Utilizing Technology Based Learning for Disaster Preparedness

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ABSTRACT
Preparing for disasters can be a grueling, although necessary, exercise for those involved in emergency response. The large scale nature of disaster response poses many obstacles to executing an effective disaster preparedness drill that incorporates hospitals, fire and rescue personnel, and police. Cooperation and effective communication during these incidents is imperative. Simulation technology is a realistic alternative to a large, multi-disciplinary, one-time effort. Each discipline may be able to practice and reinforce their roles in a disaster with the aid of various emerging technologies. This paper examines some of the technologies already being implemented in the area of disaster preparedness. Technology based learning (TBL) strategies are analyzed for consistency with accepted principles of adult education.

Keywords: Disaster, Drill, Human Patient Simulators (HPS), Preparedness, Simulation, Technology Based Learning, Virtual

INTRODUCTION
Traditionally, public safety agencies charged with emergency response have prepared for multiple casualty incidents (MCIs) and disaster through structured participation in disaster drills. Disaster drills pose several challenges for emergency medical responders. These mock exercises require an inordinate amount of pre-planning, seamless interagency communication, and the investment of additional time and resources. The identification of efficient, cost effective, and realistic training methods would theoretically enhance communication between hospitals, fire rescue departments, and other organizations charged with protecting public health. There is a paucity of data about what strategies constitute the most effective training for mass casualty occurrences. Recent developments in high fidelity simulation, virtual reality, and internet based training strategies have revolutionized public safety’s approach to disaster preparedness and response. This paper will examine currently available literature and describe how a technology based learning (TBL) strategy may complement readiness efforts.

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Rationale/State of the Art

Though disaster training seems like a prudent undertaking, the practice of system wide drills is actually mandated through several regulatory agencies. The Joint Commission (formerly the Joint Commission on the Accreditation of Health Care Organizations) requires hospitals to interface with the surrounding community and conduct a mass-scale event at least yearly (The Joint Commission, 2008). The Centers for Disease Control and Prevention have issued a variety of guidelines on disaster preparation (Centers for Disease Control). Finally, the National Incident Management System (NIMS), a component of the Federal Emergency Management Agency (FEMA), has integrated the hospital structure into a universal algorithm known as the Hospital Incident Command System, or HICS. Figure 1 contains a visual depiction of an incident management structure for healthcare organizations with the basic components of the modularized and scalable hierarchy of command and control highlighted. Hospitals participating in disaster drills must conform to existing guidelines so that every emergency medical responder, from the first firefighter on scene, to the hospital logistics officer, speaks the same language with regard to the triage, treatment, and eventual disposition of mass casualties.

The imperative of preparation has been borne out by historical events. In addition, the continued confusion surrounding the response to large scale incidents is demonstrated in the literature. In 2006, Bartley, Stella, and Walsh, (2006) examined the utility of simulated disaster exercises. The paper, aptly titled, “What a Disaster?!?” suggested that traditional training methods failed to address persistent deficiencies. Hospital personnel likely to participate in an MCI incident were asked to complete a pre-event survey. Results demonstrated a significant amount of confusion with regard to roles and command structure. The “pass rate” for the emergency management test prior to formalized training was 18% (9/50). Though participants indicated an increase in their knowledge base, “post intervention knowledge. . . remained suboptimal” (Bartley, Stella, & Walsh, 2006). The majority of participants described the exercise as having some benefit, but the authors were unequivocal in emphasizing the need for more intensive preparation, training, and a system-wide review of emergency response.

A 2003 review of literature conducted by the Agency for Healthcare Research and Quality further clarified the need for improvement in disaster training. The overall evidence of the efficacy of traditionally managed disaster drills was classified as, “inefficient.” In addition, the wide range of studies, methods of evaluation, and declared objectives obviated the AHRQ from drawing any meaningful conclusions from available data (Thomas, Hsu, Kim, & Colli, 2004). In light of imminent threats to public health and safety in the forms of bioterrorism and natural disasters, the need to optimize emergency preparedness is present and clear. Significant challenges to system wide implementation disrupt comprehensive disaster planning efforts. Traditional drills often require the presence of a large number of volunteers in addition to paid agency employees. Normal operations cannot be suspended during a drill, and public safety agencies incur overtime expenses in the planning and execution of such an event. Organizations like the Joint Commission mandate disaster exercises on a yearly basis. The idea that knowledge about emergency preparedness and response can persist despite a relative infrequency of planned events runs contrary to principles of adult learning.

Technology based learning may enhance preparatory efforts. Internet based case scenarios computer generated simulation models can factor in a wide variety of detail that traditional drills fail to replicate. In addition, the utilization of newer technologies can facilitate outreach to distant sites and theoretically introduce more personnel to an incident management curriculum.