- Wear gloves that fit
- Remove them after contact with patient or equipment
- Do not treat more than 1 patient with the same pair of gloves on
- Do not wash gloves for reuse
- Change gloves if hands move from contaminated body site to clean body site
PPE – Gowns

B. Gowns
- Wear a gown to prevent contamination of clothing
- When the patient has uncontained secretions or excretions
- Remove gown and perform hand hygiene before leaving the patient’s environment
- Do not reuse gowns, even for repeated contacts with the same patient

PPE – mouth, nose, eye protection

C. Mouth, nose, eye protection
- Used to protect the mucous membranes during activities that are likely to cause splashes or sprays of body fluids.

Think-Pair-Share

1 minute: Think about what you consider to be the most important concept covered so far

1 minute: Share this thought with your desk partner & see if you can “agree” on which is the MOST important

Share with the class
3. Respiratory Hygiene (Cough Etiquette)
- Cover your mouth and nose when sneezing or coughing
- Use and dispose of tissues
- Perform hand hygiene after hands have been in contact with respiratory secretions

4. Care of Equipment and Environment
- Follow established policies & procedures for cleaning contaminated equipment (e.g., whirlpools)
- Wear PPE when cleaning equipment
- Clean and disinfect surfaces likely to be contaminated (beds, rails, door knobs, exercise equipment, assistive devices, modalities)
- Handle used laundry with minimum agitation to avoid contamination of air, surfaces and people
- Follow established protocols for doing laundry (outpatient setting)

Transmission-based Precautions
- Transmission based precautions are additional precautions that should be implemented in addition to standard precautions.
- These are updated guidelines for the particular care of certain patients.
Transmission–based Precautions

Contact Precautions: these precautions reduce the risk of transmission of infectious agents through direct or indirect contact.
- Private room (may share with patient with same active microorganism)
- Use of gloves when entering the room
- Change of gloves after direct contact with infectious material
- Doff gloves prior to leaving the room & perform proper hand washing technique
- Wear a gown if you will have substantial close contact with patient & remove it before leaving the room
- Limit patient’s transport outside room for essential purposes only
- Dedicate non–critical patient care equipment to one patient, do not share between patients or disinfect properly prior to using it again
- Examples: GI, respiratory, skin or wound infections

Droplet Precautions: these precautions reduce the risk of droplet transmission of infectious agents. Transmission of these agents require close contact, as they do not suspend in the air & travel only 3 feet or less.
- Private room (may share with another patient with active infection of same microorganism)
- Maintain at least 3 feet between the patient and staff/visitors, etc.
- Room door may remain open
- Wear a mask when working within 3 feet of patient
- Limit patient’s transport outside of the room for only essential purposes; patient should wear a mask during transport
- Examples: meningitis, pneumonia, pertussis, influenza, mumps, rubella

Airborne Precautions: these precautions reduce the risk of airborne transmission of infectious agents.
- Private room with monitored air pressure
- 6–12 air changes within the room per hour
- Room door should remain closed with the patient remaining in the room
- Respiratory protection worn when entering the room
- Limit patient’s transport outside of the room for only essential purposes; patient should wear a mask during transport
- Examples: measles, varicella, tuberculosis
Definitions

**Aseptic technique** refers to the methods and procedures used to create and maintain a sterile field.

**Sterile Field**: An area considered free from living microorganisms.

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Creation of a Sterile Field

1. All items used within the boundaries of a sterile field must be sterile
   - Use before the expiration date
   - Single use items are preferred
2. Once a sterile package has been opened, the edges are not considered sterile
   - Carefully open package avoiding having the edges touch the contents of the package or the gloved hands or sterile gown
3. Once donned properly, sterile gowns are considered sterile in the front from shoulder to tabletop level, including sleeves
   - So, hands must be held above tabletop level and in front of the body during and after scrubbing, gowning, & gloving
4. Only the top surface of the table is considered sterile

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Maintenance of the Sterile Field

- Only sterile items & personnel in sterile attire may enter the sterile field or touch items in the sterile area.
  - However, it is okay for sterile packages to be opened by nonsterile personnel and released into the sterile field without actually being touched by nonsterile personnel.
  - Nonsterile personnel may not reach across or into a sterile field.
- Movement within the sterile area must be measured and careful.
  - Once in sterile attire, do not sit or lean against unsterile surfaces.
- Penetration of a sterile covering or barrier is considered to cause contamination of a sterile field.
  - Liquids are the most likely cause of penetration.
- Sterile fields should be prepared as close to the time of use as feasible.
  - They should not be left unattended.
  - Do not prepare and then cover for later use.
  - When there is doubt as to the sterile quality of an area, it should be considered unsterile.
Donning and Doffing Gloves

- Clean Gloves
- Sterile Gloves
  - http://www.youtube.com/watch?v=pAKZ3mdFlj4

Medical Waste

- Proper disposal
  - Sharps
  - Red Bag
  - Never attempt to retrieve items placed (purposefully or accidentally) in waste containers
  - Immediately report any exposure to body fluids when blood or other PIM contacts your eyes, mouth, other mucous membranes, non-intact skins or IV, IM to your supervisor

ASEPSIS

- **Asepsis** is the practice of reducing or eliminating contaminants (such as bacteria, viruses, fungi, and parasites) from entering the operative field in surgery or medicine to prevent infection.
- Ideally, a field is "sterile" — free of contaminants — a situation that is difficult to attain.
- However, the goal is elimination of infection, not sterility.
Where did she go wrong?

“...A nurse enters a hospital room, does a thorough handwashing, pulls back the privacy curtains and attends to a patient.”

Questions???

- http://www.cdc.gov/hai/burden.html