

Infection Control and Asepsis



Introduction to Infection Control

- *Nosocomial infections* are acquired by 5-10% of hospitalized patients.
- Center for Disease Control (CDC), the Joint Commission, state regulatory agencies, and each health care institution are required to develop and implement infection control policies.
- Infection control department of the hospital hire nurses to perform this job and they in turn work very closely with the micro department.

Asepsis

Medical Asepsis--

the use of practices aimed at destroying pathological organisms after they leave the body; employed in the care of patients with infectious diseases to prevent reinfection of the patient and to avoid the spread of infection from one person to another.

Surgical Asepsis--

the exclusion of all microorganisms before they can enter an open surgical wound or contaminate a sterile field during surgery or a procedure

Infection Control

- Stops the spread of disease to:
 - Medical personnel
 - Patients
- Breaks the chain of disease transmission
- CDC and OSHA
 - Establish and enforce infection control guidelines and regulations

Microorganisms

- Pathogenic
 - Disease-producing microorganisms
- Nonpathogenic
 - Not disease-producing microorganisms
 - Limit the growth of pathogens
 - Help maintain homeostasis in the body
 - Can become disease producing if transported to an area outside their normal environment

Growth Requirements for Microorganisms

- Nutrients: nitrogen and carbon
- Darkness: no light or low light requirement
- Temperature: body temperature of 98.6° F ideal for growth
- pH: neutral 7 preferred
- Gases: need for oxygen depends on organism
- Moisture: prefer damp environment

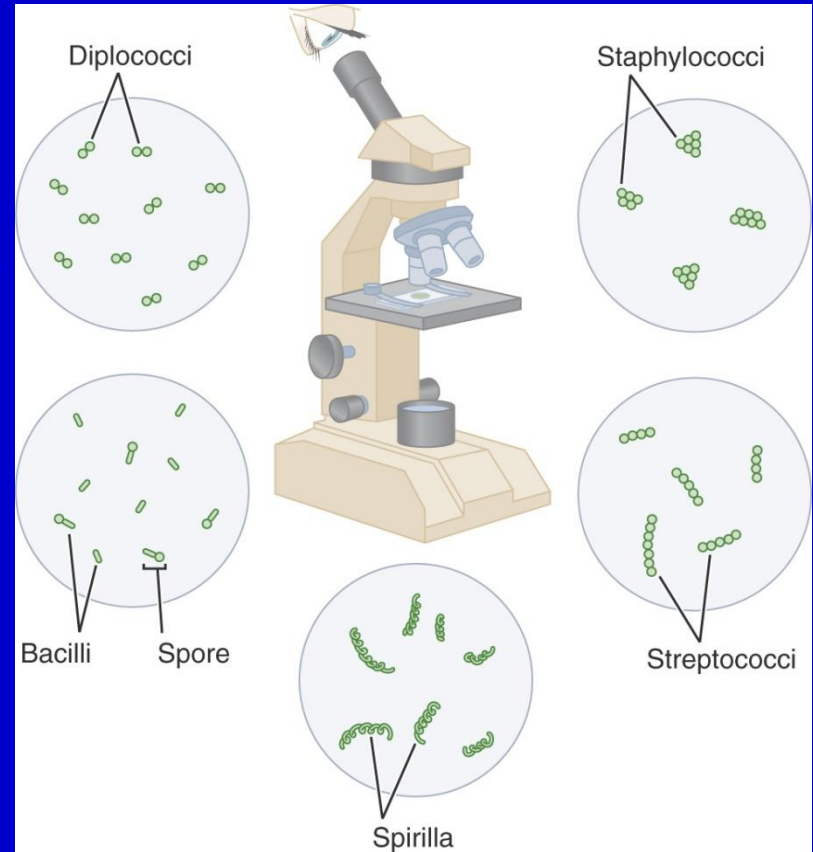
What is a nosocomial infection?

Classes of Disease-Causing Microorganisms

- Bacteria: single-celled microorganisms
- Fungi: include yeast and molds
- Rickettsiae: parasites that need a host to survive
- Protozoa: single-celled animals
- Viruses: reproduce only if within a living cell

Bacteria Classifications

- Cocci: round (spherical)
 - Diplococci: occur in pairs (gonorrhea)
 - Streptococci: occur in chains (strep throat)
 - Staphylococci: occur in clusters (acne, boils, bacterial pneumonia)
- Bacilli: rod shaped, occur singly in pairs and chains (typhoid, diphtheria, TB)
 - Spores (hard-walled capsules)
- Spirilla: spiral, corkscrew shaped (syphilis)

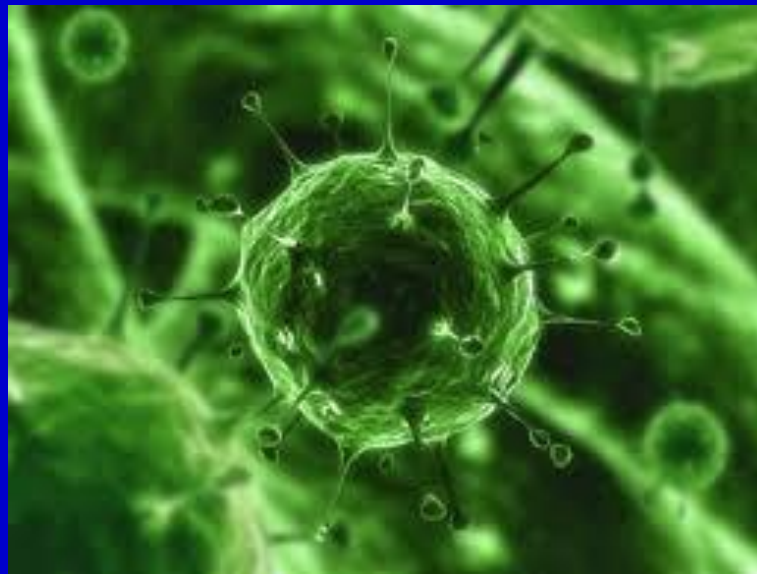




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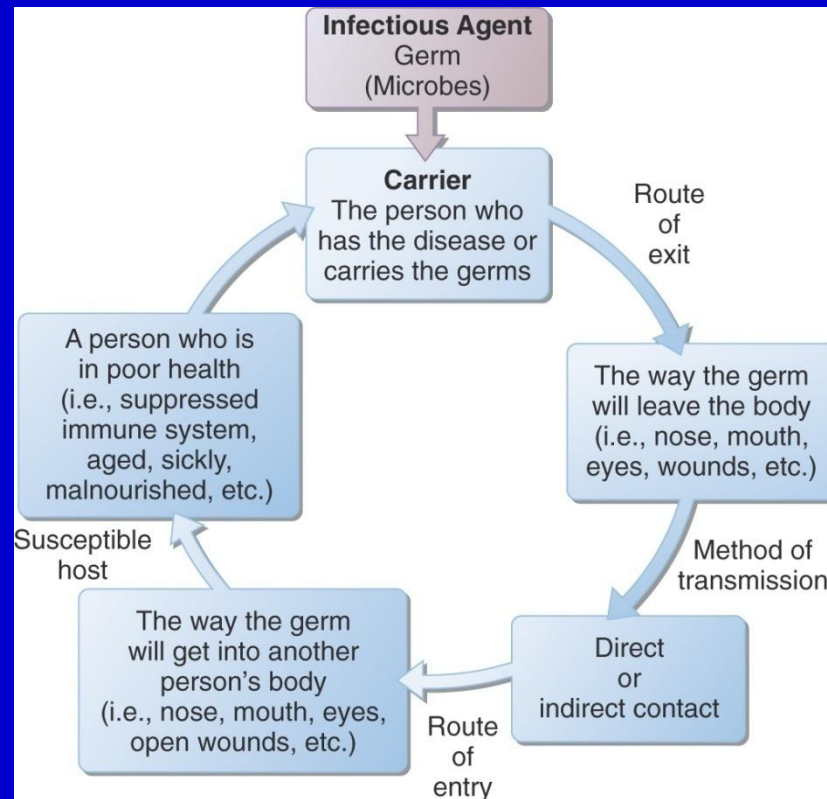
STREP



VIRUS

What are the three
shapes of bacteria?

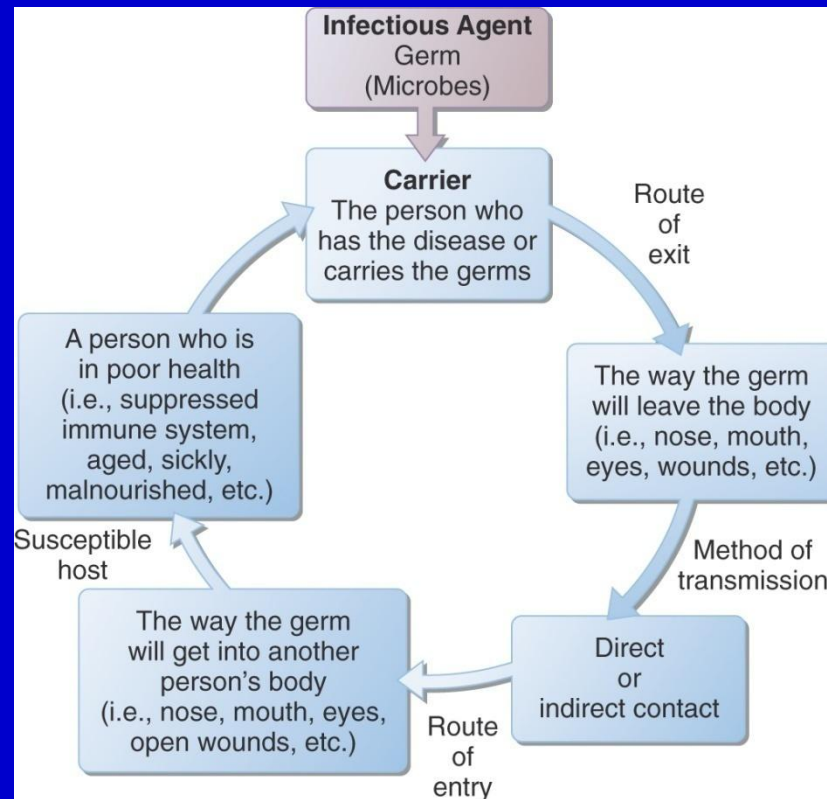
Chain of Infection (cont.)



Chain of Infection

- Infectious Organism
- Reservoir
 - An infected person carries the disease-causing germs
- Route of exit
 - Exit body through urine, feces, saliva, blood, tears
- Method of transmission
 - Direct and/or indirect contact
- Route of entry
 - Germs enter via nose, mouth, eyes, broken skin
- Susceptible host
 - Person, insect, or animal infected by microorganism

Chain of Infection (cont.)



MODES OF TRANSMISSION

Contact—Mononucleosis

Direct or Indirect

Airborne—Influenza

Droplet—Tuberculosis, Chickenpox

Vector—Fleas, Ticks, Mosquitos

What are the six
components of the
Chain of Infection?

Signs, Symptoms of Infection

- Localized infections
 - Redness, pain, warmth, swelling, and possibly pus
- Generalized infections
 - May not show all signs apparent in localized infections
 - Pain may be mild to severe depending on its location
 - Warmth is generally expressed as fever
 - Malaise
 - Anorexia
 - Prostration



Centers for Disease Control and Prevention (CDC)

- Part of the Public Health Service and U.S. Department of Health and Human Services
- Universal Precautions in 1987
 - Guidelines for protecting health care workers from bloodborne infections and HIV
- Standard Precautions in 1996
 - New guidelines for clients and patients attending health care facilities

STANDARD PRECAUTIONS

FOR INFECTION CONTROL



Sanitize Hands

Sanitize after touching **blood, body fluids, secretions, excretions**, and **contaminated items**. Sanitize immediately **after gloves are removed** and **between patient contacts**. Avoid transfer of microorganisms to other patients or environments.



Wear Gloves

Wear when touching **blood, body fluids, secretions, excretions**, and **contaminated items**. Put on **clean** gloves just **before touching mucous membranes** and **nonintact skin**. Change gloves between tasks and procedures on the same patient after contact with material that may contain high concentrations of microorganisms. Remove gloves promptly after use, before touching noncontaminated items and environmental surfaces, and before going to another patient, and **sanitize** hands immediately to avoid transfer of microorganisms to other patients or environments.



Wear Mask and Eye Protection or Face Shield

Protect mucous membranes of the eyes, nose, and mouth during procedures and patient-care activities that are likely to generate **splashes** or **sprays** of **blood, body fluids, secretions**, or **excretions**.



Wear Gown

Protect skin and prevent soiling of clothing during procedures that are likely to generate **splashes** or **sprays** of **blood, body fluids, secretions**, or **excretions**. Remove a soiled gown as promptly as possible and **sanitize** hands to avoid transfer of microorganisms to other patients or environments.

(Courtesy Brevis Corporation, Salt Lake City, UT.)



Patient-Care Equipment

Handle used patient-care equipment soiled with **blood, body fluids, secretions, or excretions** in a manner that prevents skin and mucous membrane exposures, contamination of clothing, and transfer of microorganisms to other patients and environments. Ensure that reusable equipment is not used for the care of another patient until it has been appropriately cleaned and reprocessed and single-use items are properly discarded.



Environmental Control

Follow hospital procedures for routine care, cleaning, and disinfection of environmental surfaces, beds, bedrails, bedside equipment, and other frequently touched surfaces.



Linen

Handle, transport, and process used linen soiled with **blood, body fluids, secretions, or excretions** in a manner that prevents exposures and contamination of clothing and avoids transfer of microorganisms to other patients and environments.



Occupational Health and Bloodborne Pathogens

Prevent injuries when using needles, scalpels, and other sharp instruments or devices; when handling sharp instruments after procedures; when cleaning used instruments; and when disposing of used needles.

Never recap used needles using both hands or any other technique that involves directing the point of a needle toward any part of the body; rather, use either a one-handed "scoop" technique or a mechanical device designed for holding the needle sheath.



Do not remove used needles from disposable syringes by hand, and do not bend, break, or otherwise manipulate used needles by hand. Place used disposable syringes and needles, scalpel blades, and other sharp items in puncture-resistant sharps containers located as close as practical to the area in which the items were used, and place reusable syringes and needles in a puncture-resistant container for transport to the reprocessing area.



Use **resuscitation devices** as an alternative to mouth-to-mouth resuscitation.



Patient Placement

Use a **private room** for a patient who contaminates the environment or who does not (or cannot be expected to) assist in maintaining appropriate hygiene or environmental control. Consult Infection Control if a private room is not available.

The information on this sign is abbreviated from the HICPAC Recommendations for Isolation Precautions in Hospitals.

What are signs and
symptoms of a localized
infection?

Occupational Safety and Health Administration (OSHA)

- Mandates and enforces use of Standard Precautions
- Requires all employers to provide a safe working environment for their employees

Occupational Safety and Health Administration (OSHA) (cont.)

- Requires training for management of:
 - Hazardous waste—Material Safety Data Sheet (MSDS)
 - Infectious waste—Standard Precautions
- OSHA's Occupational Exposure to Bloodborne Pathogens Standard
 - Effective since 1992

OSHA Needlestick Safety and Prevention Act

- The Needlestick Safety and Prevention Act mandated that the 1991 Bloodborne Pathogens Standard be revised to strengthen the requirements related to the use of safety-engineered sharp devices.
- Requires employers to identify, evaluate and make use of effective safer devices.
- For needle use it requires a built-in safety feature or mechanism that allows a single handed method of causing the needle to be permanently covered.
- The law mandated that employers allow “front line” employees to evaluate and select the equipment they were most comfortable with.
- Employers must maintain an injury log which will include the brand name of the device used which caused the injury.

Who is responsible for
ensuring that
employers follow
safety standards?

Procedure: Practice Standard Precautions

- Select and assemble appropriate personal protective equipment (PPE)
- Identify body substance isolation procedures
- Apply transmission-based precautions
- Describe Standard Precautions as they apply to all body fluids
- Relate the importance of continuing education for Standard Precautions
- Develop exposure and postexposure control plan

Normal Flora Versus Transient Flora

- Normal flora
 - Usually nonpathogenic
 - Grows on the surface of the skin
- Transient flora
 - Often pathogenic
 - Easily picked up on hands
 - May be removed by washing

Cleaning Methods

- ***Disinfectant***

- is a chemical compound used to **remove or kill** pathogenic organisms, they are regulated by the EPA.
- is used on surfaces and instruments, but are too caustic for direct use on human skin.

- ***Antiseptics***

- are chemicals used to ***inhibit the growth and development*** of microorganisms, but not necessarily kill them.
- may be used on human skin.

- ***Bacteriocidal***

- causing the death of bacteria

- ***Sterilization***

- the process of destroying all microorganisms and their pathogenic products

Maintaining Hand Hygiene

- Handwashing
 - Using soap and water
- Antiseptic handwash
 - Using antiseptic soap and water
- Antiseptic hand rub
 - Apply antiseptic hand rub (alcohol-based)
- Surgical handwash or surgical scrub
 - Use antiseptic preparation for extended period

Procedure: Handwashing for Medical Asepsis

- Remove rings and watch
- Microorganisms can lodge in crevices
- Stand close to sink; turn on water with paper towel
- Sink is a source of contamination
- Using warm water and antibacterial soap, lather hands and wrists
- Rinse hands in downward position
- Dry hands; turn off faucet with paper towel

Alcohol-Based Hand Rub

- Recommended by the CDC for soiled hands
- Use preparations containing 60% to 95% alcohol
- Recommended use
 - Before and after patient contact
 - Before applying gloves and when removing gloves
 - After contact with fluids or excretions, mucous membranes, wounds, and dressings
- When moving from contaminated portion of body to a clean site
- After contact with medical equipment

Procedure: Hand Sanitization Using Alcohol-Based Hand Rub

- Remove rings and watch
 - Microorganisms can lodge in crevices
- Apply product to palm
 - Follow manufacturer's recommended amount
- Spread gel evenly over hands, fingers, and wrists
- Rub until dry, approximately 15 to 30 seconds

Nonsterile Gloves

- Used for:
 - Performing clean procedures
 - Exposure to contaminated surfaces
- Reduce hand contamination by about 75%
- Prevent cross-contamination
- Protect patients and health care providers from infection
- Change before and after each patient encounter

Procedure: Apply and Remove Clean Disposable Gloves

- Select correct size
 - Difficult to work if gloves don't fit properly
 - Sanitize hands and apply gloves
- Remove gloves carefully to prevent contamination of hands
 - Grasp outside of one glove with opposite hand, pull glove off, ball it in palm of gloved hand
 - Insert fingers into cuff of remaining glove and pull glove off over palm holding balled glove from other hand