Training to Defend: A Multifaceted Approach To All Hazards Preparedness and Planning for Terrorism

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ABSTRACT

In most nations, continued concern exists regarding the potential for acts of terrorism. Healthcare providers, specifically those in Emergency Medicine, will find themselves in the forefront of responding to such events. Training for Emergency Preparedness for all potential hazards is critical. Many approaches to training in individual for All Hazard Preparedness exist. The authors describe a multifaceted approach to training for All Hazards Preparedness and planning for terrorism. The approach includes classroom exercises designed specifically at understanding hazardous material threats, high fidelity patient simulation, strategic management simulation, and simulated care exercises in a non-hospital based emergency department facility. The authors believe that this multifaceted training will provide the broadest most potentially useful training and evaluation for emergency providers to ensure optimal response in times of any and all future terrorist attacks.

Keywords

Preparedness, terrorism, simulation, training

INTRODUCTION

The threat of terrorist attack remains an important concern to most countries, throughout the world today. Terrorist attacks can result in the loss of life, significant personal injuries, property damage and disruption of vital services. While much of the international community has focused on heightened security to reduce such an attack, it seems inevitable that attacks of many forms will continue to occur. As a result, healthcare providers around the world continue to develop models and processes for training to ensure preparedness for a variety of potential hazards. Included in these are the potential threats for biological attack, radiation attack, attack through food or water vectors, and the possible mass casualty incident through use of explosive devices.

To be fully protected, a diverse population of healthcare providers including paramedics, nurses and emergency physicians must be fully trained to both anticipate and respond to a variety of possible terrorist scenarios. Such preparation for "All Hazards" is an important component of the current emergency medical system in the United States.

Multiple approaches have been used to train prepare and evaluate emergency medical providers readiness for such events. Governmental and educational entities have prepared didactic material, designed to assist providers in obtaining knowledge in discrete areas of potential hazards. Web based instructional programs, and classroom exercises are designed to increase knowledge in such areas as response to smallpox, anthrax, radiologic disaster, and other potential hazards. Hospitals, through accreditation entities such as the Joint Commission for the Accreditation of Health Care Organizations (JCAHO), and state regulatory bodies routinely plan and carry out disaster drills. These are designed to test internal and external system readiness in the face of increased patient demand that might occur in a mass casualty incident related to a terrorist attack or other natural or unnatural event.

Recently, the use of computer simulations to assess healthcare provider's response to individual or multiple patient scenarios have been growing in popularity. High fidelity simulators can create patient care scenarios in a realtime environment, providing appropriate evaluation of individual providers' patient management and situation management skills.

We describe a model in which multifaceted training is utilized as a means of ensuring All Hazard Preparedness for any and all future terrorist attacks and their medical consequences. The multidisciplinary and multifaceted training includes classroom training in hazardous materials, strategic management simulation high fidelity medical simulation, and training, drills, and simulation in a dedicated non-hospital based Emergency Department environment. Each of these components will be described, and the rationale for incorporation as a multifaceted approach to all hazard preparedness will be discussed.

ADVANCED HAZARDOUS HAZMAT LIFE SUPPORT (AHLS PROVIDER TRAINING)

The AHLS provider program is a 16 hour; two day course taught in the classroom and designed to train participants to:

- Demonstrate rapid assessment of hazmat patients
- Recognize toxic syndromes (toxidromes)
- Demonstrate ability to medically manage hazmat patients
- Apply the poisoning treatment paradigm
- Identify and administer specific antidotes

The provider course was developed and is sponsored by the University of Arizona Health Science Center, Department of Emergency Medicine. Information can be obtained at www.ahls.org. The attached table shows an outline of the syllabus materials covered in the AHLS course. The AHLS course is designed to provide emergency medicine personnel (paramedics, first responders, physicians, nurses) with the requisite skills to identify and treat a wide range of potential biohazards that might be utilized in a terrorist attack. The program utilizes textbook teaching, classroom didactics, and simulated patient exercises. The course provides a useful basic training for all providers enrolled in the multifaceted/multidisciplinary training exercises.

PROVIDER PROGRAM	
GENERAL PRINCIPLES OF AHLS ▪ Hazardous Materials Epidemiology ▪ Important Properties of Hazardous Materials ▪ Medical Management of Hazmat Victums ▪ Personal Protective Equipment and Decontamination ▪ Toxidromes and Toxicodynamics ▪ Antidotes in General ▪ Establishing and Organizing a Hazmat Response Team	**TOXIC INHALATIONS** ▪ Irritant Gases ▪ Asphyxiants ▪ Antidotes in Detail: Normobaric Oxygen Hyperbaric Oxygen Methylene Blue Amyl Nitrite Sodium Nitrite Sodium Thiosulfate **INTERACTIVE CASE STUDIES**
PESTICIDE POISONING ▪ Organophosphates and Carbamates ▪ Antidote in Detail: Pralidoxime and Atropine **TOXIC TERRORISM** ▪ Nuclear, Biological, and Chemical Terrorism ▪ Chemical Terrorism: Nerve Agents ▪ Corrosives, Hydrocarbons, and Halogenated Hydrocarbons	**MISCELLANEOUS TOXICANTS** ▪ Hydrofluoric Acids and Fluorides ▪ Hydrazines ▪ Antidotes in Detail: Calcium Gluconate Calcium Chloride Pyridoxine **INTERACTIVE CASE STUDIES** **PROVIDER EXAM**

Table 1

STRATEGIC MANAGEMENT SIMULATIONS

Terrorism, unlike other medical events does not present a repetitive challenge to healthcare providers which can be responded to in a similar matter each time. Therefore it is important not only to provide content expertise to healthcare workers, it is important to understand how decision makers and healthcare providers process information and make decisions. The SMS simulation, previously described have been used to assess, predict, and train decision making competency in executives, defense personnel, and healthcare workers (Satish and Streufert, 2004). The SMS utilizes 25 validated characteristics of human effectiveness in response to complex tasks, settings, and challenges. The measurement in a simulation environment captures not only relatively simple task competencies such as the speed of response, but also focuses on more intermediate and highly complex thought and action processes. These are particularly suited to training for all hazards preparedness as response in these settings include high level emergency management decision, planning capacity, forward thinking, and strategy development. The SMS simulation is "content independent", and may be administered to individuals or to teams. The simulation system itself can be used to identify weaknesses and to train individuals to improve their thought process regarding complex multifaceted activity.

The SMS simulation has been proven to be a reliable and valid technique and data has been collected in numerous countries across a variety of professional specialties, cultures, and job levels (Satish and Streufert, 1999).

The SMS simulations expose participants to one of several validated scenarios divided into several time periods. During a scenario, participants receive preprogramed items of information. Each simulation sequentially presents a number of diverse situations and assesses a range of appropriate/optimal actions in the face of concurrent situations. Simulation provides opportunities for sequencing activities, for developing initiative, for planning and strategy development. The simulations contain a built in crisis period, similar to what might be faced by a first responder or emergency healthcare worker in time of a terrorist attack. Participants make decisions throughout the simulation. Individual or team decisions are then computer scored against preprogramed and time related events allowing measurement of various competencies such as initiative, planning, breath of approach, strategy, etc.

To date the SMS simulations have been used in our University environment to test strategic thinking in a series of physicians in training including Psychiatry, Surgery, and Emergency Medicine residents.

HIGH FIDELITY MEDICAL SIMULATION

High fidelity medical simulation in contrast to SMS simulation is content specific and allows assessment of individual providers' medical skills and medical thinking in an environment that can reproduce the stress of multiple casualties and undifferentiated patient complaints. Human patient simulators allow for variability in cardiovascular, respiratory, neurologic and pharmacologic activity and variables, and thus allow a computerized human manikin capable of imitating the individual human response to medical care in realtime. The simulators allow a variety of patient scenarios to be developed including a number related to human mass casualty and terrorism events. Scenarios can be designed to simulate casualties from a weapon of mass destruction attack. The manikins can mimic the effects of nerve agents or chemical agents. The simulated patient can have tearing in the eyes, saliva formation, skin blisters or rashes. In addition, the simulators duplicate battle field conditions with simulated wounds, significant bleeding, and associated hemodynamic changes.

ALTERNATE SITE EMERGENCY DEPARTMENT

All United States hospitals periodically conduct training exercises in the form of simulated disaster drills. These drills are designed to provide real life, simulated training for the multiple patients of a mass casualty incident, or for specific kinds of patients (i.e. radiation accident). One of the difficulties in carrying out such exercises is that they occur in an environment along side ongoing patient care. Even the best planned exercise can be disrupted by unexpected patient care requirements for personnel or space.

One of the pressing needs in the wake of the post 9/11 planning is the need for immediately available surge capacity for hospitals and Emergency Departments. Hospitals and communities are looking to prepare themselves for the unexpected need for additional hospital beds for a large number of patients either from their own community, or transferred from a nearby community in the wake of a natural or terrorist disaster. Emergency Departments are also preparing themselves for the unlikely event that they would be unable to continue to function due to a quarantine, fire, explosion, or other natural or unnatural event.

In the Central New York region we have developed an alternate site Emergency Department to meet these demands. A fully functional, state of the art Emergency Department facility is being built at the New York State Fairgrounds, located in Syracuse, NY. This facility is designed to manage patient care needs during large scale events at the Fairgrounds. The

remainder of the year it will remain dormant, and be available as a training site. It is a fully functioning Emergency Department that will be unencumbered by patient care most of the time. Detailed memorandum of understanding (MOU's) have been developed between the Fairgrounds, the SUNY Upstate Center for Emergency Preparedness, and various entities (i.e. hospitals, health departments, governmental agencies, etc.) who will be interested in utilizing the facility as an alternate site Emergency Department, a surge capacity facility, or training site. This fully equipped Emergency Department makes an ideal venue for large scale exercises to test individual, team, or community readiness to respond to and manage large scale mass casualty incidents, and/or the devastating attacks of a variety of potential terrorist hazards.

CONCLUSION

Like many parts of the country, and the world, the Central New York region is preparing itself to respond to a variety of potential future hazards that might result from natural or unnatural events. The Center for Emergency Preparedness at the Upstate Medical University has developed an integrated multifaceted training program for All Hazards Preparedness. It includes didactic and classroom training on specific aspects of expected hazards; strategic management simulation to ensure an understanding and improvement in system thinking , planning, and strategizing; high fidelity medical simulation to ensure appropriate medical readiness in healthcare responders; and an alternate site Emergency Department which allows integration of the above skills in a real life Emergency Department setting, unencumbered by the usual day-to-day patient care demands. We believe that this combination provides optimal training for Emergency healthcare providers, and allows us to fully evaluate and improve the preparedness of our health system for a large geographic region of Central New York.

REFERENCES

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