



Chapter 3: Infection Control, Safety, First Aid, and Personal Wellness



Objectives

1. Define the key terms and abbreviations listed at the beginning of this chapter.
2. Identify the components of the chain of infection and give examples of each, describe infection-control procedures used to break the chain, and identify four functions of infection-control programs.
3. Describe proper procedures for hand hygiene, putting on and removing protective clothing, and entering the nursery or neonatal ICU.
4. Describe standard and transmission-based precautions and identify the organizations that developed them.



Objectives (cont'd)

5. State safety rules to follow when working in the laboratory and in patient areas.
6. List examples of blood-borne pathogens and describe their means of transmission in a healthcare setting.
7. Discuss the major points of the blood-borne pathogens (BBP) standard, including changes required by the Needlestick Safety and Prevention Act, and identify key elements of a BBP exposure control plan.



Objectives (cont'd)

8. Describe hazards, identify warning symbols, list actions to take if incidents occur, and specify rules to follow for proper biological, electrical, fire, radiation, and chemical safety.
9. Identify symptoms of shock, state first aid procedures for treating external hemorrhage and shock, identify the main points of the international CPR and ECC guidelines, and identify the links in the American Heart Association chain of survival.
10. Describe the role of personal hygiene, proper nutrition, rest, exercise, back protection, and stress management in personal wellness.

Infection Control

- Infection: Definition
 - When a microorganism invades body, multiplies, & causes injury or disease
 - Microbes include:
 - Bacteria
 - Fungi
 - Protozoa
 - Viruses
 - **Pathogen:** a microbe capable of causing disease

Infection Control (cont'd)

- Types of Infection
 - **Communicable**
 - Able to be spread from person to person
 - CDC investigates & controls communicable diseases & epidemics
 - **Nosocomial & healthcare-associated infections (HAIs)**
 - Infections acquired in hospitals & other healthcare settings
 - 1.7 million HAIs & 99,000 associated deaths occur each year
 - Caused by infected personnel, patients, visitors, food, drugs, or equipment

Infection Control (cont'd)

- Chain of Infection
 - 1. Infectious (causative) agent**
 - Pathogenic microbe responsible for causing an infection
 - 2. Reservoir**
 - Source of infectious agent
 - Place where microbe can survive & grow or multiply
 - Includes: humans, animals, food, water, soil, equipment
 - 3. Exit pathway**
 - A way an infectious agent is able to leave a reservoir host
 - Secretions & exudates, tissue specimens, blood, feces, urine

Infection Control (cont'd)

- Chain of Infection
 - 4. Means of transmission**
 - **Airborne**
 - **Contact**
 - *Direct* (touching, kissing)
 - *Indirect* (contaminated objects)
 - **Droplet** (coughing, sneezing)
 - **Vector** (insect, arthropod, animal)
 - **Vehicle** (food, water, drugs)

Infection Control (cont'd)

- Chain of Infection
 - 5. Entry pathway**
 - Way an infectious agent enters a susceptible host
 - Includes: body orifices, mucous membranes, & breaks in skin
 - 6. Susceptible host**
 - Someone with a decreased ability to resist infection
 - Factors: age, health, immune status

Infection Control (cont'd)

- Breaking the Chain of Infection
 - **Hand Washing!!!!!!!**
 - Nutrition, rest, stress reduction
 - Immunization
 - Insect & rodent control
 - Isolation procedures
 - Decontamination of surfaces & instruments
 - Disposal of sharps & infectious waste
 - Use of gloves, gowns, masks, & respirators
 - Needle safety devices

Infection Control (cont'd)

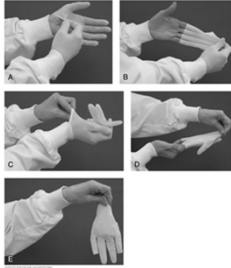
- Infection-Control Program
 - To protect patients, employees, visitors, & others
 - To break chain of infection
 - Monitors & collects data on all infections occurring in institution
 - Institutes special precautions in event of outbreaks
 - **Components**
 - Employee screening & immunization
 - Evaluation & treatment
 - Surveillance

Infection Control (cont'd)

- Infection-Control Methods
 - **Hand hygiene**
 - Use of alcohol-based antiseptic hand cleaners
 - Hand washing
 - **Personal protective equipment**
 - Gloves
 - Gowns
 - Lab coats
 - Masks, face shields, & goggles
 - Respirators

Infection Control (cont'd)

- Glove removal



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Infection Control (cont'd)

- Respirator



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Infection Control (cont'd)

- | | |
|--|--|
| <ul style="list-style-type: none">• Order for donning PPE <ol style="list-style-type: none">1. Gown2. Mask (make sure it covers nose & mouth)3. Gloves | <ul style="list-style-type: none">• Order for removing PPE <ol style="list-style-type: none">1. Gloves2. Gown3. Mask (touch only strings) <p>Wash hands after removing PPE</p> |
|--|--|

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Infection Control (cont'd)

- Isolation Procedures: Overview
 - Keep patients with communicable infections separate from others
 - Prevent spread of infection
 - Protect patients with compromised immune system
 - Isolation requires doctor's order
 - Infected patient is confined to private room

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Infection Control (cont'd)

- Isolation Procedures
 - **Protective/reverse isolation**
 - For patients highly susceptible to infections
 - **Traditional isolation systems**
 - Category-specific system
 - Disease-specific system
 - **Universal precautions (UP)**
 - Blood & body fluids of *all* people are potentially infectious
 - **Body substance isolation**
 - Goes beyond UP: gloves for contacting moist body substances

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Infection Control (cont'd)

- Guideline for Isolation Procedures
 - **Standard precautions**
 - Used for *all* patients
 - #1 strategy for control of nosocomial infection
 - Covers blood, *all* body fluids, skin breaks, mucous membranes
 - **Transmission-based precautions**
 - Used for patients known/suspected to have certain infections
 - *Three types*: 1. **airborne**, 2. **droplet**, 3. **contact**

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Biosafety

- Biohazard
 - Any material or substance harmful to health
 - Should be identified by a biohazard symbol



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Biosafety (cont'd)

- Biohazard Exposure Routes
 - Airborne
 - Ingestion
 - Nonintact skin
 - Percutaneous (through the skin)
 - Permucosal (through mucous membranes)

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Biosafety (cont'd)

- Blood-Borne Pathogen
 - **Hepatitis B virus (HBV) & hepatitis D virus**
 - Best defense: HBV vaccination
 - HBV exposure hazards
 - Present in blood & other body fluids
 - Can survive up to a week on objects
 - Transmitted via needlesticks, sexual contact
 - **Symptoms:** flu-like, fatigue, loss of appetite, mild fever, muscle/joint/abdominal pain, nausea, vomiting

Biosafety (cont'd)

- Blood-Borne Pathogen
 - **Hepatitis C virus (HCV)**
 - HCV exposure hazards
 - Present in blood & serum; sometimes saliva
 - Infection primarily occurs after large or multiple exposures
 - Transmitted via needlesticks, sexual contact
 - **Symptoms:** flu-like, fatigue, loss of appetite, mild fever, muscle/joint/abdominal pain, nausea, vomiting

Biosafety (cont'd)

- OSHA Standard for Blood-Borne Pathogens (BBPs)
 - Enforced by federal law
 - Intended to reduce/eliminate occupational exposure to BBPs
 - Requires:
 - Use of engineering & work practice controls to prevent exposure incidents
 - Availability & use of PPE
 - Special training
 - Medical surveillance
 - Availability of vaccination against HBV for all at-risk personnel

Biosafety (cont'd)

- Exposure Control Plan
 - Must be written
 - Must be reviewed & updated at least annually
 - Nonmanagerial employees with risk of exposure must be involved in:
 - Identification
 - Review
 - Selection

Biosafety (cont'd)

- BBP Exposure Routes
 - Skin is pierced by a contaminated needle or sharp object
 - Blood or other body fluid splashes in eyes, nose, or mouth
 - Blood or other body fluid contacts cut, scratch, or abrasion
 - A human bite breaks the skin

Biosafety (cont'd)

- Exposure Incident Procedure
 - **Needlestick or other sharps injury:**
 - Carefully remove shards of glass or other objects
 - Wash site with soap & water at least 30 seconds
 - **Mucous membrane exposure:**
 - Flush site w. water or sterile saline at least 10 min
 - Use eyewash station if available to flush a splash to eyes
 - Remove contact lenses as soon as possible & disinfect them
 - Report incident to immediate supervisor
 - Report directly to provider for evaluation, treatment, counseling

Biosafety (cont'd)

- Surface Decontamination (required by OSHA)
 - All surfaces in specimen collection & processing areas
 - 1:10 bleach solution or other disinfectant approved by EPA
- Cleanup of Body Fluid Spills
 - EPA-approved chemical solutions & kits
 - Gloves must be worn
 - Absorb material without spreading it over wider area
- Biohazard Waste Disposal
 - All nonreusable items contaminated w. blood/body fluids go in biohazard waste containers

Electrical Safety

- Actions to Take if Electrical Shock Occurs
 - Shut off source of electricity
 - Or, use nonconducting item to remove source of electricity from victim
 - Call for medical assistance
 - Start cardiopulmonary resuscitation if indicated
 - Keep the victim warm

Fire Safety

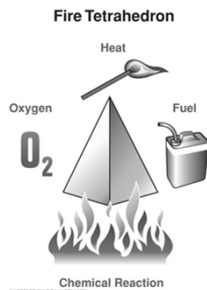
- All employees should know:
 - Procedures to follow in case of fire
 - Location of fire extinguishers & how to use them
 - Location of fire blankets or heavy towels & how to use them
 - Location of emergency exits & evacuation routes

Fire Safety (cont'd)

- Components Needed for Fire to Occur
 - **Fuel:** combustible material
 - **Heat:** raises temperature of material until ignition
 - **Oxygen:** to maintain combustion
 - **Chemical reaction:** produces fire
- Keep components apart to prevent fire

Fire Safety (cont'd)

- Fire tetrahedron



Fire Safety (cont'd)

- Classes of Fire
 - **Class A**
 - Ordinary combustible materials (wood, paper)
 - Require water/water-based solutions to extinguish
 - **Class B**
 - Flammable liquids & vapors (paint, oil, grease, gasoline)
 - Require blocking oxygen or smothering to extinguish
 - **Class C**
 - Electrical equipment
 - Require nonconducting agents to extinguish

Fire Safety (cont'd)

- Classes of Fire
 - **Class D**
 - Combustible or reactive metals (sodium, potassium, magnesium, lithium)
 - Require dry powder agents or sand to extinguish
 - **Class K**
 - High-temperature cooking oils, grease, or fats
 - Require agents that prevent splashing & cool & smother fire

Radiation Safety

- Principles of Radiation Exposure
 - Distance
 - Shielding
 - Time
- Radiation Present in:
 - Patients injected w. radioactive dyes
 - Specimens from radiology or nuclear medicine
 - Radioimmunoassay area

- Radiation hazard symbol



Chemical Safety

- General Rules
 - **Always**
 - Wear PPE
 - Clean up chemical spills properly
 - **Never**
 - Store chemicals above eye level
 - Add water to acid
 - Indiscriminately mix chemicals together
 - Store chemicals in unlabeled containers
 - Pour chemicals into dirty containers
 - Use chemicals in ways they were not intended

Chemical Safety (cont'd)

- OSHA Hazard Communication (HazCom) Standard
 - **HazCom labeling requirements**
 - Statement of warning (“danger” or “poison”)
 - Statement of hazard (toxic, flammable, combustible)
 - Precautions to eliminate risk
 - First aid measures for spills or other exposure
 - **Material Safety Data Sheets**
 - General, precautionary, & emergency info on product

Chemical Safety (cont'd)

- Safety Showers & Eyewash Stations
 - Phlebotomist should know location of these
 - Used for chemical spill or splash to eyes/body
 - Flush affected part w. water at least 15 min.
 - Visit ER for evaluation



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Chemical Safety (cont'd)

- Spill cleanup kit



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External Hemorrhage

- Definition
 - Abnormal or profuse bleeding
- Treatment
 - Firm, direct pressure to wound using cloth or gauze
 - Elastic bandage can be used to hold compress in place
 - Only use tourniquet as last resort

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Shock

- Definition
 - Condition involving insufficient return of blood to heart
 - Results in inadequate supply of oxygen to body organs/tissues
 - Caused by hemorrhage, heart attack, trauma, & drug reactions
- Symptoms
 - Pale, cold, clammy skin
 - Rapid, weak pulse
 - Increased, shallow breathing rate
 - Expressionless face & staring eyes

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Shock (cont'd)

- First Aid for Shock
 1. Maintain an open airway for victim
 2. Call for assistance
 3. Keep victim lying down w. head lower than rest of body
 4. Control bleeding or other cause of shock
 5. Keep victim warm until help arrives

CPR and Emergency Cardiovascular Care

- Training Recommended by AHA for Healthcare Pros
 - 6- to 8-hour Basic Lifesaving Healthcare Provider Course
 - Includes CPR, use of AED, removing airway obstruction
 - Certification good for 2 years
- AHA CPR and ECC Guideline Updates
 - Hands-only CPR for lay rescuers
 - 100/min compression rate
 - Infant & child compression depth of ½ anterior-posterior chest diameter
 - Allow complete chest recoil between compressions

CPR and Emergency Cardiovascular Care (cont'd)

- AHA CPR and ECC Guideline Updates (cont'd)
 - Minimize interruptions in chest compressions (try to limit to less than 10 seconds)
 - Avoid excessive ventilation (BLS single rescuer compression-to-ventilation ratio stays at 30:2)
- AHA Chain of Survival
 1. Early access to care
 2. Early CPR
 3. Early defibrillation
 4. Advanced care

Personal Wellness

- Personal Hygiene
 - Shower/bathe regularly & use deodorant
 - Brush teeth & use mouthwash several times per day
 - Hair clean & neat
 - Fingernails clean, short, neatly trimmed
 - No heavily scented lotions or colognes
- Proper Nutrition
 - Plant-based diet rich in variety of vegetables, fruits, & legumes
 - Avoid processed, starchy staple foods
 - Balance of carbohydrate, fat, protein, vitamins, minerals, fiber

Personal Wellness (cont'd)

- Rest and Exercise
 - Lack of rest & sleep can lead to fatigue & other medical problems
 - Stay fit to be healthier & live longer
 - Focus on strength, flexibility, & endurance
- Back Protection
 - Use proper lifting techniques
- Stress Management

Chapter 3 Test info: Infection Control, Safety, First aid

- External bleeding controlled how?
- Class of fires
- Know how HBV vaccines are given
- OSHA HAZCOM standard is also called what?
- Proper order for putting on protective clothing
- Principles of radiation exposure
- Parental transmission
- **Know chain of infection:** What is.. Infectious agent (causative agent), Reservoir, Exit pathway (portal of exit), Means of transmission (mode of transmission), Entry pathway (portal of entry), Susceptible host.

Cont. Chap 3 Test info

- **Know:** Per mucosal, percutaneous, medical asepsis, biohazard, universal and standard precautions, body substance isolation (BSI), PPE, N95
- **Fomites:** Inanimate objects that can harbor material containing infectious agent.
- Needle Safety and Prevention Act (pg. 85)
- **Hazards:** electrical, sharps, chemical, radiation, physical, fire/explosive, biologic, allergic
- Nosocomial infection: Infection acquired in a healthcare facility
- The most effective way to prevent the spread of infection is "HANDWASHING"
- Symptoms and first aid for shock
- Know all study questions