Personal Protective Equipment & Respiratory Protection

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Learning Objectives
At the end of this session, participants will be able to –

• List factors that influence PPE selection
• Demonstrate how to don and doff a pair of gloves
• Demonstrate how to don and doff various PPE
• Identify various types of Respirators
• Understand how respirators function
• Demonstrate how to perform a user seal check
What is PPE?

“specialized clothing or equipment worn by an employee for protection against infectious materials” (OSHA)

Factors influencing PPE Selection

- Type of exposure anticipated
- Splash/spray versus touch
- Category of isolation precautions
- Durability and appropriateness for the task
- Fit
Face Protection

- **Masks** – protect nose and mouth
  - Should fully cover nose and mouth and prevent fluid penetration
- **Goggles** – protect eyes
  - Should fit snugly over and around eyes
  - **Personal glasses are not a substitute for goggles**
  - Anti-fog feature improves clarity
- **Face shields** – protect face, nose, mouth, and eyes
  - Should cover forehead, extend below chin and wrap around side of face

DO’s and DON’Ts of Glove Use

- Work from “clean to dirty”
- Limit opportunities for “touch contamination”
  - protect yourself, others, and the environment
  - Don’t touch your face or adjust PPE with contaminated gloves
- Change gloves
  - During use if torn and when soiled
- Discard in appropriate receptacle
  - Never wash or reuse disposable gloves
How to Don a Gown

• Select appropriate type and size

• Opening is in the back

• Secure at neck and waist

• If gown is too small, use two gowns
  • Gown #1 ties in front
  • Gown #2 ties in back

Types of Respirators

• Air-Purifying - ambient air is passed through an air-purifying element that removes the contaminant(s) before they enter into the breathing zone.

• Atmosphere-Supplying - Greatest respiratory protection. Air from an outside source. They are used where oxygen levels may dip below 19.5 percent or where certain gases and vapours are highly concentrated.

• Special-Use

Reference: Canadian Standards Association
Air-purifying Respirators

- A respirator in which ambient air is passed through an air-purifying element that removes the contaminant(s) before they enter into the breathing zone.

- Non-powered (Negative Pressure)

- Powered (Positive Pressure or PAPR)

- Gas-Masks
How Respirators Function

Surgical Mask vs. Respirator

- Surgical masks help protect your nose and mouth from splattered body fluids (such as blood, respiratory secretions, vomit, urine or feces).

- **A surgical mask is not a respirator.**

- Respirators filter the air before you inhale it.
Selection of Respiratory protection for biological agents

- Respirators only reduce exposure. They do not eliminate exposure.

- There are no “Occupational Exposure Limits” (OEL) for biological agents.

- In general, respirators with higher assigned protection factors (APF) can reduce exposure to airborne contaminants.

- Selection of respiratory protection will be based on your Hazard Assessment and Infection Control Procedures to minimize risk.
Limitations of Respirators

• Difficult to wear over long periods of time

• Materials can degrade and lose their protective properties over time

• Effectiveness is highly dependent on the user fit

• Tight fitting negative pressure air purifying respirators cannot be used with facial hair, or other conditions that interfere with the seal between the face and the respirator

Health Surveillance

• Before fit testing and respirator use, the program administrator shall ensure that the individual is free from any condition that may preclude the user from wearing a respirator.

• This initial review is done by having the employee fill out a survey.

• Where the program administrator or respirator user is concerned with any condition, a medical opinion shall be obtained before the person is permitted to wear a respirator in their job.

• Evaluation should be done before conducting a fit test.
Factors which affect the seal

- Facial hair
- Weight loss/gain
- Wrinkles, scars, acne, make-up
- Facial structure
- Dentures
Before using a filtering face piece Respirator

Follow the manufacturer’s inspection procedures:
• Check for cracks, tears, dirt and fatiguing
• Examine inhalation, and exhalation valves (*where applicable)
• Examine head straps for elasticity
• Ensure filter gaskets are properly seated and in good condition*
• Note when the filter / cartridge was last changed*

Seal Check

• Place both hands over the respirator and inhale sharply
• The respirator should collapse slightly
• If air leaks between the face and face seal of the respirator, reposition it and adjust the nose clip for a more secure seal
• If you cannot achieve a proper seal, do not enter the contaminated area
Donning and Doffing a N95 respirator

- Video for Qualitative Fit Testing
  - [https://www.youtube.com/watch?v=xI4qx6qEYXU](https://www.youtube.com/watch?v=xI4qx6qEYXU)

- Donning and Doffing Practical

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Summary

- Factors which influence PPE selection - type of exposure anticipated, splash/spray versus touch, isolation precautions required, appropriateness, fit

- Face protection – mask, goggles, face shields

- Use gloves appropriately, avoid “touch contamination”, one use only
Summary

- Gowns should cover neck to knee to wrist
- Practice donning and doffing before conducting activity
- Use the Buddy system to ensure PPE is used properly
- Discard using appropriate containers
- Ensure ready availability of various sizes and types of PPE

Summary

- Types of Respirators - Air-Purifying, Atmosphere-Supplying, Special-Use
- Air-purifying respirators - Non-powered (Negative Pressure), Powered (Positive Pressure or PAPR), Gas-Masks
- A surgical mask is not a respirator.
- Respirators filter the air before you inhale it.
Summary

• Respirators only reduce exposure. They do not eliminate exposure.

• Effectiveness of a respirator is highly dependent on the user fit

• Various user factors can affect the seal

• Fit testing: Qualitative and Quantitative

• Always perform a seal check when using a respirator before entering containment zone.