



Evacuate or Stay? North Shore LIJ and Hurricane Sandy Epilogue

Hospital safety executive James Romagnoli and COO Mark Solazzo decided that North Shore-LIJ's three vulnerable hospitals—Staten Island University Hospitals North and South, and Southside Hospital—could withstand a storm surge a foot or two above Irene's four-foot storm surge. "Right up until 12 hours before, we were really being told that the storm surge should be no worse than Irene," says Solazzo. They decided to be cautious, and chose a partial evacuation:

We did the phased evacuation. I thought that that was a reasonable compromise to make certain that we protected the most vulnerable patients, yet didn't put the rest of the patient population at risk by having to move them someplace.¹

North Shore-LIJ left in place patients who could withstand complete power outages. The hospitals had blackout procedures that allowed staff using flashlights and lanterns to care for patients, says Solazzo. In a complete loss of power, the hospitals would have aggregated patients in a common space. "If the worst happened, we'd be able to take care of them," he says. "We wouldn't have to, in the middle of the darkness, pull them out and down flights of stairs."

On Sunday, October 28, 2012, Mayor Bloomberg ordered the mandatory evacuation of New York City residents in Flood Zone A.² Hospitals and nursing homes were exempted and allowed to shelter-in-place at their discretion. At 7:30 p.m. on Monday, October 29, what became known as Superstorm Sandy made landfall just north of Atlantic City, New Jersey. The storm's winds were 81 miles per hour, 12 mph higher than Hurricane Irene's winds at landfall. Sandy was also massive -- it spanned a thousand miles, more than three times as wide as Irene.

The resulting surge inundated Staten Island. The storm surge was nearly eight feet.³ "I don't think anybody anticipated the surge at the level that it came through, or the speed it came

¹ Author's interview with Mark Solazzo on February 19, 2013 in Manhasset, NY. All further quotes from Solazzo, unless otherwise attributed, are from this interview.

² New York City press release PR- 377-12. See: <http://www.nyc.gov/html/om/html/2012b/pr377-12-static.html>

³ Tropical Cyclone Report Hurricane Sandy, National Hurricane Center. See: http://www.nhc.noaa.gov/data/tcr/AL182012_Sandy.pdf

through," says Solazzo. Adds Romagnoli: "During the height of the storm, I said 'If this tide doesn't start going back out soon, we may have made the wrong decision.'"⁴

The three hospitals lost external power and switched to generator power. The generators were in the basements and vulnerable to flooding. Floodwaters reached as high as the sandbags at the front doors of Staten Island University Hospital North and Southside Hospital, but the sandbags held and no buildings were flooded. "That's about as close as we could have got. That's a pretty close margin we're playing there," says Romagnoli.

Several hospitals outside of the North Shore-LIJ system did not fare as well. Bellevue Hospital, Coney Island Hospital, NYU Langone Medical Center, Manhattan VA Medical Center and New York Downtown Hospital experienced flooding, lost some or all of their backup power, and were forced to evacuate during or immediately after the storm.

Another foot of storm surge would likely have damaged North Shore-LIJ's three at-risk facilities, says Romagnoli. In hindsight, he would have recommended totally evacuating Staten Island University Hospital North. "It's about the surge," he says. "When we see these surge numbers again, that's what's going to determine our actions." North Shore-LIJ had learned from its experience with Hurricane Irene, but that knowledge couldn't make up for the uncertainty of the forecasts for Hurricane Sandy. "To this day, the irony doesn't escape me," says Romagnoli. He explains:

I had more information. I was better informed to make that decision. And it almost worked against me. It was really that extra information that caused me to decide what I decided, and push that decision to my leadership.

In the wake of the storm, North Shore-LIJ continued to upgrade its facilities to better handle hurricane storm surges. But there is a limit, Romagnoli says:

The more protections you put in place, the easier my decision gets. But you can only do so much. I can't change the fact that Staten Island University Hospital is two feet above sea level. It's three blocks from the water. I can't move the water.

Climate change was expected to increase the intensity of hurricanes in coming years.⁵ During Sandy, North Shore-LIJ officials had gained an appreciation of what a strong storm can do, and would be better prepared for the next storm, says Romagnoli. He adds:

⁴ Author's interview with James Romagnoli on February 19, 2013, in Manhasset, NY. All further quotes from Romagnoli, unless otherwise attributed, are from this interview.

⁵ Global Warming and Hurricanes, Geophysical Fluid Dynamics Laboratory/NOAA. See: <http://www.gfdl.noaa.gov/global-warming-and-hurricanes>

This is what I know for next year: I have come as close as I possibly can. If I see those numbers again, I would evacuate. We cannot go a foot more surge. I absolutely know what the threshold is now on evacuation, and it was Sandy.