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After disasters, how do hospitals track patients?

By Peter Barnes | November 21, 2016

The bombings at the Boston Marathon finish line in 2013 flooded local medical facilities with hundreds of victims. The result was a triumph in emergency care — and a wake-up call about the challenges of tracking and locating patients.

For instance, Boston's Brigham and Women's Hospital treated 40 patients, roughly half of whom arrived during a 30-minute span, and initially replaced some electronic records with paper to save time. But the naming convention for unknown patients resulted in similar names stacking up on the patient tracking board. Some drug and lab orders bypassed electronic systems entirely, with residents entering verbal orders after the fact.

In the aftermath, the hospital examined its performance and defined two new roles in its emergency plan. A nurse in charge was designated to handle triage communication and patient tracking. And qualified staff would be enlisted as "scribes" to help enter electronic orders and update EHRs.

Every hospital plans for the worst. Triage procedures, staffing strategies, and ties with emergency management agencies stand ready for natural disasters, terrorist attacks, and other mass casualty events.

What happens following the initial influx of patients, though, is often less clear. People who arrive unconscious can remain unidentified after admission. Family members can overwhelm phone lines seeking the status of their loved ones. Staff facing more immediate demands sometimes find themselves skipping the data entry that electronic systems need to track treatment histories, lab orders, or even the location of people in recovery.

"Having good patient census is always important," says Michael Gill, a senior electronics engineer with the National Library of Medicine's Lister Hill National Center for Biomedical Communications. "Generally, everybody rallies to the cause. But if it's a sustained event, I suspect that some of the processes will be not too robust."

As part of a broader partnership, Gill has explored potential web, desktop, and mobile applications to improve patient tracking during emergencies.

"We realized software could be used — not just for hospitals, but for larger-scale mass casualty incidents," he says.

The insight led his team to create People Locator, one of several new tools that the public and practitioners can turn to for patient information during catastrophic events:

Photo matching: The People Locator website and its smartphone apps allow anyone to report a missing individual or search for those reported missing following a disaster. It also contains a tool that uses photos provided by users and — unlike Facebook, which uses a large number of images its facial recognition algorithms — can help find commonalities in just two photos.

Emergencies usually offer less-than-optimal conditions for photographing unidentified patients. But by measuring general features, the system can provide a narrowed list of potential matches based on facial traits.

Google Person Finder: Developed after the 2010 Haiti earthquake, this database uses text input to reunite individuals; it works much like People Locator. In addition to broad public awareness thanks to the Google brand, Person Finder also allows people to aggregate information from multiple sources. Not only can providers direct people to a search portal for an incident (or embed the database on their own websites), but their IT departments can contribute information about missing people via an API.

Facebook Safety Check: Safety Check can identify people located near a natural disaster and automatically send them a message asking if they're safe. If someone answers in the affirmative, Facebook will inform his or her contacts. Users also can categorize their friends as safe on the site. The feature is available only to users of the social network, but that's not a small pool — Facebook reported 1.79 billion monthly active users in September 2016.

Web-based patient tracking: On the clinical side, health organizations in Ohio recently made available a new set of tools that can streamline the transfer of patient information across parties during a disaster. OHTrac's website alerts relevant organizations to incidents in real time and acts as a central repository for patient information collected on the scene.

First responders use barcode-enable triage tags and a remote database to track patients and their arrival status at hospitals. From there, information collected by OHTrac also can be used to help reunite families.

Wireless medical records: The next generation of triage technology will likely involve storage of essential information in a device worn by the patient. One successful example is the Wireless Internet Information System for Medical Response in Disasters, also known as WIISARD. Supported by a grant from the National Library of Medicine, a research group created an intelligent triage tag that uses a passive radio frequency identification system and a tiny computer.

First responders use handheld devices to record basic triage information that is transmitted wirelessly to the tag. Providers' devices also leverage their embedded RFID sensors and GPS receivers to update patients' locations. This data helps incident managers with tablet computers coordinate ambulances, hospital availability, and other resources. Data stored in the tags can be updated as needed, with important status information visible via a text display and blinking lights.

During live drills, a 2013 paper reported, WIISARD's performance resulted in fewer data errors and the system captured more clinical information than traditional paper-based systems.

Fine-tuning EHRs: Healthcare systems confronted with mass casualty events in recent years have learned to refine patient tracking systems that are already in place. In addition to creating its new emergency roles after the Boston Marathon bombings, Brigham and Women's has developed a more effective naming convention for unidentified patients. Using those IDs, the emergency department has already preregistered 60 patients in its EHR system, standing ready for another crisis.

Everyone at the hospital rose to the occasion to care for bombing victims in 2013. But the details of their experience serve as a reminder that every crisis is an opportunity for improvement.

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