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# Guest Editorial On "Hospital Responses To Chemical Terrorism": How Should We Prepare For Chemical Terrorism?

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## Abstract

A major difference between the response to chemical terrorism and to natural disasters such as earthquakes is that the former requires victims, medical personnel, and medical facilities to be protected from contamination by chemical substances and weapons. The effectiveness of the response depends on how well the victims, the emergency staff, and the hospital are protected from dangerous chemical substances. Failure to do so could, in a worst-case scenario, necessitate closing the medical facility due to contamination at a time when it should be functioning at maximum capacity to treat victims.

The methods available for protecting victims, oneself, and the medical facility from dangerous chemical substances can be divided into 4 broad categories: zoning, personal protective equipment (PPE), detection, and mass decontamination. Unfortunately, even in the current era of evidence-based medicine, there is surprisingly little evidence concerning the details of how to implement these four methods. There are more than 200,000 varieties of dangerous chemical substances, and even the apparently simple chemical weapons number in the hundreds if precursors and derivatives are included. One can easily imagine the difficulty of establishing readily comprehensible evidence-based guidelines for responding to such a vast spectrum of dangerous chemical substances. Moreover, the responses to chemical weapons and countermeasures to chemical disasters involving small numbers of people, which have been part of combat medicine for some time, naturally differ from the responses and countermeasures that would be required in a noncombat, chemical terrorist situation in cities.

For reasons such as these, the response to chemical terrorism

by the emergency services in various countries depends largely on the opinions of experts in those countries. Nevertheless, several common trends have recently emerged in this area.

There have been no notable improvements to zoning. Moreover, there are unfortunately no portable detectors that meet the cost and operational requirements of medical facilities or that are durable enough for use at such facilities. The problems associated with detection are compounded if the chemical substances of concern are not limited chemical weapons. Throughout the world, level C PPE has come to be considered adequate for medical facilities. Originally, however, the basic assumption was that level C protective equipment would be used in circumstances where the type and concentration of the causative agent had already been determined. Consequently, there is concern regarding the use of level C protective equipment in the medical setting, where an immediate response is required after a disaster even if the causative agent has not been identified. At the least, it should always be kept in mind that level C protective equipment may be ineffective, and if symptoms of secondary exposure appear - even a small number of cases - the level of protection should be increased.

Mass decontamination is a 2-stage process involving on-site decontamination and hospital decontamination. Consequently, a major question is how many individuals can realistically undergo wet decontamination per hour. Although training in wet decontamination is routinely undertaken in various parts of the world, it is clear that the faultless wet decontamination of thousands of individuals is neither feasible nor practical. A more practical approach would be to limit wet decontamination to those individuals

in whom visual detection of contamination is possible, or to those who exhibit symptoms of skin irritation at the site of exposure with rapid and efficient dry decontamination performed by a change of clothing. As a more practical approach to the disposal of waste liquids produced by wet decontamination, it is considered acceptable in many countries to dispose of these liquids in the general sewer system in an emergency.

In the case of a chemical weapon that requires immediate administration of an antidote and medical treatment, such as a nerve or blood agent, physicians are often required to don protective equipment and rush out of the medical facility to administer treatment, although this practice varies depending on the medical system of the particular country. However, inexperienced medical personnel may find themselves in the position of requiring treatment rather than providing it, thus contributing to the confusion at the scene. Consequently, the

view that physicians should not be dispatched to the site of the emergency has also been advocated. Recently, the idea has emerged of employing bone marrow transfusion lines for treatment at the scene where intravenous line taking is difficult to perform while wearing protective equipment. Careful consideration also should be given to establishing a system that can facilitate the immediate use of large numbers of mechanical ventilators.

Thus, in the current environment of escalating threats internationally, questions are being raised regarding the extent to which realistic, practical, and effective responses to chemical terrorism can be adopted. In tackling these problems, it should be emphasized that it is the gradual accumulation of scientific evidence that will lead to advances in this field.

## **References**

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