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
- Review methods for controlling transmission of infection in outpatient settings
  - Standard Precautions
  - Transmission-based Precautions
- Describe steps for detecting and controlling outbreaks
INFECTIOUS AGENT OR “THE HARMFUL GERM”

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

RESERVOIR OR “HIDING PLACES”

Where germs live, grow, and increase in numbers

- A person
- Environment/Fomite
- An animal

PEOPLE AS RESERVOIRS

- Blood
- Skin
- Digestive tract
  - Mouth, stomach, intestines
- Respiratory tract
  - Nose, throat, lungs
- Urinary tract
PORTALS OF EXIT AND ENTRY

EXIT OR “THE WAY OUT”
- Nose and mouth
  - Allows germs to leave in mucus droplets, and saliva or spit
- Gastrointestinal tract
  - Allows for germs to leave in stool and/or vomit
- Skin
  - Allows for germs to leave through direct contact, in blood, pus, or other liquids that come from the body.

ENTRY OR “THE WAY IN”
- Nose and mouth
  - Allows germs to enter in mucus droplets, and saliva or spit
- Gastrointestinal tract
  - Allows for germs to enter via ingestion
- Skin
  - Allows for germs to enter through direct contact, in blood, pus, or other liquids that come from the body.

SUSCEPTIBLE PERSON
- Age
- Stress
- Fatigue
- Poor Nutrition
- Chronic Illnesses
- Not properly vaccinated
- Open cuts, skin breakdown
- Medications

Infectious Agent
Susceptible Host
Reservoir
Portal of Entry
Portal of Exit
Mode of Transmission
Person to Person
Environmental source
MODES OF TRANSMISSION

Contact
Droplet
Airborne

MODES OF TRANSMISSION

DIRECT CONTACT
Person to person contact and physical transfer of organisms

INDIRECT CONTACT
Contact with a contaminated surface or device

MODES OF TRANSMISSION

Droplet – an infectious agent travels as a very large particle over a short distance by air current (usually 3-6 feet)

Droplets may arise from speaking, coughing or sneezing
Need to be relatively close
MODES OF TRANSMISSION

Airborne –
infectious agent travels as very small particles over long distances by air current

Small respiratory droplets, that can remain infective for long periods of time are dispersed when an infected person coughs, sneezes, laughs or speaks.
May spread thru ventilation systems

KNOWLEDGE CHECK

The Chain of Infection Includes which of the following:
1. Infectious agent, reservoir, mode of transmission and isolation precautions
2. Susceptible host, portal of entry, OSHA rules, medical waste
3. Mode of transmission, infectious agent, susceptible host, reservoir, portal of entry and portal of exit
4. None of the above

CONTROLLING TRANSMISSION OF INFECTION

As long as there is a means of transmission, infection will spread to others.

► Standard Precautions
► Transmission-Based Precautions
CONTROLLING TRANSMISSION

**Standard Precautions**

- Hand hygiene
- Use of personal protective equipment
- Respiratory hygiene/cough etiquette
- Safe injection practices
- Use of a mask when injecting the epidural space
- Safe handling of potentially contaminated equipment

THE BEST WAY TO STOP THE SPREAD OF INFECTION

**Hand Hygiene**

Video Clip: To start video click on image

Good hand hygiene, including use of an alcohol-based hand rub and washing with soap and water is critical in reducing the risk of transmission of infections in any healthcare setting.

- Use of an alcohol-based hand rub is recommended as primary mode of hand hygiene except when hands are visibly soiled
  - Dirt
  - Blood
  - Body fluids
  - Caring for patient with infectious diarrhea

Hand hygiene is discussed in detail in Module E, “principals of asepsis”
Second component of Standard Precautions is Personal Protective Equipment (PPE)

Wearable equipment that is intended to protect healthcare personnel from exposure or contact with infectious agent

Examples:
- Use of gowns to protect skin and clothing
- Use of gloves in situations involving possible contact with blood, body fluids, non-intact skin and/or mucous membranes
- Use of mouth, nose and eye protection during procedures likely to generate splashes or splatters of blood or other body fluids

SEQUENCE FOR PUTTING ON PERSONAL PROTECTIVE EQUIPMENT (PPE)

- GOWN
  - Fold over from neck to knees, arms to end of sleeves, and wrap around the back
  - Fasten in back of neck and waist

- MASK OR RESPIRATOR
  - Secure tie or elastic bands at middle of head and neck
  - Fit flexible band to nose bridge
  - Fit snug to face and below chin
  - Fit-check respirator

- GOGGLES OR FACE SHIELD
  - Place over face and eyes and adjust to fit

- GLOVES
  - Extend to cover wrist of isolation gown

The type of PPE used will vary based on the level of precautions required, such as standard and contact, animal or airborne precautions. The procedure for putting on personal protection PPE should be tailored to the specific type of PPE.
USE OF PERSONAL PROTECTIVE EQUIPMENT (PPE)

Three overriding principals related to personal protective equipment (PPE)

Wear PPE when the nature of the anticipated patient interaction indicates that contact with blood or body fluids may occur

Prevent contamination of clothing and skin during the process of removing PPE

Before leaving the patient’s room or cubicle, remove and discard PPE
GLOVES:

**DO**
- Wear gloves to reduce risk of contamination or exposure to blood/other body fluids
- Clean hands before donning sterile gloves
- Cleans hands after removing gloves
- Cleans hands and change gloves between task (moving from one body site to another)
- Make sure gloves correct type and fit
- Follow facility policy

**DON’T**
- Re-use or wash gloves (except for utility gloves)
- Substitute glove use for hand hygiene
- Use non-approved hand lotions
- Use gloves if damaged or visible soiled
- Touch your face when wearing gloves
- Wear the same pair from one patient to another
- Wear gloves in the hall
- Forget to remove and dispose of appropriately

---

**CONTROLLING TRANSMISSION**

**RESPIRATORY HYGIENE/COUGH ETIQUETTE**
- Third element of standard precautions is Respiratory Hygiene/Cough Etiquette
- Strategy designed to contain respiratory secretions:
  - Patients
  - Accompanying individuals who have signs and symptoms of a respiratory infection
- Initial point of encounter:
  - Triage
  - Reception area
  - Waiting rooms in emergency departments, outpatient clinics and physician offices
**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 mask to symptomatic patients
- Encourage ill patients to sit away from others

*Process must be in place year round and not just during influenza season*

---

**CONTROLLING TRANSMISSION**

Video Clip: To start video click on image

ATTENTION

---

**TRANSMISSION BASED PRECAUTIONS**

- Contact
- Droplet
- Airborne
Private room or Cohort
Gown and gloves before or “upon entry”
Hand hygiene
Dedicate equipment
Disinfect shared equipment
Limit patient movement

Special enteric precautions for C. difficile and Norovirus
Routine handwashing with soap and water or ABHR

Surgical mask prior to entry
No special ventilation
Private room or Cohort
Hand hygiene
Patients/Residents use mask outside of room
Private room only
Room requires negative airflow pressure
Doors must remain closed
Visual air monitors
Everyone must wear an N-95 respirator or higher
Limit the movement and transport of the patient

**KNOWLEDGE CHECK**

What is the single most effective way to prevent the spread of infections?
1. Using PPE
2. Cleaning patient care equipment
3. Hand Hygiene
4. Coughing into the crook of elbow or tissue

**KNOWLEDGE CHECK**

True or False
Patients who require the use of droplet precautions should be allowed to wait in the waiting room with other patients.
The goal of the investigation is to control and prevent the spread of further disease.

OUTBREAKS STEPS

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

OUTBREAK INVESTIGATION

Know Who to Call for Assistance

- Your Supervisor/Manager
- Local Health Department
- North Carolina Division of Public Health
  919-733-3419
- 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  
Sean All of the above

SUMMARY

Discuss the "chain of infection"  
Review standard and transmission-based precautions for controlling transmission of infections in outpatient settings  
Describe the steps for detecting and controlling outbreaks

QUESTIONS?