Module C

Epidemiology and Risk of Infection in outpatient Settings

Statewide Program for Infection Control and Epidemiology (SPICE)
UNC School of Medicine

Objectives

• Discuss the infectious process through review of the chain of infection.
• Review methods for controlling transmission of infection in outpatient settings.
• Standard Precautions
• Transmission-based Precautions
• Describe steps for detecting and controlling outbreaks.

Chain of Infection

Infectious Agent or “The Harmful Germ”

• Bacteria (MRSA, VRE)
• Viruses (Influenza, Norovirus)
• Fungi (Candida, Aspergillus)
• Parasites (Giardia, pinworms)
• Arthropods (mites)
  • Infestations, not infections

Infectious Agent or “The Harmful Germ”

Disease Producing Characteristics:
• Virulence
  • Ability to grow and multiply
• Invasiveness
  • Ability to enter tissue
• Pathogenicity
  • Ability to cause disease

Reservoir or “Hiding Places”

Where germs live, grow, and increase in numbers
• A person
• An animal
• Environment/Fomite

Infectious Agent or “The Harmful Germ”

Reservoir or “Hiding Places”
People as Reservoirs

- Blood
- Skin
- Digestive tract
  - Mouth, stomach, intestines
- Respiratory tract
  - Nose, throat, lungs
- Urinary tract

Reservoir

People as Reservoirs

People We Know Who Are Infected

People We Don’t Know Who Are Infected

Portal of Exit or “The Way Out”

MODES of transmission

- Contact – victim comes in contact with source
  - Direct – physical contact between source and victim
  - Indirect – victim contacts contaminated inanimate objects
- Droplet – brief passage of infectious agent
- Airborne – airborne phase in disease dissemination
- Common vehicle – contaminated inanimate vehicle serves as the vector for transmission to multiple persons.
- Vectorborne - Not associated with healthcare transmission

Portal of Entry or “The Way In”

Susceptible Person

- Age: very young or older
- Stress
- Fatigue
- Poor nutrition
- Chronic illnesses
- Not properly vaccinated
- Open cuts, skin breakdown
- Immune suppressive medications
Knowledge Check

A disease or condition when harmful germs get into the body and cause pathology:

a) Host
b) Infection
c) Reservoir
d) Portal of exit

Knowledge Check

Germs can be spread indirectly through:

a) Shared medical equipment
b) Bloody gauze
c) Needlesticks
d) A and B only
e) All of the above

Breaking The chain of infection

As long as the chain of infection remains intact, infection will spread to others.

Elements of Standard Precautions

• Hand hygiene
• Use of personal protective equipment (PPE)
  • gowns, gloves, mask, eye protection
• Safe injection practices
• Safe handling of potentially contaminated equipment or surfaces
• Respiratory hygiene/cough etiquette

What is the Best Way to Stop the Spread of Infection?

Hand Hygiene

When to Perform Hand Hygiene

1. Before touching a patient
2. Before performing a procedure
3. After touching patient or environment
4. After touching patient
5. After touching patient's environment
Where Should Hand Hygiene be Performed?

at the POINT-OF-CARE

Personal Protective Equipment (PPE)

• Wear gloves for potential contact with blood, body fluids, mucous membranes, non-intact skin or contaminated equipment.
  • Do not wear the same pair of gloves for more than one patient
  • Do not wash gloves for the purpose of reuse
• Wear a gown to protect skin and clothing during procedures or activities where contact with blood or body fluids is anticipated.
  • Do not wear the same gown for more than one patient
• Wear mask and eye protection during procedures that are likely to generate splashes or sprays of blood or other body fluids.
• Wear a surgical mask when placing a catheter or injecting material into the spinal canal or subdural space.

Respiratory Hygiene/Cough Etiquette

• Post signs at entrances.
• Provide tissues and no-touch trash cans for disposal in waiting areas.
• Provide hand hygiene product in waiting areas.
• Offer a mask to symptomatic patients.
• Encourage ill patients to sit away from others.

Transmission-based Precautions

• Certain conditions (syndromes) require triage and additional attention
  • Diarrhea (C. difficile, norovirus)
  • Febrile respiratory illness (influenza)
  • Febrile rash (chickenpox/shingles, measles)
• Early detection is important
• Place promptly in private rooms
• Place appropriate signage on the door

Contact Precautions

• Place in private exam room.
• Put on gloves before entering the exam room.
• Use gown for contact with:
  • Uncontrolled secretions
  • Pressure ulcers
  • Draining wounds
• Place contaminated re-usable noncritical patient care equipment in plastic bag for transport to soiled holding area.
• Clean horizontal surfaces with Environmental Protection Agency (EPA)-registered disinfectant after discharge.
Droplet Precautions

• Place patient promptly in a private room.
• Instruct patient to follow respiratory hygiene/cough etiquette.
• HCP should wear surgical mask upon entry to room.
• Have patient wear a mask when outside the room.
• Disinfect all horizontal surfaces using an Environmental Protection Agency (EPA)-registered disinfectant after discharge.

Airborne Precautions

• Have system in place to identify patients upon entry with known or suspected airborne spread infections.
• Place patients immediately private exam room with a surgical mask on patient.
  • Instruct patient on respiratory hygiene/cough etiquette
• Private room door must remain closed.
• HCP must wear a surgical mask or fit-tested N-95 respirator upon entry.
• Upon discharge, room should remain vacant with door closed for at least 1 hour to allow for a full air exchange.
• Clean horizontal surfaces with EPA-registered disinfectant.

Air Changes per Hour

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Knowledge Check

What is the single most effective way to prevent the spread of infections?

a) Using PPE
b) Cleaning patient care equipment
c) Hand Hygiene
d) Coughing into the crook of elbow or tissue

Knowledge Check

For patients that require the use of airborne precautions, they should be allowed to sit in the waiting room.

a) True
b) False

Outbreak* Investigation

* Outbreak: occurrence of more cases of disease than normally expected within a specific place or group of people over a given period of time.
Definitions

- **Endemic**: the usual presence of disease within a geographic area
- **Epidemic** (Outbreak): an excess over the usual or expected occurrence of disease within a geographic area
- **Pandemic**: epidemics that affected several countries or continents (e.g., AIDS, pandemic influenza, SARS)

Outbreaks Steps

- Verify diagnosis
- Establish case definition
- Review for cases – case search
- Create a line listing
- Make an epi-curve*
- Develop hypothesis
- Test hypothesis
- Implement control measures
- Evaluate control measures
- Disseminate information

Suspected Outbreak...

Know Who to Call for Assistance

- Facility Risk Manager
- Local Health Department first OR State Public Health Department (Raleigh 919-733-3419)
- Infection Control Assistance: Statewide Program for Infection Control and Epidemiology (SPICE), spice@unc.edu, 919-966-3242

Knowledge Check

*Who should be notified of a suspected or known communicable disease outbreak?*

- a) Risk Management
- b) Administration/Director
- c) Local Health Department
- d) All of the above