

Skills Module 1

Asepsis

Infection Control & Prevention

Scientific Knowledge Base

- Nature of infection
 - Infection:
 - is the invasion of a susceptible host by pathogens or microorganisms, resulting in disease.
 - Entry and multiplication of organisms with accompanying alteration in normal tissue functioning results in *disease or infection*.
 - Colonization:
 - occurs when a microorganism invades the host but does not cause infection.

Nature of Infection

- Communicable disease:
 - is the infectious process transmitted from one person to another.
- If pathogens multiply and cause clinical signs and symptoms, the infection is **symptomatic**.
- If clinical signs and symptoms are not present, the illness is termed **asymptomatic**.
- ***Hand hygiene is the most important technique to use in preventing and controlling transmission of infection.***

Terminology

- **Immunocompromised** means having an impaired immune system.
- **Virulence** is the ability to produce disease.
- **Aerobic bacteria** require oxygen for survival and for multiplication sufficient to cause disease.
- **Anaerobic bacteria** thrive where little or no free oxygen is available.
- **bacteriostasis**—prevention of growth and reproduction of bacteria.
- **bactericidal**—destructive to bacteria

Infectious Process

- Four stages:

Incubation period

Prodromal stage

Illness stage

Convalescence

- Localized versus systemic infection

Defenses Against Infection

- Normal flora
 - Microorganisms
 - Normal body flora helps to resist infection by releasing antibacterial substances and inhibiting multiplication of pathogenic microorganisms.
- Body system defenses
 - Organs
 - Inflammation
 - Vascular & cellular responses:
 - Localized response: inflammation
 - Systemic response: Infection
 - Exudates
 - serous
 - sanguineous
 - purulent
 - Tissue Repair
 - **Signs of local inflammation & infection are identical**

Case Study

- Mrs. Eldredge is a 63-year-old woman who underwent a total hip replacement. Kathy Jackson is a nursing student caring for Mrs. Eldredge on her home health clinical rotation.
- Two weeks after surgery, Mrs. Eldredge complains to Kathy that she has increased pain in her hip and low-grade fever.
- Kathy observes the incision and notes that it is red, swollen, and warm.

Health Care–Associated Infections

- Results from delivery of health services in a health care facility
- Patients at greater risk for health-care associated infections (HAIs)
 - Multiple illnesses
 - Older adults
 - Poorly nourished
 - Lowered resistance to infection

Health Care–Associated Infection (cont'd)

- Types of HAI infection:

Iatrogenic—from a procedure

Exogenous—from microorganisms outside the individual

Endogenous—when the patient's flora becomes altered and an overgrowth results

Health Care–Associated Infection (cont'd)

- Risk factors
 - Number of health care employees with direct contact with the patient
 - Types and numbers of invasive procedures
 - Therapy received
 - Length of hospitalization
- Major sites for HAI infection
 - Surgical or traumatic wounds
 - Urinary and respiratory tracts
 - Bloodstream

Nursing Knowledge Base

- Factors influencing infection prevention and control:
 - Age
 - Nutritional status
 - Stress
 - Disease process
 - Treatments or conditions that compromise the immune response

Case Study (cont'd)

- Mrs. Eldredge's wound was infected. She was admitted and received IV antibiotics and wound irrigation. She was discharged on day 4.
- At present, the wound remains open, but it is healing with new granulation tissue that is healthy.

Nursing Process: Assessment

- Assessment includes a thorough investigation:
 - Review of systems, travel history
 - Immunizations and vaccinations
- Early recognition of risk factors

Nursing Process: Assessment (cont'd)

- See through the patient's eyes.
- Status of defense mechanisms
- Patient susceptibility
 - Medical therapy
- Clinical appearance
 - Signs and symptoms of infection
- Laboratory data

Quick Quiz!

- 2. You are caring for a patient who underwent surgery 48 hours ago. On physical assessment, you notice that the wound looks red and swollen. The patient's WBCs are elevated. You should*
- A. Start antibiotics.
 - B. Notify the physician.
 - C. Document the findings and reassess in 2 hours.
 - D. Place the patient on isolation precautions.

Nursing Process: Nursing Diagnosis

- Nursing diagnoses for infection:

Risk for infection

Imbalanced nutrition: less than body requirements

Impaired oral mucous membrane

Risk for impaired skin integrity

Social isolation

Impaired tissue integrity

Readiness for enhanced immunization status

Nursing Process: Planning

- Goals and outcomes
- Common goals of care applicable to patients with infection often include the following:
 - Preventing exposure to infectious organisms
 - Controlling or reducing the extent of infection
 - Maintaining resistance to infection
 - Verbalizing understanding of infection prevention and control techniques (e.g., hand hygiene)

Nursing Process: Planning (cont'd)

- Setting priorities
 - Establish priorities for each diagnosis and for related goals of care.
- Teamwork and collaboration
 - Remember to plan care and include other disciplines as necessary.

Implementation

- Health promotion
 - Preventing an infection from developing or spreading
- Acute care
 - Treating an infectious process includes eliminating the infectious organisms and supporting the patient's defenses.

Implementation (cont'd)

- When implementing care, consider:
 - Medical and surgical asepsis
 - Control or elimination of infectious agents
 - Control or elimination of reservoirs
 - Control of portals of entry
 - Control of transmission
 - Hand hygiene
 - Isolation precautions

Implementation: Asepsis

- **Asepsis** = Absence of pathogenic (disease-producing) microorganisms.
 - Aseptic technique = Practices/ procedures that assist in reducing the risk for infection.
 - **Medical asepsis, or *clean technique***, includes procedures for reducing the number of organisms present and preventing the transfer of organisms.
 - **Surgical asepsis or *sterile technique*** prevents contamination of an open wound, serves to isolate the operative area from the unsterile environment, and maintains a sterile field for surgery.

Standard Precautions – (Tier One)

- **Standard precautions prevent and control infection and its spread.**
 - Apply to contact with blood, body fluid, nonintact skin, and mucous membranes from all patients.
 - **Hand hygiene** includes using an instant alcohol hand antiseptic before and after providing patient care, washing hands with soap and water when they are visibly soiled, and performing a surgical scrub.
 - **Handwashing** is the act of washing hands with soap and water, followed by rinsing under a stream of water for 15 seconds.

These precautions protect the patient and health care provider directed by Occupational Safety and Health Administration (OSHA).

Standard Precautions used with EVERY PATIENT!

Disinfection versus Sterilization

- **Cleaning**
- **Disinfection:** a process that eliminates many or all microorganisms, with the exception of bacterial spores, from inanimate objects
 - Disinfection of surfaces
 - High-level disinfection, which is required for some items such as endoscopes
- **Sterilization:** the complete elimination or destruction of all microorganisms, including spores

Infection Prevention and Control

- Patient safety
 - Separate personal care items
 - Handling solid and fluid waste
 - Wound cleaning
 - Resistant Organisms
 - Clostridium Difficile (c-diff)
 - Methicillin Resistant Staphylococcus Aureus (MRSA)
 - Vancomycin Resistant Enterococcus (VRE)
 - Carbapenem-Resistant Enterobacteriaceae (CRE)
 - Multi Drug Resistant Organism (MDRO)
- Patient education
- Cough etiquette/Safe Injection/
- Isolation and isolation precautions
- Surgical asepsis – will review with dressing change module

Cough Etiquette

- Cover your nose/mouth with a tissue when you cough, and promptly dispose of the contaminated tissue.
- Place a surgical mask on a patient if it does not compromise respiratory function or is applicable; this may not be feasible in pediatric populations.
- Perform hand hygiene after contact with contaminated respiratory secretions
- Maintain spatial separation greater than 3 feet from persons with respiratory infection

Isolation and Isolation Precautions

- Isolation is the separation and restriction of movement of ill persons with contagious diseases. EX: Pt. w/active TB is placed in a negative pressure room on airborne precautions.
 - CDC– Isolation Guidelines– 2 Tiers:
 - <http://www.cdc.gov/hicpac/pdf/isolation/Isolation2007.pdf>
 - Tier 1
 - Standard precautions
 - Tier 2: Transmission-Based Precautions
 - Restriction & Isolation
 - Separate room (if required) & appropriate precautions
 - Isolation precautions: *airborne, droplet, contact, and protective environment*

Transmission-Based Precautions

- **Contact & Contact Enteric**
 - Direct client or Indirect (environmental-ex: hands) contact
- **Organisms:**
 - Contact: infections with multidrug resistance like MRSA and VRE) Scabies, Draining wounds.
 - Contact Enteric: c-Diff, norovirus, rotavirus
- **Prevention: Private room, gloves, gowns and policy of facility.**
- **Handout**

Transmission-Based Precautions

Droplet –

Droplets *larger than 5mcg* and being
Travel 3-6 feet. Stay 3 feet away

Organisms:

Influenza, rubella, streptococcal, pneumonia,
meningococcal or scarlet fever)

Prevention:

Surgical mask when within 3 ft of pt

Private room

Dedicated equipment

Handout

Transmission-Based Precautions

Airborne & Airborne Respirator

Droplet smaller than 5mcg

- Organisms: chickenpox, measles, shingles)
- Prevention: private room, Hepa (N-95) Mask, negative pressure airflow
- Handout

Transmission-Based Precautions

- Protective
 - – Allogeneic or stem cell transplants
 - Immunocompromised patients (chemo)
- Prevention: private room, positive pressure air exchange, HEPA mask, gowns, gloves.
- Handout

Isolation

- Psychological implications
- Isolation environment
- Personal protective equipment
- Specimen collection
- Bagging of trash or linen
- Patient transport



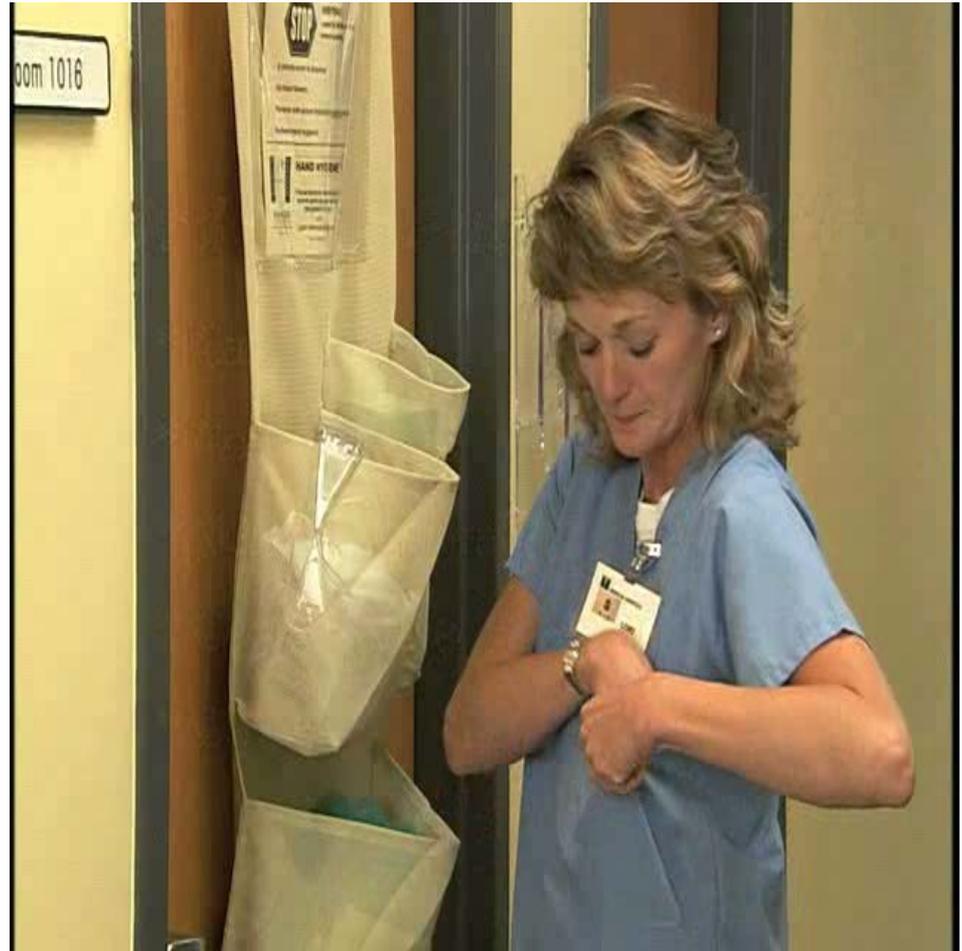
Courtesy Kimberly-Clark Health Care, Roswell, Ga.

PPE Equipment

- Includes: gowns, masks, protective eyewear, and gloves.
 - A. Gowns used to prevent soiling of clothes during contact with clients
 - B. Wear full face protection when anticipate splashing or spraying of blood or body fluids.
 - C. Eye protection – glasses or goggles when needed to prevent splashing or spraying
 - D. Gloves- wear at all times when touching blood, body fluids, secretions, moist mucous membranes, non intact skin, and contaminated surfaces. (must change between patients and when leave room)

Order for Applying PPE

- Box 28-12
- Hand Hygiene: Wash hands
- Apply:
 - Gown:
 - make sure it covers outer garments
 - Sleeves down to wrist & tie at neck & waist
 - Mask- if needed Box 28-13
 - Tie upper, then lower, then adjust bridge
 - Eyewear- if needed
 - Clean gloves



Order for Applying PPE

■ DONNING PPE

■ GOWN

- Fully cover torso from neck to knees, arms to end of wrist, and wrap around the back

- Fasten in back at neck and waist

■ MASK OR RESPIRATOR

- Secure ties or elastic band at middle of head and neck

- Fit flexible band to nose bridge

- Fit snug to face and below chin

- Fit-check respirator

■ GOGGLES/FACE SHIELD

- Put on face and adjust to fit

■ GLOVES

- Use non-sterile for isolation

- Select according to hand size

- Extend to cover wrist of isolation gown

■ SAFE WORK PRACTICES

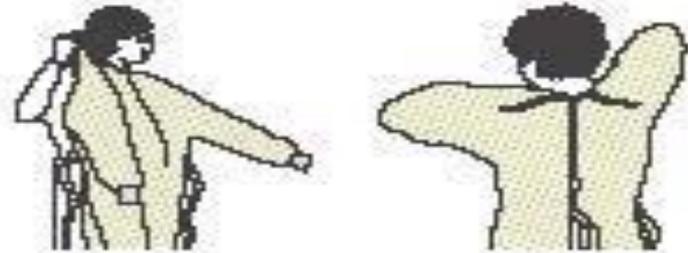
- Keep hands away from face

- Work from clean to dirty

- Limit surfaces touched

- Change when torn or heavily contaminated

- Perform hand hygiene



Order for REMOVING PPE

- Remove Gloves
- Remove:
 - Eyewear
 - Mask
 - Gown:
 - untie neck first.
 - Allow to fall from shoulders.
 - Do not touch outside of gown. Fold & discard
 - WASH HANDS

Order for REMOVING PPE

- **REMOVING PPE**

- Remove PPE at doorway before leaving patient room or in anteroom

- **GLOVES**

- Outside of gloves are contaminated!
- Grasp outside of glove with opposite gloved hand; peel off
- Hold removed glove in gloved hand
- Slide fingers of ungloved hand under remaining glove at wrist

- **GOGGLES/FACE SHIELD**

- Outside of goggles or face shield are contaminated!
- To remove, handle by “clean” head band or ear pieces
- Place in designated receptacle for reprocessing or in waste container

- **GOWN**

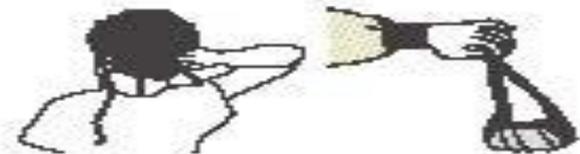
- Gown front and sleeves are contaminated!
- Unfasten neck, then waist ties
- Remove gown using a peeling motion; pull gown from each shoulder toward the same hand
- Gown will turn inside out
- Hold removed gown away from body, roll into a bundle and discard into waste or linen receptacle

- **MASK OR RESPIRATOR**

- Front of mask/respirator is contaminated – DO NOT TOUCH!
- Grasp ONLY bottom then top ties/elastics and remove
- Discard in waste container

- **HAND HYGIENE**

- Perform hand hygiene immediately after removing all PPE!



Case Study (cont'd)

- Mrs. Eldredge continues recovering at home. When she visits Mrs. Eldredge, Kathy teaches her about infection prevention and control practices.

Evaluation

- See through the patient's eyes:
 - Have the patient's expectations been met?
- Patient outcomes
 - Measure the success of the infection control techniques.
 - Compare the patient's actual response with expected outcomes.
 - If goals are not achieved, determine what steps must be taken.

Evaluation (cont'd)

- Exposure issues
 - Patients and health care personnel are at risk for acquiring infection from accidental needlesticks.
 - Report any contaminated needlestick immediately.
 - Follow-up for risk of acquiring infection begins with source patient testing.
 - Access to testing the source patient is stated in the testing law for each state.



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