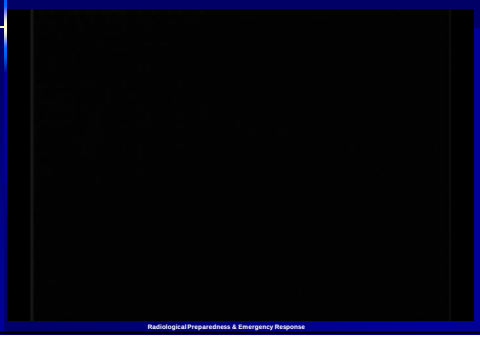
Radiological Preparedness & Emergency Response

Session IV

PPE and Decontamination Principles

Scenario



Objectives

- Discuss the different types of PPE.
- Describe radiological decontamination.
- Describe chemical decontamination.
- Discuss the differences between different types of decontamination.

Ypres, Belgium, during the afternoon of 15 April 1915

- Germans released150 tons of chlorine gas from some 6000 cylinders.
- 800 deaths. But Germans were not ready to take advantage of the British troops retreat.

Protective Masks Developed

- Small box respirator developed by the British.
- Placed on mules as well.

Various Types

Protective Suits

- Scottish soldiers particularly vulnerable to mustard burns.

Choosing the Type of PPE

- Can choose PPE necessary for respiratory protection separately from PPE needed for skin protection
- Should use at least the minimum level for each, as appropriate

Level A

Disadvantages of Level A Suits

- Oxygen source is limited.
- Needs a physically fit person.
- Heat stress.
- Heat stroke.
- Cumbersome.
- Lose manual dexterity.

Level B

Firefighters: Flame Retardant Suit

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Level C

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Standard or Universal Precautions

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Decontamination

- Decontamination is the reduction or removal of hazardous materials such as chemical or radiological compounds.
- It can be done by physical removal or chemical neutralization.

General Principles

- Removal of all clothing can reduce contamination on the patient up to 90%.

Radiological Decontamination

- Decontamination should not delay or impede stabilization of any patient contaminated with radiological material.

Whole or Partial Body Exposure to Radiation

- A person who was exposed to radiation is like having had an x-ray.
- Decontamination is unnecessary.

Secondary Radiological Contamination

- Can occur from:
  - Externally contaminated patients.
  - Internally contaminated patients
    - Can contaminate or expose others from the material inside their bodies.
- The body fluids (blood, sweat, urine) of an internally contaminated person can contain radioactive materials.

Historical Incidents

- Goiania, Brazil (1985):
  - Health care workers caring for patients internally contaminated with cesium, were not secondarily exposed or contaminated.

Historical Incidents

- London, England
  - 26 health care workers who cared for Mr. Litvinvenko did not get secondarily contaminated with polonium.

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Potential Hazard

- May occur with a highly radioactive shrapnel.
- In that case, apply Time-Distance-Shielding-Forceps

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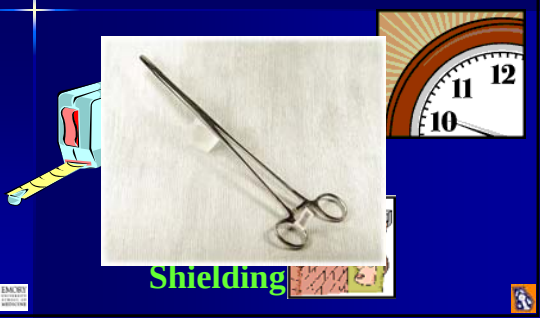
Fundamental Principles of Radiation Protection in whole body exposure



The Power of Distance

Distance from Source (Feet)	Radiation Dose (Gy)
2 feet	16
4 feet	4
8 feet	1

Recommended PPE- Radiological Victims

OSHA Recommendation for Hospital-Based Decon

- Level C
- Is it realistic in an a mass casualty incident?
- Is it necessary?

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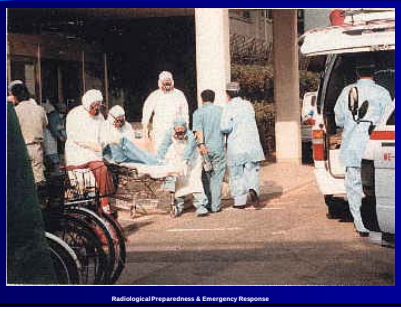
Level C in Tokai Mura Japan



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Double Glove!

External Screening Survey

- To determine if a patient is contaminated with radiological material
- May be performed if not done yet.

Cut Away from the Head

Roll Clothes Inwards

Remove Clothes by Rolling them into a Sheet

Survey the Back

Store Clothes in Bag and Store it Away from Patient

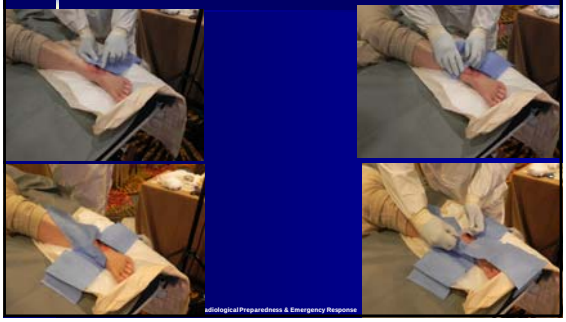
Remember

- Label bag with date, patient name, time, and name of staff.
- Store away from patient in a designated area.
- Work with your RSO.

Radiological Decontamination

- Paired with radiological survey.
- Draping.
- Soap and Water.
- Out to In.
- Targeted.
- Meticulous.

Draping



Targeted

- Soap and water
- Decontamination should proceed in a centrifugal manner

Meticulous

Check the Radiation Counts

- Try to maintain the same location for the probe when reading the counts

Radiation detection

- Excreta or swabs from the victims should be collected and labeled.

When to Stop

- The activity is less than twice the average background activity.
- Decontamination efforts do not substantially reduce the activity.
- Skin is being abraded.

Survey Staff

- Perform staff survey and decontamination if necessary.
- Use step off pad.

Chemical Decontamination

- Hazards to staff dictate decontamination prior to caring for victims with life threatening conditions.

Water Disposal

- In a small event, collection into a separate drainage and storage system is feasible.
- In large mass casualty events, collection of waste effluent may not be easy.
- Control it to the best extent possible.

Remember Commonly Ignored Areas During decontamination

- Scalp
- Genitalia
- Skin creases & folds
- Hands
- Feet
- Nails

Wound Decontamination

- Wounds need to be assessed for foreign bodies as well as underlying injuries.
- Wound care needs to be balanced against contamination.
  - What is in there? How much is in there?

Summary Points

- Radioactive contamination is easy to detect.
- Chemical contamination may be difficult to detect.
- Provision of life-saving treatment should take priority over radiological decontamination.

Summary Points

- Provision of life-saving treatment does not take priority over chemical decontamination.
- Radiological decontamination is paired with a radiation survey.
- Soap and water are sufficient for decontamination.

Any Questions?