

Telemedicine Is Earliest Relief After a Disaster

With effective communications, physicians can practice beyond the emergency operation centers.

BY SHERRY BOSCHERT
San Francisco Bureau

Imagine losing access to telephones, the Internet, and fax lines during a disaster, and trying to treat patients with nothing but a scratchy two-way radio to connect you with people and institutions outside your office.

It's so last century, and so avoidable, yet that's what happens after natural or man-made disasters, said Dr. Ronald C. Merrell. Physicians should plan ahead to maintain telecommunications so that they can practice medicine independently of emergency operation centers in such situations, he advised.

After terrorists destroyed the World Trade Center in New York in 2001, the dust was so thick that it interfered with satellite communications and cell phones. After a tsunami decimated parts of Southeast Asia in 2004, and after Hurricane Katrina hit the U.S. Gulf Coast in 2005, many physicians lost phone lines and were stuck with more primitive modes of communication, like ham radios.

"That's technology we've had since the Second World War. It's fine, but we need to find a way to access the Internet. It's hard to practice medicine over a radio," said Dr. Merrell, director of the Medical Informatics and Technology Applications Consortium (MITAC) at Virginia Commonwealth University, Richmond, and an ACS Fellow. MITAC is a research center sponsored by the National Aeronautic and Space Administration (NASA).

The medical needs of refugees from a disaster aren't necessarily what you might expect. Dr. Merrell and two colleagues from MITAC responded to a call from NASA after Hurricane Katrina to help an occupational medicine office at a NASA fa-

cility about 34 miles from the Mississippi coast. The office and its one physician had lost most communication with the outside world. Hundreds of people needed medical care, and within days the numbers grew to 4,000.

Many patients were on complex regimens of medicine, but their pills had washed away in the storm. One group of mentally ill patients from an assisted living facility had lost antipsychotic medication. Others had lost refrigeration and no longer had insulin.

Telemedicine teams in other parts of the country were eager to help, but the Mississippi facility had no good way to let them know what to send.

Dr. Merrell and his team set up a satellite telephone, a computer satellite dish, and other equipment that gave them 65 kilobytes of transmission speed. Phone calls were transmitted via a French satellite to Paris and back to the United States. The team even brought solar panels to provide power if needed, but they were able to use electricity from the NASA facility.

The system allowed them to order medications, connect with other medical facilities, and coordinate transfers of patients to more stable environments.

Because telemedicine isn't part of the usual disaster preparedness infrastructure, deploying the specialized equipment and then training people to practice telemedicine is time-consuming, which limits the amount of help it can provide, Dr. Merrell noted. Physicians would be wise to assess the disaster plans for their clinics or hospitals and advocate for redundant telecommunications capabilities.

"Medicine has to have a fairly independent and broadband interface" separate from acute emergency response efforts to serve patients well in a crisis, he said.

Having equipment and trained personnel in place made a huge difference when a devastating earthquake struck Pakistan in October 2005, Dr. Merrell said, noting that it may have been the first time that telemedicine formed the core of a successful medical response to a tragedy.

Under a grant from the U.S. Agency for International

Development, Dr. Merrell and Dr. Azhar Rafiq of Virginia Commonwealth University had traveled to Pakistan about a month before the earthquake to help establish two telemedicine training facilities in Rawalpindi, just outside the capital of Islamabad. The telemedicine facilities were to enable communications with two primary care clinics in the rural Punjab area for a more integrated health system.

When the earthquake hit, "We were in touch with them within 12 hours" thanks to the telemedicine programs, he said. The Rawalpindi medical facility was the first fully intact medical site encountered by people fleeing the mountainous areas, where the earthquake had leveled brick hospitals and killed almost all of the medical workers. Soon Rawalpindi's 1,500 beds were in demand for 6,000 patients.

Telecommunications kept the facility from being overwhelmed. Medical students volunteered for brief training in telemedicine and hiked into the mountains with backpacks containing satellite phones, digital cameras, laptop computers, and mobile power sources. From the mountains they informed the hospital at Rawalpindi and other facilities about



Dr. Merrell, left, with Dr. Khan and Dr. Gilani, outside the clinic in Rawalpindi following last year's earthquake in Pakistan.

which patients were headed their way and what would be needed. The students also transmitted medical records and photographs.

After reconstructive surgery at the Rawalpindi medical facility, patients were sent back to tent facilities in the mountains to recover. Surgeons were even able to send patients with complex orthopedic repairs to the mountains, knowing that staff would be able to telecommunicate about the patients' status and any post-surgical problems that arose.

"They never did overwhelm the hospital," Dr. Merrell said. "They were able to use telecommunications to move patients down out of the mountains for definitive care and get them out and back to the mountains in a fraction of the usual time—in about 48 hours."

Dr. Merrell and Dr. Rafiq returned to Pakistan in January 2006 to help assess the surgical systems and telemedicine facilities as the country moved from its post-earthquake crisis phase to a reconstruction phase. Telemedicine will continue to help Pakistani medical workers use their time most efficiently and make health care more integrated. ■

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