EPIDEMIOLOGY AND RISK OF INFECTION IN DENTAL SETTINGS

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

Module C

OBJECTIVES

- Discuss the infectious process
- Review methods for controlling transmission of infection in dental settings
  - Standard Precautions
  - Transmission-based Precautions
- Describe steps for detecting and controlling outbreaks

WHY IS INFECTION CONTROL IMPORTANT IN DENTISTRY?

- Patients and dental health-care personnel (DHCP) can be exposed to pathogens via:
  - Blood
  - Oral and respiratory secretions
  - Contaminated equipment
- Proper procedures can prevent transmission of infectious organisms among patient and DHCPs

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 mucous 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 mucous droplets, and saliva or spit
- Gastrointestinal tract
  - Allows for germs to enter via ingestion
- Skin
  - Allows for germs to enter through direct contact, with 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

MODES OF TRANSMISSION

- Contact
- Droplet
- Airborne

MODES OF TRANSMISSION

CONTACT

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

**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

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**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

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**CONTROLLING TRANSMISSION OF INFECTION**

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

▶ Standard Precautions
▶ Transmission-Based Precautions

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**CONTROLLING TRANSMISSION**

**Standard Precautions**

- Hand hygiene
- Use of personal protective equipment
- Respiratory hygiene/cough etiquette
- Safe injection practices
- Safe handling of potentially contaminated equipment

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**THE BEST WAY TO STOP THE SPREAD OF INFECTION**

Hand Hygiene

Video Clip: To start video click on image
**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.
- 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, “principles of asepsis”*

**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

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### PERSONAL PROTECTIVE EQUIPMENT

<table>
<thead>
<tr>
<th><strong>SEQUENCE FOR PUTTING ON</strong></th>
<th><strong>PERSONAL PROTECTIVE EQUIPMENT (PPE)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. GOWN</strong></td>
<td>Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back</td>
</tr>
<tr>
<td></td>
<td>Fasten in back of neck and waist</td>
</tr>
<tr>
<td><strong>2. MASK OR RESPIRATOR</strong></td>
<td>Secure ties or elastic bands at middle of head and neck</td>
</tr>
<tr>
<td></td>
<td>Fit flexible band to nose bridge</td>
</tr>
<tr>
<td></td>
<td>Fit snug to face and below chin</td>
</tr>
<tr>
<td></td>
<td>Fit-check respirator</td>
</tr>
<tr>
<td><strong>3. GOGGLES OR FACE SHIELD</strong></td>
<td>Place over face and eyes and adjust to fit</td>
</tr>
<tr>
<td><strong>4. GLOVES</strong></td>
<td>Extend to cover wrist of isolation gown</td>
</tr>
</tbody>
</table>

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### HOW TO SAFELY REMOVE PERSONAL PROTECTIVE EQUIPMENT (PPE)

**EXAMPLE 1**

<table>
<thead>
<tr>
<th>GLOVES</th>
</tr>
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<tbody>
<tr>
<td>Scrape all dirt and debris in waste container</td>
</tr>
<tr>
<td>Remove gowns in face shield from the back by lifting head band or neck tie</td>
</tr>
<tr>
<td>Fasten the gown up over chest and shoulders, leaving hood down</td>
</tr>
<tr>
<td>Socially distance, place in designated recovery bay</td>
</tr>
</tbody>
</table>

**EXAMPLE 2**

<table>
<thead>
<tr>
<th>GOWN AND GLOVES</th>
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<tr>
<td>Slowly pull the inside of glove off</td>
</tr>
<tr>
<td>When hands get contaminated wearing gowns, remove, immediately replace, and wear new protective cape</td>
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**EXAMPLE 3**

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**EXAMPLE 4**

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<tr>
<td>Wash hands or use an alcohol-based hand sanitizer</td>
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</tbody>
</table>

**EXAMPLE 5**

<table>
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<tr>
<th>WASH HANDS OR USE AN ALCOHOL-BASED HAND SANITIZER IMMEDIATELY AFTER REMOVING ALL PPE</th>
</tr>
</thead>
</table>
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 visibly 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

TRANSMISSION BASED PRECAUTIONS
**CONTROLLING TRANSMISSION**

- Risk of TB transmission in dental settings is low.
- DHCPs trained to recognize the signs and symptoms of TB
- Only one documented case of transmission of TB.
- Tuberculin skin test conversions among DHP are rare

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**CONTROLLING TRANSMISSION**

- Assess patient’s history for TB
- Defer elective treatment for suspected or known active TB patients
- Wear surgical face mask or N-95 respirator
- Patient should be:
  - Separated from others
  - Given surgical mask
  - Provided with tissues
  - Referred to proper facility

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**KNOWLEDGE CHECK**

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

1. Using PPE
2. Cleaning patient care equipment
   - Hand Hygiene
3. Coughing into the crook of elbow or tissue

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**OUTBREAK INVESTIGATION**

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?

- Risk Management
- Administration/Director
- Local Health Department
- All of the above

SUMMARY

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

QUESTIONS?