

# TelEmergency: A Novel System for Delivering Emergency Care to Rural Hospitals

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Providing rural emergency medical care is often difficult because of limited resources and a scarcity of medical providers, including physicians trained in emergency medicine. Telemedicine offers promise for improving the quality of care in rural areas, but previous models were not well designed to provide affordable care to unstable or potentially unstable patients. The TelEmergency program was developed to overcome these limitations by providing quality, affordable medical care to patients in rural emergency departments (EDs) using specially trained nurse practitioners linked in real time by telemedicine with their collaborating physicians at the University of Mississippi Medical Center Adult Emergency Department. Since its inception in October 2003, the TelEmergency program has evaluated and treated more than 40,000 patients in 11 rural EDs throughout Mississippi, with a high degree of satisfaction from patients and hospital administrators. This article details the development and implementation of this system and describes the patient population that has been evaluated. [Ann Emerg Med. 2008;51:275-284.]

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## INTRODUCTION

Providing quality emergency care in rural areas is a common problem in the United States. Although the hourly census of patients who present at smaller rural emergency departments (EDs) is typically lower compared with that of urban EDs, the acuity of individual patients can be high. The difficulties in caring for these higher-acuity patients is compounded by limited medical resources and a lack of training in emergency medicine by many health care providers staffing rural EDs.<sup>1-3</sup>

Although a residency-trained, board-certified emergency physician is considered the gold standard when an ED is staffed, rural EDs frequently are unable to attract such individuals and in some instances any physicians whatsoever.<sup>1-3</sup> Many rural EDs in our state are staffed by individuals who vary in training from board-certified internists and family practitioners to physicians who are either currently in residency or have left postgraduate medical education without completing any residency at all. In an effort to overcome this physician shortage and decrease costs, some facilities in our state began to staff their EDs with nurse practitioners alone, without physicians present in the hospital.

In Mississippi, nurse practitioners are allowed to practice medicine independently if they are within 15 miles of their collaborating physician. Despite this requirement, we observed

through coordinating intrafacility transfers that often the collaborating physicians were not available to assist in patient care in a timely fashion, if they were available at all. Many critically ill ED patients were thus being treated by a nurse practitioner with inadequate training and experience, without readily available physician backup. This situation was far from ideal for the patients and the nurse practitioners who were forced to practice outside the scope of their training and licensure.

Telemedicine offers promise for improving the quality of care in rural areas, but previous models were not well designed to provide affordable care to unstable or potentially unstable patients. Previous models relied on physician-to-physician consultation, usually required the presence of a subspecialist to provide the consultation, and in emergency medicine lacked Current Procedural Terminology codes for telemedicine providers to bill for their services.<sup>4,5</sup> The TelEmergency program was developed to overcome these limitations by using specially trained nurse practitioners, linked in real time by telemedicine with their collaborating physicians at the University of Mississippi Medical Center Adult Emergency Department (UMMCAED). Between October 2003 and October 2006, the TelEmergency program has evaluated approximately 40,000 patients in rural EDs in Mississippi.

### Nurse Practitioners

In the TelEmergency model, nurse practitioners and collaborating TelEmergency physicians treat ED patients at multiple geographically distant sites. Nurse practitioners were chosen rather than physician assistants or other midlevel practitioners because of the availability of nurse practitioners and the familiarity with nurse practitioners of hospitals and patients in our state. With the cooperation of the Mississippi State Board of Medical Licensure and the Mississippi Board of Nursing, we obtained a waiver allowing nurse practitioners who participated in our pilot program to collaborate with physicians who were more than 15 miles away by using a telemedicine link.

The nurse practitioners recruited were required to have specific qualifications. These include a master's degree in nursing from an accredited institution (National League for Nursing or Commission on Collegiate Nursing Education), certification as a family nurse practitioner with a current unrestricted license (registered nurse and nurse practitioner) to practice in the United States and eligibility for licensure in Mississippi, current basic cardiac life support, advanced cardiac life support, and pediatric advanced life support and completion of the Mississippi Nurse's Association Controlled Substance Workshop. We gave preference to nurse practitioners who had completed 1 year of clinical experience as a nurse practitioner and those who held a second certification as acute care nurse practitioner. If the nurse practitioner was not dually certified, we recommend registration into an acute care nurse practitioner post-master's program.

We designed an educational program specifically for the TelEmergency nurse practitioners. It consists of approximately 40 hours of continuing medical education on topics believed to be critical to the evaluation, diagnosis, and treatment of ED patients, combined with clinical and procedural training. A list of the lecture topics is given in [Figure 1](#). The TelEmergency nurse practitioners are required to complete 4 examinations based on the lectures and case presentations from a required text before completion of their clinical rotation.

The clinical training consists of clinical hours in the UMMCAED and various skill laboratories, including a cadaver laboratory. The clinical hours vary from a minimum of 135 hours to approximately 200 clinical hours and must include at least 100 patient encounters under the supervision of attending emergency physicians at the University of Mississippi Medical Center Adult Emergency Department. At the end of the clinical and skill laboratory rotation, TelEmergency nurse practitioners are required to document the patient log, as well as the procedure log given in [Figure 2](#).

All TelEmergency nurse practitioners must also obtain a Drug Enforcement Agency certificate and meet privileges and credentialing requirements at the hospitals in which they are to be employed. In addition, TelEmergency nurse practitioners are required to meet continuing education requirements, including attending quarterly performance improvement and educational "update" conferences, and to document the performance of a

|                                     |
|-------------------------------------|
| Approach to the ED patient          |
| Chest pain                          |
| Syncope                             |
| Hypertensive emergencies            |
| Acute coronary syndromes            |
| EKG Interpretation                  |
| C-spine trauma                      |
| Head trauma                         |
| Abdominal and blunt trauma          |
| Penetrating trauma                  |
| Extremity trauma                    |
| Open injuries to the hand           |
| Antiarrhythmics                     |
| Advanced cardiac life support drugs |
| Fibrinolytics                       |
| Intubation drugs                    |
| Stroke                              |
| Acute dyspnea                       |
| Obstetric emergencies               |
| Acute abdominal pain                |
| Acute gastrointestinal bleeding     |
| Adult febrile patients              |
| Pediatric febrile patients          |
| Telemedicine equipment              |
| Acute complications of diabetes     |
| Anaphylaxis                         |
| The swollen and painful joint       |
| Advanced airway management          |
| Headache                            |
| Controlled substances               |
| Seizures                            |
| Altered mental status               |
| Wheezing                            |
| Advanced trauma life support        |
| The poisoned patient                |
| Electronic medical recordkeeping    |

**Figure 1.** TelEmergency didactic lecture series.

requisite number of selected clinical procedures to continue to remain active in the TelEmergency program.

Of the 34 TelEmergency nurse practitioners who have completed the requisite training, 27 have maintained the required continuing education and procedural documentation. Of these 27, a total of 23 are actively participating in the TelEmergency program at site hospitals, which gives us an ongoing retention rate of 68% during the past 28 months.

### Collaborating Physicians

The TelEmergency program is an extension of UMMCAED, and all collaborating physicians are either faculty or senior residents at UMMCAED. The University of Mississippi

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