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Applying Artificial Intelligence to EMS Strategy

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Abstract

Background

Emergency Medical Services (EMS) has historically been undervalued as a strategic asset in healthcare. At the same time, artificial intelligence (AI) is transforming both clinical practice and operational management. Understanding the intersection of AI and EMS is essential for positioning EMS as a driver of enterprise value and as a contributor to the quintuple aim of healthcare.

Methods

This article reviews current and emerging applications of AI in EMS strategy and operations, including dispatch triage, dynamic deployment, clinical decision support, and revenue cycle management. Evidence from peer-reviewed studies, national reports, and international pilot programs was evaluated to identify validated and emerging use cases. Risks, limitations, and implementation challenges were also examined.

Results

Findings demonstrate that integrating AI into EMS can improve efficiency, reduce costs, and enhance patient outcomes. Use cases include AI-assisted sepsis triage, speech-pattern recognition for early stroke detection, predictive trauma triage, STEMI recognition from ECGs, and dynamic ambulance relocation. Operational benefits extend to improved reimbursement processes and reductions in unit hours, overtime, and fuel costs. Risks were identified in the areas of data bias, privacy, and overreliance on algorithms, underscoring the need for human oversight and governance through steering committees.

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Conclusions

AI adoption in EMS is no longer theoretical; it is both practical and effective. Agencies that implement AI-driven strategies can improve performance metrics, reduce costs, and demonstrate strategic value within healthcare enterprises. A deliberate implementation roadmap—including pilot projects, clear KPIs, infrastructure development, and clinician training—is critical for scalability and trust. EMS agencies that fail to adopt AI risk losing competitive advantage and strategic relevance in a rapidly evolving healthcare landscape.

Keywords: Emergency Medical Services, Artificial Intelligence, Healthcare Strategy, Clinical Decision Support, Revenue Cycle Management, Triage

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Introduction

EMS has been an underutilized strategic asset in healthcare systems since its inception in the 1960s. Similarly, the use of artificial intelligence has sparked controversy recently over its role in society and healthcare, specifically whether AI can be used to improve outcomes or streamline operations. EMS has an opportunity as a profession to capitalize on the advantages that AI can offer us in this new technological landscape. AI now provides practical levers for dispatch triage, dynamic deployment, documentation automation, and indeed clinical decision support, all of which can serve to reduce costs per unit, reduce response times, and improve downstream outcomes that will show hospital executives the true value of EMS (Weidman et al., 2025).

EMS Strategy Belongs in the C-Suite

One of the continuing problems in EMS is the lack of a standardized system, which makes it difficult to say that there is a magic pill for all EMS agencies. However, many EMS agencies are hospital-based and must interact with the enormity of large hospital budgets. As is, there are EMS billing systems that are out of date and directly contribute to lost revenues in systems (Sell et al., 2021).

There is a significant underutilization of Electronic Health Records (EHRs) and other charting programs that EMS does not take advantage of, for a myriad of reasons. Examples may be that institutional barriers exist that prevent coordination between systems. EHRs act as a digital library of a patient's health history and could provide indispensable information for pre-hospital providers. In 2025, using an AI interface with an EHR system can help to personalize care and anticipate patient needs before the 911 call is made. AI can also be used to track inventory and improve Revenue Cycle Management (RCM) for many agencies (American Hospital Association, n.d.). Additionally, it is predicted that agencies can improve reimbursement by 20% or more and can reduce processing times by up to 50% (Barragan et al., 2025).

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Historically, EMS as an industry has been a slow adopter of new technology. Variations in systems and regions often preclude inter-agency coordination (Center for Disease Control, 2025). This era of artificial intelligence may allow for EMS agencies to catch up to the standard of care while reducing their costs. Each system has different needs and must evaluate these needs and solutions independently. For instance, an agency that uses AI to improve chart QA/QI may not need a Large Language Model (LLM) to establish protocols. However, systems that ignore this advancing technology do so at their organization's peril and risk losing competitive advantages as well as patient volume.

What's Real Today: Proven or Emerging EMS AI Use Cases

A major step in the utilization of AI in EMS comes from our friends in neurology and infectious disease. Machine learning (ML) can be utilized to triage patients accurately and predict their clinical course, which can lead to improved outcomes and reduced costs to the hospital system. An area that is seeing significant growth is the use of AI to triage sepsis patients in-hospital (Raff et al., 2024). Use of this ML model can help to predict outcomes of routine sepsis patients. One significant area that needs improvement for these models to work is charting. Without proper entries for medications, social variables, and health system exposures, we are handcuffing ourselves and reducing the possibilities in this area. With accurate data entry for each patient, ML can be trained to interpret data and reduce adverse medication reactions by as much as 65% (Simpson et al., 2025).

The areas that have the most potential in EMS are responses, patient care, and patient triage. Currently, AI can accurately predict critical care needs in the prehospital environment, which in turn helps allocate the appropriate resources to a scene. During transport, AI can enhance the travel route to reduce transport times or direct to the most suitable facility. In Denmark, AI is being used to track the speech patterns of those who call Emergency Services to evaluate if the patient is having a stroke, and these results were particularly relevant for women and younger stroke patients (Görgens, 2025). Interestingly, in the Danish study, AI was more likely to pick up stroke symptoms on weekends compared to the standard. Below are four instances where we see AI being used effectively in EMS:

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1. **Sepsis and Neurology**: Machine learning (ML) models are already helping hospitals predict sepsis outcomes. In Denmark, AI listening to caller speech patterns improved stroke recognition, particularly for women and younger patients (Görgens, 2025).
2. **Trauma Triage**: Continuous physiologic waveforms combined with AI can predict deterioration before it's obvious to the provider—buying precious minutes in critical care (Weidman et al., 2025).
3. **ST-Elevation Myocardial Infarction (STEMI)**: We already know electrocardiogram (ECG) transmissions save lives by cutting door-to-balloon times. Now, AI is showing equal or better accuracy than physicians in spotting STEMI on ECGs (Lee et al., 2025).
4. **Operations**: AI is also changing the business side. Dynamic ambulance relocation powered by AI reduces unit hours, fuel, and overtime (Becker et al., 2023).

These are not theoretical "someday" applications—they're working examples that highlight why EMS-specific AI differs from hospital-focused AI, which often looks at population-level data.

Leadership and Strategy: How AI in EMS Drives Enterprise Value

Enterprise value in EMS is historically difficult to define. EMS exists as a service that is generally expected to break even or generate a profit. In the current healthcare environment, this can prove difficult given current reimbursement rates and institutional obstacles to financing (Gerard, 2025). For this, AI can serve EMS to reduce costs, improve patient satisfaction, enhance the clinician experience, and start to bring EMS in line with the quintuple aim for healthcare. AI can be used to optimize cost levers of EMS, such as reducing unnecessary transports via telemedicine, or optimizing deployment or responses for fewer unit hours, less overtime, and less fuel costs (Raff et al., 2024) (Becker et al., 2023).

These initiatives will give EMS executives and leaders a solid footing when approaching budget committees, hospitals, and government administrators. Agencies can now reliably use AI to establish better metrics (response times, over- or under-triaging, door-to-balloon times) and

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track the growth and efficiency of a system (Tyler et al., 2024). AI agents can also be integrated into systems to make data lakes within their organizations and establish local KPIs.

Risks and Guardrails

AI is not perfect. It is continuously growing, and human teams are developing advanced models. Leaders should take precautions when using AI to monitor for bias and generalizability, as well as safety and accountability. Human oversight is an essential feature of using any AI agent and must be used within any agency using AI. Administrators must remember that a model is only as good as the information that it is given, and so AI models may underperform in rural areas due to lower populations, call volumes, etc.. Leaders must monitor and calibrate their AI models regularly. While there are still many benefits to AI, there will always need to be a "human-in-the-loop" that can address any shortcomings of a system. In this way, directors can embrace AI by developing steering committees to help tailor models to their agency's specific needs.

Data privacy must be maintained in healthcare, and Leaders must strive to keep their data and information safe and reduce threats from hackers. For this, systems must establish HIPAA-compliant pipelines for patient charts to be moved from EMS to hospital to clinic and beyond. Maintaining privacy and remaining vigilant toward our AI models may yet be the biggest challenge to implementing AI into EMS. This may fall under the purview of steering committees and should be a primary focus when building these systems.

Implementation Roadmap

Implementing a new system can be hard. AI is a new technology that many are unfamiliar with and some may not fully trust. So how can EMS leaders begin to move into the 21st century? Choose a metric that can be easily measured and monitored. Start small. Some early solutions may include:

1. **Pilot Projects**: Start small—dynamic redeployment or AI-assisted STEMI activation.
2. **Define KPIs**: Know what success looks like (response times, outcomes, staff utilization).

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3. **Infrastructure**: Build the IT "plumbing" to connect charting platforms with EHRs.
4. **Training**: Teach EMS clinicians how AI fits into their workflows.
5. **Scale with Oversight**: Expand pilots that work, guided by steering committees.

What's Next?

There's an apocryphal saying that "today is the worst AI is going to be." Which is to say that AI will only continue to grow. There is little use in resisting the application of this new technology, as it is already being used in large systems and has commanded enormous investments. Evidence is accelerating that AI has increasing utility in EMS, and EMS leaders who choose to ignore this trend will be left to wonder why they didn't start sooner. To quote tech strategist Nidhish Dhru "If you don't change with the time, the time will change you" (Lawrence, 2025). In the coming years, we will see many new advances in AI and medicine. It is time for EMS to join 21st-century medicine.

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