Chapter XV
An Analysis of a Successful Emergency Telemedicine Venture

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ABSTRACT

This paper describes business and technological challenges and solutions for a successful emergency telemedicine venture called MediComm. Its objective is to provide a new generation of integrated information and communication systems, targeting medical and emergency care organizations. This system enables multi-directional transfer of information (including voice, data, fax, video) between the organization's central information system and its mobile fleet of ambulance vehicles. MediComm enables emergency care personnel to take a patient's vital measurements and personal information in an ambulance on the way to the hospital, send the information to the hospital, and receive from the hospital directions for the patient's treatment during transportation. When the patient arrives into the hospital, his/her information will be already updated in the information system, and the medical personnel will be ready to provide the necessary care immediately. Thus, time will be saved, which for many patients is of critical importance. The treatment of patients will be more effective and simplified, which will result in substantially lower cost of medical care.

INTRODUCTION

With advances in information systems, telecommunications, Web applications and medical equipment, ***telemedicine*** (providing health care service remotely) has become very popular in the last decade. Current telemedicine applications include: teleradiology, prison telemedicine, telecardiology, and telehome health care (Brown, 1995). However, emergency care has not exten-

sively benefited from the advances in telemedicine and the underlying technology.

The demand for ***emergency telemedicine*** has been created by the following factors:

- The time and place of health emergencies are unpredictable, while they typically require immediate medical intervention. Here are several examples:
  - **Cardiac arrest:** Among patients older than 55, who die from cardiac arrest, 91% do so outside of the hospital (Kyriacou, 2003). In order to save the patient's life, the "Call to Needle" time (from the emergency call for help, until the help is provided) should be less than an hour. A 12-lead ECG during the patient's transportation to the hospital increases the available time to perform a thrombolytic therapy effectively. Potentially, mortality can be reduced by 48% if treatment is received within an hour of onset of symptoms (Keeling, 2003). The benefits diminish thereafter.
  - **Car accidents:** According to (Kyriacou, 2003), approximately 77% of fatal injuries in accidents happen far away from any competent health care institution, which results in long response times. The mortality of injured is very high (66%) during the first 24 hours. However, the mortality can be reduced by earlier medical intervention, starting as soon as the patient is admitted to the emergency vehicle on the way to a hospital.
  - **Stroke:** Morbidity and disability due to a stroke can be significantly reduced if appropriate thrombolytic therapy is given within a "golden" 3-hour period of symptom onset. Currently, only 3% of candidate patients receive thrombolytic therapy due to missing the therapeutic window (Gagliano, 1998).
- Insufficient number of intensivists (specialists in emergency/intensive health care) — Currently, there are less than 10,000 intensivists in the U.S., while 35,000 to 40,000 are needed (Wiebusch, 2001). Less than 15% of intensive care units (ICU) have dedicated intensivists on staff (COMPACCS, 2000).
- Telemedicine may provide a way of stretching the expertise of existing intensivists in the future. Using emergency telemedicine systems, death rates can be reduced by 68% and health complications – by 50% (Gagliano, 1998).

Currently, when an emergency team transports a patient in a critical condition to a hospital or emergency center, only a basic health care is provided to the patient in the emergency vehicle. The majority of measurements of vital functions (biosignals) and administrative procedures are taken after the patient arrives to the hospital, not in the vehicle during transportation. For many patients, reducing the waiting time for emergency care may make a difference between life and death. For health insurance organizations, it may provide a substantial reduction in medical expenses.

Logical objectives resulting from the current situation follow:

- Reduce mortality and health risk to patients by improving quality of emergency health care in terms of: a) reduced waiting time for emergency health care; b) immediate access to remote specialists; c) improved convenience of transportation to the medical facility
- Organize medical and administrative staff in a more efficient and effective way
- Reduce health care costs