

## **Written Testimony for the US Senate Subcommittee on Communications, Technology, Innovation, and the Internet**

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Chairman Wicker, Ranking Member Schatz and Members of the Subcommittee on Communications, Technology, Innovation and the Internet, thank you for the opportunity to testify today regarding the challenges and opportunities associated with the First Responder Network Authority or FirstNet. My name is Dr. Damon Darsey and I serve as the Medical Director of the Mississippi Center for Emergency Services at the University of Mississippi Medical Center in Jackson.

### **Public Safety and Medical Voice Communications in Mississippi**

Mississippi covers 48,434 square miles and is home to 82 counties, 282 police departments, 82 sheriff departments, 725 fire departments with more than 12,000 fire personal, more than 10,000 certified law enforcement personal, more than 6,000 EMS paramedics and 90 hospitals. Reliable and coordinated communication across agencies and distance is essential if Mississippi is to succeed in responding to the public safety needs of our citizens.

Unfortunately, it took Hurricane Katrina in 2005 to demonstrate our state's severe lack of survivable, secure, interoperable communication. In response, the newly created Mississippi Wireless Communications Commission built out the Mississippi Wireless Information Network (MSWIN), an interoperable, P25/Phase-2, 700 MHz, Land Mobile Radio (LMR) trunked radio system with 144 towers across the state and a point-to-point microwave backhaul network. While the communications chaos that ensued in the aftermath of Hurricane Katrina was the principal inspiration for MSWIN, the federal government's initial contribution of approximately \$157M to this project reflected a nationwide concern about the inability of first responders to effectively communicate after the tragic events of 9-11. The MSWIN system is now operational statewide and provides 97% mobile area coverage across Mississippi, allowing state, local, and federal entities to communicate with each other as events unfold. This system has significantly decreased response time and increased coordination among responders.

Hurricane Katrina also presented an unprecedented medical challenge for the State of Mississippi. Following the hurricane, over thirty percent of the acute care medical facilities in Mississippi were impaired by the storm. Even the University of Mississippi Medical Center (UMMC) in Jackson, well over

100 miles from the coastal impact zone, had sustained force hurricane winds for hours, causing significant damage in the Jackson metropolitan area. The movement of patients out of the large impact zone was done with a manual paper system developed in the moment. Communications challenges significantly impacted medical response and the coordination of patient movement. In response, Mississippi MED-COM was created by the legislature to design and implement solutions for medical communications, leveraging the power of MSWIN. Since that time, MED-COM has been at the crossroads of medicine and technology.

Today, Mississippi MED-COM is a comprehensive transfer and medical communications channel relying more and more on advanced communications technology to improve coordination among medical providers statewide. Over time, more and more first responders across the state joined the MSWIN network, allowing for further coordination and efficiency in response. As the MSWIN user base grew (See Figure 1), the value of and reliance on the system was clear, making it imperative that more medical users be added.

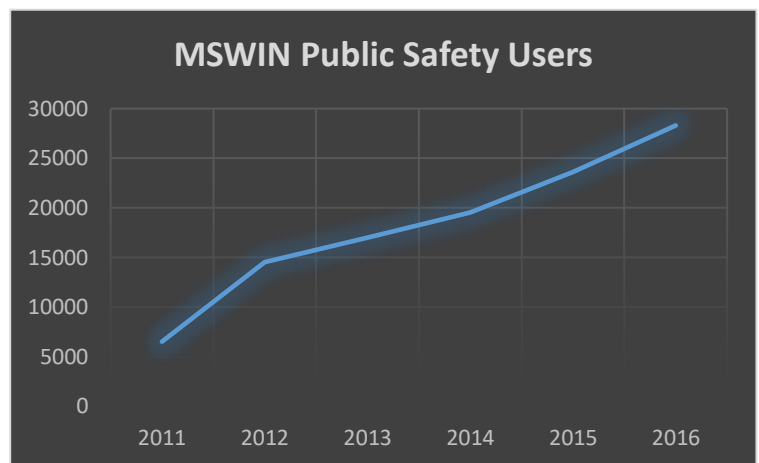


Figure 1: Source Mississippi Wireless Communications Commission

The success of mission critical voice communications in medical response has changed the way medicine is practiced in the pre-hospital environment in Mississippi. Being able to connect a trooper at an accident scene with medical professionals at our hospital, for example, improves outcomes for those patients. Being able to discuss the condition of the patients in real time gives those on scene more ability and confidence to appropriately respond and prepares those in the hospital to receive them on arrival. This improved ability to communicate about patient conditions and treatments is important, but the addition of data and live audio-visual communications will take the proven voice communication system to the next level.

### **Broadband Medical and Public Safety Communications in Mississippi**

In 2009 and 2010, key stakeholders in technology, public safety and medical response started discussing the feasibility of overlaying the MSWIN program with a Long Term Evolution (LTE) data system dedicated exclusively to public safety. In 2010, the State of Mississippi won a \$70M Broadband

Technologies Opportunity Program (BTOP) stimulus grant from the National Telecommunications and Information Administration (NTIA) for the deployment of a statewide public safety LTE network and medical telemedicine system for pre-hospital medicine. Mississippi leveraged the assets of MSWIN, including its network equipment, towers, and microwave backhaul to reduce deployment costs and make a statewide system possible. This funding would have allowed Mississippi MED-COM to be the first state in the nation to expand proven voice medical communications into data transmission.

Building on UMMC's decades of leadership in telemedicine, the BTOP award also included funding to develop the first statewide, standards based telemedicine system for ambulances in the nation.

Currently, UMMC provides telemedicine services to rural and community hospitals all over Mississippi and is a national leader in this field. To date, UMMC Telehealth has sites of service in over 200 locations statewide and has conducted over 500,000 patient visits. Years of practical experience in telemedicine put UMMC in a unique position to lead delivery of advanced mobile medical care in ambulances.

With the creation of FirstNet, Mississippi's original BTOP proposal was no longer considered viable by the Department of Commerce and was not brought to fruition. However, the preliminary work that went into the proposal, the coordination with public safety and the limitations in connectivity that we experienced have produced valuable lessons that may accrue to the benefit of those crafting the national system. These are the thoughts I'd like to share with you today regarding system reliability, adequate responder training and ensuring rural coverage.

### **First Net and Emergency Medicine: Technical Priorities**

One of the biggest requirements for the delivery of remote medical care is for the technology to be highly reliable, available and redundant. As technology has improved, the end user's confidence has improved, but challenges remain in terms of reliability and coverage. One limitation we discovered in the development of the mobile ambulance based communications system was that voice over a LTE system is not as clear and reliable as current P25 LMR systems. During the rollout of our system, we included the LMR radio component to ensure that we had access to reliable voice communications with proven reliability and sustainability. I encourage you to consider how these networks can be strengthened to improve reliability for the transmission of lifesaving medical data.

Public Safety LMR communications require redundant and hardened systems, especially for the delivery of medical care in critical times. In April 2014, the Winston County Medical Center in Louisville, Mississippi sustained a direct hit from an EF-3 tornado. As emergency responders descended into the

county to support Search and Rescue operations and to evacuate the damaged hospital, it provided a valuable lesson for those responders. Areas around MSWIN LMR towers suffered substantial damage from the tornado, but the towers remained operational and withstood the surge in radio traffic. The nearby commercial cellular towers were either damaged or overwhelmed with capacity or both, leaving many responders depending on their radio for weather reports, maps or directions into the impacted areas. Hardening FirstNet infrastructure is even more important in rural communities where there is no excess capacity and limited infrastructure. For the medical applications that could migrate to FirstNet, the reliance on mission critical communications is vital to the continued development of these technologies and operational protocols. A fear shared by many in the public safety community is that commercial towers will not be built to the same redundancy or resiliency as modern public safety communications systems.

### **FirstNet and Emergency Medicine: Rural Coverage & Priority and Preemption**

Over the past several years, a number of ways to address rural coverage have been proposed. One of the lessons we learned early on in our effort to establish a statewide LTE network is the absolute need to have reliable coverage zones on established maps with real-time communication of outages or coverage limitations. The model we developed for coverage was to leverage the existing population centers and LMR towers and provide additional coverage to the majority of state roads in rural Mississippi.

As FirstNet deploys a nationwide network, rural coverage is vital. Needs related to capacity, preemption and priority may not be served by the population based model currently being contemplated. In rural America, many first responders have very spotty or under capacity coverage. In our own state, with few exceptions, the capacity or coverage is unable to provide consistent coverage and can handcuff public safety response. Last year, for example, the UMMC Public Safety Support Division provided mobile field medical teams to support a large law enforcement mission in Southeastern Mississippi. The medical team used an on-line tool to map the different operational areas, routes, helicopter landing zones, etc. Data service in the previous day's testing proved reliable. As soon as the first arrest was made, however, social media came alive and literally left all data services in the county without capacity, rendering the network useless to law enforcement. Even where there "is" commercial coverage, that coverage often has no surge capacity.

In Mississippi, we seldom have the large train wrecks, terrorist incidents or other large scale events that bring the national media to our door. Those spectacular mass casualty incidents are tragic and horrible, but something of the same impact occurs in our state regularly. Mass casualty incidents (MCI) are simply events where the need exceeds the resources, which occurs on a weekly basis in rural states like ours. In many of our eighty two counties, a two car wreck could be a MCI. The resources are constrained as much or more than an event with ten times the patients in a larger city. The use of technology is one of the only ways we can bridge that resource limitation. The frequency of these events, coupled with constrained budgets and reduced personnel, makes rural America a great place for development, testing and deployment of technology to support medical responders.

### **FirstNet and Emergency Medicine: Innovation**

The challenges of mortality in Mississippi remain significant and public safety partners continue to use innovation to augment and support the emergency responders across Mississippi. In 2014, UMMC and the Mississippi, Wildlife, Fisheries and Parks partnered to combat the mortality statistics in rural Mississippi. At the time, more people died while enjoying the recreation of the Mississippi outdoors than in most other states. The conservation officers across Mississippi are known for their innovation and local knowledge. How to combat the challenges of rural mortality involving recreational accidents? Combine communications technology, education and partnership to bring medical care to the patient more efficiently and coordinate the tiered medical response. UMMC developed the *Mississippi FAST* (First Responder, Assistance and Training) Program to provide medical education and MSWIN training to every state conservation officer, teaching them how to use the network to share medical information and provide medical care in extremely rural areas. This partnership has been tremendously successful, with numerous conservation officers activating medical care or assisting in directing ambulances or helicopters to injured or ill patients.

In 2016, the Mississippi Center for Emergency Services, the umbrella organization containing Mississippi MED-COM, the critical care transport teams, educational programs and public safety support division was awarded the *Rural Emergency Medical Communications Demonstration Project* (REMCDP) by The Department of Homeland Security (DHS) Office of Emergency Communications (OEC). This Project seeks to identify the specific challenges of limited interoperable communications in rural areas which hinders efficient medical care delivery. By combining elements of the FAST program above with LMR training, we have learned many valuable lessons directly applicable to the deployment of a LTE network for public safety.

The first lesson learned is the importance of technology training. After two quarters of education and data collection, over 500 public safety professionals have been trained. This was the first educational program geared toward the end-user of the MSWIN system. The early feedback from this program has been dramatic. Many responders have been users of the MSWIN system for years and didn't understand basic interoperability concepts or technical specifications of the system. As FirstNet develops a nationwide network, emphasis should be placed on the training of providers in the basic use, technical limitations and possibilities to fully integrate an LTE system into the public safety arena.

Another lesson learned from the five hundred plus public safety providers in this project is to anticipate an increased use of personal devices for work use. FirstNet has discussed the concept of Bring Your Own Device (BYOD) to the network, but reportedly believes that only a small number of responders use their own smart phone for business use. As we have learned in Mississippi, over twenty-five percent of our participants only use their personal smart phone for work. This current cohort of participants is heavily weighted toward paid law state, municipal and federal officials. As the class is expanded to include many more volunteer emergency providers, that number is likely to increase significantly. While this statistic is hard to translate to a national population of public safety professionals, it is important that FirstNet focus on the BYOD model of integration, recognizing that this larger than expected population provides additional challenges for priority and preemption in the "official" capacity.

### **FirstNet and Emergency Medicine: The Possibilities**

Beyond simply having access to broadband, innovative medical applications have the potential to address solutions to many of the challenges currently facing the US healthcare system. In the next decade, the role of public safety in our nation's healthcare system will expand in ways that are not yet fully understood. Public safety professionals have a unique opportunity to expand their impact in the delivery of medical care by focusing on innovation, technology and training. FirstNet has an opportunity to provide a reliable path for critical data sharing between healthcare institutions and field providers, not only impacting emergency care, but providing solutions for cost reduction and efficiency. The University of Mississippi Medical Center is serving as an incubator for innovation and training to look at ways that networks can be leveraged to improve healthcare outcomes and achieve efficiencies, and we hope that FirstNet will consider us a partner in achieving these mutual goals.

In closing, the experiences and lessons learned in Mississippi can provide vital lessons impacting the success of FirstNet. This is a huge opportunities to develop a system that will propel the innovation and operational changes that can save lives. Congress can assist in this effort by ensuring that FirstNet:

- Focuses on medical applications and development as an integral part of the public safety and healthcare environment
- Prioritizes rural coverage and addresses different priority and preemption challenges with rural data coverage and capacity
- Develops improved methods of engagement for volunteer and rural responders using personal devices (BYOD)
- Provides funding for Research and Development of medical applications as a key component to the development of public safety broadband

Thank you for your time and allowing me to provide some comments for your committee as they oversee this vital project.

Respectfully submitted,

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