


Lesson 6
**Personal Protective Equipment (PPE)
and Decontamination**



Learning Objectives


- Describe wet, dry, and contaminant-specific decontamination techniques
- Discuss requirements for decontamination of ambulatory and non-ambulatory patients
- Differentiate levels of personal protection based on exposure risk


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Risks to Health Workers



 **Chemical contaminants**

 **Biological contaminants**


 **Radiological contaminants**

Jocelyn Augustino/FEMA

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Chemical and Radioactive Contaminants

- How much?
- Physical state?
 - Vapor/gas
 - Liquids
 - Solids
- Duration of exposure



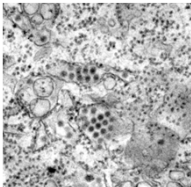
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Biologic Contaminants

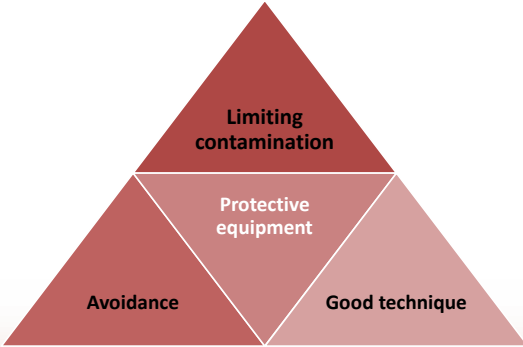
What organism is it?

- How virulent?
- How does it transmit?
- How long to incubate?
- Any need for prophylaxis?



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Personnel Protection

- OSHA requirements
- Heat stress program
- Levels of protection
 - Level A
 - Level B
 - Level C
 - Level D



Marvin Nauman/FEMA

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OSHA: Level A

- SCBA (NIOSH-certified)
- Respiratory protection for gases, vapors, aerosols, O₂-deficient environment
- Vapor-protective fully encapsulated suit
- Clothing protection against gas, vapor, liquid, solid

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PPE – Level A

- Highest level of protection
- SCBA with vapor-tight suit



- | |
|--|
| Pros Highest level of protection |
| Cons Expensive Requires extensive training Certification required Limited air supply Fatigue/heat exhaustion Dexterity Communication |

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OSHA: Level B

- SCBA or SAR (Supplied Air Respirator)
- Respiratory protection for gases, vapors, aerosols, O₂-deficient environment
- Splash-protective chemical resistant suit
- Clothing protection against liquid, solid

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PPE – Level B

- High-level respiratory
- Less eye or skin protection needed



| |
|--|
| Pros High level of respiratory protection |
| Cons Less protection from liquid or vapor Expensive Requires extensive training and fit testing Certification required Limited air supply (SCBA) Can use supplied air (limited range) Fatigue/heat exhaustion Dexterity limited Communication issues |

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OSHA: Level C

- Air-purifying respirator (APR), NIOSH-certified
- Respiratory protection for select vapors, aerosols
- Hooded, splash-protective chemical resistant suit
- Clothing protection against liquids, solid

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PPE – Level C

- Skin/eye exposure possible
- Chemical resistant clothing with APR mask or hood



Pros
Comparatively inexpensive
Good respiratory protection

Cons
Less protection from liquid or vapor
Still requires training
Required fit-testing program (PAPRS No Fit Testing required)
Certification required
Will not work in oxygen-deficient environments
Protection against chemicals limited
Fatigue/heat exhaustion
Dexterity limited
Communication issues

Usually adequate for hospital DECON operations

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OSHA: Level D


- Universal precautions
- No protection against chemicals

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PPE - Level D

- Universal Precautions
- Typical work uniform



Pros
Better than nothing
Inexpensive

Cons
Provides no, or limited, protection against liquids, particulates, or vapors
May require fitting and fit testing (N-95, etc)
Varies widely by job description

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PPE for Biologic Agents

- Splatter gown
- Goggles and face shield
- Masks: simple vs. filter (N95)
- Gloves

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PPE for Viral Hemorrhagic Fever

- Negative Pressure Room
- PAPR or N95 Respirator
 - **PAPR:** A PAPR with a full face shield, helmet, or headpiece
 - **N95 Respirator:** Single-use (disposable) N95 respirator in combination with single-use (disposable) surgical hood extending to shoulders and single-use (disposable) full face shield
- Single-use (disposable) fluid resistant/impermeable:
 - Gown
 - Two pairs nitrile examination gloves with extended cuffs
 - mid-calf or higher boot/shoe covers
 - Apron that covers the torso to the level of the mid-calf should be used if patients with EVD have vomiting or diarrhea

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PPE for Radioactive Agents

- Keeps skin and personal clothing free of contaminants
- Stops alpha and beta particles, not gamma rays
- Adds waterproof shoe covers and tape to seams
- Includes two pairs of exam gloves
- Includes radiation dosimeter attached to gown

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PPE for Chemicals

- Decontamination: outside of hospital
- Level C PPE: hospital first receivers
- Level D PPE: within hospital



Win Henderson/FEMA

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Minimizing Secondary Transfer

Decontamination Removes and neutralizes contaminants

Isolation Contains and identifies hazards

Disposal Removes hazards to approved site

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Decontamination

Removal Brush away dry hazard and remove clothing

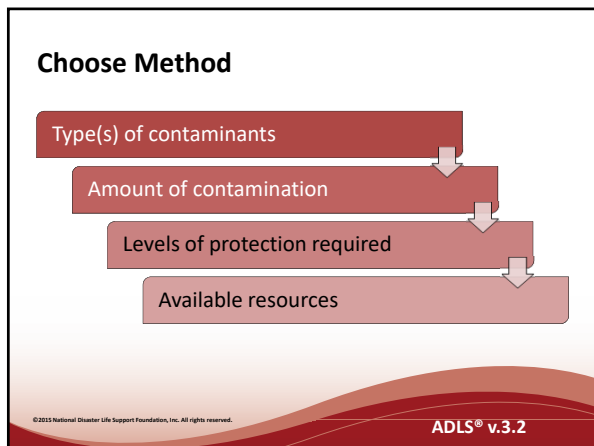
Dilution Reduces concentration with water

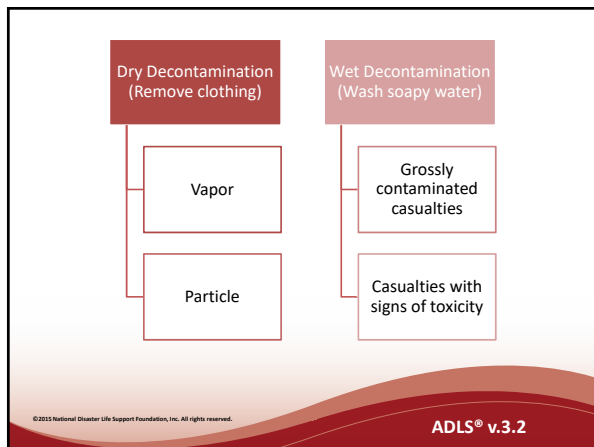
Absorption Absorb with inert material

Degradation Alter chemical structure of harmful substance with active chemical agent

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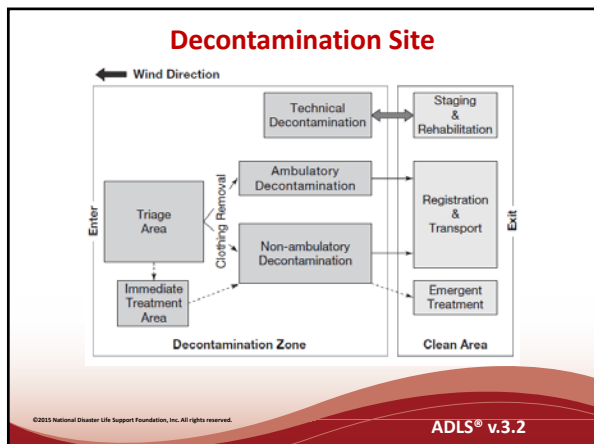


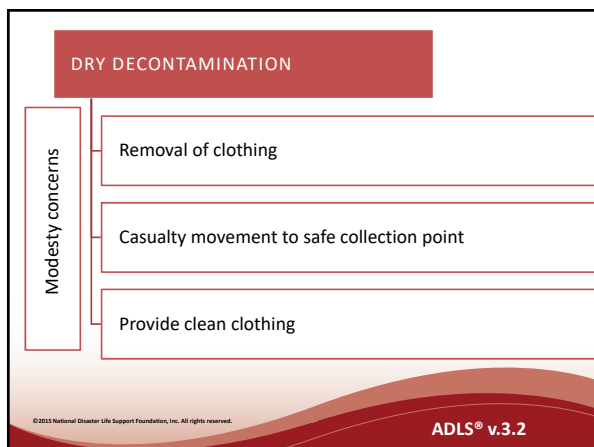
Dry Decontamination

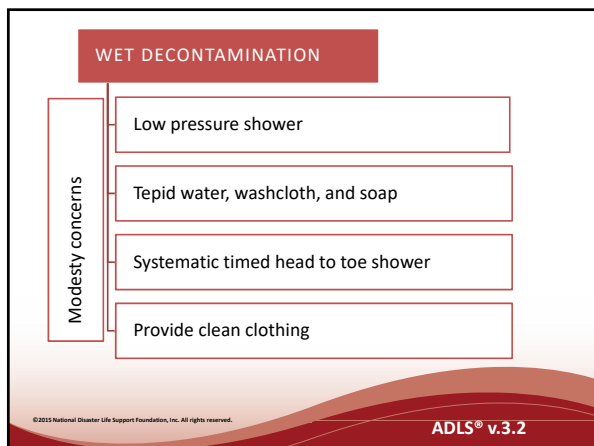
Two Definitions

1. Removal of all clothing
2. Use of powders or dry materials to remove contaminants
 - Flour, diatomaceous earth, paper towels, etc.

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**NON-AMBULATORY
WET DECONTAMINATION**


- Three to four personnel per casualty
- Wash/rinse head to toe (face, wounds, back) for 3-5 minutes
- Transfer to clean stretcher
- Monitor for effect
- Life-saving intervention trumps decontamination

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Summary

- 4 Levels of PPE A, B, C, D,
- Decontamination
 - Dry
 - Wet
- Non-ambulatory casualty decontamination is resource intensive

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Questions?

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