Information Infrastructure for Emergency Medical Services

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Abstract

The pre-hospital emergency medical and public safety information environment is nearing a threshold of significant change. The change is driven in part by several emerging technologies such as secure, high-speed wireless communication in the local and wide area networks (wLAN, 3G), Geographic Information Systems (GIS), Global Positioning Systems (GPS), and powerful handheld computing and communication services, that are of sufficient utility to be more widely adopted. We have implemented a testbed to study and evaluate clinical decision making in the pre-hospital environment using these change agents.

Purpose

The current prehospital emergency medical environment is reminiscent of an isolated clinic or hospital unit in the early 1980s, when the only communication media available were paper, voice or fax. The computer based patient record has been accepted and recognized as a vital component in many hospitals and clinics. However, the out-of-facility or prehospital emergency medicine environment appears to have lagged on this front. Paper documents are used nearly exclusively in Emergency Medical Services (EMS) environments. We plan to show that the introduction of advanced data networking technologies in the EMS environment will enable enhanced services for improving clinical care during the "golden hour" and reduce the number of major "system errors" by process improvements.

After studying the workflow of EMS in the Birmingham Metropolitan Area, we have devised an information architecture and are implementing this architecture in a testbed environment. We believe the adoption of these technologies would result in improved patient care, better clinical documentation and optimal allocation of resources within horizontal (geographical) and vertical (clinical) dimensions; thus facilitating improved response to large scale emergencies and disasters. The table below summarizes proposed technological improvements.

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Table: Advanced Information Infrastructure Technologies for EMS

Characteristic	Existing System	Proposed System
Technology:		
Voice, Fax	Current standard	Enhanced with data messaging
Voice Conferencing	Rarely used. Current standard for point to point calls	Enhanced with white boarding (shared screens)
Data Messaging	Not used currently	SIP based Instant Messaging
GIS / GPS	Available in some locations	GIS with GPS (to provide online location of mobile resources such as ambulances, EMTs, etc.)
Pre-arrival Information:		
Prior medical history	By-stander information	Basic medical information from EMP database
Incident routing	Based on pre-existing information about hospital location and type of hospital (e.g., Level of Trauma Center)	Based on assessment of distances, traffic conditions and real-time GIS information and online availability of hospital resources
Scene safety information	Based on information communicated by medical dispatch	Based on updated location information provided from the database