

Center for Excellence in Rural Safety



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CrashHelp

Improving emergency medical response to motor vehicle crashes

Over the past five years, researchers with the Center for Excellence in Rural Safety (CERS) and the Intelligent Transportation Systems (ITS) Institute at the University of Minnesota have investigated the role that information technology (IT) plays in improving emergency medical responses to victims of rural automobile crashes. The aim is to reduce the adverse health impacts of automobile crash trauma, especially those in rural areas, where crashes account for a high percentage of trauma injury and death.

While U.S. Census figures show that about 1 in 5 (21 percent) Americans live in rural areas, the Federal Highway Administration (FHWA) has found that about 6 in 10 (57 percent) highway deaths occur on roads it considers rural.

“One key aspect of reducing adverse medical effects of rural automobile crashes is to improve emergency medical services (EMS) in these regions—that is, to decrease the amount of time it takes emergency services to respond, provide care, and take

a patient to the right hospital,” CERS research director Tom Horan says.

The research team has conducted case studies of EMS systems in rural areas across the United States. A multiyear study was conducted with the Mayo Clinic in southeastern Minnesota, including analysis of EMS response data, interviews, and focus group discussions with EMS practitioners. Through this work, researchers have identified some critical gaps and consequent opportunities to improve medical responses to rural crashes.

The research team has used their findings to develop the CrashHelp system. The system enables emergency responders to collect multimedia data about crash victims on-scene via mobile Smart Phone and send it directly into emergency rooms, providing hospitals with advance notification of crash severity and related information that can be used to best prepare for the patient’s arrival.

Filling a need

One critical gap is the need to more seamlessly communicate patient and incident information from EMS prehospital practitioners to hospital emergency room/trauma center providers. “We found that information collection and handoff from ambulance providers to hospitals is fragmented,” says Benjamin Schooley, CrashHelp system architect and project co-director. “We are finding that this information can significantly impact decision making, which may lead to improvements in patient care.”

Working with EMS practitioners at the Mayo Clinic, the research team identified a need to apply new and emerging mobile, web-based, and location-based (map-based) technologies to address this information handoff challenge. “We have a very significant opportunity to apply mobile phone, Internet, and other technologies to help us respond better to trauma that results from traffic crashes,” says Mayo Clinic trauma director



CrashHelp system overview

Scott Zietlow, M.D., who has participated in the study. “There are many opportunities for improvement in EMS, one of them being the communication between medics and physicians.”

CrashHelp, version 1.0

CrashHelp provides multimedia data directly into emergency rooms, providing hospitals with advance notification of crash severity and related information that can be used to best prepare for the patient's arrival. Ambulance crew paramedics and emergency medical technicians use a mobile Smart Phone to securely capture pictures, digital audio recordings, video, and the most basic patient and incident information.

The information collected on-scene is sent securely to a hospital facility's web-based interface for practitioners to view on demand. The information can be viewed to know who and when the next patient will be arriving at the hospital, and personnel responsible for oversight can view aggregate information over time and conduct basic geo-spatial (map-based) analyses.



Ambulance paramedics use the CrashHelp handheld app.

Pilot studies

The research team is testing the application in live environments. Initial pilot testing was conducted from July through October 2011 in Boise, Idaho. A second pilot study of the system began in early July 2012 in central Minnesota. The goal of the pilot testing is a system ready to deploy in rural regions throughout the country.

The six-month Minnesota study, in partnership with the Central Minnesota Regional Trauma Advisory Committee (CENTRAC), is funded by the Minnesota Department of Transportation and the Minnesota Department of Health.

As part of the central Minnesota pilot, the CrashHelp system has been adapted to meet the specific needs of EMS and emergency practitioners. The enhanced system has been implemented at the Cuyuna Regional Medical Center (CRMC) and its ambulance service provider in Crosby, Minnesota.

Following a five-week trial period at CRMC, the research team will explore the feasibility of expanding the system throughout the CENTRAC region, which includes 14 counties in central Minnesota.

The Minnesota pilot also will include an evaluation of CrashHelp's effects on EMS communications, EMS decision making, and medical outcomes that could result from using the system in a regional setting.



Emergency room physicians view patient information over a secure web application.

Overall results from the Boise pilot last year were positive, indicating that CrashHelp allowed for the efficient collection of usable information. That study included six hospitals and two ambulance providers.

In the Boise study, researchers had anticipated images being used most frequently and were surprised by the popularity of the audio recordings. The researchers also found that use of the system varied widely between more technically savvy personnel and those who didn't know how to make the best use of the system.

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