

Disaster Charts

Information Security Nets for Patients



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When preparing for potentially dangerous weather, such as a hurricane, flood, or tornado, we often focus on securing our homes and/or fleeing the area. In areas of the United States that regularly suffer storm "seasons," residents are often very adept at boarding up windows, adding sandbag barriers, and obtaining necessary food and supplies. All of these activities are centered on riding out the storm and dealing with the aftermath.

Healthcare facilities follow a surprisingly similar thought process in storm preparation. Plans are made to ensure that the facility will have the necessary power and supplies to care for patients, as well as a speedy return to "normal" operations. However, most hospital disaster plans are concerned with minimizing any potential physical damage to the facility, maintaining adequate staffing, and protecting the troves of EMR (electronic medical record) data. Beyond anticipating a surge of injured patients, little thought or planning is focused on those in the community who may be directly impacted by a large-scale disaster in the hospital's service area. In the case of evacuation or catastrophic damage to the hospital, cancer patients receiving daily radiation therapy are particularly vulnerable to disruptions in their planned treatment regimen.

The Impact of Hurricane Katrina

On Monday, August 29, 2005, Hurricane Katrina struck Louisiana and devastated the city of New Orleans. In the days following the storm's initial impact, water poured in from a damaged levee system and eventually flooded 80 percent of the city. Located just 60 miles to the northwest of New Orleans, Baton Rouge was a routine destination for those seeking to avoid the hurricane's wrath. The initial evacuation prior to the storm and the displacement of nearly 400,000 residents quickly resulted in the population of Baton Rouge swelling from 280,000 to nearly 600,000, becoming the largest city in the state of Louisiana.

As Katrina approached, Baton Rouge General Pennington Cancer Center prepared as we had prepared for previous storms:

- We informed all patients in active treatment that we would be closed on Monday, August 29, and would resume treatment the following day.
- All patient phone numbers were confirmed and distributed to senior staff.
- The facility and computer systems were shut down and secured.

In similar fashion, the same preparation plan was followed by most of the treatment centers in New Orleans.

As planned, our radiation oncology center resumed operations on August 30. However, as soon as the doors opened, cancer patients who were displaced from New Orleans and who had never been seen at our center began to present and say "I am a cancer patient and need to get my treatment." Notifications began to come in from the emergency shelters with similar requests from patients to resume their treatment. These patients had no medical records of any kind. Further, due to a combination of the devastation from storm damage in Baton Rouge and the strain on the city's infrastructure from the doubling in population overnight, phone lines and Internet access were intermittent at best. Even if the phones worked, the treatment centers in New Orleans were either underwater or deserted, so medical records were not accessible.

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Patients arriving at our center did not realize that, in most cancer programs, radiation oncology services have separate charting and EMRs specific to their departments. As a result, radiation oncology information is not tied into the larger hospital EMR and cannot be remotely accessed. Compounding the

Back (L to R): Brad Barhorst, physicist; Dr. Andrew Lauve, radiation oncologist; Dr. William Russell, radiation oncologist. Front (L to R) Zachary Smith, director; Tracey McDowell, chief therapist; Joe Finnegan, physicist; and Trevor Smith, dosimetrist, comprised the team that identified the treatment information to include on the flash drives provided to evacuated patients (below).

dilemma was the fact that even if the EMR systems in New Orleans were accessible or the phone lines worked, we did not know who to contact and how to reconnect patients with their physicians.

An outside observer may wonder why cancer centers that operate in a disaster-prone area seemed so unprepared for this level of disruption. The answer is a mixture of prior events and culture. In the years leading up to the 2005 hurricane season, several dire storm predictions failed to materialize. In addition, as Katrina began to emerge as a possible threat, many New Orleans residents felt they had been through worse storms in the past and so did not respond to calls for voluntary evacuation. Political indecision and confusion resulted in a call for mandatory evacuations too late to be effective. Of course, no amount of planning could have taken into account the massive flooding that caused the majority of the damage to New Orleans.

Thankfully with hard work and the combined efforts of the cancer centers in Baton Rouge, we were able to care for displaced patients with minimal treatment delays. As we resumed our normal operations, our treatment team questioned: "If the storm had bypassed New Orleans and instead struck Baton Rouge, would our patients have been any better off?" The answer of course was, "No." After the storm repair was complete and we began to shift into a normal scenario, our radiation oncology treatment team began to consider what we could do to ensure that our patients would not experience the high anxiety and uncertainty surrounding a similar situation in the future.

Creating a Disaster Chart

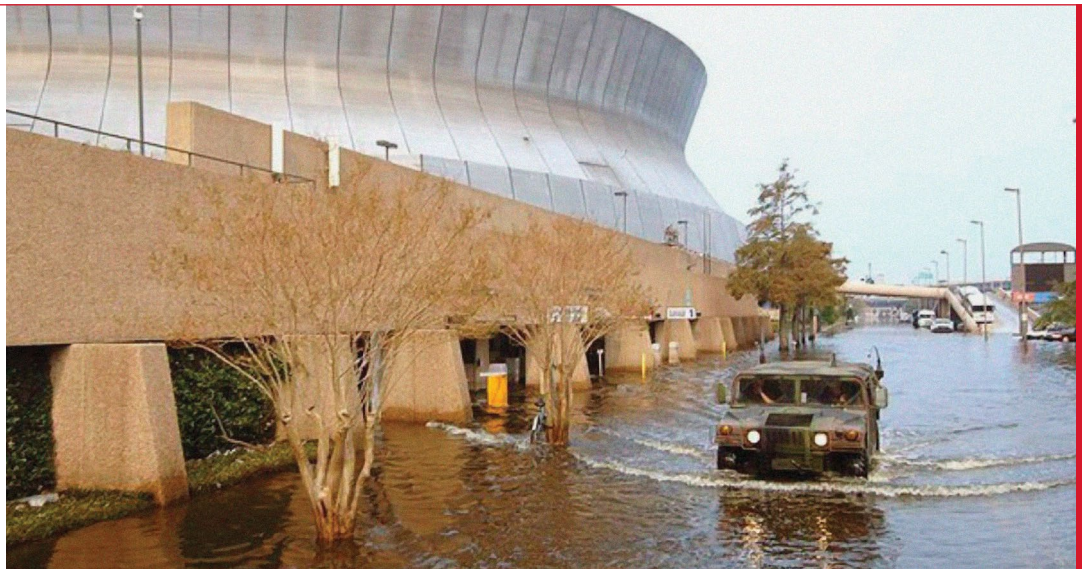
First, our team had to consider what defined a disaster. The definition of a disaster can be somewhat subjective as one person's disaster might just be a "bump in the road" to someone else. We needed to be sure that our plan could meet a patient's need should another disaster on the scale of Katrina occur. For planning purposes, we decided that our disaster charting process should be implemented whenever a potential for evacuation (voluntary or mandatory) existed for our patient population.

Second, in terms of medical information, we had to decide what information would need to be available to facilitate the quick restart of an evacuated patient's treatment. The volume of information in a patient's entire medical record can be substantial. Based on our experience during Katrina, our team came up with a list of documents that we believed any radiation oncology center would need to quickly and correctly reproduce in a patient's treatment plan and resume therapy. Our disaster charting process includes the following list of documents:

1. ***Pathology documentation.*** This information is important as some treatment regimens are tailored to the pathology, as well as the site of the cancer.
2. ***Initial consult.*** This information includes an initial history and physical, medications, and the treating physician's plan for the patient.
3. ***Treatment plans.*** This information defines the approved treatment regimen for daily radiation therapy. This plan includes 3D representations of beam angles, dose per beam, daily dose, and energy.
4. ***Setup and beam portal images.*** This information shows the patient's treatment position and set-up aids, as well as the placement of the treatment isocenter.
5. ***Dose-site summary.*** This information documents the patient's total radiation dose as of his or her last treatment.

Then, as a treatment team, we needed to decide on a format for our disaster charting system. Paper charts (or portions of them) are still used in many departments, while others are operating solely on EMRs. How could we ensure that critical treatment information would be accessible and useable if the need arose?

If you speak with anyone from your hospital information support team about patient data, they may tout the redundant back-ups and other measures in place to ensure no loss of information. Remember however, back-up processes are created to secure data and not to facilitate patient care. In a disaster in which



Even days after the storm, the city of New Orleans was immobilized by high water, power and phone outages. Many who took refuge in the Superdome were stranded.

the phone and Internet services are compromised, off-site backups of data are inaccessible and quite useless. Even though many hospitals in New Orleans had redundant onsite and off-site backups, the reality is that the phone, Internet, and power grid are very susceptible to storm damage.

Our Katrina experience and the lack of priority cancer patients had in the aftermath of this disaster also helped determine our selection of the data format for our new disaster charting system. To be fair, organizations such as FEMA are forced to prioritize where to place resources and assistance and assess situations based on the imminent danger. According to this prioritization model, cancer patients receiving daily treatments or weekly chemotherapy infusions would not be ranked very high (and were not ranked very high during Katrina). During a disaster, the focus for most government resources would be on those who were going to die in the next 24 hours if no interventions were made. Cancer patients that are in no acute distress will not be near the top of the list.

Using Katrina as a "worst case" scenario, our team realized that we would have to create a system that could operate as a stand-alone solution. Having information on hand that we could send out would not work since we could not rely on having the ability to communicate outside the facility. Information would need to be available with the patient at the point of care and in a generally accepted format. Fortunately most radiation oncology centers have a high level of computer technology. Operating with that in mind, we elected to store the information (as a PDF and/or Microsoft Word document) on USB flash drives.

Initially we developed a disaster response plan to address the threats posed by hurricanes. In the plan, the timing of a possible hurricane strike was the driving factor of the decision matrix within the protocol. At 72 hours out from a potential strike, templates for each patient's electronic chart are created. At 48 hours from potential hurricane strike, a complete EMR representation for each active patient is created. At 24 hours out from an imminent hurricane strike, each patient under active treatment receives his or her EMR on a flash drive. Patients are instructed to keep the flash drive with them at all times in the event of a disaster that requires them to evacuate. Each patient is cautioned to protect this health information and treat it just like they would a paper record. This process is HIPPA compliant since patients are given their own medical record, which is intended only for their use.

When the disaster plan is activated, the manpower to create the roughly 60 charts for all of our patients under active treatment is approximately five man hours. To help in this effort, our department developed internal workflows to create the necessary charts as efficiently as possible.

For example, we standardized the patient record format by creating a generic template. Like the individual tabs in paper charts, the disaster chart contains the list for each document as "subfolders." When the plan is activated, a single individual creates the templates for all patients by replicating the global template, essentially creating copies of blank charts with the same subfolder format. Each blank folder is moved into a list by treatment area and then labeled for an individual patient. As a result, each patient record contains the same folders for critical elements, as well a contact sheet that lists the information for our radiation oncologist director, social worker, and patient navigator.

The next step is to "fill" each patient chart with the identified elements. We have found that if a single individual commits to populate one of the subfolders in each patient record, several people can fill pieces of a patient's record in a timely manner.

Overall we believe the process works very well; three staff members working together can complete 60 patient records in just over an hour.

Putting Our Disaster Plan to Work

We have implemented our disaster charting system twice since its creation. The first deployment of the disaster charting system was in 2009 when Hurricane Gustav was on a straight path to Baton Rouge. As per our protocol, flash drives were created and

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distributed to patients prior to the storm's arrival. While Gustav turned out to be the worst storm to strike Baton Rouge in over 100 years, the impact to the hospitals and treatment centers was not so severe that a mass evacuation of patients was required.

The second activation of the disaster charting system was in 2012. Massive amounts of rain were causing flooding of the Mississippi River starting as far away as Nashville, and the river was threatening to overflow its banks all the way through its multistate track into Baton Rouge. The Army Corps of Engineers projected a flood stage 10 to 15 feet over the levees that protect the city. One possible scenario outlined a possible breach of the levee that could occur due to the combination of pressure and overflow from the Mississippi River. Such a breach would essentially re-route water through downtown Baton Rouge. As a measure to prevent the levee failure and overflow, the Army Corps of Engineers recommended opening the Morganza spillway to the north of Baton Rouge to relieve the pressure on the levees.

This time, the activation of our disaster charting system varied slightly from our original plan, which covered a time-limited threat. The possibility of a breach meant potential flooding that could occur at any given time during days or even weeks. Since we could not predict exactly when flooding or levee failure would occur, it was harder to determine when patients might need to evacuate.

In response to this less predictive scenario, our treatment team adapted their workflow processes and quickly came up with a solution. The staff knew that an evacuation could be called at any time and the data on each patient's flash drive needed to be current to be useful. So we created a 60-second process to update the dose-site summary document each time a patient presented for treatment. The new summary was copied over the patient's previous version on the flash drive that was presented each day during the emergency activation. This process change ensured that each patient's disaster chart was continually updated throughout the course of treatment. In other words, the EMR version on the flash drive was as current as the patient's last treatment.

At the end of each deployment of the disaster charting system, once the threat had passed, the flash drives were collected from the patients, erased, and stored for the next use.

Patients First

While protecting critical healthcare data is important to hospital systems, it is even more important for patients to have access to their critical medical information. The first time we distributed the disaster charts on flash drives, many patients thanked us for thinking about these "worst case" scenarios and protecting them from what could happen. The patients we care for on a daily basis may have weathered many hurricanes or other natural disasters over their lifetimes, but now they are faced with specific challenges related to being a cancer patient. Our disaster chart not only equips patients with information they need in the event of an evacuation; but it also gives them peace of mind that our center is caring for them under the most adverse circumstances, ensuring the best possible care—no matter what.

Dr. William Russell (L) and Zachary Smith met after each use of the disaster charts to discuss patient feedback and process improvements.

As I look to the future, I often think about other applications for our disaster charting system. In areas of the country prone to flooding, tornadoes, and, of course, hurricanes, a similar system could act as a safety net for displaced patients—whether patients' homes or their treatment facilities face potential damage and/or destruction—safeguarding patients from unnecessary treatment delays.

This disaster charting process worked well when implemented at our program in Baton Rouge. Most important, our patients expressed gratitude that we thought to plan for their treatment needs should disaster strike. The disaster charting system is replicable, and it is our sincere hope it can benefit other centers with patients facing similar challenges. OI

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