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Decontamination

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- **Decontamination Procedures**

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Introduction

Terrorist organizations throughout the world have used a variety of chemical, biological, and radiological weapons (collectively known as HAZMAT/weapons of mass destruction [WMD]) to further their agendas.

The possibility of such incidents requires **first responders to prepare** for such incidents, which can affect individuals or inflict mass casualties.

- \The purpose of decontamination is to make an individual and/or their equipment safe by physically removing toxic substances quickly and easily.

First responders need a rapid and efficient procedure to decontaminate individuals or large numbers of people in a short amount of time.

Such a procedure should consider:

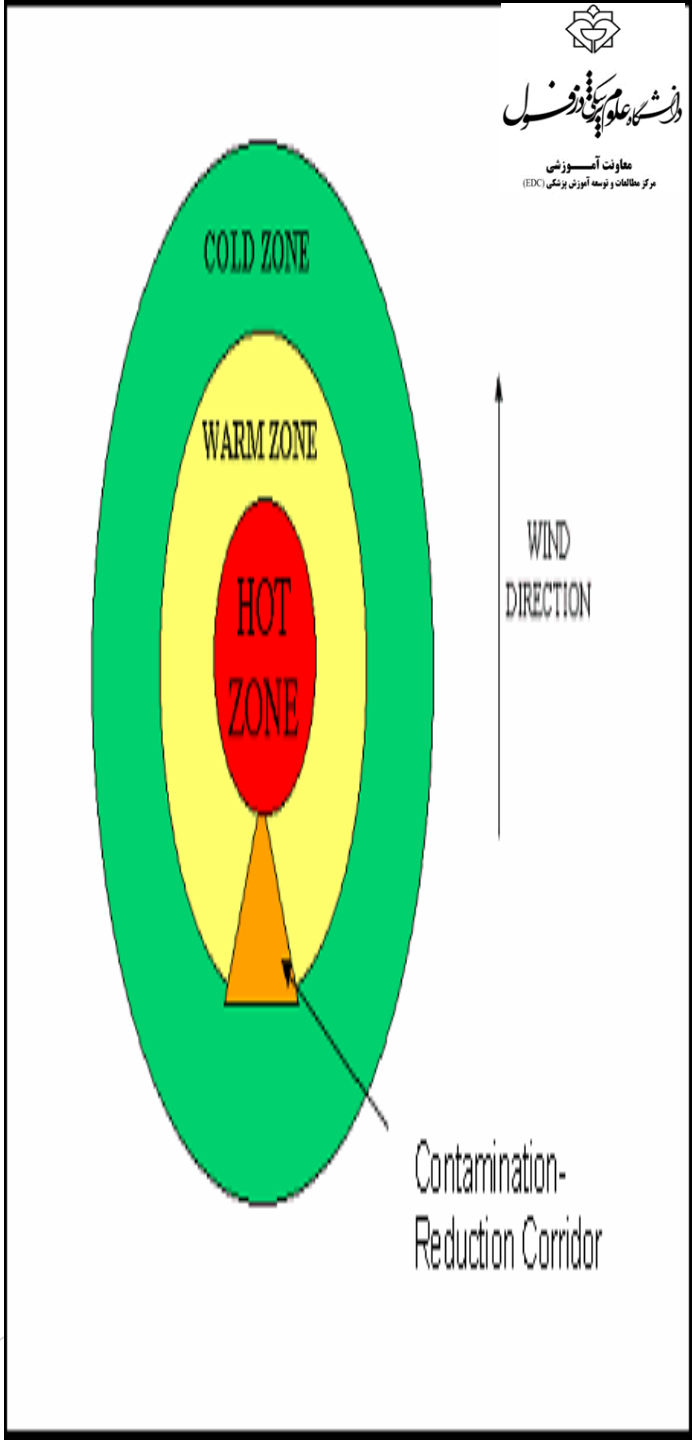
1. The condition of the victims - for example, whether they are able to walk (ambulatory) or not; age and health-related factors; and whether they show symptoms of exposure to a hazardous material
2. The need to observe victims for delayed symptoms of exposure or evidence of residual contamination
3. The potential need for secondary decontamination
4. Environmental factors (mainly cold weather)

In this procedure, you:

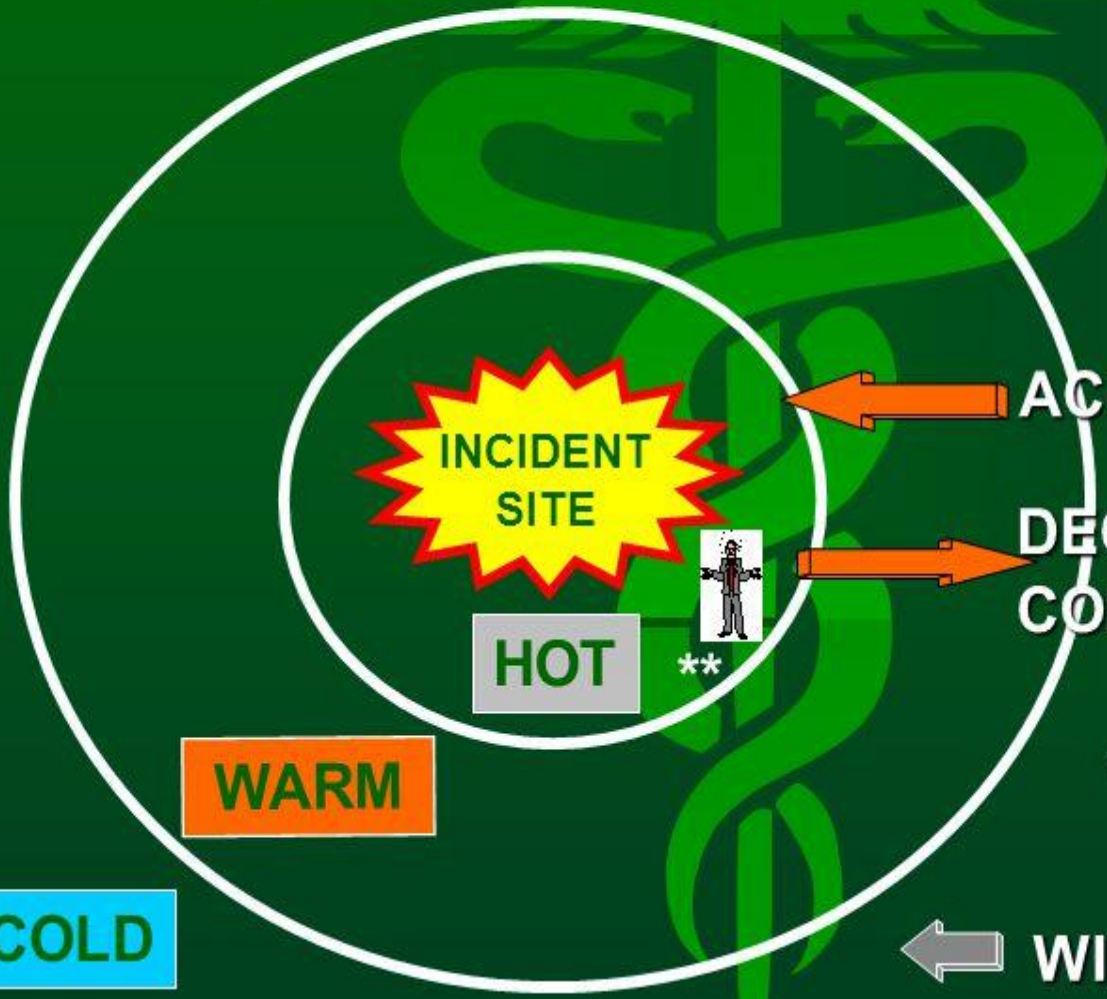
1. Set up the decontamination and support areas
2. Conduct decontamination triage (for mass casualty incidents)
3. Decontaminate the victims
4. Segregate victims for observation or treatment
5. Release the victims afterwards

Step 1: Set Up the Decontamination and Support Areas

- Once the initial isolation and protective action distances (and thus the Hot, Warm, and Cold Zones) have been established , set up the decontamination and support areas.
- These include the:
  - Primary decontamination corridor
  - Secondary decontamination corridors (if necessary)
  - Safe refuge/observation area
  - Medical triage area
- The decontamination and support areas are established within the Warm Zone, also referred to as the Contamination Reduction Zone



Isolation Zones



COMMAND POST

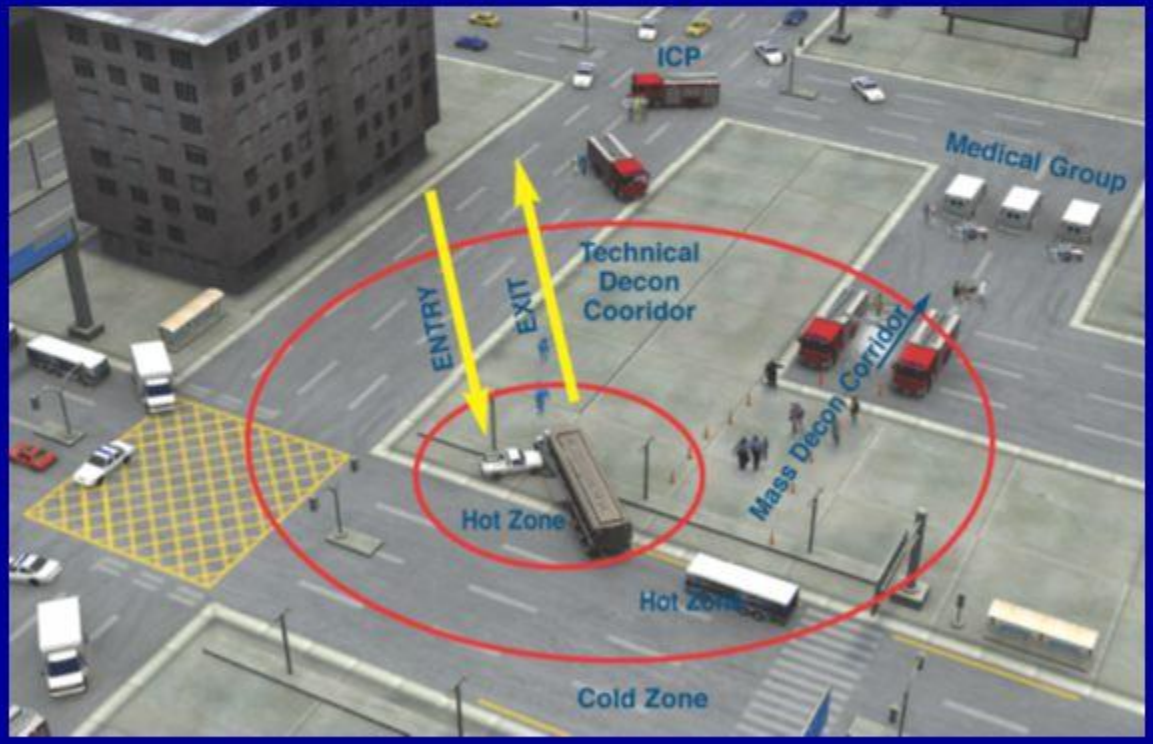
ACCESS CORRIDOR

DECONTAMINATION CORRIDOR

**SAFE REFUGE AREA

WIND DIRECTION

DECON Corridor



Decontamination Corridors

- Decontamination involves thorough washing to remove contaminants. ***It should be performed in an area***
- upwind of the Hot Zone.
- An area that is uphill,
- with good drainage,
- and easily accessible for responders is preferred.

- In mass casualty incidents, decontamination corridors can be set up that consist of high volume, low pressure water deluges.

- An effective and expedient method for setting up a water shower deluge is to use the Ladder Pipe Decontamination System (LDS):

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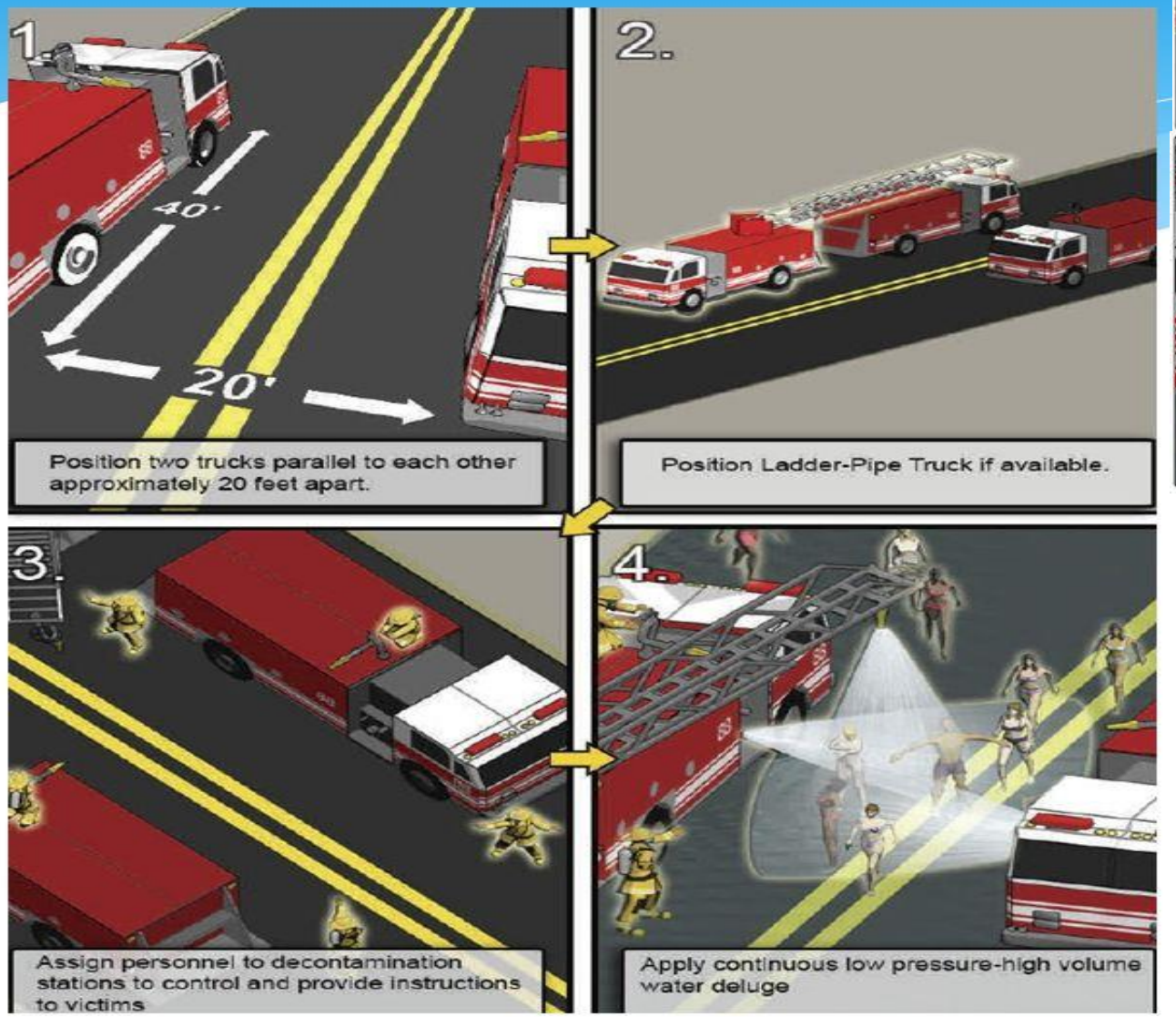
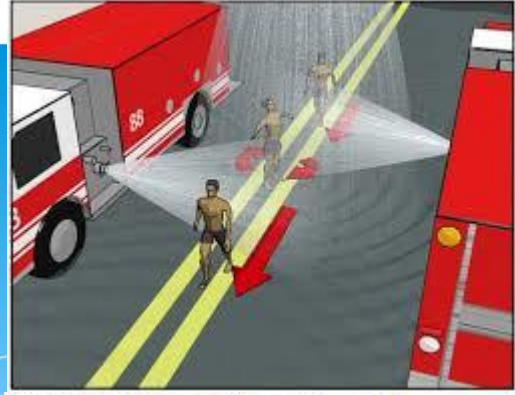
Water Shower Deluge





- If the contaminant was a liquid — especially an oily liquid (e.g., sulfur mustard) — then secondary decontamination with an emulsifier (such as soap) may be necessary.

- Secondary decontamination corridors should be set up between:

- The primary decontamination corridor and the medical triage area

The decontamination system should be designed for:

- Children of all ages
- Parentless children
- Non-ambulatory children
- Children with special needs

- It should also allow families to stay together.
- ***Use step-by-step, child-friendly instructions that explain to children and parents***
- what they need to do,
- why they are doing it,
- and what to expect.
- Take into consideration that infants are slippery when wet. You may need an inventive way to get them through the decontamination process using plastic buckets, car seats, or stretchers.

Safe Refuge/Observation Area

- Set up or assign an area or building as a safe refuge/observation area for **victims who do not require medical attention**.
- Here they can be monitored for a delayed outbreak of symptoms or indications of residual contamination.
- Unattended children may require supervision. Provide additional staff as necessary. Recommended age-appropriate staffing ratios for unattended children are:
  - 1 adult to 4 infants
  - 1 adult to 10 preschool children
  - 1 adult to 20 school-age children

Medical Triage Area

- Set up a separate medical triage area for victims who are symptomatic and might require treatment and transportation to a medical facility.

Step 2: Conduct Decontamination Triage

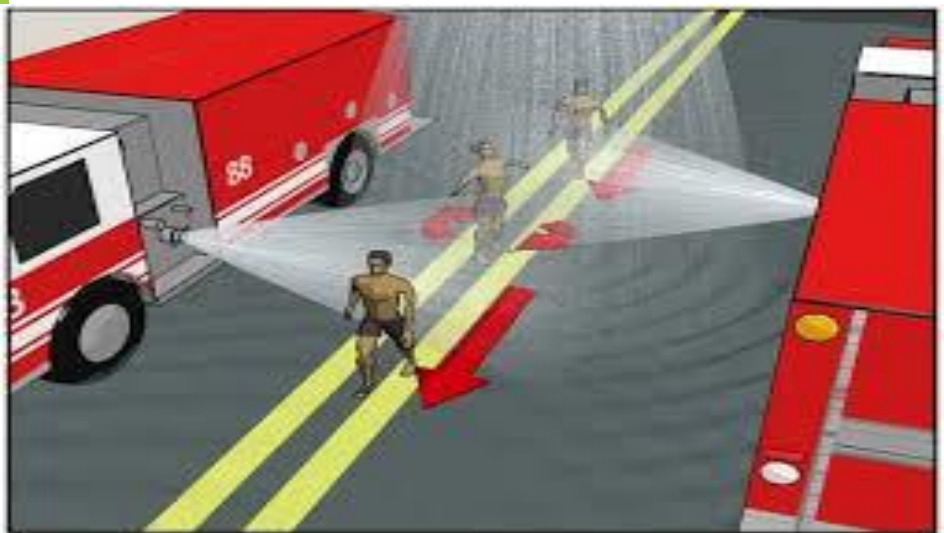
- Once the necessary areas have been set up, conduct decontamination triage on victims as they are evacuated from the Hot Zone.
- Decontamination triage is especially important in mass casualty incidents and should not be confused with medical triage.
- Decontamination triage is the process of determining which victims require decontamination and which do not. Rapidly identifying victims who may not require decontamination can significantly reduce the time and resources needed for mass decontamination.

Direct victims to either the decontamination corridor or the safe refuge/observation area, depending on their condition:

- If victims can walk, have no symptoms, and display no obvious signs of exposure to the contaminant, then direct them to the ***safe refuge/observation*** area where they will be monitored for delayed symptoms.
- If victims can walk and they are exhibiting symptoms or have been exposed to the contaminant, then direct them to the ***decontamination corridor***.
- If victims can't walk and they are exhibiting symptoms or have been exposed to the contaminant, then ***assist them through the decontamination corridor or transport them directly to a medical facility***, depending on the severity of their injuries.

Step 3: Decontaminate the Victims

- Victims are decontaminated in the water shower deluge of the decontamination corridor.
- Decontamination is most effective if victims first remove their clothing, since this alone may eliminate as much as 80-90% of all contamination.



While victims are waiting to be decontaminated:

- Keep them spaced apart to avoid secondary contamination and exposure to off-gassing.
- Collect personal items such as keys, wallets, hearing aids, phones, and valuables.
- Make sure you have a method to track victims' belongings to return to them later, such as labeling individual bags with a victim's name.
- Recommend that they remove their clothes.
- If victims are uncomfortable removing all their clothes, don't waste time arguing.
- If **victims must lift clothes over their head**, tell them to **avoid inhalation or ingestion by closing their mouth** and to use their hands and arms to keep the clothing as far from their face and head as possible.
- Place clothing in a labeled, durable, 6-mil polyethylene bag.

- Before victims go through the water shower, **instruct** them in the ***proper method for removing contamination***

- Tell them to:

- Cover all open wounds.
- Thoroughly wash and rinse contaminated skin and hair.
- Avoid breaking or abrading their skin.
- Tilt their heads back, raise their arms, and spread their legs to expose their armpits and groin.
- Prevent runoff from their head or hair from getting into their eyes, nose, or mouth.
- Turn 90 degrees periodically to expose their entire body to the cross stream of water.

If the contamination involves:

- A particulate, fine aerosol, or gas: Victims should rub with their hands, a soft cloth, or a sponge to remove contaminants.

- A liquid: Rubbing without the aid of soap is not recommended, since it may spread the agent over a larger surface area of the body, increasing the medical risk. **Soap or a solution of detergent and water (which should have a pH of at least 8 but should not exceed 10.5**) should be used as soon as possible.

- Wash time should be at least 30 seconds but no longer than 3 minutes to ensure thorough soaking. (After 3 minutes, tissue damage from increased chemical absorption may occur with some chemical agents.)

Step 4: Segregate Victims for Observation or Treatment

After victims have gone through primary decontamination:

1. Direct them to secondary decontamination, if necessary.
2. Provide them clothing or cover.
3. This helps restore modesty and provides warmth. It may include things like disposable paper gowns, socks or slippers, foil rescue blankets, sheets, and even large plastic garbage bags.
4. **Note: Children and the elderly are at increased risk for hypothermia. Provide them warm showers, if possible, and blankets.**
5. Tag them to identify their decontamination status.
6. Direct them for observation or treatment.
7. Victims with no visible symptoms of contamination should be directed to the area(s) of safe refuge for observation where they can be monitored for a delayed outbreak of symptoms.

Step 5: Release the Victims

Prior to release, any evidence of residual contamination (such as off-gassing) should be examined by trained medical personnel. Perform secondary decontamination, if necessary.

- Once the Incident Commander has **consulted** with the safety officer, medical team, technical specialists, and other response personnel and deems the incident scene safe and secure, victims in the safe refuge/observation area can be released.
- Victims sent to a medical facility/transfer station should be released as directed by medical personnel.
- Once personal belongings have been decontaminated or deemed safe, they may be returned to victims.

Cold Weather Considerations

Even in cold weather conditions to temperatures as low as 36° F, it is still most efficient to conduct decontamination outdoors using the water deluge method.

- Below 36° F, the removal of clothing and a dry decontamination method (such as blotting with paper towel) for the removal of liquids is recommended, followed by a water shower deluge at a heated facility.

First Responder Considerations

- First responders are at risk of contamination during hazardous material incidents.
- Pregnant healthcare providers should not be permitted to work in:
  - Pre-decontamination areas
  - Decontamination areas
- First responders may also require decontamination due to their proximity to the release, contact with contaminated victims, and clean-up of the contaminated area. Decontamination procedures are slightly different because of first responders' use of PPE.
- Once you have exited the Hot Zone:

1. Wash your PPE before removing it.
   1. Use a soap and water solution and a soft brush.
   2. Brush downward from head to toe.
   3. Get into all areas, especially the folds in the clothing.
   4. Wash and rinse thoroughly until the contaminant is removed.
2. Remove the PPE by rolling it downward (from head to toe) and avoid pulling it off over your head.
3. Remove your self-contained breathing apparatus (SCBA) after the other PPE has been removed.
4. Place all PPE in labeled, durable, 6-mil polyethylene bags.

Infants, Children, and Adolescents (Pediatric) Considerations

- Infants and children can have limitations in communication skills, self-care, independence, supervision, and transportation.
- Infants and children may not be able to answer triage questions about their symptoms, or to follow instructions given to them.
- Children and adolescents could be encouraged to do self-decontamination such as clothing removal and showering.

Elderly, Pregnant Women, and People with Chronic Medical Conditions: Considerations

In addition to Infants, children, and adolescents, the elderly, pregnant women, and people with chronic medication conditions should be considered for prioritization because of a possible higher risk for injury from a toxic exposure, and possible limitations in self-care, independence, supervision, and transportation.

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    3. Volume 3: Operational Guidance (PDF - 1.29 MB)

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