

Decreasing Usage of Lights and Sirens in an Urban Environment: A Quality Improvement Project

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Abstract

Introduction: The risk of lights and sirens use in emergency medical services has been well documented. Our critical care transport team performs over 1,800 interfacility nonemergency medical services transports annually into a dense urban environment. Historically, we have utilized lights and sirens to navigate traffic patterns. The use exceeded industry standards. This quality improvement project was undertaken to decrease the use of lights and sirens. **Methods/Results:** The baseline use of lights and sirens in 2011 was 76% en route and 73% on return to the facility. We revised the internal policy guiding the appropriate usage of lights and sirens. In 2012, without an improvement in usage, a use justification process was implemented. By 2013, the use of lights and sirens was still high en route, but had decreased to 53% on the return trip. In 2014, we added accountability measures requiring justification, with a subsequent drop in 2015 to 14% en route and 13% on return. In the following 3 years, the transport teams have sustained lights and sirens use to 20% or below. **Conclusions:** This quality improvement initiative impacted team behavior and decreased the use of lights and sirens over 5 years, with sustained improvement at or below 20%. This improvement was accomplished through ongoing evaluation, education, data gathering, and open communication. There was no negative impact on patient outcomes during this time. Lights and sirens continue to be used when indicated. (*Pediatr Qual Saf* 2020;2:e279; doi: 10.1097/pq9.0000000000000279; Published online March 30, 2020.)

INTRODUCTION

The use of lights and sirens is well established in the emergency medical services (EMS) community. However, there are risks associated with their use. Thousands of emergency

vehicle accidents occur each year because of lights and sirens usage.¹⁻⁴ Ambulance use of lights and sirens is associated with increased risk of ambulance crashes, resulting in more severe injuries and more fatalities.^{2,3} Restraints provide a significant form of protection for ambulance occupants involved in an accident. However, rear compartment passengers are at the greatest risk of death or serious injury when an ambulance is involved in a crash while utilizing lights and sirens.⁴ Although this risk has been well communicated, practice within the EMS community

remains variable. An analysis utilizing the 2016 National Emergency Medical Services Information System database found that the average use of lights and sirens was 77% in the response phase (to the patient) and average usage of 23% in the transport phase (to the receiving facility).² Another study utilizing the 2010 National Emergency Medical Services Information System data only looked at the use of lights and sirens in the response phase to the patient, not the transport phase to the receiving hospital. This earlier dataset showed that the average use of lights and sirens in the response phase was 75.8%.⁵

Lights and sirens usage for transport teams that do interfacility transport exclusively is not well documented. The American Academy of Pediatrics Section on Transport Medicine guidelines for lights and sirens usage states that the use of lights and sirens is a hazard and that teams

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should have policies for appropriate usage.⁶ Additionally, the use of lights and sirens has been included as a quality metric in a consensus statement for neonatal and pediatric critical care transport.⁷ However, there are no published data on the use of lights and sirens for interfacility transport teams.

In reviewing the use of lights and sirens by a critical care transport team, investigators found that the use appeared excessive.^{2,5} Our transport team is a Chicago-based neonatal and pediatric specialty critical care transport team, completing over 1,800 interfacility ground transports annually. It is a hospital-based team utilizing a contracted service with our neonatal-pediatric team-branded ambulances. The ambulance service provides dedicated Emergency Medical Technician-Basic (EMT-B) drivers for our team. We transport patients from hospitals 3–40 miles away into a densely populated urban environment. Given the location, traffic delays are inevitable and have been an issue for over 30 years. Lights and sirens had become a means of navigating traffic.

We initiated a quality improvement project to address this issue. The objective of this project was to decrease the use of lights and sirens. Given the increased risk associated with lights and sirens, we intended this project to impact team performance while still allowing for clinical decision-making and patient safety so that lights and sirens were used only when clinically indicated.

METHODS/RESULTS

Initial review of lights and sirens usage in 2011 showed that they were utilized in over 70% of pediatric interfacility transports and had become standard operating procedure. Lights and sirens were used to navigate traffic and minimize the out-of-hospital time for most patients transported. These rates were higher than those of EMS providers in the return phase to the receiving hospital.² Lights and sirens usage was tracked to the referring hospital (en route) and returning to the receiving hospital (on return) for all transports.

In 2011, the use of lights and sirens was at 76% while en route to the referring facility and 73% on return (Figs. 1 and 2). The first intervention was to revise the internal policy guiding the appropriate usage of lights and sirens. The new policy defined appropriate use of lights and sirens as when utilization would positively affect patient outcomes. The policy further defined the appropriate use when a patient was categorized as unstable or having a time-sensitive illness or injury (Table 1). The team could decide about the use of lights and sirens based upon the policy without medical control approval. Education regarding the appropriate use of lights and sirens was disseminated to all team members (nurses and respiratory care practitioners) at semimonthly team education days, staff meetings, daily huddles, and annual safety days. During this time, one way driving time ranges were 10–60 minutes, depending on the location of the referring hospital and time of day.

The transport team raised concerns regarding the definition of the patient who would be affected by lights and sirens usage. The phrase, “unstable, or time-sensitive illness or injury,” was felt to be subjective and introduced variation in practice. The team requested a further definition of appropriate use. The decision was made to retain the language for 2 reasons—it permitted team members to exercise clinical judgment, and allowed them to adapt to the change in practice at a rate and in a context consistent with their personal experience and comfort.

In 2012, we implemented a standard debrief form (Table 2) to identify and discuss any safety concerns and equipment issues on each transport. The debrief form was designed to be completed for every transport by all team members collaboratively. Our second intervention was to include the use of lights and sirens and asking for rationale on this debrief form. In 2012, there was a slightly higher use of lights and sirens, and further insight regarding this trend was sought (Figs. 1 and 2).

The third intervention was a review of the policy (Table 1) and the reinforcement of the policy on team education days. There was discussion regarding expectations as to appropriate use. There was open dialogue regarding the team’s concerns with longer out-of-hospital times directly affecting the team’s availability for subsequent transports, weighed against the risks associated with the use of lights and sirens. The policy remained as written, and the team was left to determine whether the patient was unstable or had a time-sensitive illness or injury based on their clinical judgment.

In 2013, a review of data indicated that the use of lights and sirens was still high en route to the referring facility; however, on the return leg, the team’s use decreased to 53% (Figs. 1 and 2). We attributed this decrease to the increased awareness of the risks of lights and sirens.

In 2014, we began our fourth intervention by adding direct accountability to the process by requesting a specific justification for the usage of lights and sirens. Team members were asked to provide a rationale for the use of lights and sirens for each transport as part of the debrief form. If none was provided, the team Safety Coordinator sent an email requesting the rationale and included the statements of appropriate and inappropriate use from the policy. To encourage appropriate use and transparency in reporting, we established a nonpunitive policy regarding the use of lights and sirens outside of policy, or to receiving a reminder to provide a rationale for their use.

Throughout 2014, a more significant impact was seen. The use of lights and sirens en route to a referring facility decreased to 27%, and use on the return decreased to 18% (Figs. 1 and 2). In 2015, there was a continued reduction in the use of lights and sirens to 14% en route to the referring facility and 13% on the return (Figs. 1 and 2). In the following 3 years, teams have sustained lights and sirens usage at or below 20%. In the time since implementing an accountability process in 2014, we have

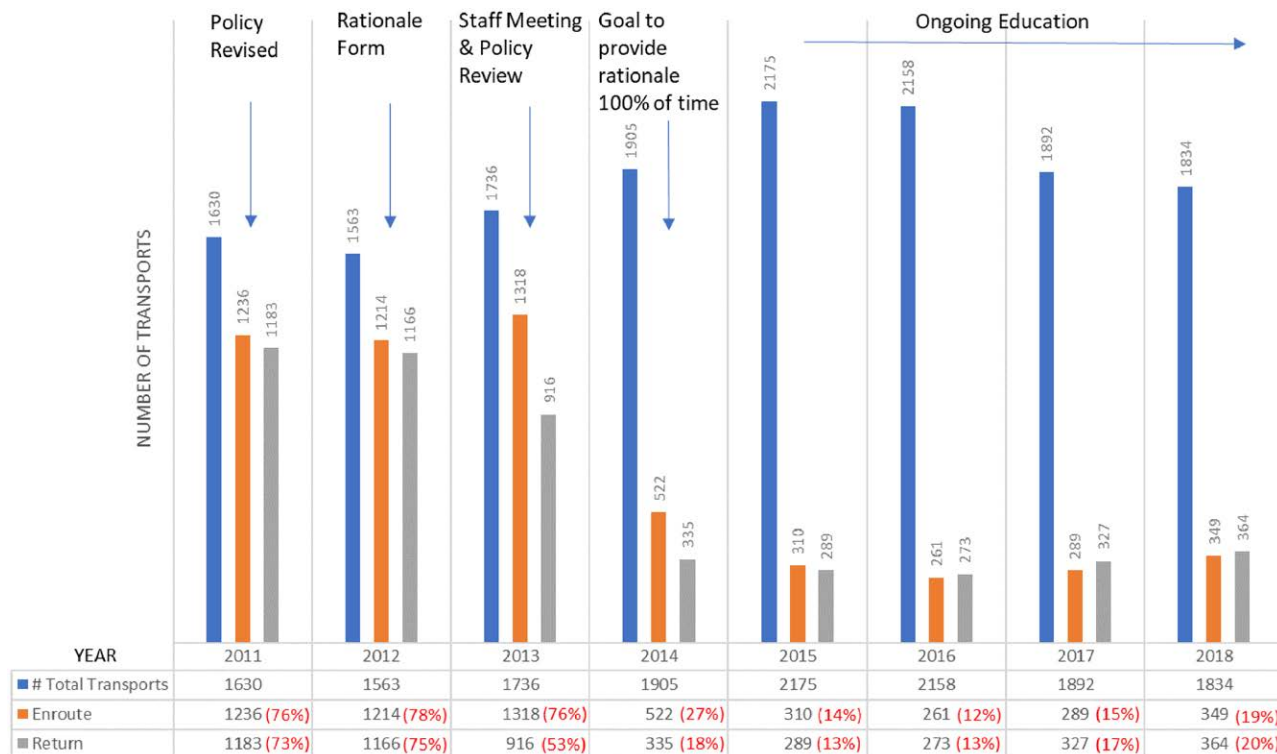


Fig. 1. Use of Lights and Sirens 2011–2018. This graph includes the total number of transports, the total number of times lights and sirens were used (%) en route to the patient at the referring hospital, and the total number of times lights and sirens were used (%) during the return to the receiving hospital.

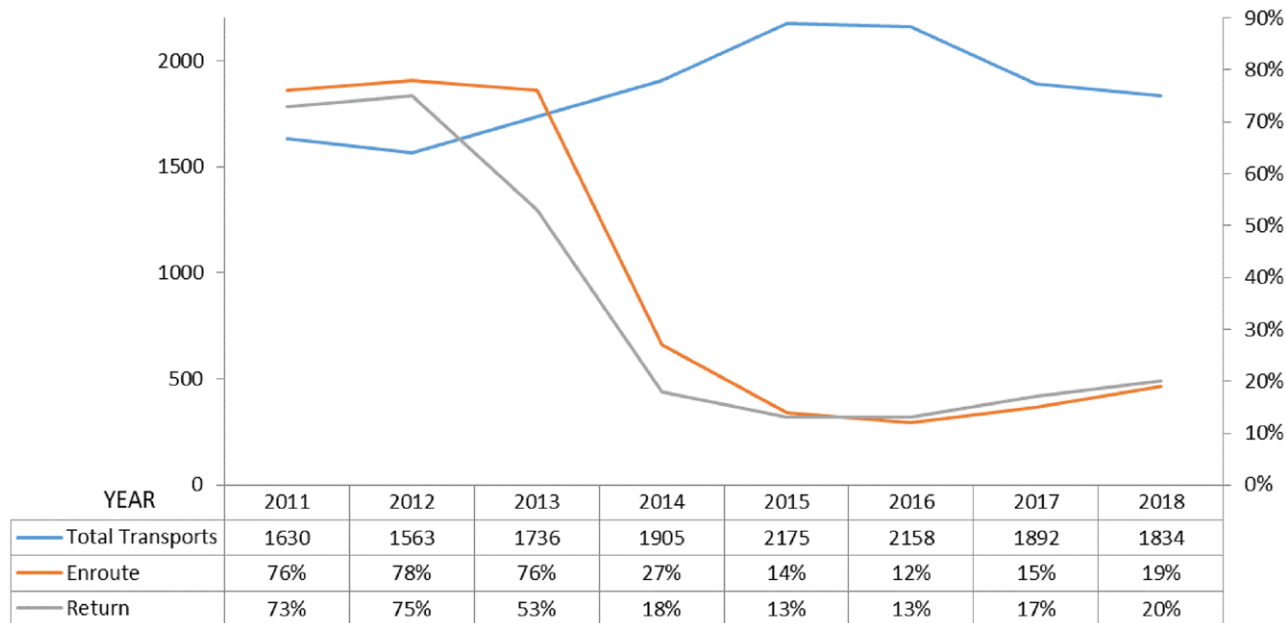


Fig. 2. Percent Usage of Lights and Sirens 2011–2018. Multifaceted approaches to the improvement project began in 2011. Baseline use was 73%–76%. By 2013, there was a 20% improvement in use on the return trip. The following year with the request for the rationale for use statement, use dropped to 20% or less over the next five years. During this time, the transport team realized a 2% growth in volume annually. In 2014, as the use of lights and sirens most dramatically decreased, transport volume also increased most dramatically 9%–12%.

consistently shown lower rates than in previous years (Figs. 1 and 2). We have continued to provide ongoing education during team education days and safety days.

In 2018, with the decrease in lights and sirens usage, one way driving time ranges were 20–125 minutes depending on referring hospital location, time of day, and traffic.

Table 1. Use of Lights and Sirens Policy

Lights and Sirens May Be Considered in the Following Situations	Lights and Sirens Will Not Be Utilized For
Critical care admission, traffic impeding forward movement of vehicle Patient transported has unstable or time sensitive illness or injury Patient requiring therapy unavailable in the transport environment	Return transport To facilitate the next transport Public relations/educational events

Table 2. Transport Team Debrief Form

Date	If Yes, Please Comment Below	
Time of departure		
Referral hospital		
Team members		
Team concerns	Yes No	
Communication	Yes	
Center concerns	No	
Equipment	Yes	
Concerns	No	
Safety	Yes	
Concerns	No	
Ambulance	Yes	If yes, brief description here and incident form completed: yes No
Concerns	No	
Ambulance #	N/A	
Lights and Sirens	Yes: there, back, round trip No	If yes, why:
Helicopter concerns	Yes No N/A	Debrief with helicopter team completed: yes/no
Referral hospital	Yes	
Concerns	No	

There have been several mechanisms in place to assure any decrease in use would not result in negative patient outcomes. There was a debriefing tool in use since 2012. It included comments related to the justification of the use of lights and sirens per team protocol; however, no concerns or adverse events were noted. There were, however, several notations regarding weather affecting the team’s decision-making. Second, the team had access to a safety event reporting process within the organization. Safety events are reported organizationally, and these assure leadership follow up within 72 hours. The only safety event noted during this timeframe was reported in July of 2016. The incident included a minor vehicle collision, no injuries to staff or patients. No lights and sirens were in use at the time of the incident. Last, data were followed, and rates of use were reported to the team monthly. In summary, there were no ill effects noted in the team’s decision-making overall.

DISCUSSION

The risk of lights and sirens usage has been well documented with increased risk of ambulance crashes and fatalities.¹⁻⁴ Several studies in the EMS literature have evaluated the time saved due to the use of lights and sirens with a range between 43.5 seconds and 3.63 minutes.⁸⁻¹³ Many studies have shown that the time saved is not clinically significant for the patient.¹²⁻¹⁴ Two studies have looked at pediatric EMS calls. One found that in

39.4% of the calls, lights and sirens were used inappropriately.¹⁵ The other found that 19.6% of lights and sirens usage was unnecessary.¹⁶ The National Association of Emergency Medical Services Physicians and the National Association of State EMS Directors published a position paper stating that written protocols and guidelines should delineate when to use lights and sirens during scene response and patient transport, as it is not a risk-free practice despite the long-established history of frequent use.¹⁷ The American College of Emergency Physicians EMS Committee also recommends the development of policies to limit lights and sirens operations.¹ Two studies have reviewed the utilization of protocols to guide lights and sirens usage.^{14,18} In both, the presence of the protocol significantly reduced the use of lights and sirens by EMS services, but did not impact patient disposition or result in adverse patient outcomes. This quality improvement project demonstrates that the creation of and the awareness of a policy are insufficient. A significant change in lights and sirens usage in this project occurred with policy implementation, accountability, case auditing, personal reflection, and ongoing education. Changing a long-standing practice within an established and experienced transport team is never easy. Any change should start with open communication to identify the problem, a review of the evidence, data collection, and then follow up with education and re-education.

The most significant change in behavior occurred when mandatory accountability was added. When team members had to justify their use of lights and sirens, the practice changed. During this time, there were no patient adverse events associated with the change in practice based upon review of transport team debrief forms, medical director chart reviews, and hospital safety event reports.

Some team members have raised concerns that team members are now “afraid” to use lights and sirens. These fears have provided the opportunity to reinforce that lights and sirens are appropriate and effective for the unstable patient. We have reinforced that the goal is not 0% use, but appropriate use in concordance with industry standards.

The team’s quality improvement work has progressed over the years. At the time of our efforts to minimize the use of lights and sirens, the work was not driven by key driver diagrams, control charts, or balancing measures. In retrospect, control charts would have been a valuable tool to quickly identify progress during initial stages as well as practice variance once the lower rates had been reached. The use of control charts is reflective of the team’s progression in their quality journey. The team’s progress

might have been expedited, given our current quality improvement tools within the organization.

CONCLUSIONS

This quality improvement initiative impacted team behavior and decreased the use of lights and sirens over 5 years, with sustained improvement at or below 20%. We accomplished this improvement through ongoing evaluation, education, data gathering, and open communication. There was no negative impact on patient outcomes during this time. Lights and sirens continue to be used when clinically indicated.

DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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