3M

Technical Data Bulletin

OH&ESD

#167

OSHA Best Practices for Hospital-Based First Receivers

Published: March, 2005

Summary

In December, 2004, the Occupational Safety and Health Administration (OSHA) published the *OSHA Best Practices for Hospital-Based First Receivers of Victims from Mass Casualty Incidents Involving the Release of Hazardous Substances* **(http://www.osha.gov/dts/osta/bestpractices/firstreceivers_hospital.html)**. Guidance is presented on risk assessment, personal protective equipment (PPE), training, decontamination, recovery, etc. However, this technical data bulletin will focus mainly on those issues related to respiratory protection. The reader is encouraged to review the OSHA document in its entirety at the web site given above.

Scope

OSHA notes that this document is advisory in nature, not mandatory. But, employers must comply with existing OSHA standards such as Respiratory Protection (29 CFR 1910.134), Hazardous Waste Operations and Emergency Response (29 CFR 1910.120) and the general duty clause that employers must provide a safe workplace for their employees: 5(a)(1).

First receivers are defined as those who are distant from the incident site and whose exposure is limited to whatever may be transported back to the hospital with the patient. This is in contrast to first responders who travel to the incident site. The OSHA Best Practices does not include situations where the incident site is at the hospital or adjacent to it. Nor does it include incidents involving infectious outbreaks.

Hazard Vulnerability Analysis

A hospital must perform an annual hazard vulnerability analysis (HVA) with information from the surrounding community. If there is a specific hazard identified (e.g. large chemical manufacturing facility), the hospital may need to augment OSHA's minimum suggested PPE given in these guidelines.

In the past, many sources were reluctant to make PPE recommendations for first responders because of "unknown" possible exposure scenarios. Unknown atmospheres are considered immediately dangerous to life or health (IDLH) until proven otherwise. Under these conditions, workers would need to wear self-contained breathing apparatus (SCBA) or combination supplied air/SCBA systems.

In contrast, OSHA notes that a literature review and exposure modeling indicate that first receivers' exposure should be minimal as long as the incident is not at or adjacent to the hospital. "...it is extremely unlikely that a living victim could create an IDLH environment at a receiving hospital, particularly if contaminated clothing is quickly removed and isolated, and the victim is treated and decontaminated in an area with adequate ventilation."

Gases and vapors will dissipate rapidly and are not likely to be present on patients in high levels away from the incident site. Solids and liquids, notably organophosphates (sarin and certain pesticides) are more persistent. In the Tokyo subway sarin attack, patients were not decontaminated and were forced to wait in unventilated rooms while still wearing their contaminated clothing. As a result, many of the health care workers (unprotected) experienced limited symptoms, but were still able to perform their duties.

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Respiratory Protection

OSHA includes three tables to help first receivers select appropriate PPE. Table 1 includes requirements for a hospital decontamination zone in order for first receivers to be able to use the OSHA recommendations for PPE. These include travel time of at least 10 minutes from the incident site, victims' clothing and possessions removed immediately, decontamination and ventilation. Table 2 in the OSHA document lists requirements for the Post-decontamination zone. These are given to help ensure that the post-decontamination zone does not become contaminated.

Table 3 includes OSHA's recommendations for PPE if the requirements of Tables 1 and 2 are met, the hospital is not the release site or adjacent to it, and the hazardous substance is unknown. OSHA recommends a NIOSH (National Institute for Occupational Safety and Health) approved powered air purifying respirator (PAPR) with an assigned protection factor (APF) of 1000. OSHA has proposed that PAPRs with hoods, helmets and tight-fitting facepieces be granted an APF of 1000. The American National Standards Institute (ANSI) also gives these systems an APF of 1000. Organic vapor/acid gas/HEPA cartridges must be used. A copy of Table 3 is included at the end of this technical data bulletin.

OSHA notes that a hooded style PAPR "provides greater skin protection, has greater user acceptance, and does not require fit testing." "However, a tight-fitting, full facepiece PAPR might offer more protection in the event of PAPR battery failure."

If the hazard vulnerability analysis indicates a chemical/biological/radiological/nuclear (CBRN) threat, NIOSH approved CBRN PAPRs must be used when they become available. Until NIOSH CBRN approved PAPRs are available, PAPRs that have been tested by the manufacturer for CBRN environments must be used. (*Please see 3M comments below.*)

Recommendations are also given for double layered gloves, chemical resistant suit, head covering and eye/face protection (if not part of the respirator), chemical protective boots, and tape for sealing suit openings.

3M Comments

OSHA states that even though exposure to first receivers is expected to be minimal, if the HVA indicates a CBRN threat, NIOSH CBRN PAPRs must be used when they become available. At the time of this technical data bulletin, NIOSH is still in the process of developing a standard for PAPRs used in CBRN environments **(http://www.cdc.gov/niosh/npptl/default.html)**. The current draft concept is not considering the needs of first receivers. It is possible that a future CBRN PAPR may be over-designed for the expected lower exposure levels that first receivers might encounter.

However, OSHA also states, "Of course, employers are not obligated to follow the guidance in Table 3; any employer can choose instead to perform an independent hazard assessment...and then select PPE adequate to protect its employees against such hazards." A logical approach would be to select PPE based upon the low exposure levels that are suggested in this *OSHA Best Practices* document.

Some manufacturers have tested their PPE against warfare agents. For example the 3M™ Breathe Easy™ PAPR and the 3M™ GVP PAPR have been tested by the U.S. Army. Test results are given at: **http://www.edgewood.army.mil/hld/ip/reports.htm**. Technical data bulletins are also available regarding cartridges and canisters used with 3M™ Respirators. Please see: **http://www.3M.com/occsafety** or call 3M Technical Service at: 1-800-243-4630 for more information.

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(The following is taken from OSHA Best Practices for Hospital-Based First Receivers, Dec. 2004, p. 24)

TABLE 3: Minimum Personal Protective Equipment (PPE) for Hospital-Based First Receivers of Victims from Mass Casualty Incidents Involving the Release of Unknown Hazardous Substances

SCOPE AND LIMITATIONS
This table applies when:
- The hospital is not the release site.[G]
- Prerequisite conditions of hospital eligibility are already met (Tables 1 and 2).
- The identity of the hazardous substance is unknown.[H]

Note: This table is part of, and intended to be used with, the document entitled *OSHA Best Practices for Hospital-Based First Receivers of Victims from Mass Casualty Incidents Involving the Release of Hazardous Substances.*

Zone	Minimum PPE
Hospital Decontamination Zone[I] • All employees in this zone (Includes, but not limited to, any of the following employees: decontamination team members, clinicians, set-up crew, cleanup crew, security staff, and patient tracking clerks.)	• Powered air-purifying respirator (PAPR) that provides a protection factor of 1,000.[J] The respirator must be NIOSH-approved.[K] • Combination 99.97% high-efficiency particulate air (HEPA)/organic vapor/acid gas respirator cartridges (also NIOSH-approved). • Double layer protective gloves.[L] • Chemical resistant suit. • Head covering and eye/face protection (if not part of the respirator). • Chemical-protective boots. • Suit openings sealed with tape.
Hospital Post-decontamination Zone[M] • All employees in this zone	• Normal work clothes and PPE, as necessary, for infection control purposes (e.g., gloves, gown, appropriate respirator).

[G] When the hospital is not the release site, the quantity of contaminant is limited to the amount associated with the victims.

[H] If a hospital is specifically responding to a known hazard, the hospital must ensure that the selected PPE adequately protects the employees from the identified hazard. Thus, hospitals must augment or modify the PPE in Table 3 if the specified PPE is not sufficient to protect employees from the identified hazard. Alternatively, if a hazard assessment demonstrates that the specified PPE is not necessary to effectively protect workers from the identified hazard, a hospital would be justified in selecting less protective PPE, as long as the PPE actually selected by the hospital provides effective protection against the hazard.

[I] The *Hospital Decontamination Zone* includes any areas where the type and quantity of hazardous substance is unknown and where contaminated victims, contaminated equipment, or contaminated waste may be present. It is reasonably anticipated that employees in this zone might have exposure to contaminated victims, their belongings, equipment, or waste. This zone includes, but is not limited to, places where initial triage and/or medical stabilization of possibly contaminated victims occur, pre-decontamination waiting (staging) areas for victims, the actual decontamination area, and the post-decontamination victim inspection area. This area will typically end at the emergency department (ED) door.

[J] OSHA recently proposed an assigned protection factor (APF) of 1,000 for certain designs of hood/helmet-style PAPRs (Federal Register, 2003). An OSHA memorandum, which provides interim guidance pending the conclusion of the APF rulemaking, listed several PAPR hood/helmet respirators that are treated as having an APF of 1,000 for protection against particulates in the pharmaceutical industry (OSHA, 2002c (Memo for RAs)). The American National Standards Institute (ANSI), in Standard Z88.2 on Respiratory Protection, also indicates an APF of 1,000 for certain PAPRs. A hooded-style PAPR provides greater skin protection, has greater user acceptance, and does not require fit testing under 29 CFR 1910.134, thus might be preferred over a tight-fitting respirator. However, a tight-fitting, full facepiece PAPR might offer more protection in the event of PAPR battery failure.

[K] Hospitals must use NIOSH-approved CBRN (chemical, biological, radiological, and nuclear) respirators, as they become available, when the HVA reveals a potential WMD threat. Until NIOSH completes its CBRN certification process for PAPRs, use PAPRs that have been tested by the manufacturer for a CBRN environment.

[L] Material for protective gloves, clothing, boots, and hoods must protect workers against the specific substances that they reasonably might be expected to encounter. However, given the broad range of potential contaminants, OSHA considers it vitally important that hospitals also select PPE that provides protection against a wide range of substances. No material will protect against all possible hazards.

[M] The *Hospital Post-decontamination Zone* is an area considered uncontaminated. Equipment and personnel are not expected to become contaminated in this area. At a hospital receiving contaminated victims, the Hospital Post-decontamination Zone includes the ED (unless contaminated).

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