PSNet
PATIENT SAFETY NETWORK

Identifying Safety Events in the Prehospital Setting

May 16, 2022
Crowe RP, Mossburg SE, Dowell P. Identifying Safety Events in the Prehospital Setting. PSNet [internet]. 2022.
https://psnet.ahrq.gov/perspective/identifying-safety-events-prehospital-setting

Introduction

Measuring and monitoring patient safety in the prehospital setting brings a unique set of challenges and opportunities. Compared to other medical professions, emergency medical services (EMS) is a relative newcomer in the field of patient safety. Patient safety is beginning to take a larger role as care delivery in the prehospital setting evolves. EMS personnel provide care outside of a healthcare facility in complex environments. The unpredictability of the scene, environmental issues like lighting (or lack thereof), and the need to make decisions for time-sensitive conditions with often incomplete information are just a few of the factors that contribute to the challenge of providing care in the prehospital setting. The setting and workflow experienced by EMS personnel caring for patients in dynamic situations can influence efforts to monitor and deliver safe patient care. Given the complex challenges involved, leaders in the field are developing novel ways to improve measurement and monitoring of patient safety in the prehospital setting.

Identifying Safety Events in the Prehospital Setting

The wide range of variability in measuring and monitoring patient safety in the prehospital setting suggests that safety surveillance systems have evolved with time rather than by design.[1] Safety events in the prehospital setting are sometimes identified through review and auditing of patient care records for high-risk, low-frequency events, 100% auditing of specific clinical pathways, voluntary reporting by EMS personnel, complaint systems, and morbidity and mortality reviews. While offering some insight into care delivery and patient safety, limitations to these methods include that they are reactive, difficult to use for trending and benchmarking, and not conducive to change efforts. Turning towards purposeful design of surveillance systems could move the EMS profession to a higher level of patient safety focused on prevention, monitoring, and incorporating improvement science principles.

As a profession, EMS is moving from measurement for compliance to measurement for improvement. To facilitate this paradigm shift, researchers have started developing EMS trigger tools, based on the IHI Global Trigger Tool widely used in primary care. EMS clinical data based on a national EMS data standard, the National EMS Information System, or NEMSIS, facilitates use of trigger tools and benchmarking. A

trigger tool identifies patient records for review based on specific criteria, or triggers, with higher risk for potential incidents, adverse events, or harm. A trigger is commonly an event or procedure that serves as a red flag for review. An example of a clinical trigger in the prehospital setting might be oxygen saturation of less than 94% without administration of supplemental oxygen. Howard et al. recently developed and tested a trigger tool, the Emergency Medical Services Trigger Tool (EMSTT), for use in ground-based EMS settings to identify cases with potential risk for adverse events and harm.[2] The research team found that, compared with a random sampling strategy, the EMSTT was more accurate at identifying cases with potential risk for adverse events and harm.

Patient Safety Incidents

Perhaps one sign of EMS's emergence in the field of patient safety is the growth of published data documenting patient safety incident rates in the prehospital setting. A recent systematic review identified a median rate of 5.9 incidents per 100 records/transports/patients, although data were limited and there was wide variability.[1] Record reviews using trigger tools may portray event rates more accurately than incident reporting systems, which are commonly believed to underestimate prevalence of events; authors noted that studies that used record review data had a higher prevalence of patient safety incidents then those that used incident reports. Trigger tools can be used to evaluate low-risk, high-frequency cases that are not typically reviewed through traditional EMS auditing programs.

Contributions to Safer Care in the Prehospital Setting

Safety culture measurement, another indicator of patient safety, is also becoming feasible in the prehospital setting. Safety culture is consistently linked to safety outcomes, and serves as a foundation for the provision of safe patient care and prevention of harm. In other settings, low levels of safety culture are associated with increased errors, while high levels are linked to improvements in safety. Measurement of safety culture in the prehospital setting can help organizations transition from a focus on individual error to a Just Culture where the system is the primary focus.

Healthcare leaders have used safety culture measurement to assess and transform culture in hospital settings using the AHRQ Survey on Patient Safety Culture (SOPS) for almost two decades, but only recently has the SOPS been adapted for use in the prehospital setting.[3] Safety culture surveys can be used for a variety of purposes, from raising safety awareness among staff, to getting a baseline assessment of culture, to examining trends over time, to measuring change as a result of interventions. Modifications to language and domains of the existing SOPs were necessary because the prehospital setting differs from other healthcare settings. Testing of the adapted instrument shows validity and reliability similar to existing SOPS instruments.

Future Directions

The future looks promising for patient safety in the prehospital setting. While the need still exists for a standard way to classify patient safety incidents in this setting, rich electronic patient data that are becoming increasingly standardized and linked with hospital outcome data will create possibilities for EMS organizations to benchmark quality and safety performance internally, locally, and nationally. Stronger surveillance systems based on implementation of novel methods, such as trigger tools, could facilitate

proactive strategies to track, trend, and improve performance in areas of identified need. In the slightly more distant future, real-time alerts based on trigger tools could be built into surveillance systems to alert quality leaders to improvement opportunities in real time. But perhaps most importantly, with the advent of prehospital-specific safety culture surveys, EMS leaders and staff have the seeds to grow the culture of safety in EMS organizations.

Authors

Remle P. Crowe, PhD
Director of Clinical and Operational Research
ESO
Austin, TX

Sarah E. Mossburg, RN, PhD
Researcher
AIR
Crystal City, VA

Paul Dowell, Pharm.D., PhD
Senior Researcher
AIR
Columbia, MD

References

---

1. O'Connor P, O'Malley R, Oglesby AM, Lambe K, Lydon S. Measurement and monitoring patient safety in prehospital care: a systematic review. *Int J Qual Health Care*. 2021 Feb 5;33(1):mzab013. doi:10.1093/intqhc/mzab013. PMID: 33459774.

2. Howard IL, Bowen JM, Al Shaikh LAH, Mate KS, Owen RC, Williams DM. Development of a trigger tool to identify adverse events and harm in Emergency Medical Services. *Emerg Med J*. 2017 Jun;34(6):391-397. doi:10.1136/emermed-2016-205746. Epub 2017 Feb 2. PMID: 28153866.

3. Crowe RP, Cash RE, Christgen A, Hilmas T, Varner L, Vogelsmeier A, Gilmore WS, Panchal AR. Psychometric analysis of a survey on patient safety culture-based tool for emergency medical services. *J Patient Saf*. 2021 Dec 1;17(8):e1320-e1326. doi:10.1097/PTS.0000000000000504. PMID: 29894440.