



Chapter 12

Medical-Surgical Asepsis and Infection Prevention and Control

“ Microorganisms

- These are tiny, usually microscopic, entities capable of carrying on living processes.
- They are naturally present on and in the human body, as well as in the environment.
- Many are harmless (nonpathogenic) and do not produce disease in most individuals.
- If an individual is highly susceptible to infection, the nonpathogenic microorganisms could be dangerous.
- There are also known microorganisms (pathogens) that do cause specific diseases or infections.

“ Infection Control

- This consists of the policies and procedures of a health care facility to minimize the risk of the spread of health care. associated (nosocomial) or community - acquired infections to patients and other staff members.
- Control of infection is an important part of every action the nurse performs.

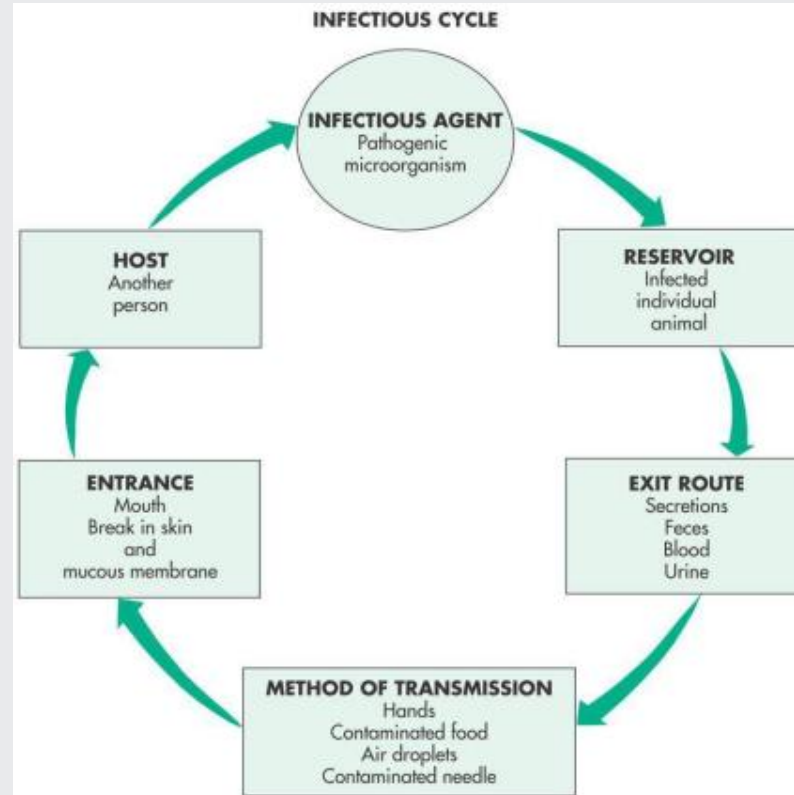
“ Asepsis

- Free of pathogenic microorganisms
- Medical asepsis
 - “ Inhibits growth and spread of pathogenic microorganisms
 - “ Clean technique
- Surgical asepsis
 - “ Destroys all microorganisms and their spores
 - “ Sterile technique

n Process

- “ Microorganisms must follow a definite cycle or chain to be transported and be effective in contamination and must have the following elements:
- Infectious agent—a pathogen
 - Reservoir—where the pathogen can grow
 - Exit from the reservoir
 - Method of transportation, such as exudate, feces, air, hands, needles
 - Entrance through skin, mucous lining, or mouth
 - Host—another person or animal
- “ The cycle must be interrupted to prevent the spread of a microorganism.

2-1



The chain of infection.

n Process

“ Infectious Agent

- Bacteria

- “ Aerobic: grows only in the presence of oxygen

- “ Anaerobic: grows only in the absence of oxygen

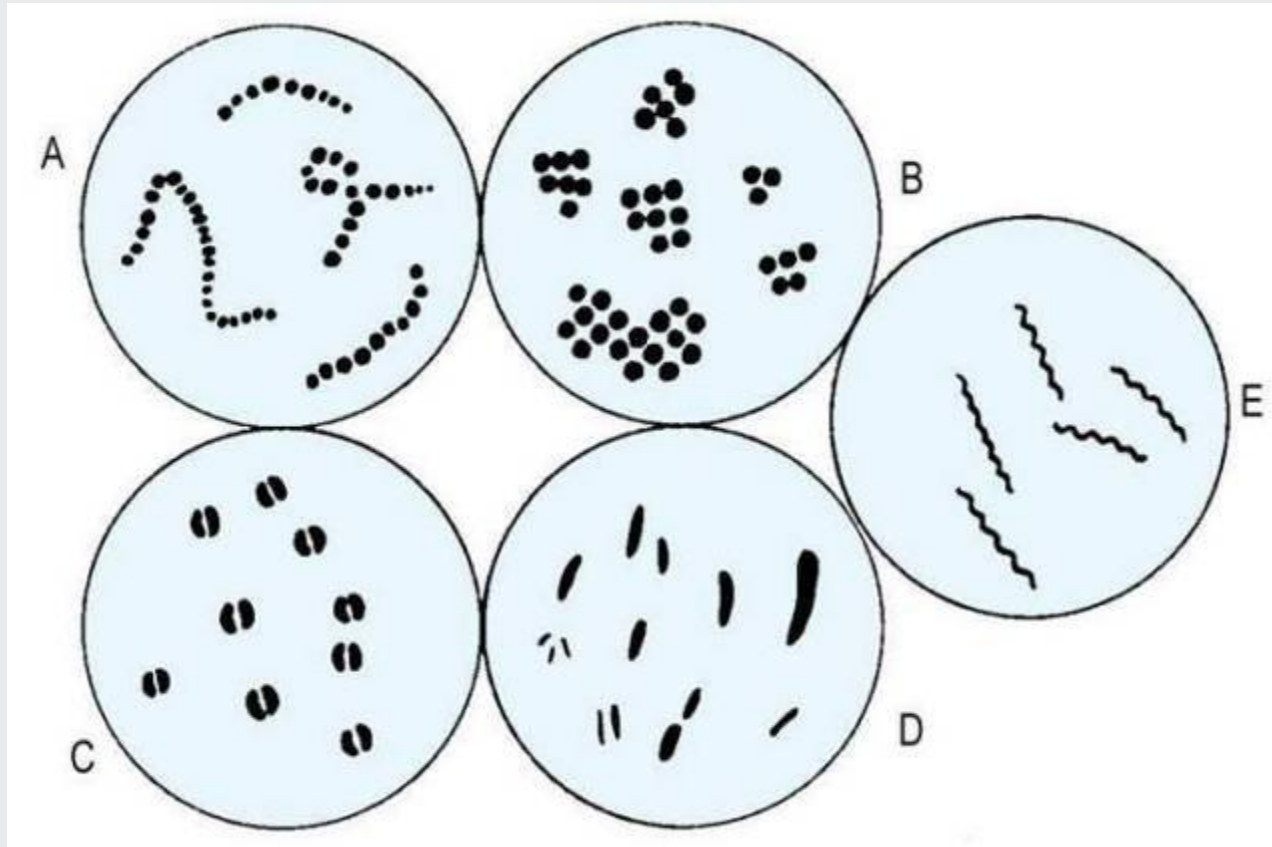
- Viruses

- “ Smallest known agents that cause disease

- “ Infections usually self-limiting

- Exceptions include rabies and HIV

2-3



Some common disease-producing bacteria.

Pox



n Process

“ Infectious Agent (continued)

- Fungi

- “ Fungi are responsible for some of the most common diseases found in humans.

- “ Many are harmless, but some are responsible for infections.

- Protozoa

- “ These single-celled animals exist everywhere in nature in some form.

- “ Disease-producing protozoa are responsible for malaria, amebic dysentery, and African sleeping sickness.

infection



protozoa



n Process

“ Reservoir

- A reservoir is any natural habitat of a microorganism that promotes growth and reproduction.
- Examples of reservoirs are soiled or wet dressings, hospital equipment, and carriers (person or animal who harbors and spreads an organism).
- Food and proper atmosphere are required to thrive.

n Process

“ Exit Route

- A microorganism cannot cause disease in another host unless it finds a point of escape from the reservoir.
- Human exit routes are gastrointestinal, respiratory, and genitourinary systems; tissue; and blood.
- Hand hygiene can prevent the spread of microorganisms or cross-contamination.

n Process

“ Method of Transmission

- Once the microorganism has exited a reservoir, there are many vehicles on or by which it can travel to the next host.
- Fomite
 - “ Vehicle is inanimate (nonliving) object
 - “ Stethoscope, thermometer, bandage scissors, etc.
- Vector
 - “ Living carrier



n Process

“ Entrance of Microorganisms

- The microorganism must find a way to enter the susceptible host.
- When the host's defense mechanisms are reduced, the microorganism has a greater chance to enter.
 - “ Punctured skin, open wounds, accidental needlesticks
- The skin is the first line of defense and should be kept intact, lubricated, and clean.

n Process

“ Host

- An organism in which another, usually parasitic, organism is nourished and harbored
- An infection will not develop unless a person is susceptible to the strength and numbers of the microorganism.
- Immunizations have proved effective in providing additional protection against infectious disease.

n Process

“ Infectious Process

- Infections follow a progressive course.
 - “ Incubation period
 - “ Prodromal stage
 - “ Illness stage
 - “ Convalescence
- Localized
 - “ Proper care controls the spread and minimizes the illness; wound infection
- Systemic
 - “ Infection that affects the entire body; can be fatal

ed wound infection



n Process

“ Inflammatory Response

- The body's cellular response to injury or infection
- Protective vascular reaction that delivers fluid, blood products, and nutrients to interstitial tissues in the area of injury
- Neutralizes and eliminates pathogens or necrotic tissues and establishes a means of repairing body cells and tissues

n Process

“ Inflammatory Response (continued)

- Signs of inflammation
 - “ Edema, redness, heat, pain or tenderness, and loss of function
 - “ Systemic signs: fever, leukocytosis, malaise, anorexia, nausea, vomiting, and lymph node enlargement
- May be triggered by physical agents, chemical agents, or microorganisms

Care-Associated Infections

- “ Health Care-Associated (Nosocomial) Infection
 - One that is acquired while in a hospital or other health agency
 - Acquired at least 12 hours after admission
 - Hospital harbors microorganisms that may be highly virulent, making it a more likely place to acquire an infection

Care-Associated Infections

- “ Exogenous Infection
 - Infection caused by microorganisms from another person
- “ Endogenous Infection
 - Infection caused by the patient's own normal microorganisms becoming altered and overgrowing or being transferred from one body site to another
- “ Health care-associated infections are most commonly transmitted by direct contact between health personnel and patients or from patient to patient.

Infection Control Team

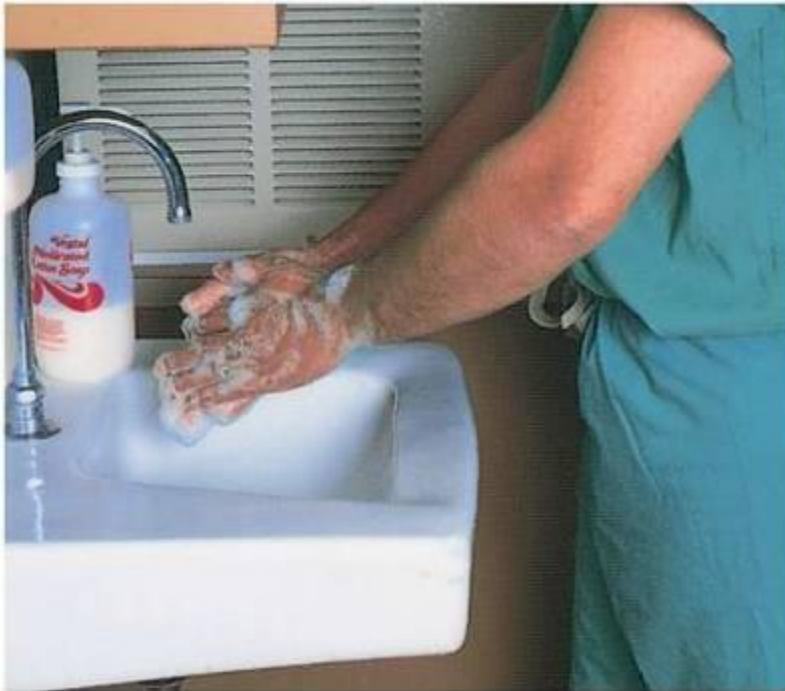
- “ Infection Control Practitioner/Professional
 - Nurses who are specially trained in infection control
 - Responsible for advising hospital personnel on safe aseptic practices and for monitoring infection outbreaks within the agency
- “ Employee Health Service
 - Plays a role in infection control by taking measures to protect the health care worker from disease carried by patients and to protect patients from disease carried by staff

Standard Precautions

“ Hand Hygiene

- This is the most important and basic preventive technique for interrupting the infectious process.
- Wash hands before patient care; after touching blood, body fluids, secretions, excretions, and contaminated items; immediately after gloves are removed; between patient contacts; and when otherwise indicated.

1: Steps 8 & 10



(From Elkin, M.K., Perry, A.G., Potter, P.A. [2004]. *Nursing interventions and clinical skills*. [3rd ed.]. St. Louis: Mosby.)

Performing a 2-minute handwashing.

1: Step 16



(From Potter, P.A., Perry, A.G. [2005]. *Fundamentals of nursing*. [6th ed.]. St. Louis: Mosby.)

Performing a 2-minute handwashing.

Standard Precautions

“ Gloving

- **Don gloves if there is any possibility of contact with infectious material.**
 - “ Gloves are worn only once and then placed into infectious waste containers.
 - “ If the nurse has not completed care but has come into contact with infectious material, the gloves should be changed before continuing patient care.
 - “ Hands should be washed after gloves are removed.

2: Steps 6 & 7



(From Elkin, M.K., Perry, A.G., Potter, P.A. [2004]. *Nursing interventions and clinical skills*. [3rd ed.]. St. Louis: Mosby.)

Remove first glove. Remove second glove.

and Precautions

“ Gowning

- Wear a gown to protect skin and prevent soiling of clothing during procedures and patient care activities that are likely to generate splashes or sprays of blood, body fluids, secretions, or excretions or cause soiling of clothing.

3: Step 5a



(From Elkin, M.K., Perry, A.G., Potter, P.A. [2004]. *Nursing interventions and clinical skills*. [3rd ed.]. St. Louis: Mosby.)

Remove gown.

3: Step 5b



(From Elkin, M.K., Perry, A.G., Potter, P.A. [2004]. *Nursing interventions and clinical skills*. [3rd ed.]. St. Louis: Mosby.)

Remove gown.

3: Step 5c



(From Elkin, M.K., Perry, A.G., Potter, P.A. [2004]. *Nursing interventions and clinical skills*. [3rd ed.]. St. Louis: Mosby.)

Remove gown.

3: Step 6



(From Elkin, M.K., Perry, A.G., Potter, P.A. [2004]. *Nursing interventions and clinical skills*. [3rd ed.]. St. Louis: Mosby.)

Discard soiled gown.

and Precautions

“ Mask/Protective Eyewear

- Protects the wearer from inhaling microorganisms that travel on airborne droplets.
- Prevents inhaling pathogens if resistance is reduced or during transport to another area.
- Discourages the wearer from touching the mouth, nose, and eyes and from transmitting infectious material.

4: Steps 2 & 5



(From Potter, P.A., Perry, A.G. [2005]. *Fundamentals of nursing*. [6th ed.]. St. Louis: Mosby.)

Donning a mask.



(From Potter, P.A., Perry, A.G. [2003]. *Basic nursing: Essentials for practice*. [5th ed.]. St. Louis: Mosby.)

Nurse wearing protective goggles and mask.

and Precautions

- “ Disposal of Contaminated Equipment
 - Specially labeled bagging and either sanitary burial or incineration are required.
 - Disposal of sharps (needles, blades)
 - “ Must be put in a puncture-proof container
- “ Double Bagging
 - This infection control practice involves placing a bag of contaminated items into another clean bag that is held outside an isolation room by other personnel.
 - This is recommended when it is impossible to keep the outer surface of a single bag free from contamination.

n Technique

“ Basic Principles

- Thorough hand hygiene should be performed before entering and after leaving a patient's room.
- An understanding of the patient's specific disease process and method of transmission of the infectious microorganism helps determine the use of protective barriers.

n Technique

“ Basic Principles (continued)

- Contaminated equipment and articles are to be disposed of in a safe and effective manner to prevent transmission of pathogens to other individuals.
- If the patient is transported to other areas in the facility, necessary measures should be taken to protect those who may be exposed. Have the patient wear a gown and mask.

n Technique

- “ The patient with an infectious disease should be placed in a private or isolation room with the appropriate hand hygiene and toilet facilities.
- “ Private rooms used for isolation have negative-pressure airflow to prevent infectious particulates from flowing out of the closed environment.
- “ Special rooms with positive-pressure airflow are also used for highly susceptible patients such as transplant recipients. No organisms are able to enter the room.
- “ All articles that come into contact with the patient are contaminated and should be handled appropriately to maintain protective asepsis.

n Technique

- “ The CDC issued isolation guidelines that contain two tiers of approach.
 - First Tier
 - “ Precautions designed to care for all patients in health care facilities regardless of their diagnosis or presumed infectiousness
 - “ STANDARD PRECAUTIONS
 - Second Tier
 - “ Condenses the disease-specific and categories approach to isolation into new transmission categories:
 - Airborne, droplet, and contact precautions

Asepsis

- “ This requires the absence of all microorganisms, pathogens, and spores from an object.
- “ The nurse working with a sterile field or with sterile equipment must understand that the slightest break in technique results in contamination.
- “ This is practiced in the operating room, labor and delivery area, and major diagnostic areas, as well as at the patient's bedside, when inserting IV lines or urinary catheters, or when reapplying sterile dressings.

Asepsis

- “ Explain what the patient can do to avoid contaminating sterile items.
- Avoid sudden movements of body parts covered by sterile drapes.
 - Refrain from touching sterile supplies, drapes, or the nurse's gloves and gown.
 - Avoid coughing, sneezing, or talking over a sterile area.

Asepsis

“ Principles of Sterile Technique

- A sterile object remains sterile only when touched by another sterile object.
- Only sterile objects may be placed on a sterile field.
- A sterile object or field out of vision or an object held below the waist is contaminated.
- A sterile object or field becomes contaminated by prolonged exposure to air.

Asepsis

“ Principles of Sterile Technique (continued)

- When a sterile surface comes in contact with a wet, contaminated surface, the sterile object or field becomes contaminated.
- Fluids flow in the direction of gravity.
- The edge of the sterile field or container is considered contaminated.

Asepsis

“ Opening Sterile Packages

- Sterile items are placed in plastic or paper containers that are impervious to microorganisms as long as they are dry and intact.
- Reusable supplies may be wrapped in a double thickness of linen or muslin.
- Sterile supplies have dated labels or chemical tapes that indicate the date when the sterilization expires.
- If the integrity of the sterile package is questionable, the item should not be used.

Asepsis

“ Opening Sterile Packages

- Nurse performs a thorough hand hygiene.
- The supplies are assembled at the work area.
- Commercially packaged items are usually designed so that the nurse only has to tear away or separate the paper or plastic cover.
- The item is held in one hand while the wrapper is pulled away with the other.
- Care is taken to keep the inner contents sterile before use.

6: Step 3d



(From Elkin, M.K., Perry, A.G., Potter, P.A. [2004]. *Nursing interventions and clinical skills*. [3rd ed.].
St. Louis: Mosby.)

Surgical handwashing.

6: Step 3e(1)



(From Elkin, M.K., Perry, A.G., Potter, P.A. [2004]. *Nursing interventions and clinical skills*. [3rd ed.].
St. Louis: Mosby.)

Surgical handwashing.

6: Step 3e(2)



(From Elkin, M.K., Perry, A.G., Potter, P.A. [2004]. *Nursing interventions and clinical skills*. [3rd ed.]. St. Louis: Mosby.)

Surgical handwashing.

6: Step 3f



(From Elkin, M.K., Perry, A.G., Potter, P.A. [2004]. *Nursing interventions and clinical skills*. [3rd ed.].
St. Louis: Mosby.)

Surgical handwashing.

6: Step 3g(1)



(From Elkin, M.K., Perry, A.G., Potter, P.A. [2004]. *Nursing interventions and clinical skills*. [3rd ed.]. St. Louis: Mosby.)

Surgical handwashing.

6: Step 3g(2)



(From Elkin, M.K., Perry, A.G., Potter, P.A. [2004]. *Nursing interventions and clinical skills*. [3rd ed.].
St. Louis: Mosby.)

Surgical handwashing.

Asepsis

“ Preparing a Sterile Field

- When performing sterile procedures, the nurse needs a sterile work area that provides room for handling and placing of sterile items.
- A sterile field is an area that is free of microorganisms and is prepared to receive sterile items.
- The field may be prepared by using the inner surface of a sterile wrapper or by using a sterile drape.

2-10



(From Potter, P.A., Perry, A.G. [2005]. *Fundamentals of nursing*. [6th ed.]. St. Louis: Mosby.)

Placing items on a sterile field.

Asepsis

“ Pouring Sterile Solutions

- A bottle containing a sterile solution is sterile on the inside and contaminated on the outside; the bottle's neck is also contaminated, but the inside of the bottle cap is considered sterile.
- Before pouring the solution into the container, the nurse pours a small amount (1 to 2 mL) into a disposable cap or waste receptacle. This cleans the lip of the bottle and is referred to as **flipping**.
- Pour the solution slowly to avoid splashing.
- The bottle should be held outside the edge of the sterile field.

Asepsis

“ Donning Sterile Gown

- Necessary for operating room and certain sterile procedures or special treatment areas

“ Donning Sterile Gloves

- Two methods

“ Open

- Used on general nursing divisions before procedures such as dressing changes or urinary catheter insertions

“ Closed

- Performed when the nurses wear sterile gowns and is practiced in operating rooms and special treatment areas

g, Disinfection, and Sterilization

“ Cleaning

- This is the removal of all foreign materials, such as soil and organic material, from objects.
- It generally involves the use of water and mechanical action with or without detergents.
- Contaminated disposable objects are usually discarded; reusable objects must be cleaned thoroughly and then either disinfected or sterilized.
- When cleaning equipment that is contaminated by organic material, the nurse applies a mask and protective eyewear and waterproof gloves.

g, Disinfection, and Sterilization

“ Disinfection

- It is used to destroy microorganisms, but it does not destroy spores.
- Solutions used are called disinfectants or bactericidal solutions.
 - “ They are too strong for human skin and are used only on inanimate objects.
 - “ The nurse should use clean gloves to protect the skin.

g, Disinfection, and Sterilization

“ Sterilization

- Method used to kill all microorganisms, including spores
- Two types
 - “ Physical (uses heat or radiation)
 - Steam under pressure, boiling water, radiation, or dry heat
 - “ Chemical
 - Gas
 - Chemical solutions
 - Iodine, alcohol, and chlorine bleach

Teaching for Infection

- “ Patients and families often must learn to use infection control practices at home.
- “ The patient may not be aware of the factors that promote the spread of infection or of the ways to prevent its transmission.
- “ Educate patient about the nature of infection and the techniques to use in planning or controlling its spread.

Infection Control for the Home and Hospice Settings

- “ Prevention of Infection in the Home Setting
 - Review basic principles of hygiene
 - “ Bathing, not sharing personal articles, and covering one's mouth when coughing and sneezing
 - General guidelines for
 - “ Handwashing
 - “ Food preparation
 - “ Linen care
 - “ Waste container care
 - “ Body fluid spills

Process

“ Nursing Diagnoses

- Tissue integrity, impaired
- Infection, risk for
- Social isolation