EXPERT SYSTEMS: A DISASTER MANAGEMENT SOLUTION AT THE READY

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NYU's Downtown Manhattan Hospital was one of many victims of the Sept. 11 terrorist attacks. The hospital is just blocks from the World Trade Center and was a primary care site on that tragic day. In fact, it was overwhelmed, with too many victims to count. On a typical day, the hospital treats about 100 people. After the terrorist attacks, hospital officials estimate that doctors and nurses treated more than 1,200 casualties.

The hospital lost $32 million as a result of that day, ***Healthcare IT News*** reported. The chaos of the moment, and an inadequate system to manage the colossal surge in patients, resulted in details – ***important*** details – slipping through the cracks. Officials from NYU Downtown estimate they registered and tracked only about 10 percent of the patients who came for emergency treatment on Sept. 11. Because there weren't adequate records, the hospital had no means to obtain reimbursement for a massive amount of the cost.

Today, there's less reason a hospital like NYU Downtown should suffer such a financial blow as the result of inadequate disaster management systems – even in an unprecedented event like Sept. 11. Using expert systems – intuitive software based on best practices, which serves as a guide and recorder during a crisis – decision-makers can now take action with far improved efficiency and results. Expert systems can recommend responses and capture, analyze and track relevant data so important action steps are not overlooked. Perhaps most importantly, recent developments in expert system capabilities mean they're faster, cheaper and more flexible to build and maintain than ever before.

The Need for Expert Systems

Sept. 11 was a wake-up call for the healthcare industry. The tragedy highlighted the necessity of Disaster Management plans that can adapt to the most extreme circumstances. We all hope there's never another calamity on the scale of Sept. 11, but we also now know to be ready for anything. Unfortunately, attacks by foreign terrorists aren't our only worry. We've seen massive casualties caused by domestic terrorism in Oklahoma City, man-made disasters like Three Mile Island and natural disasters like Hurricane Andrew. Even an event like the Great Blackout of August 2003, when much of the East Coast lost power, could cause incalculable problems.

Moreover, not all disasters are external and leave the hospital intact and operating. Some disasters will impact the fabric, personnel and resident patients of our institutions directly. For example, I was at George Washington University's Medical Center last year when a gas

explosion under the street induced not one, but two successive, evacuations of key hospital facilities. Simply, hospitals must be prepared with a comprehensive Disaster Management plan so they're ready for the unexpected, effective during the crisis, and financially solvent in its aftermath.

Mandated-readiness is coming from other sources, too, like JCAHO, the Joint Commission on Accreditation of Healthcare Organizations. Since Sept. 11, Disaster Management has been designated one of JCAHO's seven "environments of care." JCAHO is looking for hospitals to move beyond Disaster Management Plans to Disaster Management Programs. Agreed, tested and executable programs are required, according to the 2003 JCAHO White Paper ***Health Care Emergency at the Crossroads: Strategies for Creating and Sustaining Community-Wide Emergency Preparedness Systems***. "There is a fundamental need for templates and scalable models for community-wide preparedness to guide planning before, and actions taken curing and after, an emergency," the paper noted.

JCAHO's requirements are numerous and specific. They include:

- 48-hour to 72-hour standalone capability, including stockpiling of medications and supplies.
- Organizing around an incident-command format, with provision for robust interaction with other agencies in the community.
- The capacity to deal with a biological or chemical incident and the provision of decontamination facilities for all hospitals.

There is one more key concern that JCAHO has expressed: making care for caregivers a very high priority: That means providing things like personal protective equipment, vaccinations, prophylactic antibiotics, chemical antidotes, and counseling--and also to assure that caregivers can attend to their family concerns, including two-way information on their status and that of their family members.

It is fascinating to note that 62 percent of the emergency department nurses at St. Vincent's Medical Center, the hospital at the center of the 9/11 medical response, had spouses or partners who are first responders. What could this mean? That the sociological and psychological risk to communities from a mass casualty event may be very highly concentrated among your the hospital staff.

Expert Systems and Disaster Management

Hospital administrators and employees must embrace and practice a Disaster Management program so it will be tested and reliable during the galloping, intense tempo of a real crisis. This preparation starts with day-to-day surge management. If hospitals can refine and imbed their surge management skills and processes –when patient surges are slight instead of drastic – they will be that much better prepared when a major disaster strikes. In addition, effective surge management is financially beneficial. An emergency room that can take in a few more patients than available beds without lessening the standard of care will generate additional revenue, preserve its reputation and gain referrals. Effective surge management also means fewer resources will be unnecessarily consumed, especially expensive staff time.

Expert systems can provide solutions for surge management and Disaster Management preparedness. Broadly speaking, an expert system is a type of software that mimics how the human brain locates, assesses and deploys knowledge – and finds solutions. Imagine packaging together the knowledge and experience of all the best people in the healthcare industry – digitalizing it, making it accessible without limit in time or place and tailoring it to specific circumstances. That, in essence, is an expert system. Moreover, with the ability to capture the know-how of the best domain experts, the 'brain drain' that comes when experts retire or, worse, join a competitor is mitigated.

This expert system in the form of a digital mentor should be available to a hospital before, during and after an incident. The system would replicate the ability to understand context, mental frameworks, logic, rules of thumb, and problem-solving processes that a "live" expert would bring to a task, and be able to adapt to the particular circumstances of a specific incident.

Accessibility and flexibility are the watchwords; expert systems are now accessible via the Internet 24-hours-a-day from any location. Prior to an incident, the expert system would provide an assessment of a hospital's state of readiness, help generate a Disaster Management Plan and support Disaster Management training. During a crisis, the expert system would guide decision-makers through the process of setting up an incident command center, evaluating the situation assessment and response, issuing job action sheets, identifying treatment protocols and managing crisis communications, all while tracking patient flow, costs and process effectiveness. Finally, after the disaster, the expert system would capture the lessons learned and identify remediation opportunities.

Expert Systems in Action

To make it more concrete, let's take a real-life scenario – a chemical HAZMAT incident creates massive casualties in your town or city. The incident commander should be able to quickly:

- Determine the appropriate alert level based on the nature, extent and proximity of the incident.
- Identify the chemical agent involved based on the symptoms and other indicators displayed by the casualties – even before the patients arrive at the hospital.
- Determine the treatment protocol for the chemical agent.
- Access guidelines to create an appropriate decontamination center.
- Alert all required Disaster Management administrative and clinical personnel.
- Hand out configurable job action sheets customized for the specific incident.
- Track required staffing, beds, drugs, supplies and equipment and needed replacement levels and staff rotation during an incident.
- Track expenses incurred for later reimbursement.
- Access scripts for crisis communications with the media and public.
- Capture lessons learned for use in recovery and remediation after the incident and preserve vital know-how.
- Share data with other software applications, systems and agencies.

The same expert system that guides decision-makers through Disaster Management situations can also streamline day-to-day operations. Managing supply levels, identifying supply and labor inefficiencies and meeting accreditation requirements are just a few of the everyday applications of today's more advanced expert systems.

Now, the bottom line: expert systems are affordable. The expense depends on how many facilities share the expert system, but the annual cost may be in the low four figures for smaller hospitals and mid-five figures for large metropolitan institutions. Of course, better surge management will also increase revenues and decrease expenses. Ultimately, the return depends on the number and nature of incidents a hospital incurs.

The right expert systems can help preserve your hospital's reputation and level of patient-care, both on ordinary days and extraordinary days. The pressures we face – most importantly from the inevitability of future disasters and from JCAHO in response to that prospect– mean we must integrate effective Disaster Management programs. Like NYU, communities depend on local hospitals at their most desperate moments. It is imperative that we be prepared.

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