National EMS Quality Alliance

2021 Safety-02 Measure Package

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Safety-01 – Safety-02: Use of Lights and Sirens During Response/Transport

Safety-01 Safety-02 focus on the judicious use of lights and sirens during response to scene (Safety-01) and during patient transport (Safety-02). These measures may have the strongest evidence any measure in the EMS Compass Measure Set. There are strong guidelines and published studies that support the limited use of lights and sirens to protect not only the public but also EMS providers and patients from potential danger, as a consequence of lights and sirens use. The intent of these two measures is to determine how often EMS professionals are not using lights and sirens during response and transport.

The denominator for these measures is the total number of EMS responses/transports originating from a 911 request. The TEP decided not to add denominator exclusions to these measures, as even though there may be times were an EMS provider is responding to a high-risk emergency or transporting a high-acuity patient, the principle this measure was built upon is, *Above All Do No Harm,* and in order to uphold this principle and the intent of the measures, lights and sirens usage on all EMS responses and transports will be measured.

The numerator for both Safety-01 and Safety-02 was changed during the measure re-specification process. The original measures released as part of the candidate EMS Compass measure set were inverse measures, meaning lower measure scores indicated better quality. However, to eliminate confusion of the measure score interpretation, the TEP decided to change the measures to standard scoring, where higher scores will indicate better quality. This means the numerator for both Safety-01 and Safety-02 measure the process in which lights and sirens were **not** used.

The TEP understands the use of lights and sirens is often governed by state or local agency protocols. However, quality measures are built upon published guidance and rationale and the intent is to drive change. While individual EMS providers may still have to follow written protocols, NEMSQA and the TEP hopes that these quality measures will help drive change at the state and local levels, so protocols that are more in-line with the guidelines and evidence for lights and sirens use can be developed.

Safety-02: Use of Lights and Sirens During Transport

Measure Score Interpretation: For this measure, a higher score indicates better quality

Measure Description	
Percentage of EMS transports originating from a 911 request during which lights and sirens were not used during patient transport.	
Measure Components	
Initial Population	All EMS transports originating from a 911 request
Denominator Statement	**Population 1:** EMS transports in the initial population **Population 2:** EMS transports in the initial population for patients greater than or equal to 18 years of age **Population 3:** EMS transports in the initial population for patients less than 18 years of age
Denominator Exclusions	None
Denominator Exceptions	None
Numerator Statement	**Numerator for Populations 1-3 (Calculate 3 Rates):** EMS transports during which lights and sirens were not used
Supporting Guidance & Other Evidence	The following evidence statements are quoted verbatim from the referenced guidance: U.S. Department of Transportation, National Highway Traffic Safety Administration, Office of Emergency Medical Services: Lights and Siren Use by Emergency Medical Services (EMS) Above All Do No Harm:[i] Recommendations for EMS Vehicle Operators: • The driver is responsible for the mode of response to the scene based upon dispatch category, information available from dispatcher, and agency policy • The EMS provider, with the highest level of training, caring for the patient should direct whether or not L&S are used during transport based upon the patient's medical condition and potential benefit of time saved with L&S transport. • L&S merely request the right of way from other drivers, but neither emergency warning lights nor siren are very effective. Do not assume that your vehicle has been seen by other drivers, and

always proceed with caution and due regard.

- Consider the following when driving an EMS vehicle:
  - Automatic daytime running lights or manual headlights increase vehicle visibility and should be on at all times when vehicle is moving
  - Both L&S should be used when exercising moving privileges (e.g., traveling through a red traffic signal or in travel lanes that oppose normal traffic). Likewise, if the driver does not intend to exercise the privileges, neither light nor siren should be used during the response or transport. Traffic is confused by an EMS vehicle that approaches an e signal to turn green if the traffic has given the right of way.
  - EMS vehicle operators (assisted by EMS provider passengers) should ensure eye contact with other drivers and clear intersections before proceeding through intersections before proceeding through intersections against a red traffic signal or stop sign.
  - EMS vehicle drivers should primarily use a combination of wail and yelp when "requesting a right-of-way" with a siren. High-low and air horns are less effective siren modes.
  - EMS agencies and EMS vehicle operators should avoid continuous use of siren during L&S response or transport and should limit the siren use when needed to "request right-of-way" or when exercising privileges only permitted by emergency vehicles with L&S. Using sirens when travelling at highway speeds with traffic or when traveling unimpeded without exercising emergency vehicle privileges may impede crucial communication related to the response or patient care.
  - Avoid flashing white lights after dark, as these may blind oncoming drivers.
  - Do not exceed the posted speed limit in EMS vehicles (some experts suggest not exceeding the speed limit by more than 10 mph).
  - Drivers should have the mindset that L&S use is only asking permission of other drivers – never assume that permission will be granted.
  - Come to a "full stop" at red traffic signals or stop signs before proceeding, when using L&S.
  - Limit speed to less than 20 mph when traveling in a lane apposing the normal flow of traffic.
  - Downgrade L&S use if not indicated after more information becomes available during response or transport.

	○ L&S are not indicated if ALS is not indicated. ○ L&S use is a medical treatment that should be used only when indicated. ○ Consider specific approach to crossing intersections during EMS vehicle L&S driving (From Ambulance Insurance Services, Inc. Sample Intersection Crossing Policy). • Crossing on Green – slow down, look all 3 directions, proceed with caution. • Crossing on Red – come to complete stop, make eye contact with drivers of other vehicles, wait for partner to communicate all clear, wait 2 seconds, proceed with caution. • Making right or left turns across stopped vehicle – come to complete stop next to vehicle, establish eye contact via partner or self, wait for partner to tell you all clear, be aware of vehicles from behind, proceed with caution. • Other – use yelp siren mode, use headlights hi-lo beam, be patient. • Other – avoid passing on the right unless it is the last resort. • Other – avoid traveling in opposing traffic unless you are certain traffic is clear. If you must, use extreme caution and stay to your far right. ○ When "blocking the right-of-way" at a scene, consider altering the lighting pattern of the vehicle with the goal of drawing attention without blinding of overwhelming other drivers. • Do not use headlights or flashing white lights. • Consider decreasing the number and intensity of flashing lights overall. • Consider using scene floodlights to illuminate the scene and areas around the vehicle. • Consider turning off distracting flashing emergency lights if the EMS vehicle is not the primary vehicle "blocking the right-of-way" for traffic. • Consider using amber warning lights to warn of hazards ahead of amber directional signals to direct traffic away from hazards.
Measure Importance	

Rationale	When the National Highway Traffic Safety Administration reviewed two decades of data in 2005, it was found that there is an average of 4,500 MVC's involving ambulances each year, and of these crashes, and average of 34% involve injuries and 33 people are killed.[ii] A 2005 study of motor vehicle crashes in Pennsylvania found that ambulances were more likely to be in crashes at intersections and traffic signals than other vehicles of similar size. In addition to the increased MVC rate for ambulances, the study found that MVC crashes involving ambulances typically involve more people and more injuries than MVCs among vehicles of similar size.[iii] A 2018 study of trauma outcomes and prehospital transport time was unable to identify a correlation between increased prehospital transport times and 30-day mortality rates or hospital length of stay.[iv] A 2015 medical record review of pediatric transports found that of 490 RLS transports, 19.6% of them unnecessarily used lights and sirens.[v]
Measure Designation	
Measure purpose	• ☒ Quality Improvement • ☐ Accountability • ☐ MOC
Type of measure	• ☒ Process • ☐ Outcome • ☐ Structure • ☐ Efficiency
National Quality Strategy/Priority/CMS Measure Domain	• ☐ Clinical Process-Effectiveness • ☒Patient Safety • ☐ Patient Experience • ☐ Care Coordination • ☐ Efficiency: Overuse • ☐ Efficiency: Cost • ☐ Population & Community Health
CMS Meaningful Measure Domain	• ☐ Medication Management • ☐ Admissions and Readmissions to Hospitals • ☐ Transfer of Health Information and Interoperability • ☐ Preventative Care • ☐ Management of Chronic Conditions • ☐ Prevention, Treatment, and Management of Mental Health • ☐ Prevention and Treatment of Opioid and Substance • ☐ Risk Adjusted Mortality • ☐ Equity of Care • ☐ Community Engagement • ☐ Appropriate Use of Healthcare

	• ☐ Patient-focused Episode of Care • ☐ Risk-Adjusted Total Cost of Care • ☐ Healthcare-associated infections • ☒ Preventable Healthcare Harm • ☐ Care is Personalized and Aligned with Patient's Goals • ☐ End of Life Care according to Preferences • ☐ Patient's Experience of Care • ☐ Patient Reported Functional Outcomes
Level of measurement	• ☒ Individual EMS Professional • ☒ EMS Agency
Care setting	• ☒Pre-Hospital Care
Data source	• ☒Electronic Patient Care Record (eCPR) data • ☐ Administrative Data/Claims (inpatient, outpatient or multiple-source claims) • ☒ Paper medical record/Chart abstracted • ☒ Registry

NEMSIS Pseudocode: Safety-02: Use of Lights and Sirens During Transport

Measure Score Interpretation: For this measure, a higher score indicates better quality

Measure Description	
Percentage of EMS transports originating from a 911 request during which lights and sirens were not used during patient transport.	
Measure Components	
Initial Population	(eResponse.05 Type of Service Requested is in (2205001 ("Emergency Response (Primary Response Area)"), 2205003 (“Emergency Response (Intercept)”), 2205009 (“Emergency Response (Mutual Aid)”)) and (eDisposition.28 Patient Evaluation/Care is 4228001 (“Patient Evaluated and Care Provided”) and eDisposition.30 Transport Disposition is in (4230001 ("Transport by This EMS Unit (This Crew Only)"), 4230003 (“Transport by This EMS Unit, with a Member of Another Crew”), 4230007 (“Transport by Another EMS Unit, with a Member of this Crew”)))
Denominator	**Population 1:** Equals Initial Population **Population 2:** (Initial Population and (ePatient.15 Age is greater than or equal to 18 and ePatient.16 Age Units is 2516009 ("Years")) **Population 3**: (Initial Population and (

	ePatient.15 Age is greater than or equal to 2 and ePatient.15 Age is less than 18 and ePatient.16 Age Units is 2516009 ("Years")) or (ePatient.15 Age is greater than or equal to 24 and ePatient.16 Age Units is 2516007 ("Months"))))
Denominator Exclusions	None
Numerator	**Numerator logic for Populations 1-3 (Calculate three separate rates)** Disposition.18 Additional Transport Mode Descriptors is 4218015 (“No Lights or Sirens)

[i] Kupas, D.F. (2017) Lights and Siren Use by Emergency Medical Services (EMS): Above All Do No Harm. U.S. Department of Transportation, *National Highway Traffic Safety Administration, Office of Emergency Medical Services*, 49-51.

[ii] Smith, N. (2005) A National Perspective on Ambulance Crashes and Safety, *EMS World*, 2015; 44(9): 91-94.

[iii] Ray, A.F. & Kupas, D.F. (2005) Comparison of Crashes Involving Ambulances with Those of Similar-Sized Vehicles, *Prehospital Emergency Care*, 9:4, 412-415.

[iv] Brown, E., Hideo, T., Bailey, P., Fatovich, D., Pereira, G., & Finn, J. (2018) Longer Prehospital Time was not Associated with Mortality in Major Trauma: A retrospective Cohort Study, *Prehospital Emergency Care*.

[v] Burns, B., Hansen, ML, Valenzuela, S., Summers, C., Van Otterloo, J., Skarica, B., Warden, C., Guise, J.M. (2016) Unnecessary Use of Red Lights and Sirens in Pediatric Transport, *Prehospital Emergency Care*, May-Jun;20(3):354-61.