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How Should We Fund and Reimagine EMS to Support Sustainable Rural Health Infrastructure?

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Abstract

Emergency medical services (EMS) care in rural areas of the United States has suffered from being chronically under-resourced and understaffed for many years. Deficits, to a large extent, are due to how EMS is funded and due to shortfalls in staffing and equipment. Licensed volunteers often staff EMS units in rural areas, but recruitment and retention of skilled professional and volunteer caregivers is stifled by waning numbers. If further expansion of our nation's ambulance deserts is to be avoided, policy action must be taken to adequately fund, as well as to reimagine, rural EMS care.

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Accidental Death and Disability

Rural, remote, and frontier areas in the United States are subject to scarce emergency medical services (EMS) resources, and, without significant changes in funding and staffing, there is every reason to be concerned that this situation will worsen. The Maine Rural Health Research Center identified “ambulance deserts” (areas where people live more than 25 minutes from an ambulance station) based on analysis of ambulance location data acquired for 41 of 50 states in 2021-2022, as well as US census data. Among the concerning findings were that 4.5 million people lived in such areas (52% are rural residents) and that 8 states had fewer than 3 ambulances covering every 1000 square miles of land area.¹ This article will examine the structure and funding of the US EMS system and delivery models and contrast US EMS to how other countries attempt to create a more equitable EMS response. To better understand how this inequity came to be, it is necessary to review a brief [history of the US EMS system](#).

History of EMS

The origins of our EMS system are generally attributable to a seminal 1966 white paper by the National Academy of Sciences and National Research Council titled “Accidental Death and Disability: The Neglected Disease of Modern Society,”² which exposed the nation's lack of an effective system for treating and transporting the sick and injured. Initial federal funding for the system in the early 1970s was through the US Department

of Transportation but in 1981 was transitioned to block grants to states, where the organization and regulation of EMS resides to this day.³ Ceding authority and funding to the states has led to each state overseeing its own EMS system and created significant nationwide variation and disparities. That the National Highway Traffic Safety Administration is the government agency that provides EMS oversight⁴ illustrates that EMS was envisioned more as a transportation modality than as an extension of the health care system.

As EMS matured and became more professional, more complicated, and more expensive, rural EMS has not been able to keep pace. If rural EMS is to meet its potential and the needs of its population, it will require doing the following:

- Providing funding that is independent of the tax base in areas of low population density
- Ensuring predictable staffing and establishing training and certification that is appropriate to the geography and population needs
- Leveraging recruitment and retention through the sense of community and pride of place that is common among EMS volunteers yet only sustainable through measures such as salary support, tax credits, loan forgiveness, or other innovative payment-in-kind programs.

Funding EMS

Unlike law enforcement and fire protection services, EMS is not federally recognized as an essential government service and only designated by statute as such in roughly a quarter of states; in many of those states there is still no associated funding.^{5,6} Thus, in most states, the provision and funding levels of EMS are determined at the community level.⁷ States regulate EMS licensure, scope of practice, and ambulance standards,⁸ among other aspects of how EMS is delivered, but, in the absence of specific regulations mandating the provision of EMS in communities, it falls upon the local jurisdictions to decide what, if any, EMS will be available. The EMS response in a town could be limited to basic first responders—a “squad” or other public servants, such as law enforcement, with first aid skills—while a neighboring town may provide EMS by using fire equipment and crews to provide care but without transport capability. Other communities may have ambulance services at a basic or advanced level. More services, more apparatus, and increased levels of EMS training would generally be deemed desirable but come with increased costs and complexity.

Funding for EMS in the United States is varied. Larger communities commonly fund EMS through tax assessments on property or similar means. Rural areas with lower population densities and lower per capita incomes are often unable or unwilling to level additional taxes for this purpose. While there is some ability to bill the patient for the service, reimbursement is mostly limited to payment for transport to the hospital, frequently amounting to less than the true cost of the service.⁹ In rural areas with low patient volumes and often with a low prevalence of third-party insurance, the payments are paltry relative to expense.⁹ In addition, there might be no reimbursement for readiness costs or the drugs or medical items (eg, gauze, splints) used in the patient’s care that would fall upon the local agency, and it is uncommon for insurance to pay for providing on-scene care if there is no transport.⁹ A rural volunteer EMS call in the middle of the night to a rollover car accident on a lonely highway with the fortunate occupants

having only cuts and scrapes and refusing transport results in no billable event despite the time spent and vehicle and supply costs, for example.

Personnel costs represent a major part of the cost of providing EMS. Rural EMS faces fundamental operational and staffing challenges.¹⁰ A common model for rural, remote, and frontier communities is for EMS personnel to be provided through a volunteer fire department or, in other cases, unaffiliated volunteer agencies.¹¹ Although volunteer fire departments may have access to limited federal and state fire funds, overall, funding for these organizations often comes down to community contributions from bake sales, fish fries, and raffles. It is estimated that over half of the country's EMS care is provided by volunteer labor,¹² which is skewed heavily toward rural systems. Put differently, half of the EMS budget in some areas of the United States is "paid for" with volunteer hours. Does this affect the quality and quantity of care available in these areas?

Quality of Care

Rural communities have higher mortality and morbidity than urban areas for many time-critical, life-threatening emergencies.^{13,14} Rural EMS often takes longer to get to someone experiencing one of these emergencies than most urban providers for various reasons, including the distance between the ambulance location and its destination, the lack of multiple ambulance locations to adequately cover a geographic area, and the staffing model for the agencies. While urban EMS strives for a response time of 8 minutes, rural EMS response times of 60 minutes are not uncommon.^{15,16} The crisis of health care "deserts," exacerbated by the closure of 193 rural hospitals from January 2005 through December 2024,¹⁷ is a major contributor to rural communities' increased mortality and morbidity for time-critical emergencies, as is the EMS system. If the tautology "every system is perfectly designed to achieve the results that it gets"¹⁸ applies to EMS systems, would it be too harsh to say that rural EMS had been "engineered" to have poorer outcomes in time-critical medical emergencies?

In urban areas that also include **rural communities** in their response geography, the choice of physical location of EMS stations may be implicitly unfair to the rural population based on agency assumptions about best location of EMS resources. When agencies use a static location model for EMS deployment, the station will often be in an area of highest demonstrated call need. It could be said that, in these communities, urban patients are covered at the expense of rural patients. To address this inequity, a "bi-objective" location model for improving EMS in rural areas has been proposed. In this model, the usual goal of meeting maximal demand incorporates fairness as a secondary objective.¹⁹ Keeney and Winkler differentiate between *ex ante* equity (resource allocation that leads to differences in service or health risks) and *ex post* equity (differences in health outcomes).²⁰ Qualitative measures of *ex ante* and *ex post* equity in public services and equity in facility locations have been proposed,^{21,22} but the impact of these tools on EMS health equity is unknown. Norway, a country with significant rural and remote areas, has a national EMS model that also includes strategically located helicopter bases to meet defined response-time metrics for the population. Nevertheless, those in sparsely populated areas are unlikely to receive care within those parameters due to resources being concentrated closer to population centers.²³ Fairness in health care is a stated EMS value,²³ and the most efficient solution is typically not a fair one. To incorporate fairness in choosing helicopter base locations, Jagtenberg et al showed that using an iso-elastic social welfare function in the mathematical optimization model increased service levels in rural areas.²⁴

Although health equity is certainly spoken of as a value in US health care, it is not apparent in EMS in rural, remote, and frontier regions, despite legislation in 1997 that created the critical access hospital designation, which is intended to reduce rural hospitals' financial vulnerability.²⁵ The norm is that access to health care in rural areas is limited, and programs that would allow expansion of EMS lack funding.

Licensed Volunteers

The culture and spirit of volunteerism is an inspiring facet of rural EMS and is a fundamental glue that holds this fragile system together. Policies that seek to improve care in rural areas would be wise to seek ways to incorporate the values and rewards of being a volunteer in one's community while making it more feasible for volunteers to continue to participate. Nonetheless, volunteerism is on the wane and likely to continue to diminish.²⁶ As such, to ensure available resources for the sick and injured in rural areas, EMS needs to be refinanced as well as reconceptualized.

Summary and Suggestions

The "EMS Agenda 2050: A People-Centered Vision for the Future of Emergency Medical Services" provides a high-level view of a reimagined system that is (1) inherently safe and effective, (2) integrated and seamless, (3) reliable and prepared, (4) socially equitable, (5) sustainable and efficient, and (6) adaptive and innovative.²⁷ Although the agenda was not envisioned as a solution to the challenges faced by rural EMS, it aptly provides a framework for operations, shaped by rural EMS needs, to which rural EMS can aspire. Certainly, rural EMS should be safe and effective. An integrated rural EMS system would use available health resources to the greatest extent possible without unnecessary regulatory impediments, such as who can do what and where, but with consideration of how to safely achieve the desired results and outcomes. Integration of EMS clinicians into local clinics and critical access hospitals to provide cross staffing, training, and clinical exposure would allow care to flow bidirectionally and better equip EMS to help with transitions to higher levels of care and to be more reliable and better prepared. Improvements in the system would be expected to be socially equitable, but care must be taken to ensure that equity is truly addressed and reiteratively confirmed. Efficiency and sustainability go hand-in-hand, with efficiency being one aspect of sustainability. Achieving efficiency may largely be a matter of leadership with sufficient authority and vision to "rearrange the board" by eliminating redundancy and breaking down silos. Yet improving efficiency often involves funding for improved technology or other key infrastructure. At some level, sustainability **requires predictable funding** at a level that meets at least operational minimums. EMS is also redefining its basic mission and the role of the EMS clinician. EMS as a transport service staffed by technicians trained with a focus on heart attacks and trauma is maturing into a mobile aspect of a system of care that provides a spectrum of person-centric care at the location most appropriate to the person's needs. EMS clinicians optimally would be trained in the model of community paramedicine aimed at overall community wellness, as opposed to simply reacting to emergencies.

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Conflict of Interest Disclosure

Dr Levy reports serving as chief medical advisor to a commercial EMS entity.

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