

YOUNG LEADERS



Raina Merchant, MD, MS, who pioneered the use of crowdsourcing and tournament theory to provide greater access to automated external defibrillators, shows students how to use the device to save lives during cardiac arrest.

DOI: 10.1377/hlthaff.2012.1115

Using Digital Communications And Social Media To Redraw The Cardiac Care Map

Emergency medicine physician Raina Merchant created a cell phone program to provide CPR instructions—and now leads an effort to map every automated external defibrillator in the United States.

As an emergency medicine specialist, Raina Merchant saw more than her share of heart attack and cardiac arrest victims over the years—patients who died because they didn't get adequate treatment before it was too late. She was frustrated when bystanders didn't perform cardiopulmonary resuscitation (CPR) on some vic-

tims because they didn't know how to, or were reluctant to intervene.

In 2005 Merchant, an assistant professor in the Department of Emergency Medicine at the University of Pennsylvania's Perelman School of Medicine, became starkly aware of another problem. A young college basketball star who'd gone to a Philadelphia high school collapsed and died of cardiac arrest while

working out at a city recreation center. The young man, Daniel Rumph, might have been saved, but there was no automated external defibrillator in the center, and no one knew how to find the nearest one. As Merchant later learned, not even manufacturers of the devices know where they are installed, because registration of their locations is not required.

Merchant, now 36, decided that digital communications technology could hold the key to saving more lives. She first created a cell phone program that provides audible CPR instructions and that can be activated immediately by a call to 911. A randomized controlled clinical trial subsequently demonstrated that the program improved the quality of CPR and was even more effective than widely used conventional CPR training.

Then Merchant realized that it would be helpful to have a comprehensive map of all of the automated external defibrillators in Philadelphia, which people could download onto their smart phones. She put together a team of people that included Penn faculty, local design firms, businesses, representatives from Philadelphia's Department of Health and Fire Department, and a platoon of medical and other students. Drawing on so-called tournament theory, which explains how people are ranked relative to each other and promoted for outperforming their rivals, Merchant launched an effort to "crowd-source" the locations of all of the devices in Philadelphia, making it into a competition of sorts. Called the "MyHeartMap Challenge," the effort worked. Philadelphia's automated electronic defibrillators were located, verified, and mapped—the first such map in any major American city.

"It was one of the most innovative social mission projects I've ever seen," says David Asch, Merchant's colleague at the university and executive director of its Penn Medicine Center for Innovation and Learning and the Leonard Davis Institute of Health Economics. Merchant, who was a Robert Wood Johnson Foundation Clinical Scholar,

Curriculum Vitae

Name:	Raina M. Merchant
Born:	April 1976, Chicago, Illinois
Education:	Yale University, 1998, BA, psychology University of Chicago Pritzker School of Medicine, 2003, MD University of Pennsylvania, 2009, MS, health policy research
Current position:	Assistant professor, Department of Emergency Medicine, University of Pennsylvania, Philadelphia, Pennsylvania
Career highlights:	Emergency Medicine Ambassador award, 2006 Senior Fellow, Leonard Davis Institute of Health Economics, University of Pennsylvania Perelman School of Medicine, 2007–present <i>Philadelphia Magazine</i> , “Rising Stars: Top Physicians Age 40 and Under,” 2008 Associate program director, Robert Wood Johnson Foundation Clinical Scholars Program at University of Pennsylvania, 2011–present Healthcare Innovation: New Media Award, <i>Philadelphia Business Journal</i> , 2012

says that although she is “single-minded” in her focus on cardiovascular outcomes, “I would like to think I am broad-minded in my approach. My greatest successes so far have come from multidisciplinary work, and I’ve also found that I’ve needed the participation of artists, software designers, politicians, block captains, and business leaders” to make a difference.

Now, following in the spirit of Chicago’s Cow Parade and similar public art projects in other cities, Merchant is working to get the City of Philadelphia to place sponsored sculptures adjacent to the city’s automated electronic defib-

rillators to draw attention to their location. Merchant’s ultimate goal is to require manufacturers to implant a global positioning system (GPS) chip in every device, so that the equivalent chips in cell phones could locate them. Meanwhile, Merchant is also pursuing plans to map every defibrillator in the United States, and possibly the world. Her efforts are drawing increased attention, with mass media entities like *Wired*, the *Economist*, and National Public Radio all having showcased Merchant’s work.

These days, Merchant is paying close attention to Twitter as another feature

of social media and communications technology that could improve health. She’s created a Twitter lab at the University of Pennsylvania to systematically mine tweets that refer to cardiovascular health crises, such as cardiac arrest and resuscitation. About a quarter of the tweets posted on resuscitation, she and colleagues have found, contain substantive information rendered in everyday language. For example, Merchant saw tweets from people asking for (and receiving) CPR instructions, wondering what to ask their doctor after a loved one had a cardiac arrest, or even complaining that CPR classes were too boring. Merchant sees an opportunity for trusted health professionals to become part of these conversations.

“There’s an opportunity to understand what people are saying about the topic and then provide the most up-to-date and evidence-based information,” she explains.

Merchant is driven by the hope that her efforts in Philadelphia will have a real impact in her own backyard and could then be offered as a tool kit for other communities nationwide.

“We have a lot to do in Philadelphia,” she says. “We have the opportunity to raise awareness and improve education about cardiac arrest. We can really have impact. And it’s not small differences: It’s differences between life and death.” ■

Photo used with permission from the Robert Wood Johnson Foundation. [Published online November 21, 2012.]