



# How Houston hospitals prepared for Hurricane Harvey

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In a major flood event like Tropical Storm Harvey, hospitals are both some of the most critical infrastructure and among the most vulnerable. Miles O'Brien talks to Bill McKeon, president and CEO of Texas Medical Center, about the crisis.

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### **MILES O'BRIEN:**

Some of the most critical pieces of any city's infrastructure are its hospitals. In a major flood event like Harvey, they are also among the most vulnerable.

We turn now to Bill McKeon, who is the president and CEO of Texas Medical Center, a sprawling health complex southwest of downtown Houston. I spoke to him by Skype a short time ago.

Bill McKeon, thank you for being with us.

Give us an idea how the medical center system was prepared and what it did as Harvey approached.

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### **BILL MCKEON, President, Texas Medical Center:**

We anticipated to be enduring four or five days of it. I don't think anyone planned for the amount of rain, the record-breaking rainfall that has hit Houston.

We have made huge investment in the Texas Medical Center. It's the largest medical city in the world. And we have built storm gates around all of our hospitals and clinics, which have protected all of our buildings.

And even though we had streets filled with water, none of our facilities were affected by the flooding.

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### **MILES O'BRIEN:**

Tell us a little bit about these floodgates. As I understand it, that came after a storm in 2001, Allison.

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### **BILL MCKEON:**

That's true.

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### **MILES O'BRIEN:**

Give us an idea of what the investment was and whether you feel it was worth it.

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**BILL MCKEON:**

Sure.

Well, we spent over \$50 million creating this very sophisticated network of floodgates that actually protect all the assets. In Allison, we lost over \$2 billion in research from the flooding of all of our buildings. These integrated floodgates are essentially submarine doors that actually protect these assets, and that the water really pushes off, maintains in streets, and flows away from the medical city.

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**MILES O'BRIEN:**

So, the floodgates are down?

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**BILL MCKEON:**

The floodgates are down, yes.

They did they job. And it's really a marvelous feat of engineering and, today, all of those are open. There are cars in the street. Our helicopters are landing here nonstop from surrounding areas.

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**MILES O'BRIEN:**

So you have 10,000 beds in all. We can presume they were close to being full. Do you have any reports of patients being adversely affected by the storm?

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**BILL MCKEON:**

We brought in physicians and nurses, technicians throughout ahead of time, and that we have all been here on this campus really for last five days, day and night.

It's been quite miraculous to see the number of dedicated medical professionals that have really come here ahead of time been away from their families, and dedicated to serving the patients here this environmental catastrophe.

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**MILES O'BRIEN:**

So, just to be clear, the staff, it's stuck inside, for all intents and purposes?

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**BILL MCKEON:**

That's correct.

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**MILES O'BRIEN:**

You have in your medical city the M.D. Anderson Cancer Center, a world-renowned cancer center.

Many people are outpatient and in need of ongoing chemotherapy regimens. What are people in those situations supposed to do?

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**BILL MCKEON:**

Sure.

Well, again, the medical staff actually, knowing this was coming, had accelerated some of those chemotherapy sessions. But, also, people are still accessing local hospitals in their communities, can also receive that outpatient care.

They have rescheduled now. So, when you think about it, from the medical city, really, it's only been two days, three days that people from far outside have not been able to access the medical center, so those are being rescheduled now as we speak.

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**MILES O'BRIEN:**

There were some early reports that the Ben Taub Hospital in the medical center was evacuated. I understand that's not true. Would you clarify what happened there?

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**BILL MCKEON:**

Sure.

So, there was a water pipe that actually burst in the basement of Ben Taub Hospital. Initially, they were thinking they might have to evacuate the building, but found that they contained the leak. The leak did actually contaminate some of their dry goods, some of their food supply.

So they actually asked police and fire department to really divert new patients on to one of our many hospitals here on our campus. And they continue to provide care for the patients that are there at Ben Taub.

So, some of the critical patients moved across to other hospitals, less than 60. But they continue to provide care to the patients that are there in the hospital. So they have not evacuated Ben Taub. Just some of the patients have had to move across to some of the sister institutions.

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**MILES O'BRIEN:**

Give us a just little bit of perspective on that. Any time you think about moving patients, particularly those in greatest need of care, that gets a little bit dicey, doesn't it?

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**BILL MCKEON:**

Sure.

With 23 hospitals all in one campus, the movement of those patients is essentially across to another building. Many of our buildings are connected through tunnels or for above-ground — above-ground ramps across to other hospitals, so it's actually done quite easily here on the Texas Medical Center.

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**MILES O'BRIEN:**

Bill McKeon, thanks for being with us.

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**BILL MCKEON:**

Delighted to be here.

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As Hurricane Michael made landfall in Panama City, Fla., this past October, entire communities were levelled, their infrastructure destroyed. Within 48 hours, 10 hospitals planned to evacuate patients or had already done so, as did about two dozen nursing homes and assisted-living communities. Freestanding dialysis centers in the path of the storm gave evacuating patients essential medical information on how to receive dialysis services at their destination, while neonatal intensive care units (NICUs) airlifted their tiny patients to safer locations.

Panama City's two largest hospitals—[Bay Medical Sacred Heart](#) and [Gulf Coast Regional Medical Center](#)—evacuated 330 patients after they sustained heavy structural damage. Bay Medical sheltered 1,500 people, including patients and staff, until the roof of their materials management building caved in, destroying supplies and forcing the facility to evacuate. Gulf Coast Regional evacuated approximately 130 patients because of the infrastructure challenges in their community, which included interrupted water supply, lack of sewage treatment, and impassable roadways.

While the losses from this year's storms were still being tallied, the Camp Fire wildfire destroyed the entire town of Paradise, Calif., last month, [forcing Feather River Hospital to evacuate patients](#) while its roof was burning.

After each of these events, we wonder why our medical infrastructure isn't better prepared. Experience demonstrates that typically it's only *after* an extreme event occurs that local practices, regulation, and public policy ramp up to reduce future vulnerabilities. Case in point:

During Tropical Storm Allison in 2001, [Texas Medical Center](#) (TMC; Houston) hospitals were devastated by flooding, causing structural damage and destroying irreplaceable research samples and records. Afterwards, TMC spent a decade making significant campus-wide infrastructure investments, including an elevated central cogeneration energy plant and storm water management systems, in partnership with the City of Houston and the Army Corps of

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Engineers. As a result, TMC sustained only minor flood damage and remained fully operational during last year's Hurricane Harvey.

Likewise, [CHRISTUS Health](#) (Irving, Texas) focused on strengthening its buildings post-Allison, installing windows and roofing materials designed to withstand Category 4 and 5 storms. When Harvey hit, its hospitals were in good shape and even had a seven-day water supply on hand to distribute to Corpus Christi residents when a boil order was issued in the city. "We have to ensure that our facilities are better prepared to handle these storms," said Ernie Sadau, CEO at CHRISTUS.

Hospitals have vital roles to play during an extreme weather event—sheltering patients and staff in place and serving as first responders to treat emergencies. But a hospital's important role in the community persists even once the storm has passed. As large employers, a hospital's ability to remain operational plays a critical role in recovery by stabilizing the workforce and supporting the local economy.

Following Hurricane Katrina, the extensive damage to hospitals and community infrastructure caused thousands of medical professionals to leave the region, severely impacting the community's recovery. By contrast, while one in five CHRISTUS nurses in southeast Texas lost their homes during Harvey, the system was prepared to provide both financial and spiritual support to sustain its workforce through the long recovery period.

What Hurricane Michael and Camp Fire have in common is that they're the most powerful extreme weather events to hit their respective regions in history. As we learned with Katrina, Allison, and Sandy, historical experience-based codes and regulations don't prepare hospitals for these unprecedented weather events. The challenge that climate change puts before us is to be both proactive and aggressively forecast-based—to prepare for the extreme weather event that has never happened in our regions, cities, neighborhoods *before* it does happen.

A recent report, "[Safe haven in the storm: Protecting lives and margins with climate-smart health care](#)", published in November 2018 by [Health Care Without Harm](#) and PricewaterhouseCoopers Advisory Services LLC, analyzed billions of dollars in losses and

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resilience-related savings to demonstrate how preparing for extreme weather can make or break a health system. The report also discussed how leading health systems are beginning to partner with policy makers, researchers, and their communities to improve facility, social, economic, and ecological resilience. For example, the new waterfront CHRISTUS Spohn Hospital in Corpus Christi, Texas, goes beyond local requirements to include numerous strategies, including enhanced wind-design performance, for hurricane resilience and future sea level rise.

**Global analysis** identifies extreme weather events as the combined most likely and highest economic impact risk of this year. In 2017, extreme weather events and natural disasters in the U.S. caused more than \$300 billion in property damage as well as loss of life and displacement. With this year's hurricanes and the recent fires in California, 2018 is shaping up to be yet another record-breaking year.

The lessons from extreme events is clear: Climate and weather models are strong predictors of future realities, and proactive investments in hospital infrastructure resilience are a new imperative. The health and future existence of our communities are at stake.

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