Beyond the Sirens

by

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Abstract

This capstone evaluated the persistent overuse of lights and sirens (L&S) in emergency medical services (EMS) and assessed whether tiered response models, guided by structured policy and leadership accountability, could reduce operational risk without delaying patient care. Despite years of research showing that L&S rarely improve patient outcomes, their use remains routine across many EMS systems, often driven by culture, habit, and public expectation. To address this gap, survey data from 49 EMS professionals were analyzed alongside policies from Dane County's 10-Delta project, Marathon County Dispatch Policy 801, and leadership accountability frameworks from Marc Hill, who is a highly credible and experienced voice in this discussion. As a seasoned firefighter and paramedic, as well as an award-winning educator and author of "Two Dark Thirty," he brings a wealth of knowledge to the table. With over twenty years in public education and emergency services, having served as a teacher, administrator, college professor, and fire chief, his impressive background lends strong support to the vital policies and insights he offers for this project.

Findings show that while most providers trust dispatch accuracy, nearly three-quarters believe L&S are used sometimes or frequently when not clinically necessary, and nearly two-thirds have witnessed preventable safety consequences linked to those responses. Participants emphasized that response time is important, but the quality of care once on scene remains the primary focus. The research revealed that overreliance on L&S stems from inconsistent policy application, staffing shortages, and cultural pressure rather than actual clinical need.

Keywords: lights and sirens, emergency medical services, tiered response models, dispatch accuracy, responder safety, leadership accountability, risk management, EMS policy

Introduction

The use of lights and sirens (L&S) has been a significant feature of fire and emergency medical services (EMS) operations for decades. It is traditionally viewed as a symbol of urgency and life-saving necessity, given the constant use, L&S have become a routine part of nearly all emergency responses, regardless of urgency or severity of the emergency. Over time, the practice became embedded in EMS systems, reinforced by organizational culture, provider beliefs, and public demand.

However, the evidence supporting this practice has remained weak. Research over the last two decades has consistently demonstrated that the actual time saved through L&S use is modest and rarely associated with meaningful improvements in patient outcomes (Shekhar & Clement, 2024; Jarvis et al., 2024). Conversely, the risks associated with emergency driving are well documented. Studies confirm significantly higher crash rates, injuries, and fatalities among both responders and civilians when L&S are used unnecessarily (Watanabe et al., 2019; Kahn, 2006; Kupas et al., 2022).

Against this backdrop, EMS systems have begun to experiment with alternatives. Tiered response models, such as the 10 Delta project in Dane County, Wisconsin, demonstrate that reducing automatic use of L&S for intermediate-acuity cases can lower risk without compromising patient safety. The six-month pilot demonstrated that limiting automatic L&S response did not compromise patient outcomes; only 2.8 percent of non-paramedic cases required emergent paramedic intervention, and none showed preventable morbidity or mortality when advanced life support (ALS) arrival was delayed (Dane County Emergency Management, 2021). These models align with principles of risk management and high-reliability organizations (HROs), emphasizing proportionality, safety, and evidence-based deployment of resources (Zygowicz, 2016).

The Marathon County Sheriff's Office Policy 801: Dispatch Center shows how dispatchers handle calls based on evidence. It uses standard questions to assess urgency and provides Emergency Medical Dispatch (EMD) training. This approach helps determine how urgent a call is and allocate resources effectively (Marathon County Sheriff's Office, 2022). These policies demonstrate the value of balancing caller information, dispatcher judgment, and response prioritization to protect both responders and the public. Together, these policies demonstrate how evidence-based decision making can balance response efficiency with responder and public safety.

Despite increasing evidence of the excessive use of L&S, this practice continues in EMS operations. Such disconnect between research and actual practice indicates a lack of inflexibility and, at its worst, a stagnant organizational environment. Additionally, it reflects broader cultural issues within the public safety sector. The primary concern is that the ongoing indiscriminate use of L&S poses a risk to both responders and the public, resulting in preventable harm. Research shows that the clinical benefit, actual measurable improvement in patient outcomes, is minimal. This differs from the more common perceived benefits, such as the belief that L&S inherently make responses faster or demonstrate a higher level of care, which lacks evidence.

The issue prompting this capstone is the continuous injuries and loss of lives, both responders and the public. This capstone is needed to systematically assess whether tiered EMS response models offer a safer and more effective alternative to traditional L&S practices. The October 8, 2025, Polk County Fire Rescue ambulance crash resulted in the death of the driver who turned in front of an ambulance responding with L&S (FireRescue1, 2025). The nature of the call has not been made public; 83-year-old Elaine Dunn passed away at the scene. Such incidents reinforce the importance of data-driven evaluation to prevent policies that compromise safety, increase liability, and erode public trust.

This capstone's goal was to assess the effectiveness of tiered EMS response models as an alternative to routine L&S use. Specifically, this capstone will examine whether tiered responses

reduce crash risks and occupational hazards without negatively impacting patient outcomes or the timeliness of care.

Additionally, this capstone is motivated by recent line-of-duty tragedies that underscore the importance of the issue. For example, two Timber Mesa Fire and Medical District firefighters, Brenna Kulikowski and Damon Thompson, lost their lives in a head-on collision involving their ambulance while returning from a patient transfer. The driver of the other vehicle crossed the centerline and struck their ambulance. Their deaths serve as a stark reminder that, despite policy, training, and risk awareness, the current system continues to allow loss of life under Code 3 responses, losses that may be avoidable with more refined, evidence-based response models (FireRescue1, 2025). These events underscore that reforming L&S policy is both a safety and leadership imperative.

This capstone is guided by objectives and questions which draw from the principles of high-reliability organizations and evidence-based practice. This capstone examines how dispatch accuracy, staffing sufficiency, and agency policy influence both response performance and safety outcomes. The capstone is grounded in the belief that leadership accountability and structured decision-making can reduce unnecessary risk without compromising clinical care.

Five guiding questions shaped the analysis.

First, the capstone explored how EMS providers describe their average response times and what barriers most often cause delays. This question links to national discussions on how operational factors: traffic, staffing shortages, or dispatch procedures, all of which affect response consistency rather than just speed.

RQ1: How do EMS providers describe their average response times and what factors most often cause delays?

Second, the capstone investigated how frequently providers believe L&S are activated when not clinically necessary, and whether they have witnessed negative safety consequences. These perspectives were compared to data from Dane County's 10-Delta pilot, where limiting automatic L&S responses did not compromise outcomes, revealing how culture and policy alignment influence risk exposure.

RQ2: How frequently are lights and sirens (L&S) activated when not clinically necessary, and what safety consequences do providers report witnessing?

Third, the analysis examined providers' confidence in dispatch accuracy and call prioritization. Understanding this trust relationship between dispatch and field crews is critical because it directly shapes decision-making under stress and ultimately determines when emergency driving is justified.

RQ3: How confident are EMS providers in dispatch accuracy and their agency's operational capacity?

Fourth, the capstone examined how providers strongly believe response times affect patient outcomes and whether those perceptions align with clinical data showing minimal benefit from L&S use for most calls. This question addresses a long-standing cultural assumption in EMS that faster always means better.

RQ4: To what extent do EMS providers believe response time impacts patient outcomes, and how does this perception align with existing clinical evidence?

Finally, participants were asked to share their recommendations through open-ended responses, which offer a qualitative dimension that complements the quantitative findings that will be used to improve system efficiency and safety. These questions form the foundation for analyzing how policy, culture, and leadership interact to sustain or reform current L&S practices.

RQ5: What system improvements or leadership strategies do EMS professionals recommend to enhance efficiency and safety?

The following literature review addresses these research questions through analysis of existing studies, policies, and professional reports.

Literature Review

The purpose of this literature review is to assess the safety, clinical effectiveness, and cultural acceptance of L&S use in EMS. Only sources that were peer-reviewed studies, formal policy statements from recognized EMS organizations, or significant professional case reports providing contemporary relevance were included. An example is the documentation from (FireRescue1, 2025) regarding a fatal crash in Arizona (full report pending). Articles were excluded if they lacked empirical data, or relied solely on subjective observations, or focused on driving contexts that are not comparable internationally.

This review is organized, focusing on outcomes, methodologies, and applications to place the issue within both EMS practice and the broader public safety policy discussions. Historically, most of the studies reviewed are retrospective or observational, which limits the ability to draw causal inferences. While their large sample sizes and use of national datasets provide strong descriptive evidence, the absence of prospective or experimental designs represents a significant gap in the existing body of research.

The mission of this case capstone is to reduce unnecessary use of emergency response signaling during medical incidents by promoting risk-informed decision-making and implementing tiered response models. The target audience includes emergency medical professionals, dispatchers, and agencies operating under municipal and county emergency service systems, agencies, guided by state regulations and national standards such as those issued by the National Highway Traffic Safety Administration (NHTSA) and the National Association of EMS Physicians (NAEMSP). These organizations advocate for evidence-based practices that prioritize safety and patient

outcomes rather than routine use of high-risk response modes. While the broader purpose is to change EMS operations to reduce risk to responders and the general public.

The legal environment governing emergency vehicle operations in the United States is complex. Federal guidelines, state statutes, and local ordinances are what collectively shape when and how emergency warning devices can be used but that is where the Authority Having Jurisdiction (AHJ) comes in. While the federal government does not directly regulate local EMS operations, agencies such as NHTSA and the Federal Highway Administration provide national standards emphasizing the principle of "due regard for safety." This means that even when exemptions from traffic laws are granted, emergency vehicle operators must operate with reasonable caution for public safety. What is not addressed is the requirements for operators and when the states have regulations the AHJ can choose to follow or not. In many jurisdictions, the AHJ also plays a critical role in determining whether volunteers may equip their personal vehicles with emergency lights or warning devices. Depending on state law, the AHJ may issue written authorization, permits, or identification cards that allow qualified volunteers, such as EMS personnel or firefighters, to use designated lighting configurations when responding to emergencies.

Liability remains a central policy driver. While state immunity statutes commonly protect public agencies from specific categories of lawsuits, they rarely extend comparable protections to individual providers. Agencies seldom communicate this distinction. In cases involving alleged negligence, counsel is obligated to defend the agency as the primary liable entity, leaving the individual provider with limited protection. High-profile cases, such as the Miami-Dade lawsuit in which the family of a patient pronounced dead on arrival sued the county for alleged negligence (Fire Law Blog, 2021), illustrate the ongoing legal tension between protocol adherence, provider discretion, and public expectations. Such cases emphasize the need for clearer policy alignment that integrates operational evidence, legal protection, and public accountability.

National and professional organizations have spent decades working to standardize safety practices

and vehicle operation policies within emergency response programs. The National Highway Traffic Safety Administration (NHTSA, 2011) developed the EMS Safety Program. It is a National Strategic Plan aimed at lowering preventable injuries and deaths among responders and the public. The program serves the public by addressing five key objectives: advancing safety through data-driven policies, improving driver and operator training, incorporating safety metrics into performance management, enhancing vehicle design, and fostering a culture of accountability within EMS organizations.

Together National Fire Protection Association (NFPA) with standards such as the NFPA 1500: Standard on Fire Department Occupational Safety, Health, and Wellness Program (2021), the National Association of State EMS Officials (NASEMSO, 2023) which a little over two-years ago recently published its Model EMS Vehicle Operations Policy, outlining best practices for safe response, vehicle maintenance, and community risk communication are attempting to aid departments in establishing clear policies to minimize risk during emergency vehicle operations.

In the context of public safety operations, two evaluation frameworks are especially applicable: the Logic Model and the CIPP Model (Context, Input, Process, Product). Both help break down complex systems like EMS into something we can actually measure and improve. As most programs simply identify issues but really do not offer a path to solutions or implementation.

The Logic Model lays out the basics: Inputs include dispatch protocols, vehicle equipment, and responder training. Activities are the decisions made in the field, like when to activate emergency lights and sirens. Outputs are things we can track such as, response times, crash reports, patient outcomes. And outcomes tell us if the system is working: are we reducing collisions, improving safety, and following evidence-based practices? This model helps us test assumptions, like whether faster response actually improves survival, and gives us data to back it up.

The CIPP Model adds more dept to the context and looks at the culture and public's expectations which shape how L&S are used. Input covers policies, legal authority, and available

resources. Process focuses on how training, dispatch procedures, and leadership oversight are carried out. Product measures the actual results, collision rates, clinical outcomes, and public satisfaction. Together, these models help us see not just what's happening, but why it's happening.

Using both frameworks gives us a full picture. We are not just checking boxes, we are looking at how the system performs, how it's built, and how it is perceived.

From the first ambulances in the early twentieth century, flashing lights and sirens have become symbols of urgency and authority, identifying responders as rushing to help. (Bledsoe, 2003) referred to this part of EMS as "mythology," highlighting how many of these traditions persist due to cultural influence, rather than research demonstrating their effectiveness. (Huff, 2015) pointed out the tension between these traditions and newer safety guidelines. Many providers believe they are failing their duty if they do not respond with lights and sirens, even when evidence shows the risks. The media has reinforced this mindset, and what does not help is that television, movies, and news often portray sirens as a core part of saving lives. That expectation filters down to families and communities. If an ambulance arrives without sirens, some people perceive it as a delay or neglect. The U.S. is a very litigious society, and at times, leaders are scared of litigation. Complaints from the public can lead to investigations or disciplinary action, so providers feel pressure to use L&S even when it is not necessary. Over time, this culture has created momentum that makes reform challenging, despite the growing evidence against its universal use.

The dangers associated with L&S use are well-documented. Kahn (2006) demonstrated that EMS responders face a higher risk of crashes when operating with lights and sirens. Watanabe (2019), using national EMS data, confirmed that L&S increases the risk of ambulance crashes. Kupas et al. (2022), representing multiple EMS organizations, went further by publicly acknowledging that these risks are excessive and calling for reform. Unfortunately, these numbers play out in real life. In September 2025, two Arizona firefighters were killed in a head-on crash while running L&S. (FireRescue1, 2025) reported the incident as "horrific," and it underscored how

dangerous emergency vehicle operations can be, not just for responders, but for the public as well. Beyond the lives lost, these crashes bring lawsuits, financial strain on agencies, and trauma for coworkers. Most research relies on post-crash reports, and near misses often go unreported due to fear of punishment from their agency. Additionally, differences between rural and urban areas are not always clearly stated.

Supporters of L&S are often justified by claims of faster response and transport times; research increasingly questions the clinical significance of these time savings. Shekhar and Clement (2024), in a scoping review, concluded that the average time saved is modest and rarely results in improved patient outcomes. Jarvis et al. (2024) found that implementing time-critical intervention–based dispatch thresholds lowered L&S use substantially without compromising care quality, demonstrating that reduced reliance on L&S can be achieved safely and effectively.

These findings reveal a disconnect between perceived and actual benefit. While certain conditions: such as cardiac arrest or airway obstruction, which warrant urgent response and L&S use, most calls do not benefit from heightened response modes. Methodologically, these studies draw strength from large datasets and cross-agency comparisons but often lack longitudinal analysis. Few studies track whether consistent restraint in emergency signaling affects system-wide outcomes over time, leaving an important gap for future research.

Provider attitudes remain a central factor in the persistence of L&S overuse. Tennyson (2015) surveyed EMS providers and discovered widespread misconceptions, with many overestimating the benefits of L&S for patient care. Isaacs (2017) argued directly against these assumptions, presenting “the case against” L&S responses and urging agencies to reconsider entrenched practices. Zygowicz (2016) further stressed the importance of aligning operational culture with safety priorities, highlighting the need for education and system-wide accountability to reduce unnecessary use.

Liability fears also play a major role. Many believe they are safer from lawsuits if they consistently use L&S, despite data suggesting the opposite. Add in public complaints about "slow responses," providers often feel like they have no choice. Supervisors sometimes reinforce this, whether directly or indirectly, creating a workplace culture where not using L&S can be seen as doing less than your best. All these factors work together to sustain practices that do not line up with evidence-based medicine. To change this, agencies will need strong leadership, clear policies, and providing education that demonstrates restraint is not neglect, but rather a safer approach.

System-level strategies have emerged as promising alternatives to routine L&S use. Dane County Emergency Management (2021) implemented an adjustment to Delta EMD codes in an automatic ALS dispatch system, successfully reducing L&S responses while maintaining service effectiveness. Technology is another tool. AI-assisted call processing, as demonstrated in the Predapred 911 case studies, has enhanced dispatch accuracy, enabling agencies to match resources more effectively to the actual needs of patients. These kinds of changes reduce unnecessary risk while keeping the ability to respond quickly when it really matters. The challenge is getting buy-in. Rural systems worry about coverage, and urban systems face high call volumes and complex traffic. Any change requires leadership support, intense training, and transparency with the community. Even with those challenges, the case studies demonstrate that reform can be effective.

The reviewed literature reveals three consistent themes. First, L&S operations substantially increase the risk of collisions and injuries (Kahn, 2006; Watanabe et al., 2019). Second, the time saved through L&S use is limited and rarely provides clinical benefit (Shekhar & Clement, 2024; Jarvis et al., 2024). Third, while many studies support reducing L&S use, there is a lack of intensive experimental research on tiered response models. Pilot programs have been attempted, but few have expanded in today's complex social, political, and legal environment. More work is needed to address community expectations, liability concerns, and provider pushback.

The legal dimension is especially understudied. Cases such as the Miami-Dade lawsuit, where the family of a man pronounced dead on arrival is suing the county over alleged EMS negligence (Fire Law Blog, 2021), illustrate the consequences agencies face when protocols and public expectations collide. Incidents like this underscore the importance of incorporating liability and legal accountability into future research and policy reforms.

Empirical evidence supports that unnecessary urgent responses increase crash risk without corresponding clinical benefit, yet agencies lack structured evaluation tools to measure reform outcomes. Few studies have simultaneously examined operational performance, provider culture, and policy context. Moreover, the connection between liability exposure and decision-making remains understudied. This capstone contributes to filling these gaps by evaluating how tiered response models balance efficiency, safety, and accountability.

The capstone applies an integrated framework while drawing from operational data, provider surveys, and case analysis to assess whether new L&S policies can maintain patient care standards while improving safety. By combining cultural, operational, and legal, this paper hopes to move past the discussion and focus on statistical outcomes to implement the changes required for updated L&S policy. The findings will inform both agency policy and state-level guidance, helping EMS systems transition from tradition-driven to evidence-driven practice.

Methodology

The primary data collection method was an online survey that took about ten to fifteen minutes to complete, incorporating both quantitative and qualitative elements. The survey was anonymous and included multiple-choice, scale, and open-ended questions. Topics covered included EMS response times, including barriers such as traffic congestion, staffing shortages, dispatch and transport practices, and a focus on the connection between these factors and patient

outcomes.

The survey was deployed via Qualtrics, using the Middle Georgia State University institutional license. This approach was selected because it enabled the researcher to capture responses from a wide range of EMS providers and administrators, generating both measurable data and practitioner-driven insights.

This was a formative evaluation designed to explore current EMS response practices and perceptions of L&S utilization. The goal was not to determine program success or failure, but rather to identify areas where dispatch procedures, operational safety, and policy alignment could be improved based on both data and field experience. This capstone focused on three primary criteria: effectiveness, measuring how accurately dispatch protocols identify true emergencies; efficiency, assessing how resources and response times are managed; and impact, analyzing how L&S use influences both patient outcomes and provider safety.

The sample group for this capstone consisted of approximately one hundred to one hundred fifty participants, all over the age of eighteen. This included EMTs, AEMTs, paramedics, firefighters, supervisors, and administrators. Recruitment was conducted through professional EMS networks, agency contacts, and social media targeted at EMS professionals. The survey remained anonymous, and participants were not identified unless they chose to provide their information for a follow-up interview. This approach brought together a diverse group of agencies and varying levels of experience, while keeping the risk to participants very low.

Data was collected using the Survey on EMS Response Times and System Efficiency (Roque, 2025), designed and distributed through the Middle Georgia State University Qualtrics platform. The instrument includes 17 questions, organized into five thematic sections: Participants were asked to specify their current role within the EMS system by selecting EMT, Advanced EMT (AEMT), Paramedic, EMS Supervisor, Chief, Firefighter/First Responder, or Other, with an option provided to explain if their position differed from the specified roles. The following question was

about their time in service, ranging from 0–2 years, 3–5 years, 6–10 years, 11–20 years, or more than 21 years. Lastly, participants identified the type of agency they primarily serve with: fire-based EMS, third-service or municipal EMS agency, private EMS provider, hospital-based EMS, or military/DoD EMS.

Participants were surveyed regarding the average EMS response time for their service, choosing from the following options: under 5 minutes, 5–8 minutes, 9–12 minutes, 13–16 minutes, or over 16 minutes. To gain insight into the operational challenges they face, participants also identified the most common factors that contribute to response delays. This included traffic congestion, delays in dispatch processing, staffing shortages, hospital diversion or transfer delays, issues with equipment or vehicle availability, and geographic barriers, particularly in rural or remote areas. Participants were then asked to reflect on outcomes and safety. They indicated how strongly they believed response time affects patient outcomes by selecting from Extremely, Very, Moderately, Slightly, or Not significant. Respondents were also asked whether they had personally observed any negative safety consequences related to pressure to respond faster, answering Yes or No, with space provided to describe those incidents in their own words. The survey ended by asking participants to share what system improvements or innovations they believed would most reduce response times and enhance overall safety. Lastly, they were asked whether they would be willing to participate in a follow-up interview, with Yes/No response options and an optional space for contact information.

The survey remained active for four weeks and was distributed electronically through email, professional associations, and EMS-focused social media groups. Participation was voluntary. Respondents reviewed a consent statement explaining the purpose, anonymity, and data protection measures before beginning. No IP addresses were recorded. Responses were downloaded from Qualtrics as a CSV file and imported for analysis.

Data were be analyzed using descriptive statistics and was used to identify averages and

trends, and inferential tests (chi-square, regression, t-tests) were applied where appropriate to examine relationships between factors such as staffing and response times. Open-ended responses were analyzed for themes. This allowed the findings to connect statistical patterns with the lived experiences of EMS providers. Both quantitative and qualitative methods were employed.

Each data source brought a different angle: one historical, one administrative, and one experiential. The first data source is the Dane County EMS "Automatic ALS System Review: 10 Delta EMD Code Adjustment" (June 2021). This report was published by Dane County Emergency Management's EMS Division and focused on how automatic ALS dispatches were being handled during a six-month pilot program. In total, the study reviewed 868 incidents: 144 from non-paramedic jurisdictions and 724 from paramedic jurisdictions. Within those, 263 cases received physician review, with 49 non-paramedic and 214 paramedic calls examined in detail. The Dane County data provides a benchmark for this capstone by establishing how often L&S were actually necessary and what patient outcomes looked like in those cases. It also provides a model for structuring and comparing the results of survey data against a real-world baseline.

The second data source is the Marathon County Sheriff's Office Dispatch Policy 801 (2022). This document outlines how dispatchers handle both emergency and non-emergency calls and details the process of call prioritization, communication standards, and procedural expectations. Policy 801 defines the criteria that guide dispatchers when deciding which units to send, whether L&S use is justified, and how to document those calls. While it is not numerical data, this policy gives critical context to the operational side of the issue, essentially showing what "should" happen. Having a procedural standard like this makes it easier to interpret how real-world practices align or differ from the administrative intent.

The third and primary data source is the current Qualtrics EMS Provider Survey (2025). This was the survey designed and distributed through the Middle Georgia State University Qualtrics platform.

To add to the analysis, I used a series of peer-reviewed EMS studies, which include Kupas (2006), Watanabe (2019), Shekhar and Clement (2024), and Jarvis et al. (2024), among others. These works establish the national and international trends in L&S use, providing valuable comparison points and theoretical grounding for the findings that emerge from my data.

Combined, these data sources allowed comparison between what policies require and what actually occurs in the field, giving this research both credibility and real-world depth.

The total quantitative dataset exceeded one thousand data points when the survey's goal was reached. The Dane County dataset includes 868 incidents, with an additional 263 cases undergoing physician review, while the Qualtrics survey was expected to contribute between 100 and 150 new responses. The qualitative data consist of open-ended survey comments, excerpts from Marathon County Policy 801, and provider observations from the Dane County reports.

The variables, first section, operational effectiveness, focuses on the current dispatch system and how much they trust it to send the right resources to the right calls. Participants were asked how effective they believe dispatch protocols are in identifying true emergencies, how well those same protocols prioritize the right response level, and how effective communication is between dispatch and responding crews. Each of these questions uses a five-point scale ranging from "not effective" to "extremely effective." The responses are treated as dependent variables that show the level of trust and confidence EMS providers have in the system. Mean scores, correlations, and ANOVA test were used to look for patterns, such as whether paramedics view dispatch differently than EMTs or if years of experience change how someone sees the process. Another question asks how strongly response time affects patient outcomes. This one serves as an independent variable that helps measure how much weight responders place on speed versus patient condition, and it will be tested against other items to see whether faster always means better in their eyes.

The second section, safety perception, examines the risks associated with using L&S. Open-ended questions often tell the story behind the numerical results, such as drivers taking unnecessary

risks, fatigue from long shifts, or the public reacting unpredictably when hearing sirens. One question asks whether the participant has ever witnessed a negative safety consequence from using L&S, and then allows them to explain what happened. These are real experiences that numbers alone cannot capture. The responses were categorized into themes including driver behavior, intersection hazards, and public interference so that the researcher could identify which issues arise most frequently. Another question asks for their recommendations to improve safety and efficiency. Many of these answers go beyond just driving habits; they touch on training, dispatch decision-making, and even public education. Those insights will be analyzed for recurring themes that point toward system-level improvements.

In the last section about system improvement, providers are encouraged to think about the overall system, not just their individual roles. They are asked about improvements that could make their jobs safer and more effective. Responses often relate to leadership, resource allocation, and better communication between dispatchers and providers. There is also a follow-up option; if they agree, they provide their contact information, which is kept separate and deleted before data analysis to ensure anonymity.

My analysis was based on forty-nine complete survey responses collected during the initial phase of data collection. While smaller than intended, these responses are sufficient for exploratory analysis and identifying preliminary patterns. Quantitative data were analyzed using descriptive statistics, including means, frequencies, and standard deviations, will be used to summarize trends across each variable. Inferential analysis will include chi-square tests to examine categorical relationships, independent-samples t-tests to compare mean scores between BLS and ALS providers, and one-way ANOVA for multi-group comparisons by certification level. Simple linear regression will test the influence of years of EMS experience on perceptions of dispatch accuracy, while Spearman's rho correlation will explore relationships between perceived response-time significance and safety perceptions. Qualitative responses will undergo content analysis to identify

dominant themes and subthemes related to safety, operational efficiency, and system improvement. Common categories such as dispatch workload, driver behavior, and public response to L&S will be coded and compared against quantitative results. This process allows the data to tell a more complete story, connecting the numbers to the real experiences and opinions of the people who provided them.

Content Validity: Survey items were reviewed by EMS educators and operational supervisors to ensure alignment with established EMS efficiency constructs. Construct Validity Variables were aligned with prior empirical studies (Kupas, 2006; Watanabe, 2019; Shekhar & Clement, 2024; Jarvis et al., 2024), ensuring comparability with national data.

This capstone complies with the ethical standards of Middle Georgia State University. All participants were over the age of eighteen and participated voluntarily. No identifying information was required, and IP addresses were not recorded. The survey was deployed through the secure Qualtrics platform using the Middle Georgia State University license. Participants were informed that their responses would remain anonymous, and any optional contact information provided for follow-up interviews was stored separately.

The next chapter presents the results from the analysis of the forty-nine valid survey responses, along with comparative insights drawn from the Dane County and Marathon County data. These findings highlight how EMS providers perceive L&S operations, dispatch accuracy, and safety practices, providing the foundation for recommendations and the next phase of this capstone.

The following chapter transitions from methodology to findings. It presents quantitative and qualitative data that collectively illustrate how dispatch accuracy, staffing, and policy alignment affect both efficiency and safety in EMS operations.

Analysis

The findings of this capstone show that EMS professionals overwhelmingly value rapid response, yet they also recognize that safety and judgment are equally important. Participants expressed confidence in dispatchers' ability to prioritize emergencies but noted that inconsistent policy application and staffing shortages often lead to unnecessary L&S use. These observations reinforce earlier research (Kupas et al., 2022; Jarvis et al., 2024) showing that the overuse of emergency driving stems not from clinical necessity but from cultural expectations and uneven leadership oversight.

Operationally, most providers reported response times within national benchmarks, yet nearly three-quarters believed L&S are sometimes or frequently used when not clinically necessary. This perception aligns with national crash statistics (Watanabe et al., 2019) and suggests that agencies could significantly reduce exposure to risk by revising dispatch criteria rather than altering response speed. Providers mentioned variations in how dispatchers interpret call information and a lack of standardization between agencies. This aligns with what Dane County found in its review of its Auto ALS system: the written policy looked solid, but how it was applied depended on who was working. Providers recommended scenario-based driver and dispatcher training that focuses on judgment under stress and real-world intersection hazards.

A total of 49 survey responses were collected from EMS professionals. The average responder brings over ten years of experience to the table, with 30.4% identifying as paramedics. Even more impressive, over half of our respondents have spent more than 21 years in the EMS field, which really enhances the value of their insights.

The survey results reflected a broad mix of agency types: 42% work in private systems, 21.8% in fire-based agencies, and 10.9% in hospital-based environments. This diversity provides a broad view of operational perspectives. Most agencies reported response times averaging 9-12

minutes (34.5%); only 9% exceeded 16 minutes.

Overall, these findings show that while many operational performances are strong, there is potential for even greater improvements in staffing and policy implementation.

Safety remains a leading concern among EMS professionals. Nearly three-quarters of respondents (75%) reported that lights and sirens are sometimes or frequently used when not clinically necessary, reflecting a national trend identified by Kupas et al. (2022) and Watanabe et al. (2019). More than half (54%) said their agency lacks sufficient staffing, which contributes to fatigue and decision-making errors. Dispatch prioritization was rated only moderately effective, suggesting that while confidence in dispatch exists, consistency across agencies remains lacking.

Although 70% of respondents viewed response time as highly significant for patient outcomes, many emphasized that what happens after arrival is more important. A perspective consistent with that of Jarvis et al. (2024). Safety incidents tied to L&S use were common, with nearly two-thirds (63.3%) reporting firsthand experience. Most of these occurred at intersections or involved civilian driver unpredictability, reinforcing previous research that identifies L&S operations as one of the highest-risk activities in EMS. The data also showed a relationship between agency type and reported safety problems. Larger, fire-based systems reported more incidents, which makes sense considering their higher call volume. Still, the risk exists in every system regardless of size. The takeaway is clear: every unnecessary L&S activation increases exposure to danger without delivering measurable patient benefit.

When asked how to make the system safer, most providers supported stricter dispatch criteria, improved driver training, and stronger public education. These suggestions echo what has already been proven effective in Dane and Marathon Counties, where limiting L&S to truly critical calls improved safety without harming patient outcomes.

What stands out is that EMS providers understand the issue. They see that unnecessary L&S use is more about culture and public expectation than clinical need. Many said they feel pressure

from supervisors or citizens who expect every call to be "hot." This shows that the real change needed is not just operational but cultural. Providers are ready for reform, but leadership has to support it and set the tone. Using real-world policies allowed me to evaluate not only what the research says should happen, but what agencies are actually doing, how they structure decision-making, address resistance, and manage staffing or community expectations. Incorporating those operational policies grounded this analysis in reality and showed what successful implementation truly looks like on the street, not just in theory.

Marc Hill is a perfect example of an authentic leader who practices what he writes. He did not just hand me a policy and hoped it helped; he stayed involved. When I had questions during this project, he picked up the phone, talked through ideas with me, and gave clarity on how these tiered-response systems work in the real world. That kind of accessibility and willingness to bounce ideas back and forth matters because it shows he is invested in getting it right, not just getting it done. His approach shows exactly how leadership can reduce unnecessary risk, set expectations, and keep everyone aligned without making it punitive. It is accountability through support, not fear, and EMS needs a lot more leaders who operate that way.

The findings point to several broader implications for policy and practice that reach beyond EMS. The way we handle L&S use affects risk management, legal exposure, and public trust.

Agencies that continue to use L&S unnecessarily open themselves up to lawsuits and higher insurance costs. In recent years, courts have started asking whether L&S activation was justified, not just whether the crash occurred. Policies that clearly define when L&S can be used protect both the agency and its personnel. Agency leaders have expressed concerns about potential legal exposure, which remains a significant barrier to adopting tiered response protocols

Dispatch criteria vary widely across jurisdictions, creating confusion and risk. One county may consider a call emergent, while another may not. Developing uniform L&S guidelines at the state level, modeled after Marathon County's policies, would improve consistency and fairness in

dispatch decision-making. Changing how providers think about L&S will take leadership and education. The old belief that sirens equal professionalism must shift to the idea that good judgment and safety equal professionalism. Leaders need to talk about this openly, reinforce safe behavior, and highlight that restraint is not neglect; it is the mark of a mature system.

Many citizens still believe that if they do not see or hear sirens, care is delayed. Agencies should be transparent and proactive in explaining why not every call requires L&S. When the public understands the "why," complaints drop, and support for reform grows.

This public service dilemma is one that the fire service is currently dealing with regarding "clean cab," in which firefighters no longer wear their bunker gear (firefighting gear) in the truck but instead dress on scene. The reason is to keep the cab free of carcinogens. Some agencies are doing an excellent job of educating the public not only about the implications for firefighter health but also about how the firefighter is not delayed in mitigating the emergency because no time is lost, as in the past when firefighters would get dressed before the truck left the station. Now they do it on scene. The approximate 1.5 minutes it took to get dressed and leave the station are now added on-scene, but to the uninformed public, it can appear as if the firefighters were not ready.

There is no single fix that will solve the problems with L&S use in EMS, but there are several steps that agencies can take to make things better right away. The first is to move toward a tiered response model. Not every call needs L&S, and agencies should start separating true emergencies from those that are not time-critical. This would help reduce unnecessary risk while still keeping fast responses for patients who really need it.

The next thing is training. Dispatchers and drivers both need more realistic training, not just lectures or videos. The focus should be on judgment, communication, and fatigue—especially when working long hours or driving in traffic. Intersections continue to be one of the most dangerous points in any response, and scenario-based driver training would make a real difference there.

Agencies should also get in the habit of doing regular safety audits. Looking at L&S activations every few months can help identify trends, hold people accountable, and ensure policies are consistently followed. These audits do not need to be complicated; they need to be conducted and implemented. Agencies and municipalities do a great job of research, but poorly at implementation.

Public education also has to be part of this. The public has grown accustomed to hearing sirens for almost every call, creating an unrealistic expectation. Agencies need to explain that fewer L&S calls do not mean slower care; they mean safer roads and more thoughtful responses. If the public understands why some calls do not require L&S, they will be more likely to support those changes.

Leadership plays a significant role in this, too. Department heads and shift officers have to set the example and make it clear that safety comes first. While most accidents are investigated, agencies must implement a policy requiring policymakers to report all near misses (this will be a cultural issue; there should be no consequences for reporting a near miss). Near-misses provide valuable insight and should be used to shape stronger, more realistic training so that preventable injuries or fatalities are avoided. Last but not least, agencies must take advantage of the technology already available.

This capstone is limited by its sample size and self-reported nature. Only forty-nine complete responses were included, and participants may have stronger opinions about L&S than the general EMS population. The findings are not meant to represent all systems nationwide but to highlight trends that appear consistent with other studies. The comparison with Dane and Marathon Counties data adds credibility, but the absence of outcome-based metrics means results are perception-based, not clinical.

The next phase of this capstone will focus on regrouping and improving the survey. I plan to build on what I already learned from this round by adding new questions and refining old ones. The goal is to dig deeper into the cultural side of L&S use and understand why people make the choices they do. I also want to look closer at leadership, dispatch policy, and public pressure, since those

came up repeatedly in responses.

I plan to work with Marc Hill and his program to broaden participation and strengthen the academic side of this research. His connections could help bring in a broader range of agencies and make the data more diverse. I have also been trying to connect with Prepared911. So far, I have not had much luck, but I still want to get them involved. Their technology could help tie dispatch decisions directly to outcomes, taking this capstone to the next level.

For future work, I plan to:

- Track crash reduction and response times after tiered systems are implemented.
- Compare urban, suburban, and rural systems to see how geography affects L&S decisions.
- Study how leadership and agency culture influence how policies are followed.
- Compare time saved from L&S use to the cost of crashes, insurance, and liability.
- Examine how public education campaigns can shift communities' perceptions of EMS operations.

Results

The overview of findings in this chapter presents the results from forty-nine valid survey responses collected from EMS professionals, supported by comparative insight from the Dane County Auto-ALS Review and Marathon County Dispatch Policy 801. The purpose of this capstone was to evaluate how dispatch procedures, staffing challenges, and operational barriers influence EMS response times, safety, and overall perceptions of L&S use.

The findings are organized around three main themes that guided this capstone: operational effectiveness, safety perception, and system improvement. Both quantitative and qualitative results are presented to show how measurable data and provider experiences align to form a clearer understanding of how L&S practices impact daily EMS operations.

Out of forty-nine valid responses, participants first identified their current EMS role. Fifteen (30.4%) identified as paramedics, ten (19.6%) as EMS supervisors or chiefs, eleven (21.4%) as firefighters or first responders, and thirteen (28.6%) as EMTs or AEMTs. When asked about experience more than half of respondents reported more than 21 years of EMS experience (53.6%), meaning that most participants were seasoned professionals. Only 14.5% had fewer than 6 years of experience, providing a mature, experienced sample for this capstone. Agency type would introduce plenty of diversity in range with 42% reported working in private EMS systems, 21.8% in fire-based agencies, and 10.9% in hospital-based services, with the remainder in military or municipal operations. Across all participants, dispatch accuracy and prioritization were rated favorably. On a five-point Likert scale, the mean score for dispatch accuracy was 4.1, and call prioritization averaged 4.0. This shows that most EMS providers believe dispatchers are effective in determining true emergencies and assigning appropriate response levels. However, comments from the open-ended questions discovered issues with consistency of information provided by dispatchers, the lack of standardization between agencies, and, at times, deviations between dispatchers within the same agency.

Further analysis was not part of this basic evaluation. Future research could examine the relationships among provider certification levels, dispatch confidence, and operational safety once more data becomes available. The next section summarizes the key themes from open-ended survey responses.

Two open-ended survey questions provided valuable insight into safety concerns connected to L&S use. Sixty-eight percent of respondents reported witnessing these issues and shared specific examples. The first question asked participants what system improvements would most reduce response times in their community. Responses highlighted the need for better 911 triage and nurse navigation “directing non-emergency calls elsewhere like urgent care”, more public education, “just because you go by ambulance doesn’t mean you get seen faster”, improved hospital turnaround

times, automatic-aid agreements, and expanding BLS (Basic Life Supprt coverage for lower-acuity calls. The second open-ended question asked whether respondents had observed any negative safety consequences tied to pressure for faster response times. Several examples were provided, such as a driver nearly losing control in wet conditions while responding to a structure fire and concerns that community complaints encourage crews to 'push the limit' or use lights and sirens when they are not needed.

Many specified fatigue and judgment issues after long shifts or multiple back-to-back calls. Another recurring theme was intersections, especially in busy areas where other drivers failed to yield or tried to follow emergency vehicles through red lights. Public interference came up often, with providers mentioning distracted drivers, citizens filming on phones, or vehicles not pulling over until the last second.

When asked how to improve L&S safety, most people suggested stricter dispatch rules, better driver training, and more public education. Several respondents said dispatchers need clearer directions on when to use L&S, noting that some high-priority calls could be managed safely without it. These suggestions match the findings from Dane County and Marathon County reports, which emphasize that reducing unnecessary L&S responses can increase safety without greatly affecting results.

The survey data and narrative responses agree that EMS professionals want to deliver fast, effective care, but they also recognize that using L&S out of routine creates avoidable risks. Before sending the survey out, I asked six experienced EMS and fire professionals—ranging from paramedic shift supervisors to a district commander, program director, battalion chief, and active field staff—to review the questions to make sure they were clear and grounded in real operations. None of them took the survey themselves. Most respondents support evidence-based reform that balances speed with judgment. Quantitatively, dispatch systems were rated as effective but

inconsistent; qualitatively, respondents called for cultural reform supported by leadership and public understanding.

The findings reinforce that L&S overuse is not an issue of capability but of perception and tradition. Agencies with structured policies, such as Dane and Marathon Counties, which demonstrate that safety improvements do not compromise care which set the stage for the next section, that connects results to broader policy and leadership implications.

Conclusion

The purpose of this capstone was to examine the overuse of L&S in EMS operations and determine whether tiered response models supported by structured policy and leadership accountability can improve safety and efficiency without compromising patient care. The central problem addressed is the continued reliance on outdated habits, where L&S are often used by default rather than by need. Despite decades of evidence revealing that L&S rarely improve patient outcomes, L&S use remains ingrained in agency culture, often reinforced by public expectation and inconsistent supervision.

The results show that while most EMS professionals believe their dispatch systems are effective, they also acknowledge that L&S are overused and inconsistently applied. Nearly three-quarters of respondents stated that L&S are sometimes or frequently used when not clinically justified, and almost two-thirds have personally witnessed preventable safety incidents. Most respondents believe response time is significant to patient outcomes, yet many also recognize that quality care after arrival matters more than seconds saved en route. The findings point to a profession in need of change but still struggling to balance perceived urgency with actual clinical need.

Although Marc Hill did not author the policies used in this capstone, he provided access to the tiered-response policies used by his agency and a neighboring agency in his area. I chose to use these policies because they came from someone who has experienced the changes, challenges, and cultural shifts that occur when an agency transitions to a more structured response model. Having firsthand, operationally tested policies offered far more depth than simply reviewing studies or theoretical frameworks. These documents showed how real departments write, interpret, and apply tiered-response guidelines and how they balance safety, accountability, and community expectations. Including these real-world policies grounded the capstone in actual practice and demonstrated how structured, clearly defined procedures can support safer and more consistent response decisions.

Another perspective that emerged from this capstone is the need to change how performance is measured. As ESCI's article "Why Average Response Times Do not Tell the Whole Story" Curtis (2025) explains, agencies that rely on average response times risk masking the true variability in their system. Averages hide the extremes, and in emergency services, those extremes can mean the difference between a life saved and a life lost. The industry standard, using 90th percentile fractile response times, offers a more precise, more honest measure of reliability. This method shows that 90 percent of calls meet the target time, providing transparency and accountability that averages simply cannot. Integrating fractile response measurement into EMS policy offers a more accurate way to evaluate performance and reduce unnecessary L&S activations. By focusing on system reliability rather than statistical midpoints, agencies can make better decisions grounded in data rather than perception.

This capstone contributes to the broader field of public safety by providing an applied model that connects culture, policy, and data. It shows how tiered response systems, supported by leadership accountability and better performance metrics, can lower risk without harming patient care. The combination of provider feedback, operational policies, and comparative research

establishes a foundation for reform that other agencies can adapt. These results inform how EMS organizations can design policies based on real-world evidence and create accountability structures that protect both responders and citizens.

The goal and hope are that we will move forward and EMS agencies focus on building smarter systems, not just faster ones. That means developing or tightening tiered response plans, refining dispatch policies, and tracking performance in ways that reflect system reliability rather than simple speed metrics. Agencies do not have to create these policies as they are already in use. It will be an all-hands-on process, including leadership, which must remain involved to see the change. The public also has to be part of the education process. Fewer sirens do not mean delayed care; they mean safer roads for the public and responders. This is not about doing less; it is about doing better. When leaders hold themselves accountable, measure what really matters, and build a culture where safety comes first, in the safest way possible for everyone involved.

Figures

When asked how strongly response times affect patient outcomes, the mean score was 4.3. Most respondents felt that response speed remains clinically important, though several noted that outcomes often depend more on the quality of care once on scene. One provider wrote, “Getting there fast does not matter if what happens after arrival is not right.” This reflects a growing understanding in the EMS field that response time alone does not guarantee better outcomes.

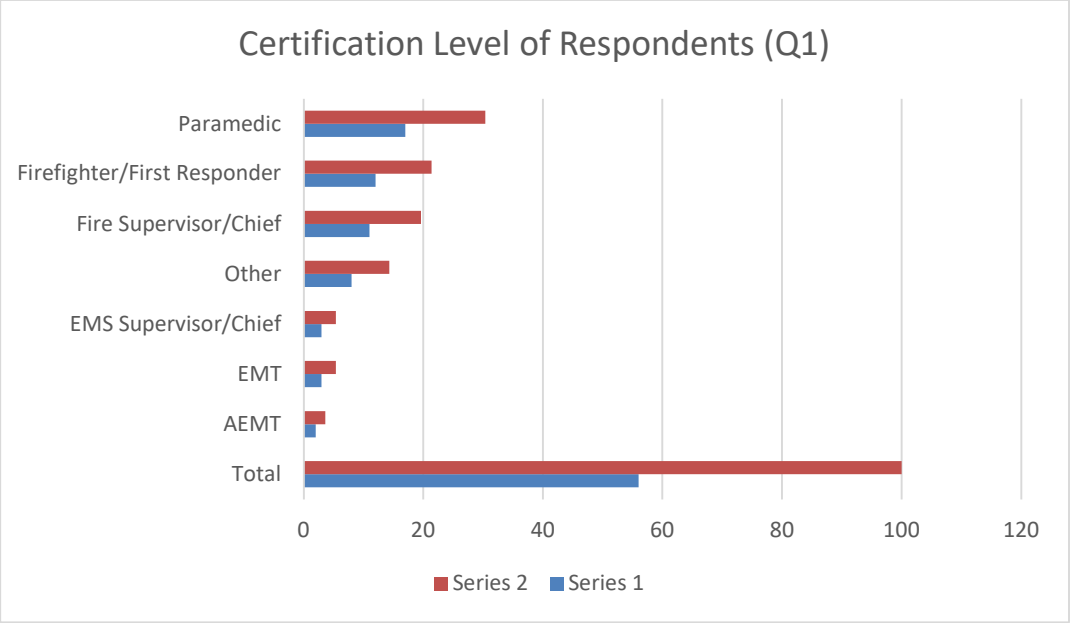

Figure 4.1-
Certification Level of Respondents
Note. n = 56. The majority of participants identified as paramedics (30.4%), followed by firefighters/first responders (21.4%) and fire supervisors/chiefs (19.6%). EMTs and AEMTs represented a smaller portion of the sample. This distribution suggests that responses primarily reflect the perspectives of advanced-level providers.

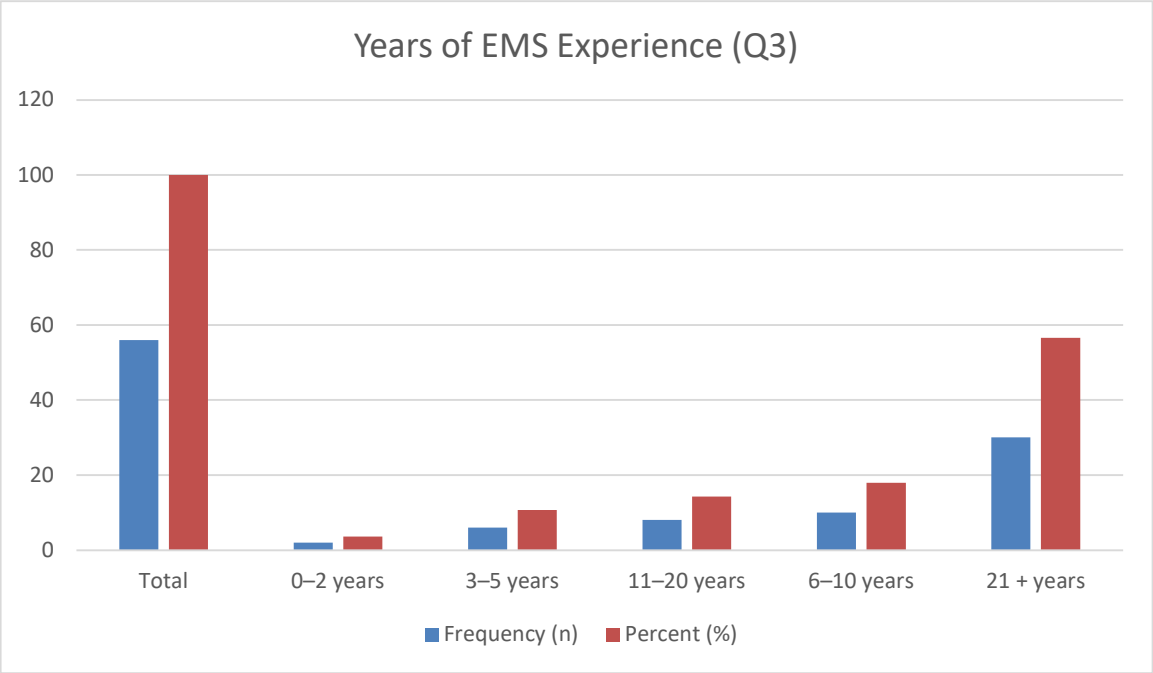

Figure 4.2
Years of EMS Experience

Note. n = 56. Over half of respondents (53.6%) reported more than 21 years of experience, indicating that the majority were seasoned professionals. Fewer than 15% had less than six years in the field, providing an experienced foundation for interpreting operational and safety practices.

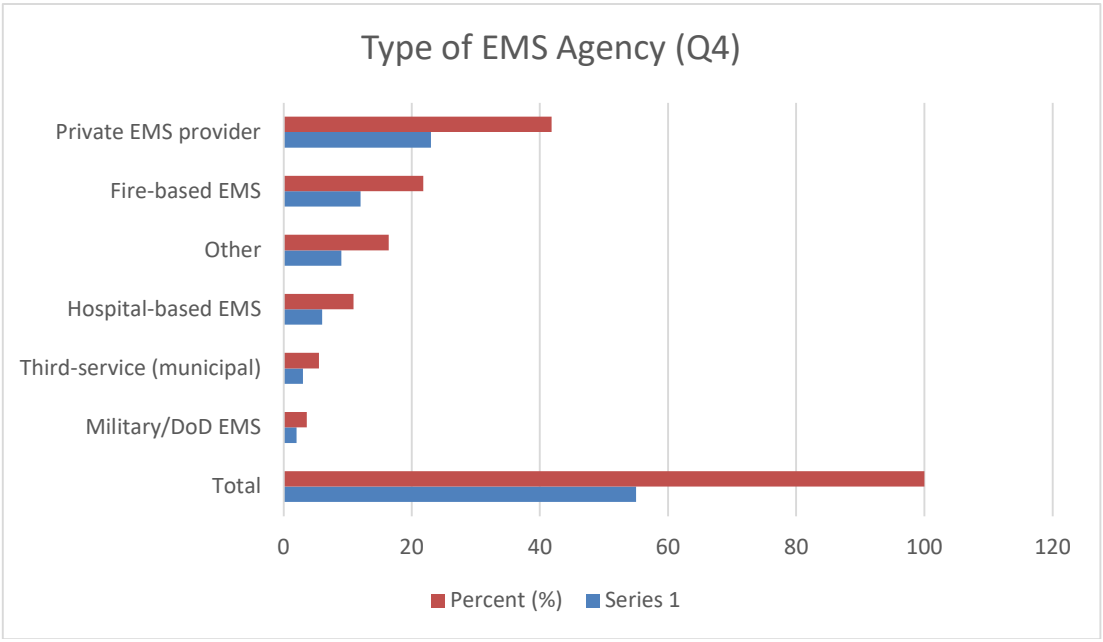

Figure 4.3
Type of EMS Agency

Note. n = 55. Nearly 42% worked in private EMS systems, followed by fire-based agencies (21.8%) and hospital-based services (10.9%). This mix reflects both public and private operational environments across different service delivery models.

Out of 55 respondents, 19 (34.5%) reported an average response time of 9–12 minutes, 14 (25.5%) reported 5–8 minutes, 9 (16.4%) reported 13–16 minutes, 8 (14.5%) reported under 5 minutes, and 5 (9.1%) reported over 16 minutes. This indicates that most EMS agencies represented in the sample operate within the 8–12-minute benchmark typical of urban and suburban response systems.

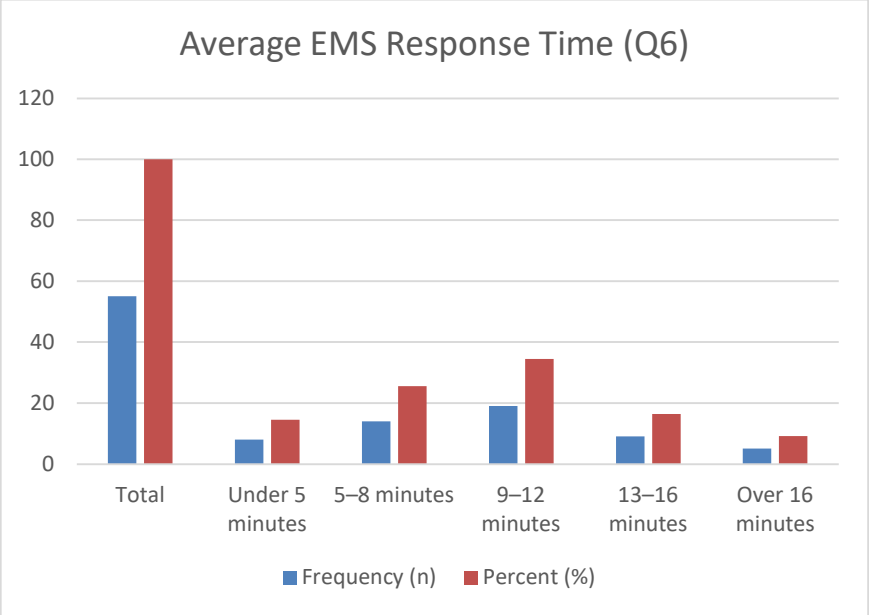

Figure 4.4
Average EMS Response Time
Note. n = 55. Most respondents reported an average response time between 9 and 12 minutes (34.5%), consistent with national averages for urban EMS systems.

Among 53 respondents, 23 (43.4%) answered “Sometimes,” 17 (32.1%) “Frequently,” 9 (17.0%) “Rarely,” 3 (5.7%) “Always,” and 1 (1.9%) “Never.” Nearly three-quarters (75%) of participants indicated that lights and sirens are used sometimes or frequently when not clinically necessary, suggesting potential overuse of emergency driving procedures.

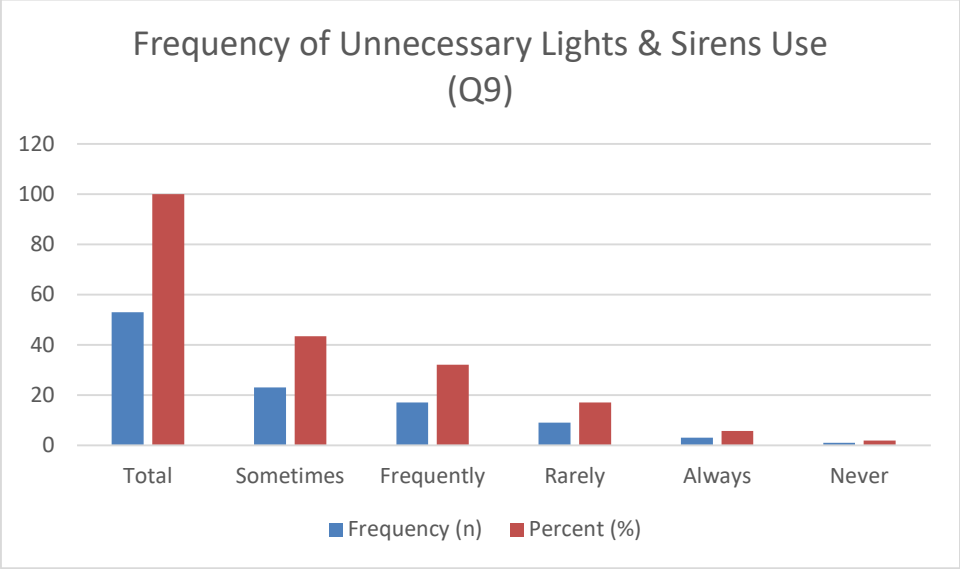

Figure 4.5
Lights & Sirens Use

Note. n = 53. Approximately three-quarters (75%) reported that L&S are used sometimes or frequently when not clinically necessary, underscoring a potential area for dispatch protocol review.

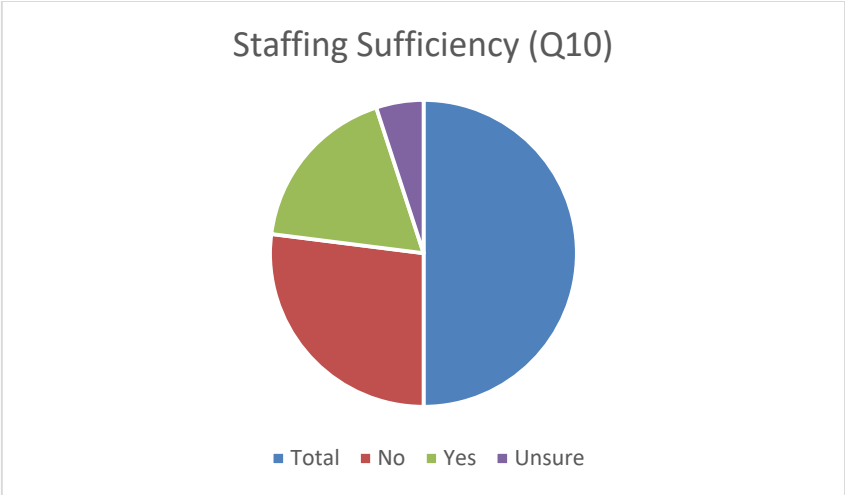

Figure 4.6
Staffing

Note. n = 50 A majority (54%) indicated their agency does not have sufficient staffing to meet call demand, revealing a significant operational constraint that may influence response times and safety.

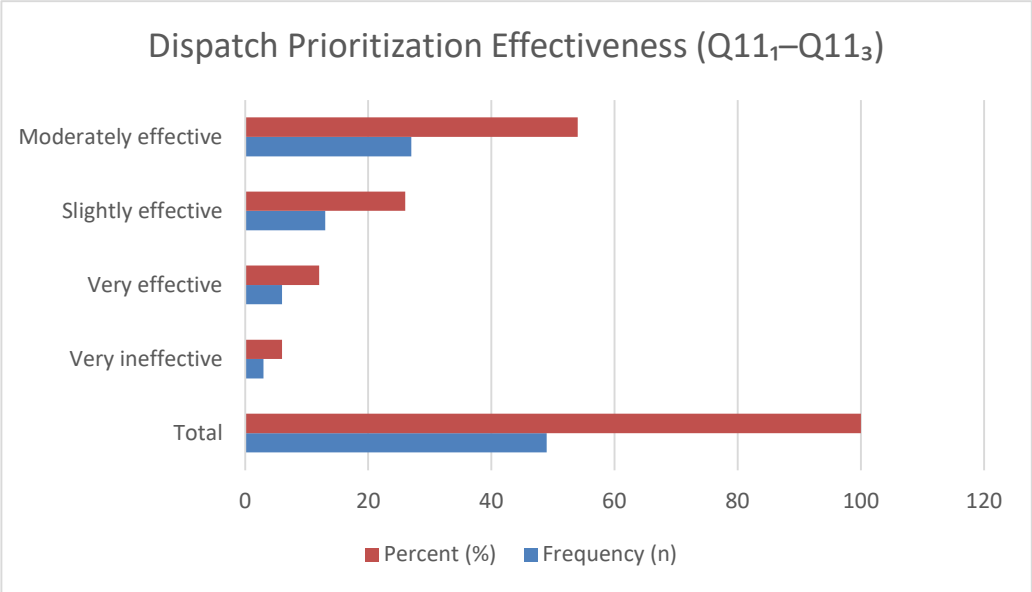

Figure 4.7
Dispatch Effectiveness

Note. n = 49. Over half rated dispatch prioritization as moderately effective, suggesting cautious confidence but room for improvement in accurately identifying true emergencies.

Out of 50 respondents, 20 (40%) rated the impact of response time as “Extremely significant,” 15 (30%) “Very significant,” 8 (16%) “Moderately significant,” 5 (10%) “Slightly significant,” and 2 (4%) “Not significant.” Overall, 70% of providers believed response speed plays a critical role in patient outcomes, although some noted that the quality of care after arrival is equally important.

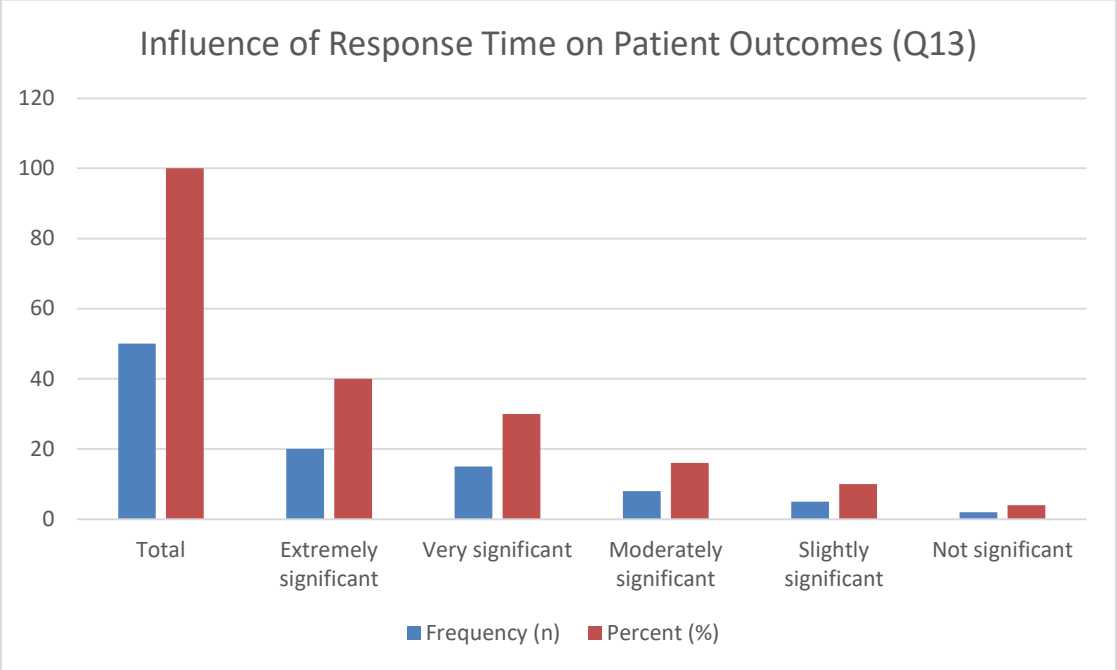

Figure 4.8
Response Time
Note. n = 50. The majority (70%) perceived response time as very or extremely significant to patient outcomes, reinforcing its central role in EMS performance metrics.

When asked whether they had ever observed a safety consequence from lights and sirens use (Q14), 31 respondents (63.3%) answered “Yes,” and 18 (36.7%) answered “No.” Follow-up open-ended responses (Q15) described common issues such as driver fatigue, intersection hazards, and public interference. Many participants recommended stricter dispatch criteria, enhanced driver training, and public education initiatives to reduce risk during emergency responses.

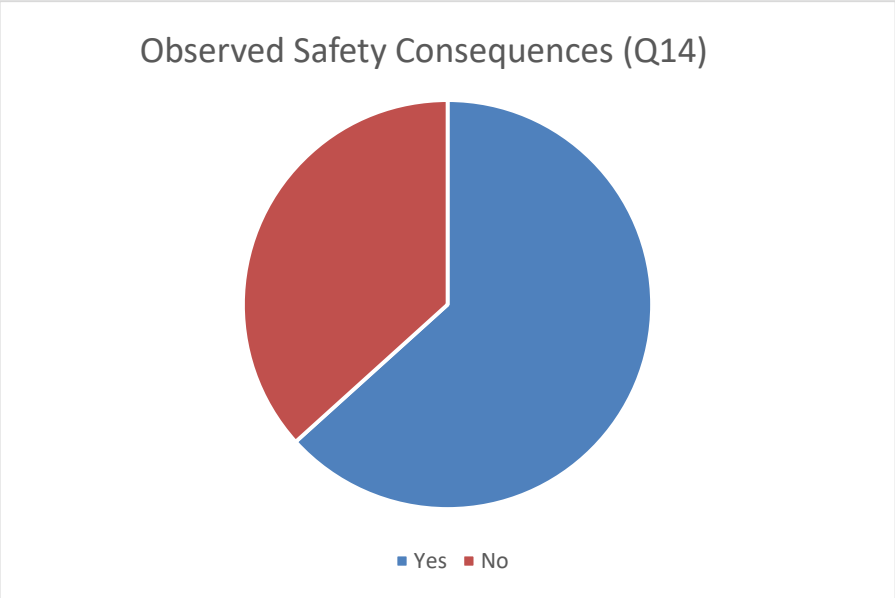

Figure 4.9
Safety Consequences
Note. n = 49. Nearly two-thirds (63.3%) reported observing negative safety consequences linked to response-time pressure or L&S use, validating widespread safety concerns identified in prior literature.

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Appendix A: IRB Approval

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September 11, 2025

TO: Dr. Erica Russell & Jorge Roque

FROM: Dr. John Powell Hall
Institutional Review Board Chair 2023-2026 Middle Georgia State University

SUBJECT: Approval of Project # 202509 - N
Title: "Beyond the Sirens: Rethinking Lights and Siren.'

I am pleased to inform you that your project has been approved under the Exempt Review protocol of the Middle Georgia State University Institutional Review Board. Your project complies with the IRB guidelines for exempt proposals, including "research projects which present no more than minimal risk and therefore can be reviewed without a convened meeting."

If you wish to make any changes to this protocol, you must disclose your plans before you implement them so the IRB Board can assess their impact on your project. In addition, you must report to the Board any unexpected complications arising from the project that affect your participants. Approval of this project is for a period of one year from the date of this letter, the maximum duration permitted by the Federal Office for Human Research Protections (OHRP). If the project will not be completed by September 10, 2026, then you must submit a Renewal Form notifying the IRB of the continuation of this project. It is recommended that you keep your unit supervisor informed about the status of this project. If you have any questions regarding this project, please contact the current Chair of the IRB at irb@mga.edu.

Sincerely,

Dr. Jo n Powell Hall
IRB Chair
2023-2026

Appendix B: Survey Questions

Section 1: Demographics
1. What is your current role?
(Multiple choice)

EMT
Advanced EMT (AEMT)
Paramedic
EMS Supervisor/Chief
Firefighter/First Responder
Other (Short answer)

2. How many years of experience do you have in EMS/public safety?
(Multiple choice)

0–2 years
3–5 years
6–10 years
11–20 years
21+ years

3. What type of agency do you primarily serve with?
(Multiple choice)

Fire-based EMS
Third-service (municipal EMS agency)
Private EMS provider
Hospital-based EMS
Military/DoD EMS
Other (Short answer)

Section 2: Response Time Factors
4. In your experience, what is the average EMS response time in your service area?
(Multiple choice)

Under 5 minutes
5–8 minutes
9–12 minutes
13–16 minutes
Over 16 minutes

5. Which of the following factors most often delay EMS response times in your area?
(Checkboxes — allow multiple selections)

Traffic congestion
Dispatch processing delays
Staffing shortages
Hospital diversion or transfer delays
Equipment/vehicle availability
Geographic barriers (rural, remote areas)
Other (Short answer)

6. How often do you believe lights and sirens are used when they are not clinically necessary?
(Multiple choice)

Always
Frequently
Sometimes
Rarely
Never

Section 3: System Efficiency and Safety
7. Do you believe your agency has sufficient staffing to meet call demand?
(Multiple choice)

Yes
No
Unsure

8. How effective are current dispatch protocols in prioritizing critical calls?
(Linear scale: 1 = Very ineffective, 5 = Very effective)

9. In your opinion, what system improvements would most reduce response times in your community?
(Paragraph response)

Section 4: Outcomes & Perspectives
10. In your experience, how strongly do response times affect patient outcomes?
(Multiple choice)

Extremely significant
Very significant
Moderately significant
Slightly significant
Not significant

11. Have you observed any negative safety consequences related to pressure for faster response times?
(Multiple choice + optional follow-up)

Yes (Short answer: “Please describe”)
No

12. What strategies or innovations would you recommend to improve EMS system efficiency and safety?
(Paragraph response)

Section 5: Closing
13. Would you be willing to participate in a follow-up interview?
(Multiple choice)

Yes (Short answer: “Please provide contact information”)
No