Rethinking Emergency Medical Services:

Applying Evidence and Data to Redesign Response Models for a Resilient and Sustainable Future

Background

The current Emergency Medical Services (EMS) delivery model places significant emphasis on short response times and advanced life support (ALS) staffing. However, contemporary evidence-based research has revealed response times have little to no impact on patient outcomes for the majority of EMS responses[1], and only 6.9% of patients accessing EMS require potentially lifesaving interventions (PLSI)[2].

There is a current EMS staffing crisis facing many communities across the United States, driven by several interconnected issues, including economic pressures, competition for employment of EMTs and paramedics in the overall healthcare system, burnout, and workforce retention. A news media tracking report from the American Ambulance Association and the Academy of International Mobile Healthcare Integration reveals that between January 2021 and December 2024, 94% of the 2,600 EMS related local and national news reports highlight staffing, economic and response time challenges by EMS agencies[3].

The EMS staffing crisis highlights the need for reasonable, evidence-based and data driven system design and response changes to sustain these vital services while addressing the root causes of workforce shortages and economic challenges. EMS system leaders should critically evaluate clinical, operational and financial data, provide essential education for local stakeholders, including community leaders, about local realities of EMS response acuities, and engage in informed, collaborative decision-making regarding system redesign to mitigate the staffing and resource challenges faced at the local level.

BETWEEN JANUARY 2021 AND DECEMBER 2024, 94% OF THE 2,600 EMS RELATED LOCAL AND NATIONAL NEWS REPORTS HIGHLIGHT STAFFING, ECONOMIC AND RESPONSE TIME CHALLENGES BY EMS AGENCIES.

Key Challenges

WORKFORCE COMPETITION

Although the number of initially certified clinicians through the National Registry of EMTs has increased from 74,118 in 2020 to 104,312 in 2023[4], EMS agencies across the U.S. report overall applications for EMS field positions has been decreasing. In a recent survey conducted by the National Association of Emergency Medical Technicians[5], 65% of the respondents indicated a reduction in applications for field EMS positions, with overall respondents indicating a 13% reduction in applicants. This data may reveal that although the number of certified clinicians is increasing, fewer people are applying for EMS positions. This may be due to the inherent risks associated with a career in EMS, combined

with generally low wages for EMS workers. Due to the ongoing nursing shortage[6], hospitals and other settings in the healthcare sector often recruit paramedics and EMTs for positions within facilities. The wage rates these systems can offer often are much higher than EMS agencies can offer.

ECONOMIC STRAIN

EMS funding primarily depends on reimbursements for patient transport, which often fall below the actual cost of service. Medicare and Medicaid reimbursements typically cover only a fraction of the expenses, leaving many agencies struggling financially. The 2024 Ground Ambulance Data Collection System report from the Centers for Medicare and Medicaid Services[7] revealed the mean cost of an EMS response is $1,845 and the mean reimbursement per response is $975.

This economic imbalance contributes to operational decisions by the leaders of provider agencies to decide between maintaining and upgrading equipment or paying their workforce a living wage. It has also led to staff reductions and closures of ambulance services[8].

When the cost of delivering the level of EMS that the community expects exceeds the revenue that is generated from user fees, local communities are faced with using tax revenue or other public funding methods to cover the gap. Increasingly, local communities are also facing economic challenges and find it difficult to provide the funding necessary to maintain historical EMS delivery performance.

HIGH TURNOVER AND BURNOUT

EMS personnel experience intense stress, long hours, and relatively low pay, leading to high turnover rates. Estimates of clinician turnover (an indicators of workforce stability) vary from 6% to 30% annually in both regional and national samples of EMS clinicians[9]. Many leave due to burnout or better-paying opportunities in other healthcare fields[10,11]. A recent study revealed that 7.1% of current EMTs and 7.9% of current paramedics renewing their certifications indicated they were likely to leave the EMS profession within 12 months[12].

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Considerations of Potential Solutions

MOVING FROM ALL ALS TO TIERED DEPLOYMENT MODELS

For decades, there has been a long-held belief that most EMS responses are for time-critical emergency medical conditions. This belief led to many systems relying on ALS staffed ambulances, typically staffed with at least one paramedic and one emergency medical technician (EMT). A recent news report from New Hampshire reported that a fire department shut down an ambulance due to no paramedic being available to staff the ambulance, as opposed to simply staffing the ambulance with EMTs and maintaining ambulance services for the community[13].

However, evidence-based, peer reviewed research depicts the reality of EMS response volume and patient acuity. For example, a 2024 study of over 1.7 million EMS patient encounters revealed that only 6.9% of EMS responses resulted in a patient receiving a Potentially Life Saving Intervention (PLSI)[14]. Further, few prehospital interventions required to be administered by paramedic level clinicians have been shown to have a significant impact on survival[15].

Many EMS systems have transitioned from an all-ALS deployment model to a tiered deployment model, using both ALS and Basic Life Support (BLS) ambulances in EMS response plans. A study in 2015 found that the most common procedures performed by paramedics were prophylactic intravenous access and 12-lead monitoring in otherwise alert and stable patients, which suggests these patients would not have had adverse outcomes if these ALS interventions had not been performed[16].

Using an effective, accredited emergency medical dispatch (EMD) system can determine the level of clinical capability necessary for an EMS response. A study evaluating the clinical efficacy of the Medical Priority Dispatch System (MPDS®) found that when an ALS upgrade was requested on a call identified as eligible for a BLS response, upon exclusion of the prophylactic intravenous access, only 0.5% of BLS responses were true ALS upgrades. Advanced resuscitative therapy was only provided to 27 of 14,100, or 0.2% of patients, in the tiered response model[17].

Similar research demonstrates that EMS response times greater than 5 minutes[18] have little to no impact on patient outcomes for most EMS responses, and the responses in which the patient's outcome may be favorably impacted represent about 5% of EMS responses[19].

SEVERAL EVIDENCE-BASED, PEER REVIEWED STUDIES HAVE REVEALED AN INVERSE RELATIONSHIP BETWEEN THE NUMBER OF PARAMEDICS IN AN EMS SYSTEM AND PARAMEDIC PERFORMANCE ON CRITICAL INTERVENTIONS. ESSENTIALLY FINDING THAT PARAMEDICS PERFORM BETTER CLINICALLY WHEN THEY ARE HIGHLY UTILIZED FOR CRITICAL PATIENTS.

Given the infrequency of patients requiring critical ALS intervention, another challenge with all ALS staffing is the reduction in opportunities for ALS clinicians to perform ALS skills on actual patients.

Several evidence-based, peer reviewed studies have revealed an inverse relationship between the number of paramedics in an EMS system and paramedic performance on critical interventions. Essentially finding that paramedics perform better clinically when they are highly utilized for critical patients[20,21,22].

An additional study found that cardiac arrest patients treated with BLS care had higher survival rates at discharge and 90-day post discharge than cardiac arrest patients treated with ALS care (9% vs. 13%)[23].

EMS Community risk reduction programs like fall protection, nurse/paramedic triage lines, community paramedicine/ mobile integrated health, and treatment in place are ways to reduce the need for an EMS response, thus alleviating using 9-1-1 ambulances to respond and transport patients unnecessarily, keeping them available in the system for high-acuity 911 responses.

The 2024 High Performance EMS System Benchmark Survey conducted by the Academy for International Mobile Healthcare Integration (AIMHI) reveals that 100% of the high-performance EMS systems have transitioned from an all-ALS ambulance deployment to a tiered deployment model[24].

Most EMS responses can be effectively managed using BLS care. Due to the prevalence of EMTs vs. paramedics in the available workforce, ambulance staffing could be greatly enhanced, alleviating critical ambulance shortages for EMS response and reducing the workload of ambulance clinicians.

ESTABLISHING EVIDENCE-BASED, CLINICALLY APPROPRIATE RESPONSE TIME GOALS

A commonly held belief is that there is a correlation between ambulance response times and patient outcomes. However, there is a direct correlation between response times and staffing. The shorter the response time goal, the more resources are needed in order to staff ambulances to be available (i.e.: not on a response) to meet the community's response time goals. However, numerous studies have revealed that patient outcomes cannot be correlated to any response time standard[25,26].

A 2022 joint position statement from fourteen national and international EMS and patient safety associations encourages EMS systems to reduce light and siren emergency medical vehicle operation, citing the exceptional risk associated with his mode of operation and the little clinical benefit of the reduction in response time[27].

A 2008 joint position statement from the U.S. Metropolitan Municipalities' EMS Medical Directors[28] cites the association of the former [response time] with patient outcomes is not supported explicitly by the medical literature.

A meta-analysis conducted on the direction of the National Highway Traffic Safety Administration (NHTSA)[29] of over 200 studies related to the use of light and siren responses and response times also revealed that the commonly held belief that community expectations regarding light and siren responses may not be true. The report cites a 1988 study of residents in Connecticut which found that the top two reasons for being uncomfortable in calling EMS were: "Sirens/ Noise" and "Getting a lot of attention"[30].

The 2024 AIMHI EMS System Benchmarking Survey[31] revealed that among high-performance, high-value EMS systems, only 54% of 911 EMS responses were responded to using lights and siren, and 43% of the benchmark systems had increased low-acuity response time goals to over 25 minutes, with two systems reporting response time goals of 60-minutes and 90-minutes. Another two systems had no response time goals for low-acuity 911 responses. These systems found that they could reduce response times to critical EMS calls by holding responses to low-acuity calls, while at the same time, reducing the number of ambulances needed to be staffed to meet the community's needs and realistic expectations.

OTHER CONSIDERATIONS FOR REDESIGNING RESPONSE PLANS COULD INCLUDE

Dispatch Triage Systems

- The use of an accredited EMS dispatch triage system, approved by local medical directors, that prioritizes EMS responses using quality assured, evidence-based triage protocols.

Call Disposition from the Communications Center

- Implementing 'hear and treat' dispatch protocols, potentially including telemedicine or nurse triage, to appropriately manage low-acuity 911 calls without necessitating a response from EMS resources.

The Use of Non-Ambulance EMS Personnel to Respond to Low-Acuity 911 Calls Without the Simultaneous Response of an Ambulance

- EMS response types with low transport ratios, or that can be effectively managed using on-scene assessment and treatment modalities with referrals to non-emergency department dispositions would reduce the demand on the ambulance system.

Implementing processes to delay responses to low-acuity calls until there are sufficient available EMS resources in the community to ensure a rapid response to high-acuity calls is evidence-based, and a valuable system redesign option to improve patient outcomes and reduce the workload on EMS staff.

Conclusions

EMS systems across America are facing an unprecedented staffing and economic crisis. Some systems are failing, while others are facing difficult decisions and insurmountable hurdles. Many of the reasons for the staffing and economic crisis are unrealistic public expectations based on beliefs that are not supported by contemporary evidence-based research. Significant community education should be undertaken by local community and EMS system leaders, including physician EMS medical directors, to inform local communities on the current national research, and actual data from the local EMS system types of EMS responses, clinical care provided, and the potential benefits of an appropriate, data-driven redesign of the local EMS response system.
Right-sizing expectations and EMS delivery based on scientifically proven EMS system redesign, specifically regarding ambulance staffing and reasonable response times, may have a significant impact on EMS system sustainability in many communities across the country, and help preserve an over-taxed, stressed EMS workforce.

EMS system leaders should analyze response data in their local community and critically evaluate the acuity of patients requesting 911 EMS response in their communities. Additionally, EMS Systems should perform a community risk assessment to determine the best placement and use for paramedics, for example, areas where there are prolonged transport times to the emergency department. Based on this evaluation, EMS leaders, including physician medical directors, agency chiefs, and local elected and appointed officials, should consider redesigning response plans to assign the most appropriate EMS response based on the actual acuity level of 911 EMS requests in the local system. Assuring patients with high acuity medical complaints receive a rapid response, including closest medical response resources with ALS support, and low acuity patients receive alternative responses.

This White Paper was produced and approved by the **Joint Task Force on EMS Response Staffing Configurations**.

The mission of the Joint Task Force was to develop a national guidance document on the preferred staffing of EMS personnel for various types of medical responses, including interfacility transfers. We envision that this guidance document will be used by state EMS offices, EMS agency leaders, EMS medical directors and local community leaders when considering revisions to their EMS response plans to determine the optimal staffing configurations that support quality patient care, efficient operations, and practitioner safety.

This is not a government-funded task force, but rather a coalition of EMS industry associations committed to the transformation of patient-centered EMS delivery based on current evidence and science.

In the development of this guidance document, participants used peer-reviewed and published studies on patient outcomes based on variables such as response times and EMS personnel staffing comprising the EMS response. A compendium of the resources used in the development of this document is included in the References section.

Members of the Task Force on EMS Response Configurations included representatives from:

- The Academy of International Mobile Healthcare Integration
- The International Academies of Emergency Dispatch
- The International Association of Fire Chiefs
- The International Association of Fire Fighters
- The National Association of Emergency Medical Technicians
- The National Association of EMS Physicians
- The National Association of State EMS Officials
- The National Registry of Emergency Medical Technicians

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