

IT Lessons from the Hurricane Disasters of 2005

EXECUTIVE SUMMARY

When Hurricane Katrina swept out of the Gulf of Mexico and into our national consciousness in August, it changed much about the way we see our cities and national infrastructure. Also changed, albeit barely noticeable to all but those directly involved, was the way we view healthcare information technology. Just as the storms humbled a nation, they too humbled our view of healthcare IT.

Clinical IT acronyms like EMR and CPOE, which often grace these pages, were rudely elbowed out by emergency acronyms like DMAT (Disaster Medical Assistance Team) and SAT (satellite) phone. Much of patient care became emergency care. Paper records regained respect. Patient accounting and billing systems disappeared. The limitations of IT became glaring under the circumstances.

Still, it would be extreme to say IT became irrelevant. A more accurate view is that the hurricanes changed how we define healthcare IT. Communications assumed priority over applications. The concept of disparate systems and sources of data, that boogeyman of integrated systems, suddenly was welcome in an environment where any information sharing was considered precious. Ensuring redundancy and multiple channels were lessons learned. A case in point is text messaging. Familiar to any teenager with a cell phone, in the future it should become

familiar to every hospital administrator who wants to keep all lines of communication open during an emergency.

“Katrita”—as the combined hurricanes of Katrina and Rita became known to those who faced their wrath—may also take to task the concept of regional health information organizations, or RHIOs. How valid is a strategy that encourages local community networks when the “community” straddles several states? asks one expert. In this issue we examine these and other issues with St. Louis-based Ascension Health, Dallas-based CHRISTUS Health and Houston-based Memorial Hermann Healthcare System, all SI-member organizations with hospitals in the Gulf Coast that were affected.

Memorial Hermann

“Most of the IT lessons learned from the hurricanes are about deficiencies,” says Ed Septimus, MD, medical director of infectious diseases at Memorial Hermann, whose Beaumont, Texas, facilities were especially hard hit.

Still, he says, it was clear IT was able to provide enormous benefits at times. Patients coming from New Orleans, for example, who had purchased their prescription drugs at Walgreens or CVS pharmacies, had their medication histories available on those companies’ electronic registries. “Those national pharmacy chains are all linked, so if your prescrip-

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January 19

Western Colorado RHIO: Quality Agenda Drives Interoperability

- Dick Thompson, president, Quality Health Network, Grand Junction, Colo.

January 23

Automating Ambulatory Procedure Notes

- Rebecca Craig, administrator, Harmony Surgery Center, Poudre Valley Health System, Ft. Collins, Colo.

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The Value of IT in Disease Management

- Davis Bu, MD, The Center for Information Technology Leadership (CITL), Partners Healthcare, Boston
- Eric Pan, MD, The Center for Information Technology Leadership (CITL), Partners Healthcare, Boston
- Jan Walker, The Center for Information Technology Leadership (CITL), Partners Healthcare, Boston

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tions were filled by one of them, we would have had access to the records. A lot of patients do not know their dictations, so that's one IT tool we took advantage of," says Septimus.



Ed Septimus, MD,
medical director,
infectious disease,
Memorial Hermann,
Houston



Another IT advantage, he notes, was associated sadly with the fact that many New Orleans patients were on treatment for pulmonary tuberculosis. This disease requires

"direct observed therapy" (DOT) two to three times a week regardless of socioeconomic background—meaning that those patients must be observed taking their medications to better ensure compliance. That strategy arises from the fact that multi-drug-resistant (MDR) strains of TB tend to thrive when drug regimens are inconsistently applied.

"In the late 1980s, public health began emphasizing the need for DOT, especially for HIV-positive patients with pulmonary TB," notes Septimus. "We had healthcare workers die from MDR tuberculosis transmitted from patients who were not compliant with their medications and were not on DOT. You greatly decrease the risk of MDR TB by making sure patients take their meds consistently. Fortunately patients on DOT were kept in a computer database with names and the drugs they were on. This information was forwarded to local health authorities." That was especially a concern with New Orleans Parish itself, in which lived the poorest of the poor, a population with the highest incidence of TB.

Lack of interoperability

IT was not so helpful elsewhere, says Septimus. For example, when Ochsner Clinic in New Orleans sent its sickest patients to Memorial Hermann facilities, the two organizations' information systems lacked interoperability. "We had limited access to patient information. They could send some records, but we couldn't access their complete medical records," he says.

Memorial Hermann is no stranger to disaster. In 2001, a major tropical storm hit Houston and flooded its medical-records storage. "A lot of paper records got wet in the basement," recalls Septimus, but that wasn't the end of the problem. When patients were transferred to other hospitals, records that traveled with them never returned to Memorial Hermann. "The paper never got back to the original hospital. Today, since our system is on a common platform with proper security, we have access to our EMR from any of our facilities."

Septimus says the experience raises an obvious question about a national health information infrastructure. "What if we developed a mechanism in which everybody—Cerner, Epic, Eclipsys, Meditech, and other IT providers throughout the United States—all had to comply with a common language, not just in hospitals but also to physicians' offices? What if a California patient gets sick in Houston and comes in comatose? Evacuees within our system had seamless care because we had their labs, dictation, medication administration record—everything except progress notes. You can take care of a patient pretty well," he says.

Because that kind of information sharing during the hurricanes was so rare, says Septimus, "You just had to piece it together." Still, there's reason to be optimistic. "Five years ago, none of this even limited information exchange would have

occurred. We're in an intermediate state. The future state depends on developing a common language. You can see where we're going."

Sorting patients at the Astrodome

Ironically, an IT executive at Memorial Hermann says IT was almost an after-thought in the disasters. "We set up a major clinic in the Astrodome but did not have an EMR," says Emily Handwerk, assistant VP of IS. "We stayed paper—and on purpose because the care was transactional not setting up an ongoing relationship. Time was also a key driver. All these clinic cases were charity and were not being billed", she says.



Emily Handwerk, assistant VP, IS, Memorial Hermann, Houston



The only software used onsite was a triage system for sorting patients at the Dome. IT developers quickly wrote up a special program for Memorial

Hermann's web page so physicians, nurses and other employees could volunteer online for the disaster. "That was the only other application we used," says Handwerk.

Because the organization's hospitals received 4,000+ patients through the ED—one in five of whom were admitted to the hospital—there was some software tweaking, including adding patient class "Katrina" and "Rita" to the registration system to identify patients from Louisiana who could validate residence with a driver's license. Today, that tracking data has allowed Memorial Hermann to bill Medicaid for reimbursement for those hospital patients' care visits.

At another Houston staging area, the downtown Toyota Center, Memorial

Hermann set up a bank of computers so storm refugees could retrieve email, write resumes and access the Internet. "In these free clinics, there was no need for an EMR," says Handwerk. "What's the point of having all that IT capability in this free clinic environment in which many of these patients—the poorest of the poor—didn't have primary care doctors or would not need an on-going healthcare relationship. Many of these people were the ones who couldn't afford to get out of town during the hurricane."

A lesson learned, she says, is that, "Under the free services we offered, care was much more important than having a computer. We all helped—volunteers, massive amounts of donations like cash, food, water, bedding, clothing—but it wasn't deeply IT-related. The biggest thing in IT was segregating the patients, along with the patient types Inpatient, Outpatient, ER, Day Surgery and Recurring, we had to add patient classes for "Rita" and "Katrina," says Handwerk. "Was it an IT thing? No, it was a community patient-care outreach. IT had a very small part."

"When an IT vendor offered to set up an EMR, my response was 'Why?' What IT plan would we implement in a timely enough fashion? I don't know that you can have a plan other than acting fast and moving on your feet."

Ascension Health

Cynthia Hyde, CIO at Providence Hospital in Mobile, Ala., part of Ascension Health, says that more than an EMR, communications were critical: Internet, cell, satellite. "If you can't transmit that EMR, or if you can transmit it but the receiving end can't accept it, having an EMR is irrelevant," she says.

Tim Stettheimer, CIO for Ascension's southeast region and VP and CIO at St. Vincent's Hospital in Birmingham, Ala., says even IT

Upcoming Events continued

February 1

Stunning Interoperability

- Jonathan M. Teich, MD, PhD, SVP and CMO, HealthVision, Asst. Professor of Medicine, Harvard University, Dept. of Emergency Medicine, Brigham & Women's Hospital, Boston

February 8

THR's Safety Action Learning Tool (SALT)

- Tony Keller, director, Enterprise Data Management, Texas Health Resources
- Faye Sheppard, director, Risk Management, Texas Health Resources

March 16

Partners Healthcare Connected Health Initiative

- Joseph C. Kvedar, MD, director, Partners Telemedicine, Boston
- Khinlei Myint-U, corporate director, Partners Healthcare, Boston
- Douglas McClure, corporate director, Partners Healthcare, Boston

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“How do you reconfigure the network? There is no single aspect that covers the problem. It’s a matter of knowing where all your information is. You need multiple solutions as part of your contingency planning,” Hyde says.

disaster plans using traditional magnetic tape to store backup data can be of limited utility because other facilities often use different data definitions or lack the equipment to play the tapes. “So, usefulness becomes a question,” he says.



Tim Stettheimer, CIO,
SE region, Ascension,
and VP, CIO, St.
Vincent's Hospital,
Birmingham, Ala.



Tape backups vary by facility even within the same organization. In the case of Ascension, which has 67 acute care hospitals, some have fully-developed

EMRs and some are only early in the process toward that goal. As a result, says Stettheimer, “We have multiple layers of backup. In come cases, traditional magnetic tapes can store a clinical database—but it’s just data, not the full applications themselves.”

Hyde’s Providence Hospital, for example, is in the process of migrating to a new third-party-hosted data backup center in Meriden, Conn. Other Ascension facilities will rely on similar hot sites in Chicago. The strategy is to have redundancies in different geographic areas with real-time data.

Still data tapes are practically ancient compared to the Internet. It’s necessary to load them onto a remote server of appropriate size and processor power in order to be able to go at a moment’s notice. “That’s not a small endeavor,” says Stettheimer.

The scale of disaster is the key factor: If all the patients affected were within Mobile, that would be one thing; if it spread to other areas, IT may or may not be useful because of the lack of a national health information infrastructure.



Cynthia Hyde, CIO,
Providence Hospital,
Mobile, Ala.



Hyde says it’s critical to develop plans with a combination of alternatives. For example, after the storm, Providence

experienced myriad gaps in communications because AT&T lost 300 T1 lines and on another occasion Bell South lost all of the area codes in southeast Alabama. It took four to six weeks to stabilize land lines, Internet and cell phone operations. At one point, long distance didn’t work. “How do you reconfigure the network? There is no single aspect that covers the problem. It’s a matter of knowing where all your information is. You need multiple solutions as part of your contingency planning,” she says.

Serving Blackberry

In the era of PDAs and other mobile devices, which allow users to save data in multiple locations, the challenge depends on which link goes down. “If you lose a server you’re more challenged than if you lose your Blackberry,” she says. “It comes down to how much you can do to focus staff. Because we have hundreds of systems, we must focus on the most critical systems first.”

According to Hyde, “You have to ask what takes higher priority, pharmacy or mainframe? Sometimes it’s not black and white.” It was clear that a system is required to track patients and overall logistics during a disaster; and that requires new databases and tools to analyze this data. CFOs, for example, will need to determine what services apply as FEMA recoverables; family members will need to know where their

loved ones went after leaving Providence Hospital.

Providence was lucky. While its windows leaked, the hospital was still able to maintain power with the help of seven generators—including three from a sister hospital in Pensacola, Fla.—which enabled continuity of care and even dietary service for people fleeing the storm. “We had people coming off the Interstate to have hot meals,” says Hyde.

While the disaster recovery went well with the 350-bed hospital able to care for the extra patients, she says the challenge is running two operations simultaneously, a disaster facility, as well as carrying on normal operations. Adding to the complexity, “some patients came in with medical information and some didn’t. It is not as simple as having the information, it is having the critical link that makes the information accessible. It is a challenge. If communication is lost it doesn’t matter what EMR you have. You have to have that link. You need to look beyond where your internal communication ends,” Hyde says.

Still, she says Katrika made her realize how daunting it is to build community-wide networks like RHIOs that would be able to work without power. “It’s back-to-basics medicine during disasters. In planning for RHIOs, it’s all about the technology, but we can’t lose the basics in the meantime. We can’t develop an over-reliance on technology.”

Says Stettheimer, “RHIOs are not going to be the panacea. They’ll add yet another level of complexity. It’s like Cynthia said: Do you bring up the mainframe first or the pharmacy system? They’re all now becoming interconnected so, if one goes down, they all go down. With a RHIO, you now add, say, three health systems in one environment. And, don’t assume that if your system goes down and you bring it up quickly that you’re ok. The stress of going

down and up can blow hard drives and choke interfaces. It mandates that you focus on planning, preparation and practice.”

Wave of evacuees

Seton Healthcare Network, an Austin, Texas-based, eight-hospital system part of Ascension Health, opened up a 24-hour command center in Austin staffed by senior executives. “We ramped up our emergency management mode,” says Mark Barner, CIO for Seton and corporate regional CIO for Ascension Health’s Southwest Region, which includes hospitals in Austin and Waco, Texas, and Tucson, Ariz., plus a handful of community health centers in places like suburban New Orleans. “The priority from an IT standpoint was to get the command center moving,” he says.



Mark Barner, CIO, Seton, and SE regional CIO, Ascension Health



Over a 10-hour period when Rita struck, Seton accepted 160 patients from the University of Texas Medical Branch (UTMB) in Galveston, including

critically ill babies requiring triage. As a wave of more than 20,000 people hit Austin, at least another 500 evacuees sought care on their own at Seton hospitals and 100 of those were admitted. So, within a period of only a few hours the Seton infrastructure absorbed 260 people—but remained stable.

Under a helipad at the Brackenridge Hospital, a triage center operated with Flo wireless mobile carts using the Cerner EMR’s ED triage and tracking application. “All the handoffs through the telecommunications network went very well,” says Barner, adding that Nextel radio devices

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“As administrators rotated out of a shift, we had to have a central repository for items like patient lists, which had lots of revisions, and we didn’t want to go from email to email. It’s all about easy access in a secure environment quickly,” Barner says.

also worked reliably. Executives used an automated bed board system to view which patients were going where. They also conducted frequent, around-the-clock conference calls on a telecommunications bridge to deal with all the complexities of managing in the disaster.

Twice—after Katrina and then after Rita—the organization conducted best-practices/lessons-learned analyses. Seton executives grappled with items for technology improvement, including how to better employ email during disasters or the mainstream use of all-in-one Blackberry devices, which have radio, paging and email capabilities. If there was a single emphasis for the analysis it was the convergence of IT and communications devices—email and radio, for example—that was underscored by analysts’ reports on IT trends.

Seton has established a March 2006 deadline for finalizing enhancements to its emergency management IT strategy, including reaching out to sister facilities in Birmingham and Mobile, Ala., and Pensacola.” Ascension Health is big, with facilities all along the Gulf coast. We want to make sure all of our emergency plans are consistent and that we leverage every learning or best practice possible,” says Barner.

Leveraging vendors

Speed was another area of improvement. “We were fast in setting up the incident command center but we want to be faster. How many computers and devices do we keep in stock, or do we further leverage our existing vendor relationships?” asks Barner, adding that all vendors—Dell, Cisco, Nextel, Cingular and SBC—were quite responsive during the hurricanes. “Our infrastructures withstood additional wireless access without causing service interruptions and our applications functioned smoothly. We have data in secured envi-

ronments in Connecticut, Pennsylvania and Missouri so we absolutely need reliable, redundant connectivity.”

One IT-related item found critically important: ensuring there was print capability for the network in the incident command center. “We want to be sure we can flip a switch in the command center to print documents related to decision flows, volumes and statistics that can be used to coordinate with city operations like EMS and other hospitals,” Barner notes.

Another piece of the disaster toolkit was the use of a secure, easy-to-use, document-management solution—Microsoft’s SharePoint application—that facilitates teamwork around specific projects. Seton has designated “sites” in the application for pharmacy, nursing, physician and management teams to help manage data during an emergency. “As administrators rotated out of a shift, we had to have a central repository for items like patient lists, which had lots of revisions, and we didn’t want to go from email to email. It’s all about easy access in a secure environment quickly,” he says.

CHRISTUS Health

With 40 hospitals and numerous other facilities in 60 cities in seven states near the Gulf and in Mexico, Dallas-based CHRISTUS Health was bound to experience some impact from Katrina and Rita. “We were spared the brunt of Katrina but our Texas and Louisiana facilities saw substantial growth in patient volumes,” says George Conklin, senior VP and CIO. With Rita, as the storm progressed during the week, CHRISTUS began discharging or transferring patients from the affected areas.

Hospitals became full to the brim because cities overflowed. After Katrina hit, Alexandria, La., for example, spiked to 56,000 people from its previous 40,000. It has now settled back to 44,000, but the population is 10% greater than before the

storm and expected to remain at that level. In Baton Rouge, the population jumped to a level not expected until the year 2025. “The growth was virtually instantaneous,” says Conklin.



George Conklin, VP
& CIO, CHRISTUS



CHRISTUS information management (IM) had five-part disaster plans—communications, data integrity, associate safety, equipment safety

and patient safety—for each of its hospitals and a system-level response ready for the storms. “Because of the expected size of the storm,” says Conklin, “we knew that local infrastructures were going to collapse over a very short period of time. So, we knew we’d be very busy keeping computer systems, email, etc. running. Since there were no levees—we were miles away from any rivers—we wouldn’t see the amount of standing water New Orleans saw. We asked: If we were going to lose our computer systems, what is job number one? The answer was to maintain communications through a variety of channels—land lines, SAT (satellite) phones, cell phones or text messaging like SMS or PIN.”

SMS and PIN, two low-level communications modalities that support text messaging, were maintained throughout the storm. Cell phones rely on antenna towers that can be knocked out by winds, but there was enough redundancy built into the tower network that cells were still able to operate. CHRISTUS IM staff was able to use SAT phones using portable satellite dishes to which could be connected analog phones for use as long as there was unobstructed line of sight. These three-foot-in-diameter dishes, which sit on heavily weighted

bases that can be moved, are pointed in the general direction of the satellite and can support up to five phones.

“It was a conscious hodge-podge of communications channels. We wanted as many alternatives as possible,” says Conklin.

After the flood

“What happened after Katrina was a complete collapse,” he says. At St. Patrick’s Hospital in Lake Charles, La., for example, all the local provider telephone switching networks went down and all IT function were lost at the facility, in large part because it lost its water-chilling capability, required to cool data-processing equipment. Other facilities, also losing water pressure, resorted to spot air conditioning in order to run limited data processing.

CHRISTUS data centers in Clear Lake and Port Arthur, Texas, had to shut down completely. And IM staff wrapped computers in plastic to protect them from leaky roofs. “One thing you learn is that when you lose AC in a hot and muggy climate, water begins to condense on the inside of plastic,” says Conklin. Still, IM was able to use fans to dry out the computers with no impairment in operation.

During the storms, IM leadership—CIO Conklin, associate CIO Chris Blakemore, regional CIOs (called market information officers or MIOs), technical staff from all the data centers, communications personnel and line staff—conducted meetings every three hours from 7:00am until 9:00pm to marshal resources against the disaster, which was an ever-shifting target. Blakemore ran the meetings from San Antonio, which was never threatened, to free up Conklin who remained in Houston, one of the potential storm targets. CHRISTUS also put together teams of a dozen senior IM technical people each and shipped them out to places like Lake

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Charles, and Beaumont, Texas, where they spent a week working with indigenous IM staff getting data centers back working and doing other chores.

The IM leadership worked with FEMA, the military and local government to coordinate efforts, including acquisition of diesel generators, which Conklin notes are great for the short-term but not designed to run an entire hospital, given that would require 15,000 gallons of diesel fuel a day at a price of nearly \$3.00 a gallon.

On Oct. 24th, the IM staff conducted an "After Action Review," a process CHRISTUS modeled on the military, thanks to a senior IM staffer who is a former Army major. The structured process broke down all five areas of disaster planning to determine what went right and what could have been done better.

One lesson learned under the communications category was that the organization needs to become part of the State of Texas' powerful 800-mghz communications network used by police and utilities. But even walkie-talkies, which use that frequency, can go out, so IM staff has added shortwave, which penetrates storms better, to its communications armamentarium. "That takes us back in history," says Conklin.

Conclusion

That may be Katrina's ultimate lesson: be ready to go back in history—both from a medical and an IT perspective. Conklin recalls how the federal Disaster Medical Assistance Teams or DMATs worked. "They don't care about EMRs, they just operate on paper. It's back to Medicine 101—and

there's no billing for the services they provide," which further eliminates the need for software, he says.

"As we become more dependent on EMRs and PACS, as we move away from paper, the need for disaster-recovery facilities is going to increase. These events—Katrina, Rita, the 'Big One' in California—as soon as one of these events occurs, all those technologies become meaningless to the people directly affected. For the patients you transport, you need to stick with paper," says Conklin. Still, there was a nod to high-tech modalities. CHRISTUS has become dependent on PACS, he says, because it is hugely cost effective. "So, for every patient transported, we attached to the stretcher a paper medical record and a CD [with digital radiology images]. You don't know where those patients are going to end up."

For example, during Katrina, patients transported to Houston were triaged in the Astrodome, then transported to a hospital—many without medical records or diagnosis, and some were unconscious. "Doctors had to work from scratch," says Conklin.

The larger lesson, he notes, is that the federal emphasis on building a national health information infrastructure by starting with local initiatives such as RHIOs is misguided. In disasters like Katrina, "patients are thrown to the four winds. What's it going to matter if I live within a San Antonio RHIO if I end up in Atlanta?" he asks. By encouraging local initiatives at the expense of a standardized national network infrastructure, the result will be no better than the existing IT landscape "and we'll have invested billions."

