Personal Protective Equipment and Decontamination of Adults and Children

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KEYWORDS

• Decontamination • Personal protective equipment (PPE) • Levels A, B, C, D
• HAZMAT • Chemical contamination

KEY POINTS

- Accurate identification of the chemical substances involved is the most important information necessary for proper care of the hazardous materials (HAZMAT) incident, but is often not available initially.
- Proper decontamination prevents further chemical injury, protects health care workers and prevents secondary contamination of facilities and equipment.
- Many patients will not have been decontaminated at the scene; proper triage and security must be in place to prevent contamination. Many "worried well" present without significant exposures, but can overwhelm staffing.
- Decontamination by health care workers in Level C suits is sufficient protection. Decontamination areas are located outdoors ideally to prevent hospital air becoming contaminated.
- Proper advanced planning and practice are essential for efficient performance in an emergency. Knowledgeable hospital security and efficient triage can effectively control patient flow.

PERSONAL PROTECTIVE EQUIPMENT IN HAZARDOUS MATERIALS INCIDENTS

Biological, chemical, and radiologic materials that result in adverse effects to the health and safety of exposed individuals are termed hazardous materials (HAZMAT). These substances represent significant risks to health care workers when hospitals receive patients contaminated with these materials. Therefore, hospitals and their

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Emerg Med Clin N Am 33 (2015) 51–68
http://dx.doi.org/10.1016/j.emc.2014.09.006 **emed.theclinics.com**
0733-8627/15/$ – see front matter

workforce must be prepared to use personal protective equipment (PPE) to protect themselves when these situations arise. Federal, state, and local regulations may specify types of PPE for specific job tasks when dealing with specific HAZMAT. There are 4 key issues which must be fully understood whenever PPE is required[1]:

1. The various types of PPE
2. The basics of a "hazard assessment"
3. How to select appropriate PPE; and
4. Training in the proper use of PPE.

It is only after these 4 key issues have been adequately addressed that a properly equipped and well-trained health care staff facility can provide a safe and effective response.

TYPES OF PERSONAL PROTECTIVE EQUIPMENT

PPE are articles worn or equipment used to protect the user from harmful contaminants released into the environment. In this article, this means the PPE used by hospital personnel when decontaminating and caring for patient(s) involved in a HAZMAT incident. The main function of PPE is to provide a barrier between the user and respiratory or skin exposure to the contaminant in the environment or on the skin/clothing of contaminated patients. PPE can be listed in the following categories:

1. Respiratory protection
2. Eye and face protection
3. Hand protection
4. Foot protection; and
5. Body protection.

A specific combination of PPE from each of these categories is normally needed to properly protect the wearer from each specific contaminant.

Respiratory Protection

Respiratory equipment prevents airborne contaminants from being inhaled, and some types can also protect the eyes and face. There are 2 primary types of respirators, air purifying and supplied air respirators. Air-purifying respirators (APRs) have filters, cartridges, or canisters that trap contaminants from the air. APRs are the most common protection method for particulates and vapors, and are used in environments where there is no chance of an oxygen-deficient state. Available filters should protect against, at a minimum, organic vapors and also contain a high-efficiency particulate air cartridge for particulates.[2] Supplied air respirators provide breathable air from a clean source such as an air tank or air compressor located outside the contaminated area, and are suitable for use in an oxygen-deficient environment. Respiratory protection must only be used in compliance with the applicable Occupational Safety and Health Administration (OSHA) regulations and National Institute for Occupational Safety and Health (NIOSH) publications.

The advantages and disadvantages of various styles of respirator face pieces are discussed in the OSHA best practices document.[3] Half-face pieces allow workers to wear any appropriate eyewear that does not interfere with the respirator seal, but they provide no eye protection themselves, and contaminated air can enter the mask if the seal is broken. Full face pieces provide eye protection and a tight-fitting face piece may be able to pull filtered air into the face piece if the battery fails on a powered APR (PAPR). Loose-fitting helmet/hood face pieces provide eye and head