Letter to the EDITOR

Emergent Communication Networks During Disaster: An App for That

Larissa K. Laskowski, DO, Giselle Cruz, MD, and Silas W. Smith, MD

To the Editors:

Inadequate communication repeatedly challenges disaster response, with subsequent adverse effects on coordination.[1] However, emergent cooperative behaviors, including collaborative groups, social links, and social networks, have long been recognized as normative disaster developments.[2] These behaviors are facilitated by existing precrisis social relationships. For example, in 1965, Hurricane Betsy's destruction of telephone lines disabled the US Weather Service office in New Orleans. It was unable to issue weather bulletins, contact other weather station offices, and fulfill its warning functions. A local amateur radio club, exploiting a patchwork of existing radio groups, achieved contact with the office in Baton Rouge, establishing a novel social linkage and network.[2]

On the evening of October 29, Hurricane Sandy widely damaged New York's utility functions, including the power grid supplying lower Manhattan and the private, public, and federal institutions served by the Department of Emergency Medicine: NYU Langone Medical Center, Bellevue Hospital Center, and the Manhattan Campus of the Veterans Administration New York Harbor Healthcare System. Almost immediately after electrical power was lost, cellular telephone service dwindled as well. Power disruptions were expected; cellular telephone dysfunction was not. While engineering a planned reversion to e-mail, almost on cue, the employee server and local wireless failed. Months of discouragement of noninstitutional (non-compliant with the non-Health Insurance Portability and Accountability [HIPPA] Act/Health Information Technology for Economic and Clinical Health [HITECH] Act) e-mail addresses also left personal e-mails unknown or unavailable. In addition, paging capacity was compromised. Two components supported the reconstitution of a disaster-response communication method: a close-knit resident community and familiarity with a group texting application. Without a "push-to-talk" service, this existing social network was rapidly adapted.

Before the chief residents assumed their duties, they had reviewed various social media platforms (ie, Facebook, Twitter, and Google+) and discovered GroupMe, a free smartphone application with corresponding web interface that allows users to send a group text to as many as 50 individuals simultaneously. GroupMe functions on nearly every phone via push or short message service (SMS), independent of cellular usage or texting plans. Piloting the application with the class of postgraduate year (PGY) 4, the chief residents established a GroupMe group, allowing spontaneous, consistent communication via smartphone by the entire cluster. Once established, GroupMe provided such an easily accessible, private networking medium that each PGY class was encouraged to create its own GroupMe group. In the ensuing months, residents used GroupMe as a durable methodology for trading shifts, scheduling educational sessions, and planning events.

In preparation for Hurricane Sandy, the chief residents solicited 2 resident volunteers per PGY class for a disaster team leader (DTL) role. The DTL was conceived to disseminate storm information and hospital status, to inform residents of evolving staffing needs, and to provide closed-loop communication. Thus, when power was interrupted at 8:29 PM and services were subsequently lost, the chief residents transitioned communication to a spontaneously created GroupMe texting group Sandy, comprising the 8 DTLs. Hospital status updates emanated from the Sandy text tree, and the DTLs were then able to contact their preestablished class-specific GroupMe networks for further dissemination. Inherent redundancy was provided by the fact that residents were known to cluster into class-specific groups while not working to debrief each other in person—many were relying on each other for alternate housing due to mandatory residential evacuations or uninhabitable dwellings. Faster than a telephone tree, which relies on a one-to-one information handoff, the Sandy text tree permitted the distribution of crisis details in real time, as well as specific staffing requests to 59 residents within minutes. It did so with limited prerequisites: a mobile telephone with 3G or 4G capability and minimal battery power.

When backup power at New York University Langone Medical Center (NYULMC) unexpectedly

and abruptly failed, the chief residents needed to send "as many residents as possible" on an urgent basis to evacuate NYU's patients. Multiway communication between the chief residents and DTLs identified specific, available residents based on their location and ongoing and anticipated shift commitments. The Sandy text tree was then activated for individual resident recall. Within 45 minutes, 15 residents were standing in NYU's lobby. Three were deployed to Bellevue's emergency department (which also was functioning without backup power), and the remainder assisted in the evacuation.

Within 48 hours, a fully designed disaster communication tool was implemented. Additional GroupMe groups were formed to extend the text tree and to provide additional communication portals, enhancing the information flow among residents, the program directors, and hospital site directors. This approach was able to overcome the "frequency incompatibility"[1] problem that is so often described in disasters and is inherent in our 3 distinct hospital systems. Although updates to residents' personal e-mails were retained, GroupMe emerged as the fastest, most efficient, and most reliable means of maintaining a well-informed network of physician responders who could be mobilized. The communication tool now provides residents with a stable platform for potential all-hazards applications (eg, mass casualty events, active shooter scenarios). We encourage exploration, testing, development, and implementation of social media to achieve communication redundancy in disasters.

About the Authors

New York University School of Medicine, New York, New York (Drs Laskowski, Cruz, and Smith).

Address correspondence and reprint requests to Larissa K. Laskowski, DO, Department of Emergency Medicine, Bellevue Hospital Center, 462 First Ave, Rm A340, New York, NY 10016 (e-mail: Larissa.Laskowski@nyumc.org).

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