

# A Rural, Ambulance-Based Telemedicine Project



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# Learning Objectives

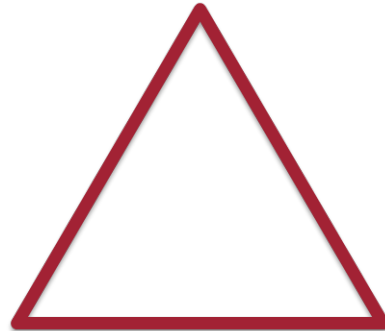
- Upon completion of this session, participants will:
  - Be able to understand the technology used for an ambulance-based telemedicine project.
  - Understand the benefits, both in costs and health outcomes, of an ambulance-based telemedicine program.
  - Be able to understand the implementation process of an ambulance-based rural telehealth initiative.
  - Understand the guidelines and submission process for the United States Department of Agriculture’s “Distance Learning and Telemedicine Grant Program.”

# Overview

- Ambulance-based telemedicine connects emergency medical technicians and paramedics directly to a hospital's ED physician and includes the transmission of real-time video/audio and medical data.
- We received grant funding for an ambulance-based telemedicine initiative in a rural, underserved community (Pickens County, Alabama).
- With this funding, our project team has installed state-of-the-art telemedical equipment in the community's two ambulances, as well as communication and reception equipment in the community's sole local hospital.

# Goals

**Decreased costs for  
patients, the EMS provider,  
and the hospital**



**Increased  
quality of care**

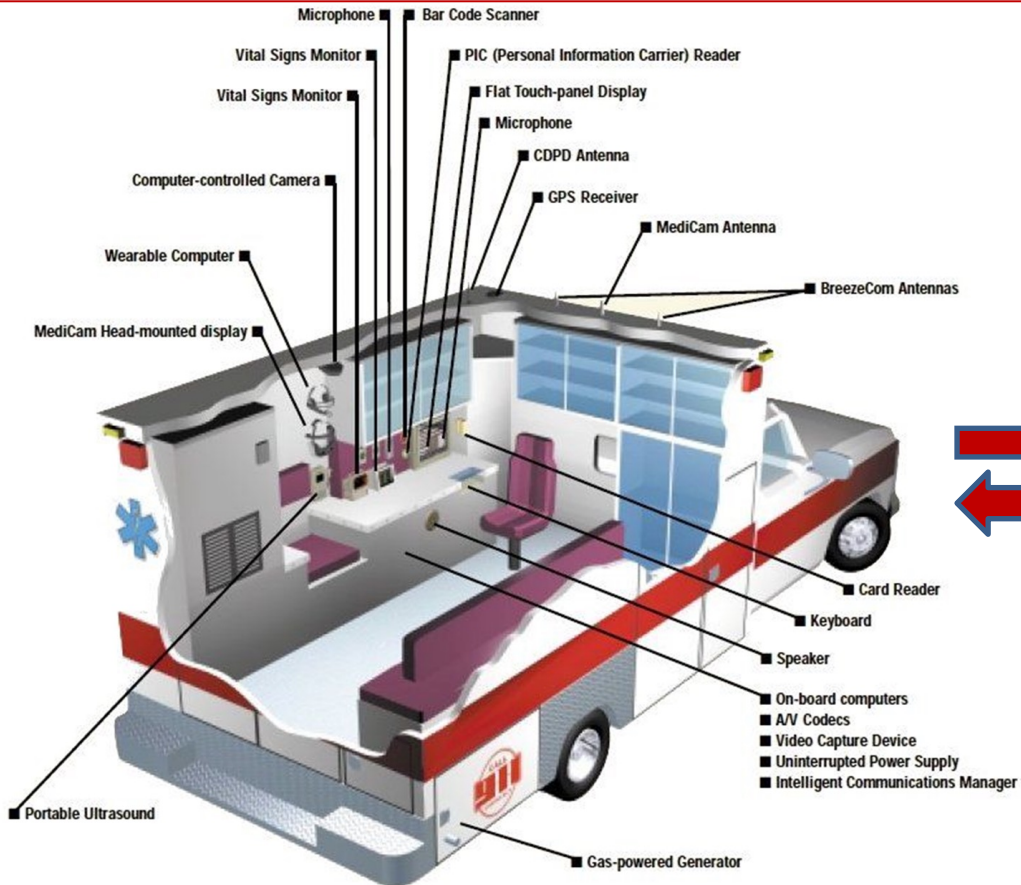
**Increased  
effectiveness**

# Technology Overview

- A battery operated portable telemedicine system
- Includes live transmission of two-way voice and video, as well as physiological data
- Communications Manager
  - manages all mobile related connectivity
    - cellular, satellite, wi-fi, or data radio
    - aggregates available bandwidth for reliable transmissions

# Ambulance-Based Telemedicine

Equipment Located on Each of Two Ambulances in Pickens County



Communication Enabled Between EMS and Hospital's ED physician/staff



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# Technology Overview

- One camera mounted on the portable unit
- Two additional cameras inside the ambulance
- Mounting bracket for both transport operations and ready detachment of the telemedicine system for portable use

# Portable Unit Mounted in Ambulance



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# Setup with Patient & EMT (similar to what is in the ambulance)



# Physiological Data

- Local physiological patient monitoring and remote transmission of data
- ECG - single Lead ECG and 12-lead ECG
- $S_pO_2$ , Pulse Ox, EtCO<sub>2</sub>,
- NIBP
- Body temperatures
- Abdominal ultrasound probe

# Sample Monitoring Report

AMB 2 22:37:51 H 0 Patient Patient Unit 2 System Msgs ALARM SITUATION: pulse is: 0; res...

### Trauma Report

Aid

Aid Prior to Arrival:

Preventive Aid:


Time Records (24-hr)

Start:	End:
Requested:	On-Scene:

Vehicle Extraction Req'd

Medical Airvac Dispatched

### Injuries



Loc	Type	Severity
18	2-Fracture/Dislocation	2-Non-Incapacitating
45	5-Drown/Suffocate/Choke	2-Non-Incapacitating
33	1-Burn	2-Non-Incapacitating
16	4-Internal	3-Incapacitating

Code Causes

Add Edit Delete

Add Edit Delete

Call Info Patient Info Patient Med Hx Vital Signs 12-Lead ECG Monitor Trauma Report Advanced Care Report Narrative Pt Billing Summary Refusal / Release Form Sign / Print Run Record

System ePCRecord Video/Vitals Map Tracking Information Triage Admin

# Abdominal Ultrasound



# Receiving Unit in ED:

Touch-screen desktop workstation with remote client software for ED physician/staff



# Tablet touchscreen PC with remote client software for ED physician



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# Technology

- Solves the problem of limited communication between emergency physician and the EMS team
- Rich communication environment that facilitates the best possible care for the patient – whether inside or outside of the ambulance
- Fully integrated system
  - All components work seamlessly with one another
  - Provides monitoring and high-quality secure communication between ambulance and emergency department before or during an ambulance trip

# Benefits

## QUALITY

- **Quality Care** – expedites access to patient data and eliminates geographic and logistical barriers to care
- **May save lives** – through more timely and more accurate decisions that reduces morbidity and mortality and improves outcomes
- **Transportable Data** – data can be ported to the hospital's EHR and the EMS' call record system

## COSTS

- **Reduced Costs** – may substantially reduce healthcare costs
  - Avoid unnecessary ED visits
  - Avoid multiple transfers
  - Reduce <30 day readmissions
- **Reimbursement** – may improve reimbursement, especially under a value-based purchasing environment

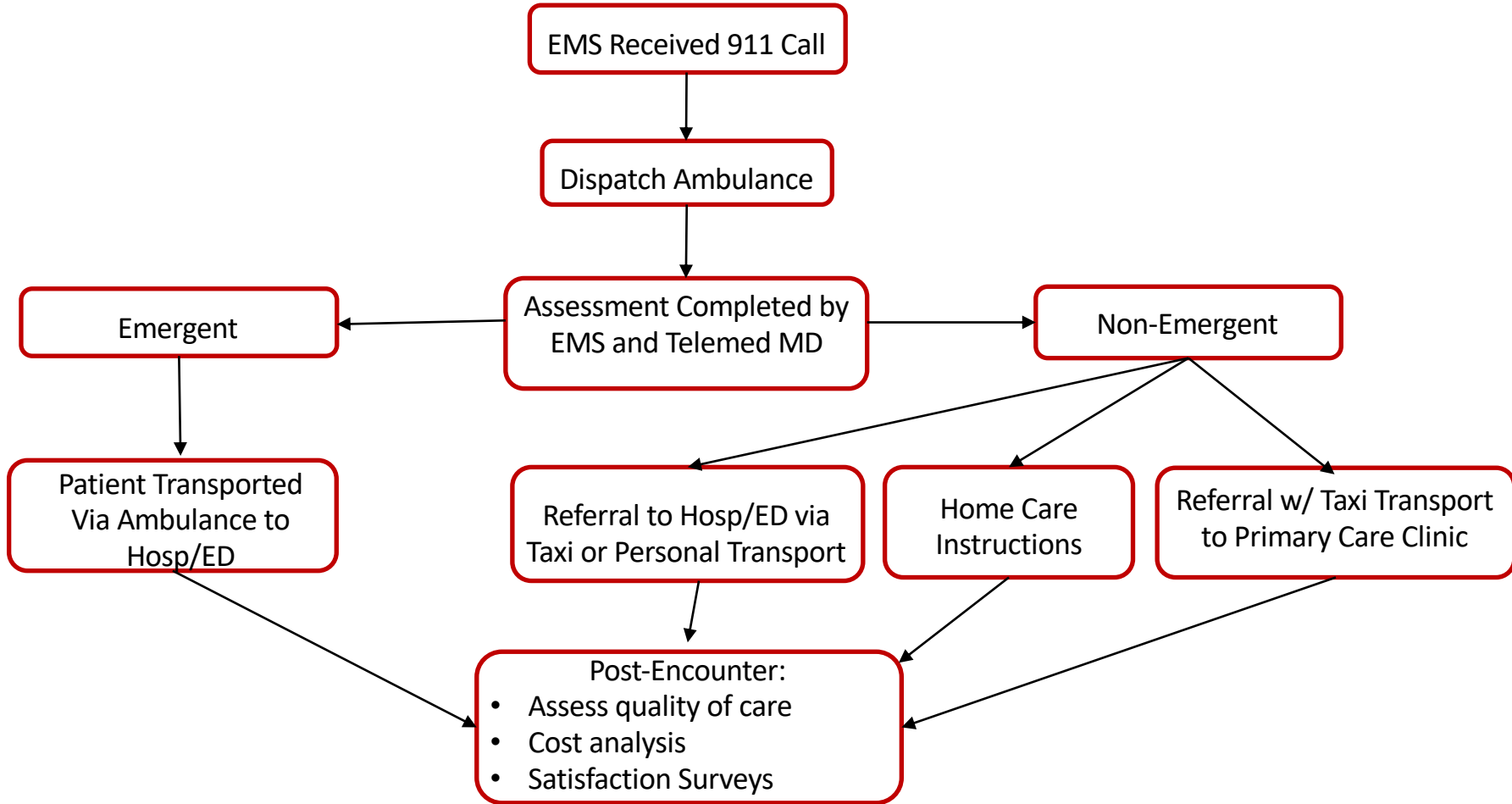


# Benefits

## EFFICIENCY

- **Direct Patient/Physician Communication** – patients can directly communicate with the remote ED physician
- **Community Paramedicine** – delivers EMS pre-hospital primary care
- **Care Coordination** – matches level of care required at the outset
- **Accelerated Care** – documentation assessment support for faster safer and more accurate diagnoses
- **Situational Awareness** – know precisely what we are dealing with real-time data prior to patient's arrival in the ED
- **Lower Personnel Risks** – video monitoring may make patients more compliant and protect the staff

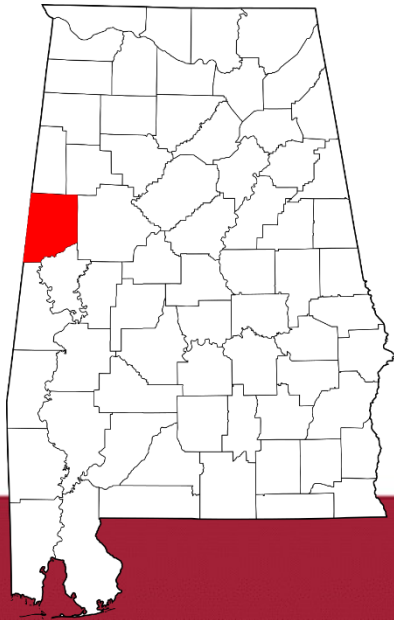
# Process



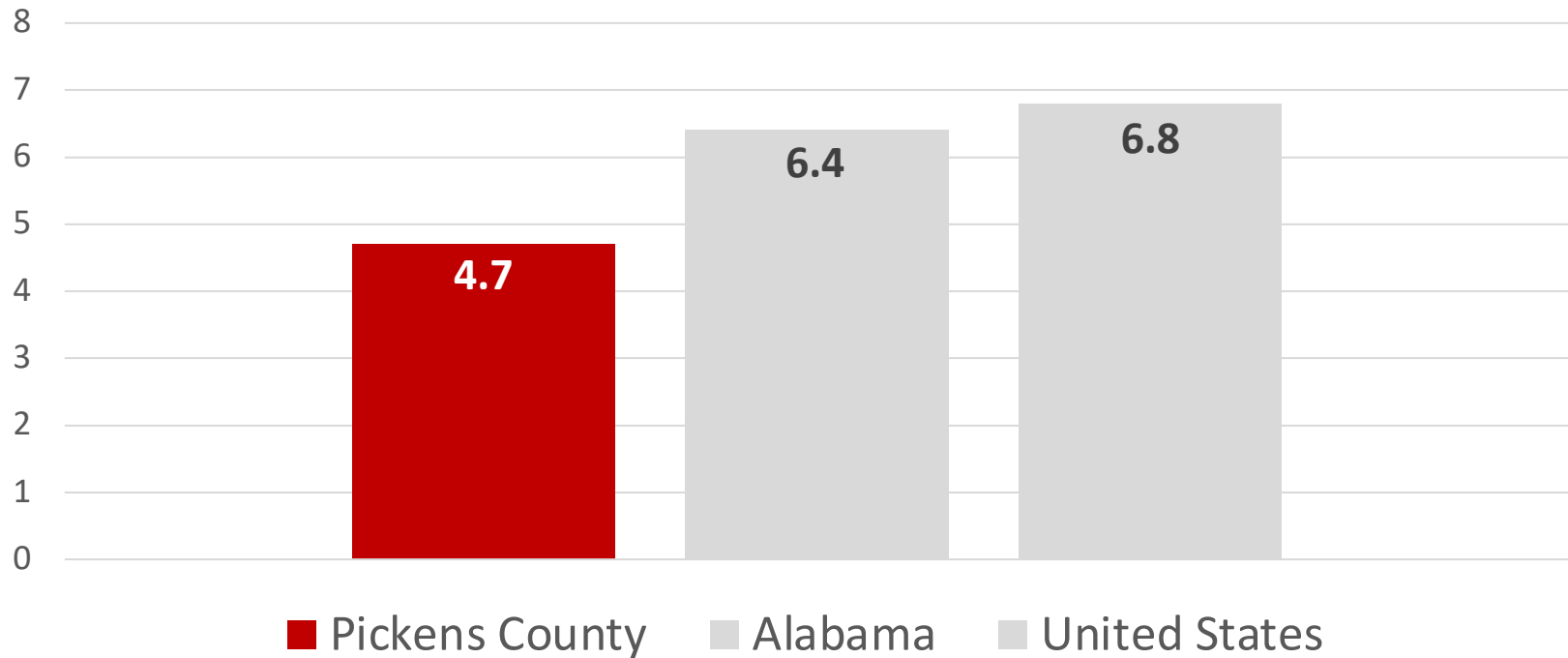
# Pickens County, Alabama



- Our project provides telemedicine capacity to Pickens County, Alabama, a rural underserved county with limited ability and resources to manage their medical and healthcare decline
- Two ambulances are equipped with the latest and most advanced telemedicine emergency equipment that will enable communication between the EMTs and Pickens County Medical Center

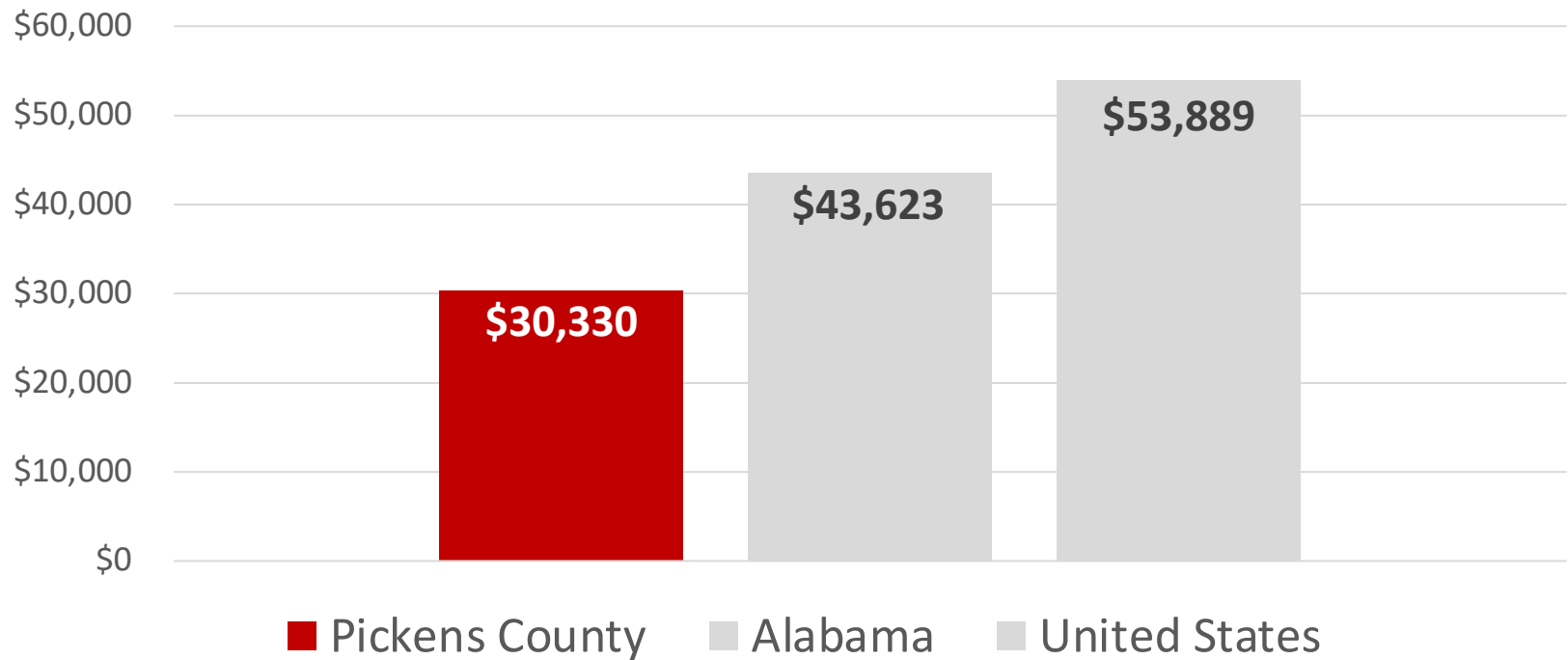


# Primary Care Physicians per 10,000 Population\*



\*Pickens County has no specialists

# Median Household Income\*



\*One in four members of the population lives below the poverty level – almost twice the national average

# Pickens County Medical Center & Northstar EMS: Hub and Spoke

- Pickens County Medical Center (PCMC), Carrollton, AL
  - PCMC ER physicians and staff = Hub of Telemedicine System
  - 56-bed hospital in Carrollton, AL; only hospital in Pickens County
  - Serves the county of 19,746 people
  - Poor financial status and some management issues
- NorthStar EMS, Carrollton, AL
  - NorthStar EMS Ambulances and EMTs = Spokes of Telemedicine System
  - Only two ambulances in Pickens County; ~ 30% of calls go to PCMC
  - Majority go to another hospital that is about 45 minutes from PCMC
  - Often strained to meet demand

# Pickens County EMS - 2016

**3048**

## **CALLS**

Pickens County had approximately 3000 support calls in 2016

**2581**

## **TRANSPORTS**

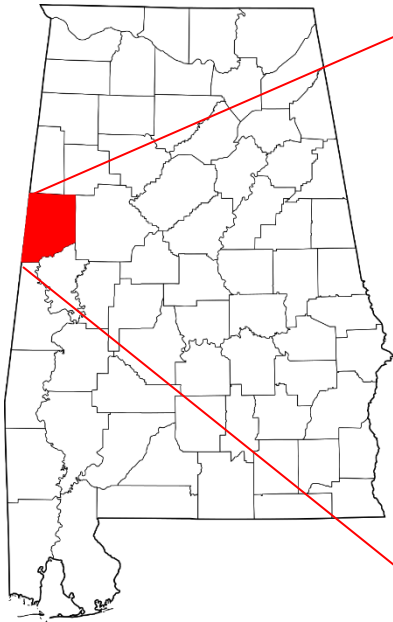
Pickens County had approximately 2600 transports in 2016

**18%**

## **WRITTEN OFF**

Approximate percent of billed EMS services written off by Pickens County EMS in 2016

# Pickens County EMS - 2016



## **In County**

**1,076** transports  
**\$554.69** per transport

## **Out of County**

**1,453** transports  
**\$883.67** per transport



# United States Department of Agriculture (USDA): Grant Funding

- **USDA Distance Learning & Telemedicine Grants**
  - 31% match from The University of Alabama
  - Future USDA grants require only 15% match
  - Next USDA funding cycle expected June 2020
- **Awarded January 24, 2018**
- **Funds support:**
  - Equipment for both ambulances
  - Communication equipment in the local, rural hospital
  - On-going equipment maintenance
  - Initial training
- **Funds do not support:**
  - Evaluation and assessment
  - Personnel
  - Equipment for future sites

# Collaborators/Partnerships



- Northstar EMS – an ambulance/EMS service



- Pickens County Medical Center (PCMC)
  - Emergency Department Physician
  - PCMC Administrator



- The University of Alabama
  - Two faculty members
  - Two staff members in the EMS department



- Alabama Department of Public Health EMS Program

# Grant

- Writing the grant was the easy part
  - Implementation has been much more challenging
- Setting realistic timelines, establishing essential roles, managing expectations, and seeking partnerships/collaborators has been much more difficult

# Summary of Benefits

- Provides high-tech, high value telemedicine equipment that Pickens County could not otherwise afford
- Provides life-saving service to the most vulnerable members of the community
- Reduced costs (e.g., unnecessary ER visits, reduced 30-day readmissions, etc.)
- Improved quality of care
- Increased satisfaction: patients, EMS providers, and ED physicians/staff

# Things to Consider

- The delivery experience is changing
- If a grant-supported project, is there a required match?
- Risk aversion of ED doctors
- State/federal regulations – to where can patients be transported?
- EMS staff – is big brother going to be watching us?
- Patients' trust in the local hospital
- Ownership of the system
- Technological implementation – people, technology, and processes

# Roll Tide!



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National Monument  
Veterans' Memorial  
Scenic Overlook**



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