

# POSITION PAPER

NATIONAL ASSOCIATION OF EMS PHYSICIANS

## RISK REDUCTION FOR EXPOSURE TO BLOOD-BORNE PATHOGENS IN EMS

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The Occupational Safety and Health Administration (OSHA) estimates that approximately 5.6 million workers are at risk for contact with blood and other specified body fluids during the performance of their work duties. Of these, 4.4 million are health care workers at risk of exposure to potentially infectious materials. These workers include nurses, physicians, dentists and dental workers, laboratory and blood bank technologists, emergency department personnel, orderlies, housekeeping personnel, and oth-

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ers. OSHA identifies an additional 1.2 million others, "whose job might require providing first-response medical care in which reasonable expectation of contact with blood or potentially infectious materials may occur." The latter category includes personnel employed as law enforcement officers, fire suppression and rescue workers, correctional officers, paramedics, and emergency medical technicians (EMTs).

It is estimated that more than 20 infectious diseases can be transmitted via blood or body fluid contamination. These diseases include human immunodeficiency virus (HIV), hepatitis viruses (A, B, C, and D), cytomegalovirus, tetanus, tuberculosis, herpes simplex virus, malaria, Rocky Mountain spotted fever, and Creutzfeldt-Jakob disease. Some blood-borne diseases are fatal (e.g., HIV), some are seriously debilitating and impart risk of chronic infection and sequelae (e.g., hepatitis), and others have multiple-drug resistance, necessitating prolonged and complex therapy (e.g., tuberculosis). Contraction of these illnesses can impart serious long-term consequences.

While the geographic distribution and incidence of most blood-borne diseases are known, this does not imply that risk of infection is limited to specific ethnic groups, races, or subsets of the population. Given the world's in-

creasingly mobile population, diseases that were once geographically isolated may migrate to regions where there is no previous disease incidence. In addition, many infectious diseases have heterogeneous and varying symptom complexes, including prolonged latent or asymptomatic stages. Therefore, the provision of care to a seemingly "healthy" patient does not preclude possible exposure risk. Since one cannot dependably identify those patients who are either "infected" or "at risk," it makes intuitive sense to employ infection control practices and personal protective equipment (PPE) during patient care activities that offer potential for exposure to blood or body fluids.

### POSITION

The National Association of EMS Physicians (NAEMSP) recognizes the potential for exposure to blood-borne diseases for emergency medical care providers. Since a number of infections may be acquired via blood or body fluid exposure, worker education, observance of infection control practices, and workplace activities may mitigate exposure and reduce the likelihood of occupationally acquired illness. NAEMSP recommends that the following practices must be adopted to protect the EMS workforce from blood-borne infectious diseases:

1. All services and agencies employing personnel who engage in first-response and out-of-hospital emergency medical care should devise a written infection control plan. This plan should identify “at-risk” job classifications and tasks, establish a schedule for initial and ongoing infection control training for employees, and communicate the hazards of blood-borne diseases, mechanisms of transmission, and methods to prevent or minimize exposures. This plan should establish the policies and procedures for postexposure incident reporting, documentation, medical management, and follow-up.

2. All services and agencies employing personnel engaged in first-response and out-of-hospital emergency medical care should establish administrative controls in the form of uniform, systemwide policies and procedures. These documents should describe techniques to prevent the transmission of blood-borne diseases, barrier precautions to be utilized during all patient encounters, and expected behaviors for the decontamination or disposition of contaminated items. Written policies and procedures should be readily available in the workplace for reference and review by personnel. Periodic review and modification of these policies and procedures should occur as scientific knowledge, medical device technology, and practice patterns evolve. Quality improvement programs should be employed to document, monitor, evaluate, and maximize compliance with standing policies and procedures.

3. All services and agencies employing personnel engaged in first-response and out-of-hospital emergency medical care

TABLE 1. Task-specific Recommendations for the Use of Personal Protective Equipment\*

Patient Care Activity	Disposable Gloves	Mask and Protective Eyewear	Impervious Gown
Measuring blood pressure	No <sup>†</sup>	No	No
Measuring pulse	No <sup>†</sup>	No	No
Measuring temperature	No <sup>†</sup>	No	No
Examination of bleeding patient	Yes	No <sup>‡</sup>	No <sup>‡</sup>
Wound management/dressing	Yes	No <sup>‡</sup>	No <sup>‡</sup>
Minor hemorrhage control	Yes	No <sup>‡</sup>	No <sup>‡</sup>
Profuse hemorrhage control	Yes	Yes	Yes
Cardiopulmonary resuscitation	Yes	No <sup>‡</sup>	No <sup>‡</sup>
Venipuncture	Yes	No	No
Intravenous line placement	Yes	No	No
Intramuscular, subcutaneous, or intravenous medication administration	Yes	No	No
Cricothyrotomy/needle decompression	Yes	Yes	No
Intubation/airway adjunct placement/suctioning	Yes	Yes	No
Childbirth	Yes	Yes	Yes
Nasogastric/orogastric tube placement	Yes	Yes	No <sup>‡</sup>
Specimen handling	Yes	No	No

\*Adopted from multiple sources; see references 20, 26, and 37 in the bibliography.

<sup>†</sup>Utilize gloves if task performance includes possible contact with patient blood, secretions, or body fluids.

<sup>‡</sup>Utilize mask, protective eyewear, and impervious gown if possibility of splashing or spray exists.

should ensure that equipment safety engineering in the form of safety devices and PPE are employed. These controls should specify the safety devices and PPE to be available and utilized while performing high-risk activities (Tables 1 and 2). Evaluation of newly marketed devices and PPE should be ongoing to ensure that appropriate protective equipment is available for use in the field. Quality improvement activities should be implemented to monitor safety and efficacy of PPE use. It should be noted that PPE designed to limit exposure to blood and body fluids offers little or no protection against hazardous material (hazmat) exposure.

4. All services and agencies employing personnel engaged in first-response and out-of-hospital emergency medical care

should provide PPE of appropriate sizes and types for patient care, disinfection, and decontamination. PPE should be utilized prior to any anticipated exposures and be made immediately available for use in cases of unanticipated exposures. PPE should not be utilized by out-of-hospital providers in an indiscriminate fashion. Selecting the type of PPE to be utilized should be determined by the tasks being performed and patient condition, both of which and may vary with each case (Table 1). Patient care efforts should commence only after appropriate PPE is in place.

5. All services and agencies employing personnel engaged in first-response and out-of-hospital emergency medical care should devise work practice controls intended to create an environment requiring general

TABLE 2. Task-specific Recommendations for the Use of Medical Safety Devices\*

Patient Care Activity	Self-sheathing Needles	Needleless Administration Devices	Splash Guards	Sharps Containers
Wound care/lavage	No	No	Yes	No
Venipuncture	Yes	No	No	Yes
Intravenous line placement	Yes	No	No	Yes
Intramuscular, subcutaneous, or intravenous medication administration	Yes	Yes	No	Yes
Cricothyrotomy/needle decompression	Yes	No	No	Yes
Intubation/airway adjunct placement/suctioning	No	No	No	No†
Nasogastric/orogastric tube placement	No	No	No	No‡
Specimen handling	No†	No	No	No‡
Childbirth	No	No	No	No‡
Resuscitation activities	Yes	Yes	No	Yes

\*Adopted from multiple sources; see references 20, 26, and 37 in the bibliography.

†Utilize self-sheathing device if specimen has needle permanently attached.

‡Utilize sharps container or noncrush container for contaminated hardware, devices, equipment, or specimens.

infection control practices and behaviors. Standardized procedures and schedules for disinfection of equipment and disposal of infectious waste or contaminated items must be developed. An adequate work environment and facilities should be available to allow eating, drinking, and personal hygiene activities in a location separate from areas where patient care is performed.

6. All services and agencies employing personnel engaged in first-response and out-of-hospital emergency medical care should formulate a comprehensive infectious disease vaccination schedule and postexposure management plan. All emergency medical personnel should have the opportunity to receive vaccinations for infectious diseases to which they might be exposed during the course of their work. Of particular importance is access to vaccinations for blood-borne diseases such as hepatitis. Post-exposure medical management utilizing appropriate active and

passive immunization and serologic testing of source patients and exposed employees should be standard. All workers with exposure to an individual with a known blood-borne disease should be provided postexposure counseling, medical management, testing, and follow-up. Precise methods for testing, prophylaxis, and follow-up should be in compliance with federal regulations, law, or rules, and follow the current recommendations of the Centers for Disease Control and Prevention. Confidentiality must be maintained at all times for both the source patient and the exposed worker.

## DISCUSSION

General infection control practices are designed to prevent the transmission of a variety of microbiological agents and to provide a wide margin of safety for health care workers. Although these practices were initially developed for hospital employees and other workers in health care facilities, similar modes of blood-borne exposure and dis-

ease transmission have been described for patient care activities in both the hospital and out-of-hospital environments.

It is appropriate to apply successful hospital infection control practices to use by out-of-hospital medical personnel and public safety workers. Out-of-hospital infection control should include basic activities that have been developed to minimize the risk of acquisition of infection from contact with contaminated devices, objects, or surfaces. These activities include hand washing, needle and sharps disposal, cleaning, disinfecting and sterilizing equipment and surfaces, cleaning and decontaminating blood and body fluid spills, decontamination and laundering of soiled uniforms and clothing, and disposal of infectious waste. Because emergency medical personnel function in an environment that is inherently unpredictable in its exposure risk, general infection control procedures should be incorporated into routine work activities. Control measures that are simple and uniform for specific patient care activities have the greatest likelihood of worker compliance.

A comprehensive infection control program includes five major initiatives. These are administrative controls, engineering controls, work practice controls, education of the workforce, and medical management.

1. Administrative controls include the development of a written infection control plan and adoption of systemwide policies and procedures delineating expected work behaviors and actions when activities involve exposure to blood or body fluids.
2. Engineering controls reduce blood-borne disease exposure by removing the hazard or isolating the worker from exposure. Such controls include self-

sheathing needles, catheters, and syringes, needleless drug administration devices, syringe splash guards, sharps containers, cut-resistant gloves, pocket masks, disposable medical equipment, and PPE. In the context of exposure to blood-borne pathogens, PPE is defined as specialized clothing or equipment that does not permit blood or potentially infectious substances to pass through or reach workers' clothing, skin, eyes, mouth, or mucous membranes under normal conditions of use. This includes items such as examination gloves, face shields, eye protection, masks, gowns, aprons, leg covers, sleeve protectors, and booties. The American Society for Testing and Materials (ASTM) has published specifications for examination gloves and protective clothing. Additionally, the National Fire Protection Association (NFPA) specifies minimum design criteria, performance criteria, and test methods for clothing used in EMS.

3. Work practice controls alter the performance of tasks to minimize or eliminate exposure to blood and body fluids. This includes the proper disposal of needles and sharps (avoid shearing, bending, recapping, or breaking needles, disposal in plastic containers), the proper disposal of contaminated linens, clothing, and infectious waste, appropriate disinfection of reusable equipment, and restriction of activities in work areas with reasonable likelihood of exposure to blood and body fluids (avoid eating, drinking, smoking, and application of cosmetics).
4. Education of the workforce is imperative and should include prevention of blood-borne disease transmission, symptoms of illness, epidemiology, portals of

exposure, infection control methods, administrative policies and procedures, appropriate use and cleaning of medical equipment and safety devices, use of PPE, postexposure management, and the medical management of patients suffering from blood-borne diseases. Education should emphasize that mandatory utilization of safety devices and PPE is established by policy and enforced by daily monitoring and practice. Workers must learn to recognize tasks that may result in exposure to blood and other potentially infectious materials (wound examination and bandaging, intravenous access, administration of parenteral medications, intubation and airway management, suctioning). While providers should learn which types of PPE are employed during various task performance, they must also recognize that utilization of PPE does not eliminate risk. An educated workforce is more likely to comply with infection control guidelines when they understand the purpose and reasoning that underlie specific policies and procedures.

5. Medical management practices include vaccinations to prevent infection with hepatitis B virus and other blood-borne illnesses as well as postexposure surveillance and treatment procedures. Vaccines should be readily available and free of charge to all workers with the potential for blood exposure. Mechanisms for postexposure medical management should be established in policy and understood by all workers. An exposure incident is defined as a specific eye, mouth, other mucous membrane, nonintact skin, or parenteral contact with blood or other potentially infectious material. An established policy for incident reporting, medical assessment, prophylaxis, and fol-

low-up appropriate to the type and source of exposure must be clearly delineated. As with any medical evaluation, the confidentiality of the source patient and exposed worker must be strictly maintained.

The U.S. government, through OSHA, has promulgated regulations that prescribe safeguards to protect workers and reduce their risk of exposure to blood-borne diseases. These federal standards (first published in Title 29, Code of Federal Regulations, Part 1910.1030, in December 1991) require employers of one or more individuals who can reasonably be expected to come into contact with blood or specified body fluids during the performance of their duties, to develop programs involving the five initiatives described above. Title 29 legislation requires a written exposure control plan and communication of infectious disease hazards to public safety personnel, specifies the need for engineering and work practice controls, recommends postexposure evaluation and follow-up, and offers advice on how to comply with these regulations. Admittedly, Title 29 does not specifically address all blood-borne pathogens (the focus is on hepatitis and HIV), but this does not limit the value of the OSHA recommendations. While government employees may be excluded from OSHA requirements, one must not lose sight of the purpose of such regulations. The goal is to provide safe working conditions and protect workers from occupationally acquired, blood-borne diseases.

## CONCLUSION

The National Association of EMS Physicians recognizes the potential for out-of-hospital personnel exposure to blood-borne pathogens. Accordingly, NAEMSP strongly urges EMS medical directors, managers, and workers to devise, implement, and adhere to practices designed to limit exposure. Any agency whose

personnel engage in any phase of out-of-hospital care should devise an infection control plan, establish systemwide policies and procedures, provide appropriate PPE, ensure that such devices are used, develop work practice controls, require immunization, and develop a postexposure treatment plan. Ensuring safe working conditions for the protection of out-of-hospital workers is the duty of all EMS agencies.

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