

guage literature; informal questionnaire survey of first responders in several European countries.

**Results:** The initial on-scene measures during a HAZMAT response—cordoning off the scene and rescue out of the contaminated area—are done uniformly by fire service responders. In most cases, emergency decontamination of casualties at the scene (disrobing and flushing), is performed by firefighters, however, reliability appears variable. The probability of a coordinated patient handover from fire personnel to emergency medical services (EMS) staff is rated “low” by most sources.

In many countries, specialized casualty decontamination units have been commissioned and are operated by a variety of services: fire, EMS, military and civil protection.

Hospital decontamination facilities are in most countries still the exception and depend mostly on local commitment.

Substantial detection usually invalues only simple measurements performed by the first responders; specialized support is planned to be given mainly by military, civil protection and specialized laboratories.

**Conclusions:** Initial on-scene response to chemical/radiological incidents is fundamentally similar in most countries. However, distinctive differences beyond the first steps restrict the transferability of organizational solutions.

**Keywords:** chemical, biological, radioactive, nuclear; chemical substance; contaminated patient; decontamination; detection; HAZMAT; radioactive substance

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### Effect of Physical Exertion in Level-C Chemical and Biological Protective Equipment on Physiological Function

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**Introduction:** The objective of this study was to assess the effect of 20 minutes of heavy treadmill exertion in military-style, Level-C chemical and biological personal protective equipment (PPE), including a filtering face piece respirator, on physiological variables including venous pH, venous PCO<sub>2</sub>, SpO<sub>2</sub> and tympanic temperature.

**Methods:** Baseline physiological variables were measured in 19 healthy subjects who undertook heavy physical exertion on a treadmill at a constant room temperature of 20°C: (1) once while wearing a short-sleeved t-shirt, shorts, and running shoes; and (2) once while wearing chemical and biological PPE. Repeat measurements of physiological variables were made after 10 and 20 minutes of exertion in both groups.

**Results:** Twenty minutes of physical exertion was undertaken by healthy subjects wearing chemical and biological PPE resulted in moderate hypoxemia, significantly decreased pH ( $p = 0.003$ ), elevated PCO<sub>2</sub> ( $p = 0.018$ ) and elevated tympanic membrane temperature ( $p < 0.001$ ), compared to baseline values. Despite these significant differences, none of the mean venous blood gas values deviated from the normal range during physical exertion.

**Conclusions:** The degree and duration of physical exertion undertaken in chemical and biological PPE induced some significant changes in physiological variables compared to control but, with the exception of SpO<sub>2</sub>, did not result in changes considered to represent abnormal physiology. However, it is likely that core body temperature was underestimated by tympanic measurement. Blood gas data indicating that CO<sub>2</sub> was retained during exertion in this type of PPE were unanticipated and require further investigation.

**Keywords:** chemical and biological warfare; emergency medical services; physical exertion; protective clothing

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### Comfort Level of Emergency Medical Services Providers in Responding to Weapons of Mass Destruction Events: Impact of Training and Equipment

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**Introduction:** Emergency medical services (EMS) providers are ill-prepared in the areas of training and equipment for weapons of mass destruction (WMD) events and other public health emergencies.

**Methods:** A nationally representative sample of the basic and paramedic emergency medical service providers in the United States was surveyed to assess whether they had received training in WMD and/or public health emergencies, as part of their initial provider training and as continuing medical education (CME) within the past 24 months. Providers also were surveyed as to whether their primary EMS agency had the necessary specialty equipment to respond to these specific events.

**Results:** More than half of EMS providers had some training in WMD response. Hands-on training was associated with EMS provider comfort in responding to chemical, biological and radiological events and public health emergencies (OR = 3.2; 95% CI = 3.1–3.3). Only a small portion (18.1%) of providers surveyed indicated that their agencies had the necessary equipment to respond to a WMD event. The comfort level and having equipment to respond to these incidents was not as highly associated as the comfort level and having had training to respond to these incidents.

**Conclusions:** Lack of training and education as well as the lack of necessary equipment to respond to WMD events is associated with decreased comfort among emergency medical services providers in responding to chemical, biological, and radiological incidents. Better training and access to appropriate equipment may increase provider comfort in responding to these types of incidents.

**Keywords:** bioterrorism; emergency medical services; equipment; training; weapons of mass destruction

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### The New Austrian Plan for Medical Diagnostics and Therapy after Radiation Accidents

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Recently, the plan for Medical Diagnostics and Therapy after Radiation Accidents was developed in Austria as part