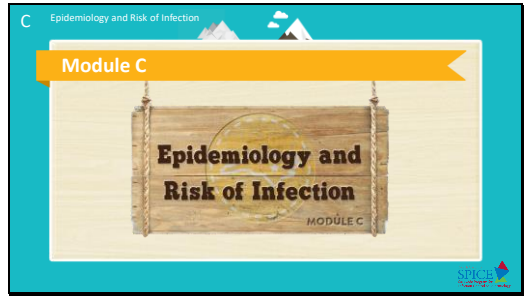


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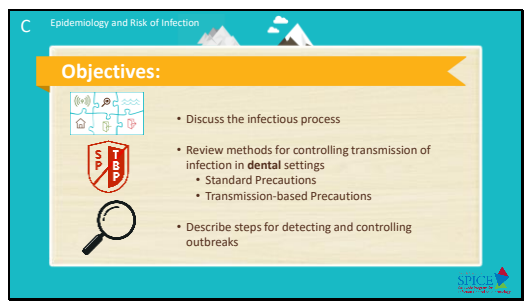
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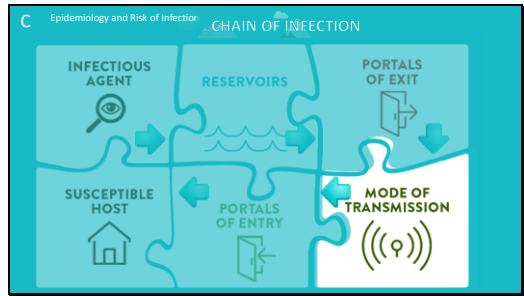
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Slide 3



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Slide 4



C Epidemiology and Risk 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**



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Slide 5

C Epidemiology and Risk of Infection

### Reservoir or "Hiding Places"

Where germs live, grow, and increase in numbers

- A person
- Environment/Fomite
- An animal

**RESERVOIRS**



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Slide 6

C Epidemiology and Risk of Infection

### People as Reservoirs

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

**Most Common**



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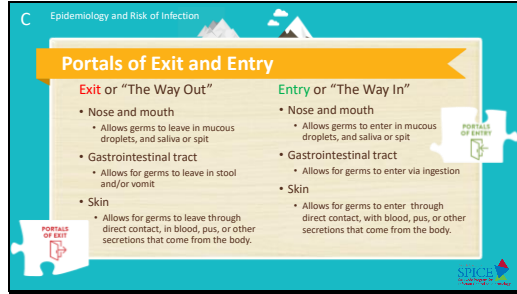
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Slide 7

C Epidemiology and Risk of Infection

### Portals of Exit and Entry

<b>Exit or "The Way Out"</b>	<b>Entry or "The Way In"</b>
<ul style="list-style-type: none"><li>• Nose and mouth<ul style="list-style-type: none"><li>• Allows germs to leave in mucous droplets, and saliva or spit</li></ul></li><li>• Gastrointestinal tract<ul style="list-style-type: none"><li>• Allows for germs to leave in stool and/or vomit</li></ul></li><li>• Skin<ul style="list-style-type: none"><li>• Allows for germs to leave through direct contact, in blood, pus, or other secretions that come from the body.</li></ul></li></ul>	<ul style="list-style-type: none"><li>• Nose and mouth<ul style="list-style-type: none"><li>• Allows germs to enter in mucous droplets, and saliva or spit</li></ul></li><li>• Gastrointestinal tract<ul style="list-style-type: none"><li>• Allows for germs to enter via ingestion</li></ul></li><li>• Skin<ul style="list-style-type: none"><li>• Allows for germs to enter through direct contact, with blood, pus, or other secretions that come from the body.</li></ul></li></ul>

A slide titled "Portals of Exit and Entry" with two columns of bullet points. The left column lists exit points: nose and mouth, gastrointestinal tract, and skin. The right column lists entry points: nose and mouth, gastrointestinal tract, and skin. The slide includes puzzle piece graphics and a SPICE logo.

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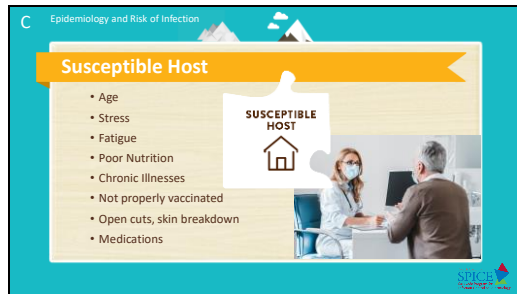
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Slide 8

C Epidemiology and Risk of Infection

### Susceptible Host

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

A slide titled "Susceptible Host" with a list of factors. It features a puzzle piece graphic with a house icon and a photo of a doctor and patient. The slide includes a SPICE logo.

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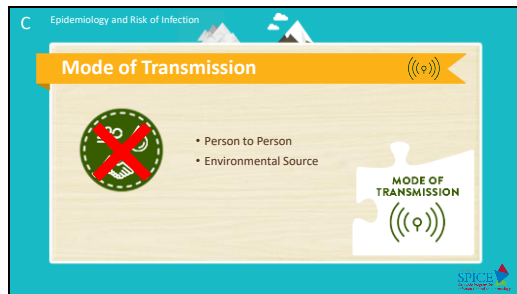
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Slide 9

C Epidemiology and Risk of Infection

### Mode of Transmission

- Person to Person
- Environmental Source

A slide titled "Mode of Transmission" with a list of two items. It features a puzzle piece graphic with a transmission icon and a SPICE logo.

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Slide 10

C Epidemiology and Risk of Infection


**Modes of transmission** ((☺))



**Contact** = Most Common

**Droplet**

**Airborne**



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Slide 11

C Epidemiology and Risk of Infection

**Modes of transmission** ((☺))

**Contact**



**Direct Contact**  
Person to person contact and physical transfer of organisms



**Indirect Contact**  
Contact with a contaminated surface or device



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Slide 12

C Epidemiology and Risk of Infection


**Modes of transmission** ((☺))



**Droplet**

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*



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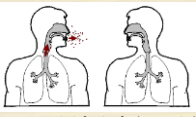
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Slide 13

C Epidemiology and Risk of Infection

### 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

Airborne

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Slide 14

C Epidemiology and Risk of Infection

### Knowledge Check

The Chain of Infection Includes which of the following:

- A. Infectious agent, reservoir, mode of transmission and isolation precautions
- B. Susceptible host, portal of entry, OSHA rules, medical waste
- C. Mode of transmission, infectious agent, susceptible host, reservoir, portal of entry and portal of exit
- D. None of the above

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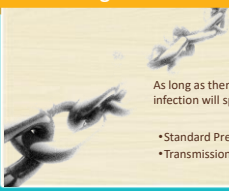
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Slide 15

C Epidemiology and Risk of Infection

### Controlling transmission of infection



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

- Standard Precautions
- Transmission-Based Precautions

SPICE

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Slide 16


C Epidemiology and Risk of Infection

### CONTROLLING TRANSMISSION

#### Standard Precautions



The minimum infection prevention practice that applies to all patient care, regardless of suspected or confirmed infection status of the patient



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Slide 17


C Epidemiology and Risk of Infection

### 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



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Slide 18

C Epidemiology and Risk of Infection

### The Best Way to Stop the Spread of Infection: *Hand Hygiene*

- 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



*Hand hygiene is discussed in detail in Module E, "principles of asepsis"*



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Slide 19

C Epidemiology and Risk of Infection

### The Best Way to Stop the Spread of Infection: Hand Hygiene

- 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

Hand hygiene is discussed in detail in Module E, "Principals of Asepsis"



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Slide 20

C Epidemiology and Risk of Infection

### The Best Way to Stop the Spread of Infection: Hand Hygiene



Hand Hygiene



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Slide 21

C Epidemiology and Risk of Infection

### Personal Protective Equipment

- 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

Personal Protective Equipment (PPE)



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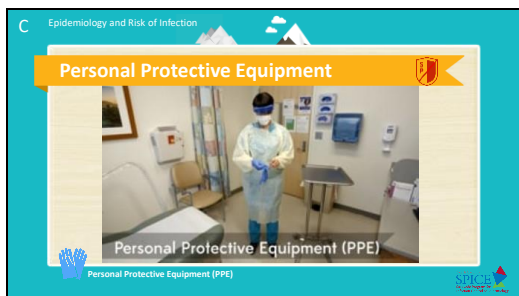
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Slide 22




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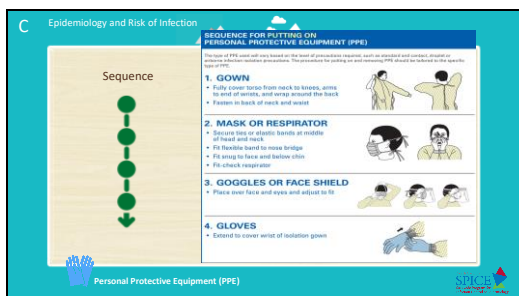
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Slide 23




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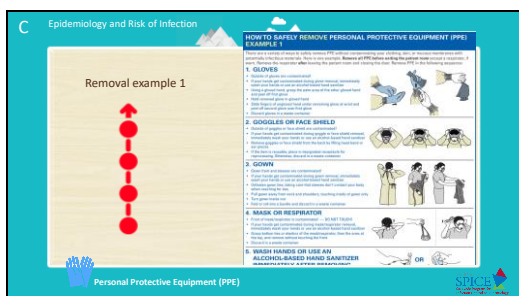
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Slide 24




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Slide 25

C Epidemiology and Risk of Infection

HOW TO SAFELY REMOVE PERSONAL PROTECTIVE EQUIPMENT (PPE)  
EXAMPLE 2

1. GOWN AND GLOVES

2. GOGGLES OR FACE SHIELD

3. MASK OR RESPIRATOR

4. WASH HANDS OR USE AN ALCOHOL-BASED HAND SANITIZER IMMEDIATELY AFTER REMOVING ALL PPE

Removal example 2

Personal Protective Equipment (PPE)

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Slide 26

C Epidemiology and Risk of Infection

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

Personal Protective Equipment (PPE)

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Slide 27

C Epidemiology and Risk of Infection

DO

- Wear gloves to reduce risk of contamination or exposure to blood/other body fluids
- Clean hands before donning sterile gloves
- Clean hands after removing gloves
- Clean hands and change gloves between tasks (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

Personal Protective Equipment (PPE)

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Slide 28

C Epidemiology and Risk of Infection

### 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 dental practices

Respiratory Hygiene/Cough Etiquette



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Slide 29


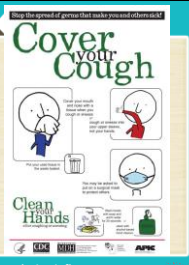
C Epidemiology and Risk of Infection

### Cover your Cough

- 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

Clean Hands

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



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Slide 30

C Epidemiology and Risk of Infection

### Respiratory Hygiene/Cough Etiquette

Respiratory Hygiene/Cough Etiquette



Respiratory Hygiene/Cough Etiquette



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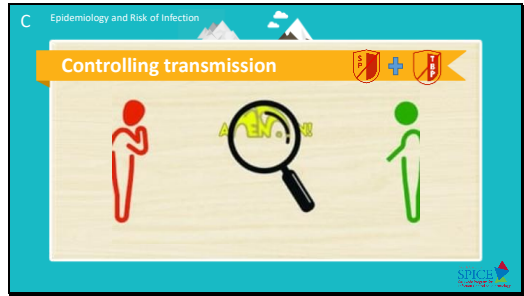
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Slide 31



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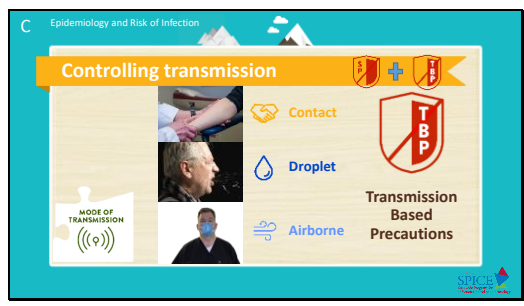
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Slide 32



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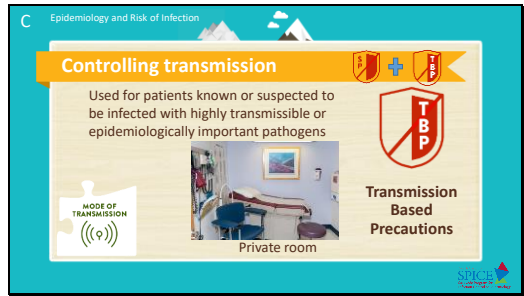
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Slide 33



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Slide 37

C Epidemiology and Risk of Infection

### Airborne Precautions

- 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



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Slide 38

C Epidemiology and Risk of Infection

### 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

SPICE

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Slide 39

C Epidemiology and Risk of Infection

### 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.

True  False

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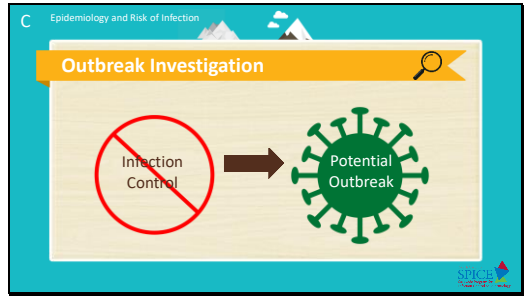
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Slide 40



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Slide 41



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Slide 42



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Slide 43

C Epidemiology and Risk of Infection

### Outbreak Investigation



The goal of the investigation is to control and prevent the spread of further disease

- Determine contributing factors
- Implement measures to
  - stop the outbreak
  - prevent future outbreaks



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Slide 44

C Epidemiology and Risk of Infection

### 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



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Slide 45

C Epidemiology and Risk of Infection

### Outbreak Investigation

Know Who to Call for Assistance

- Your Supervisor/Manager
- Local Health Department
- North Carolina Division of Public Health
- Statewide Program for Infection Control and Epidemiology (SPICE) [spice@unc.edu](mailto:spice@unc.edu), 919-966-3242



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Slide 46

C Epidemiology and Risk of Infection

**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 the above



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Slide 47

C Epidemiology and Risk of Infection

**Summary**

- Discuss the "chain of infection"  
person-to-person, animal-to-human
- Review standard and transmission-based precautions for controlling transmission of infections in outpatient settings  
supplement to antimicrobial resistance
- Describe the steps for detecting and controlling outbreaks  
signs, symptoms, exposures



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Slide 48

C Epidemiology and Risk of Infection

**References**

- List K: Antimicrobial Products registered with EPA for Claims Against Clostridiales difficile Spores  
<https://www.epa.gov/pesticide-registration/list-k-antimicrobial-products-registered-epa-claims-against-clostridium>
- NC Statewide Program for Infection Control and Epidemiology  
<https://spice.unc.edu/>  
<https://spice.unc.edu/resources/signage/>

Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings (2007) (cdc.gov)



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Slide 49



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