National EMS Advisory Council
Committee Reporting Template
FINAL

Committee: Adaptability and Innovation

Title: Telehealth as a Strategy for EMS Care

A. Executive Summary

Telemedicine is a practice of medicine that seeks to improve a patient's health by permitting two-way, real time interactive communication between the patient, and the physician or practitioner at the distant site. This exchange of medical information occurs through telecommunications or other electronic technology, to provide access to health care across short or long distances (1a). This electronic communication implies the use of interactive telecommunications equipment that includes, at a minimum, audio and video devices.

Telemedicine differs from Telehealth. ***Telehealth*** (or Telemonitoring) is the use of telecommunications and information technology to provide access to health assessment, diagnosis, intervention, consultation, supervision and information across distance (1b). Telehealth is broader in scope and includes telemedicine.

Telemedicine is viewed as a cost-effective alternative to the more traditional face-to-face method of providing medical care (e.g., in-person consultations or examinations between provider and patient). Telemedicine is a potential resource to augment available emergency medical services (EMS) activities and extends the reach of tertiary medical care. It is currently being used selectively, and its necessary extension to rural and underserved America is both worthy and worthwhile.

For EMS providers, Telehealth (or Telemonitoring) service opportunities may include assessment, diagnosis, and intervention either at the scene, or while en route to a hospital with medical control providing consultation, supervision, and information. Telemedicine may encompass an array of technologies, including videoconferencing, the internet, streaming media, images, or wireless communications, depending on the resources available. These services may be most useful in remote and underserved areas of the country, but also have a role in urban environments.

B. Recommended Actions/Strategies:

NEMSAC Recommends to the NHTSA:

Recommendation 1:

NEMSAC recommends NHTSA promote the expansion of the EMS environment of care to include telemedicine through telehealth services, particularly in rural areas of the country where the need for point of care services is often the greatest.

a) This recommendation includes amending the current National EMS Education Standards or appropriate EMS education documents to include the proper and most appropriate use of telemedicine as a mechanism for treating patients.

b) This recommendation includes providing demonstration grant funding opportunities for EMS agencies in rural areas of the country to determine technological inadequacies in supporting Telehealth equipment and devices and mechanisms to overcome these inadequacies.

c) This recommendation includes formalizing telemedicine capability allowing EMS 911 response-video visit integration.

Recommendation 2:

The National EMS Advisory Council (NEMSAC) recommends that the Federal Interagency Committee on EMS (FICEMS) and the National Highway Traffic Safety Administration (NHTSA) promote the use of audio-only telehealth in remote areas, as an acceptable alternative to audio/Video telemedicine if video fails or is unavailable.

a) This recommendation includes amending the current National EMS Education Standards or appropriate EMS educational documents to include assessment and treatment algorithms for use when audio-only is used for Telemedicine.

Recommendation 3:

NHTSA should work with FirstNet to encourage prioritization and expansion of service capability to rural and underserved communities. This includes assessment of alternative infrastructure to land based telecommunications cell towers, such as satellites, to provide adequate coverage.

Recommendation 4:

Continue and expand the use of telehealth in distance learning for EMS professionals using Project ECHO methodology.

These three recommendations align with the FICEMS Strategic Plan:

1. **Mission Statement**

   Ensure coordination among Federal agencies supporting local, regional, State, tribal, and territorial emergency medical services and 911 systems to improve the delivery of EMS services throughout the nation and,

2. **Strategic Goals**

   To provide:
   - coordinated, regionalized, and accountable EMS and 911 systems that provide safe, high-quality care,
   - EMS systems that are fully integrated into State, territorial, local, tribal, regional, and federal preparedness planning, response, and recovery,
   - EMS systems that are sustainable, forward looking, and integrated with the evolving health care system,
   - an EMS culture in which safety considerations for patients, providers, and the community permeate the full spectrum of activities.

C. Scope and Definition

Telemedicine is the exchange of medical information from one site to another through telecommunications or other electronic technology to provide access to health care across short or long distances (1). For purposes of Medicare, telemedicine seeks to improve a patient's health by permitting two-way, real time interactive communication between the patient, and the physician or practitioner at the distant site. This electronic communication means the use of interactive telecommunications equipment that includes, at a minimum, audio and video equipment. Telemedicine is viewed as a cost-effective alternative to the more traditional face-to-face way of providing medical care (e.g., in-person consultations or examinations between provider and patient). This definition is modeled on Medicare's definition of telehealth services (2). The federal Medicaid statute does not recognize telemedicine as a distinct service.

Currently, the beneficiary must go to an originating site for the services, which may be in either:

- A county outside a Metropolitan Statistical Area (MSA) (3)
- A rural Health Professional Shortage Area (HPSA) in a rural census tract (4)

The Health Resources and Services Administration (HRSA) determines HPSAs, and the Census Bureau determines MSAs. Paramedics are not among the current list of Medicare providers who can furnish or receive payment for covered telehealth services.

For EMS providers, Telehealth service opportunities may include assessment, diagnosis, and intervention either at the scene or while en route to a hospital with medical control providing consultation, supervision, and information. Telemedicine may encompass an array of technologies, including videoconferencing, the internet, streaming media, images, or wireless communications, depending on the resources available. These services may be most useful in remote and underserved environments but also have a role in urban environments. Telemedicine is a potential resource to augment available EMS services and extend the reach of tertiary medical care. It is currently being used selectively, and its extension into rural and underserved America is expected to be both worthy and worthwhile.

Rural America as an Area of Need

The population of the United States (US) as of 2019 was estimated at 329,450,000 million. At the time of the 2010 Decennial Census, almost 60 million people (19.3%) lived in rural areas. Rural Americans reside in 80 percent of the total US land area and comprise about 20 percent of the population (5). Despite a decline from 54.4% in 1910 to 19.3% in 2010 in the population segment living in rural areas, the total number has changed very little as most of the increase in US population is attributed to urban growth (5).

Beginning in 1910, the current population threshold of 2,500 or more was adopted and considered rural (6). Rural is defined as open countryside and any municipality with <2,500 people. Areas designated as rural can have population densities as low as 1 person/mi^2, or as high as 999/mi^2. Nearly a quarter (22.3%) of those living in rural areas as of 2016 are children under 18 years, at least 18.9 percent of children and their families live in poverty, and 23.8% of households have no internet access (5).

Access to emergency medical care in remote and underserved environments may be difficult and the experience of EMS practitioners may be limited by infrequent exposure to serious medical conditions across the spectrum of ages. The ability to communicate with medical control via telecommunications to ground or air

transport vehicle, or at the scene or transferring facility, would clearly extend the capabilities of the EMS service.

D. Analysis

Challenges to Telemedicine Services

The use of telemedicine tools in the home holds great promise for patients and health systems but is dependent on the availability of technologies, including smart phones and high-speed internet access, which are not universally available, particularly among poor and rural patients (7). Although this "digital divide" continues to narrow, with 77% of American adults owning a smartphone in 2016, socio-economic status remains a determinant of digital access (7).

During the COVID-19 pandemic, telehealth has also been used for EMS professional distance learning. The model of tele-mentoring known as Project ECHO originally developed for patient care has been expanded to use the hub-and-spoke model to teach not only rural and urban providers to navigate the COVID-19 environment in addition to manage of a wide variety of complex conditions (https://echo.unm.edu) (7).

Another global theme is how to address communication in rural and austere environments that are resource poor. This may be more problematic from the perspective of financing and security because the technology is available.

The US ranks only 6th globally in mid-band spectrum availability. To begin addressing wireless carriers mid-band spectrum needs, the FCC recently proposed expanding access to the 3.7 GHz band. FirstNet was established by a Congressional Act in 2012 as a Federal government program and part of the Department of Commerce (8). FirstNet has an innovative public-private partnership with AT&T that does not extend to other communication providers at the present time. Thus far, there is no movement toward integration of competitive carriers.

From 2012-17, FirstNet consulted in all 56 states/territories and in 2016-17 awarded AT&T the full implementation contract, during which time 56 Governors made opt-in decisions. It is a 25-year contract with a 5 year build out phase. The radioactive network (RAN) operates through shared towers and a central core, which separates the public safety traffic from the commercial traffic. AT&T deploys and manages the contract and is getting ready to expand the core and make sure it is ready for 5G. The road map was recently released but is not publicly available. AT&T claims to have the technology framework needed to fulfill the contract and is studying the issues of coverage and capacity.

FirstNet includes a feature that will allow voice communication and other technology, including live streaming data in real time from the patient/EMS scene to a hospital/physician and medications reconciliation prior to administration using a video link. Currently, there are several challenges with the technology: 1. rural and remote services may not be able to afford the cost and subscriptions might need to be paid personally by the practitioner; 2. the FirstNet subscription does not come with training; 3. there is a formal process that AT&T uses to determine who qualifies for the product; 4. there are two levels of coverage which allow "primary" users to receive liberal coverage with a feature called preemption. However, other users receive a lower priority, secondary service.

FirstNet is expected to resolve only about 25% of the issue with data communications, which will ultimately need multiple carrier and possibly satellite devices for improved access in rural areas. Another telecommunications carrier has been developing and deploying their own first responder network but its technological structure does not utilize a central core to separate the network from commercial traffic.

Challenges for both 911 services and communications for EMS providers (including 911 video integration) increase in some rural and wilderness areas relative to most urban and suburban settings. Many deaths in the wilderness are caused by falling (39.15%) or being lost (5.66%), both of which might be aided with improved communication. Cellular/network coverage in these areas can be "spotty" at best. Services use cell phone hotspots to transmit EKGs and call reports to hospitals, but often have to wait until they enter a particular geographic area, in order to attain and maintain adequate telecommunications coverage. Adequate coverage also depends on the time of day/night and sometimes even the time of year makes a difference. Extending coverage for all cell phone services in the backcountry and in extremely rural areas surrounding the wilderness would benefit those who would not have access to medical help in these areas (9). Rural EMS typically serve a geographically large and sparsely populated area. Due to the nature of rural areas, EMS may be required to travel farther or navigate difficult terrain when responding to a call or transporting a patient to the hospital. Adverse weather conditions, when coupled with longer distances and geographical obstacles, can significantly affect response or transport times. These are all situations where telehealth services could have the most impact. Promoting the use of audio-only telemedicine in remote areas, as an acceptable alternative to audio/video telemedicine if video fails or is unavailable, is another strategy that makes sense under current conditions and there is evidence that clarifies its role as equivalent to video communication (10). This would necessitate amending the current National EMS Education Standards or appropriate EMS educational documents to include assessment and treatment algorithms for use when audio-only is used for telemedicine.

While many services have implemented computers of some type in their ambulances, these computers were purchased for documentation in the agency's electronic PCR, not for the use of telemedicine, and updating to equipment that would allow for this would be cost prohibitive for many of the smaller and/or volunteer services who are the primary care providers in the rural and wilderness areas.

The EMS practitioners for most rural, austere and volunteer services are primarily at the EMT or First Responder level (9). It is difficult for these services to find Paramedics or Advanced EMTs who will volunteer to work in these areas. Although many of the interventions needed in the wilderness and austere environments might fall outside of the scope of practice of a first responder, this does not obviate the ability to obtain advice from medical control for a sick or injured patient.

Currently, discussion of telemedicine for EMS relates more to Community Paramedicine or Mobile Integrated Health in urban areas and less to the rural 911 practice. Community Paramedicine as it currently exists is performed in mostly urban areas and is more limited in rural environments largely because of the inadequate workforce, both in terms of numbers and training.

Another challenge to the future of telehealth communication in rural America may be reluctance of the EMS provider to participate in telehealth services. The EMS provider needs both the public's confidence and heightened self-awareness of the important role that they play as part of the medical team as we consider how to bring telemedicine as an EMS delivery model to rural areas. Many agencies already struggle to maintain service, particularly volunteer services. Both training and telemedicine might eventually benefit from the use of virtual reality.

Technologically posed health hazards

There may be potential health hazards (memory loss, brain damage, carcinogen effects) to the public associated with expansion of telehealth services related to the radiation risk. For several years, the World Health Organization has been encouraged by scientists globally to have a stronger role in fostering the development of more protective electromagnetic field (EMF) guidelines, encouraging precautionary measures (11), and educating the public about health risks, particularly risks to children and fetal development (11a). There appear to be passionate advocates on either side but the World Health Organization's International EMF Project, which investigates the health effects of electromagnetic fields on humans, argues there are "no major public health risks [that] have emerged from several decades of EMF research.

Pediatric Readiness

For those who do not have appropriate access to tertiary pediatric care, both "pediatric readiness" of emergency medical services (EMS) and Emergency Departments (ED) are crucial. According to the HRSA Emergency Medical Services for Children Program (EMSC) which funds programs in every US state and territory, most non-pediatric centers see fewer than 5 pediatric patients a day, ≤ 10% of all EMS runs are for children, and a fraction of these patients are critically ill or injured (12-14). Therefore, the extent of exposure of an individual EMS practitioner to a sick or injured child will be low and the availability of telecommunication with a tertiary center while en route would be particularly valuable, especially if the hospital is remote from the scene (9).

Out-of-Hospital Experience

The Patient-Centered Outcomes Research Institute (PCORI) topic brief, *Rural Trauma Care* (15), states that rural populations have less access to advanced trauma care. *Disparities in Access to Trauma Care in the United States: A Population-Based Analysis*, published in 2017 in *Injury*, found significant disparities in trauma care access for vulnerable populations and identified disparities directly affecting rural residents (16). The article states that "as of 2010, 29.7 million Americans still lack access to a Level I or II trauma center within 60 minutes." Live audio-video conferencing with real time solutions can aid EMS practitioners in providing life-saving care outside the trauma facility.

In the pre-hospital setting, telemedicine can be a useful tool to assist early evaluation, diagnosis and intervention of patients with traumatic injuries. It would be ideal to formalize the telemedicine capability allowing EMS 911 response-video visit integration where possible. For example, portable ultrasound equipment with transmission of images to an experienced provider can assist in early diagnosis and triage including accurate performance of a focused abdominal sonographic test (FAST) to assess for intraabdominal hemorrhage (17). An ambulance equipped with real-time video and vital sign monitoring that is wirelessly transferred to a physician workstation at a Trauma Center has resulted in improved stability of patients on arrival and appropriate diagnosis and interventions for critical events (18).

Use of telemedicine, via a smartphone, to share images for patients with intracranial hemorrhage can result in shorter times to surgical intervention at the receiving Trauma Center (19). Simple burn assessment, wound management and follow up can successfully occur utilizing video and pictures from smart phones to avoid the need for transfer to tertiary centers. Similarly, advice

regarding initial and ongoing management and follow-up can preclude the need for the patient to travel long distances (20,21).

E. Strategic Vision

Opportunities

The expertise of specialists in tertiary centers can be extended to rural and underserved areas using telemedicine, including in the arena of prehospital care. This represents a frame shift for EMS but recognizes that EMS providers are an essential part of the medical team who can extend the “medical home” to the patient’s home. This is a paradigm shift that emphasizes holistic over episodic care, patient and family centered care, and has the potential to limit the number of visits to a hospital by patients with multiple co-morbid conditions. Telemedicine is an enhancement that will allow treatment in place (TIP) and preserve a patient’s independence at home but will require high resolution video service to be most effective. There are challenges to making these resources available that need to be methodically assessed but this modality of care is an exciting opportunity for the future and should be explored through research and expanding technology.

F. Strategic Goals

1. Expand the use of telemedicine in the EMS environment of care to include rural environments and underserved environments.
2. Encourage the collection of information that would support using audio telehealth only in certain, algorithm driven patients.
3. Extend coverage for all cell phone services in the backcountry and in extremely rural areas surrounding the wilderness.
4. Continue and expand the use of telehealth in distance learning for EMS professionals using Project ECHO methodology.
5. Formalize the telemedicine capability allowing EMS 911 response-video visit integration.

Reference Material:

A. Crosswalk with other standards documents or past recommendations

No current standards or past recommendations related to this topic.

B. Sources/references related to the issue

Sources relevant to the problem statement used to support the committee’s analysis of the issue or topic.

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