



**Designers of Tampa General Hospital's  
new emergency and trauma center  
factored in impacts of hurricanes,  
other unforeseen events** By Robert Berry

# DESIGNED TO SURVIVE

Early planning for surges in patient volume due to both man-made and natural disasters is crucial for emergency and trauma centers to be operationally effective in such situations. A challenge in disaster-planning is the identification of a rational strategy that balances the possible risks of major events, the capital cost implications to respond to those events, and an institution's strategic priorities. >>



General Hospital

EMERGENCY

WAVE

When Tampa General Hospital, the only level-one trauma center in west central Florida, began planning for the construction of its new Emergency and Trauma Center, the design process included creating an emergency department that would be functional in the event of a large-scale disaster.

In recent years, Mother Nature has reminded everyone about the critical need for emergency centers to be able to react quickly in the face of a natural disaster and support the community. Given TGH's location on Davis Islands, taking the probability of a hurricane into account was

### DESIGN FIRM INCLUDES ALL STAKEHOLDERS WHEN GATHERING INFO

A multi-disciplinary study team was established to work with Gresham, Smith and Partners and included representation from emergency medicine, trauma, radiology, pharmacy, psychiatry, orthopedics, emergency department nursing, security, aero-medical operations, registration, respiratory, social services and other related services. Police and emergency medical partners were also included to assure approval of access routes and dedicated support space.

The MDST established 51 guiding principles for incorporation into the design. The principles were grouped in the following categories:

- > Quality of care
- > Operational efficiency
- > Information systems
- > Departmental agility
- > Healing environments
- > Patient/staff safety
- > Emergency preparedness

imperative when designing this facility. Being able to defend in place and provide continued treatment to previously admitted patients, while addressing the needs of the influx of those needing medical attention due to a large-scale disaster, is critical to the ability for Tampa General to serve the Tampa Bay area.

The site for the now-opened 346,000-square-foot expansion lies only 6 feet above sea level and 30 feet from



the water's edge, making the hospital extremely vulnerable to potential hurricane damage and flooding. Although less likely to occur, key military locations nearby were considered potential targets for terrorist attacks at the time of the facility's design. Strategically conducted during the initial design phase, disaster-planning for Tampa General resulted in a relatively minimal additional capital cost and a uniquely tailored design.

A multi-disciplinary study team representing disaster-care professionals from Tampa General met with the design team from Gresham, Smith and Partners to determine the specific needs of the new facility. Together, they determined that the facility must have the capacity to at least double the capacity of the planned treatment areas; use support spaces for patient care in response to a major storm surge; have appropriate space for management of high-risk epidemic situations; and have mass-decontamination

capabilities in the event of a chemical spill or other toxic disasters.

The building's exterior structure and interior floor plate design are specifically designed to meet the needs of the community while adequately addressing the needs of the Tampa General staff. Due to hospital building codes, all critical functions must be located above the 100-year flood plain and above storm surge level. To comply with these codes, the team planned the new emergency department on the second floor, where it would be above the flood level. An active hurricane season prompted the hospital to request the design team to further reinforce the building's structural frame to withstand winds of up to 140 miles per hour, exceeding the required 120 mph required by code. These measures will ensure the hospital is able to defend in place, providing immediate care to the community after a hurricane.



**left: Tampa General Hospital from top: Mass decontamination showers have the capability to decontaminate up to 200 patients per hour with quick-connect plumbing pipes from above. Medical gas cabinets throughout the corridors, waiting rooms and offices increase capacity in the event of patient census spikes.**

Mock-up patient rooms and central nursing stations were created following the schematic design phase to allow clinical teams to evaluate the proposed spaces for optimal performance. Buy-in was achieved up-front, which helped avoid potential change orders which can be costly at later stages of design and construction.

## TAMPA BAY'S GOOD LUCK STANDS AT 85 YEARS

In 2008, Florida was mostly spared from the wrath of a hurricane. The only substantial damage recorded in the Sunshine State during the most recent hurricane season was from Tropical Storm Fay, in August.

According to [www.hurricanecity.com](http://www.hurricanecity.com), the Tampa Bay area has seen 39 storms within the vicinity in the past 138 years, adding up to a close call every 3.53 years.

In 1921, however, Tampa Bay sustained a direct hit, causing intense damage and three deaths. Also known as the Tarpon Springs Hurricane, the 1921 storm was the third hurricane — the second major one — and the final storm, of a relatively inactive 1921 Atlantic hurricane season, according to [Wikipedia.org](http://Wikipedia.org). The first hurricane in recorded history to directly make landfall in Tampa Bay, the storm took a typical path for an October Atlantic hurricane, brushing past Cuba before hitting near Tampa. The hurricane was also the most destructive storm of the season, causing around \$10 million in damage — or \$92 million in today's dollars.

Due to the Tarpon Springs Hurricane, Tampa received 8.53 inches of rain, sustained winds of 75 mph, and a storm surge of 10.5 feet. The surge damaged a fishing pier in St. Petersburg, and destroyed a casino in Gulfport. In Tampa, several buildings of the historic Ballast Point Pavilion were destroyed by the storm, according to [Wikipedia](http://Wikipedia).

A 10-room exam/treatment pod layout was decided on in order to most effectively fit the tight constraints of the building site and appropriately suit the needs of the staff. One of the six 10-room treatment pods has all isolation rooms, ideal for treatment of patients suffering from airborne infectious diseases like severe acute respiratory syndrome. Furthermore, the hospital has some compartmentalization of ventilation systems within the emergency department, allowing staff to potentially prevent contamination of other areas.

Tampa General and Gresham, Smith and Partners — the firm who designed the facility — also recognized that using non-clinical space would have a significant impact on the ability to accommodate a surge of patients in the face of a calamity. Through collaboration with Florida's Agency for Healthcare Administration, the emergency and trauma center can expand to accommodate 123 additional patients through the use of locked medical gas cabinets in corridors, waiting areas, consultation and conference rooms, and dual headwalls in exam rooms. If the medical gas cabinets outside the treatment rooms are needed, TGH must inform AHCA. Outside the

emergency department, the covered ambulance ramp can be converted into a triage area to support more patients within the building.

The dedicated parking under the new emergency department contains mass decontamination showers capable of decontaminating up to 200 patients per hour using quick-connect plumbing pipes from above. The design also provided an opportunity to double capacity in the trauma rooms by including overhead booms which supply electricity and medical gases.

Although the timing and nature of disasters is unpredictable, planning for the likelihood of various events and the impact they may have on a facility is critical for the community. Incorporating this planning early in the design and development stages allows for greater flexibility and cost-effective solutions which not only better serve a community — but help meet the bottom line. ■



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