

**National EMS Advisory Council
Committee Report and Advisory**
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Committee: Patient Care, Quality Improvement, and General Safety
Title: Successful Integration of Improvement Science in EMS
Version: FINAL

Issue Synopsis: Improvement science is an emerging scientific field that provides a framework for research focused on healthcare improvement in order to determine strategies to assure effective and safe patient care. Improvement science is being implemented in hospital systems, and in many cases has been shown to facilitate improvements in both the care process and in outcomes for some measures.

A. Executive Summary

While improvement science is just gaining popularity in Emergency Medical Services (EMS), it has been delayed due to disjointed efforts at establishing out-of-hospital evidence-based guidelines (EBG), developing benchmarks for quality EMS care, and having a uniform national EMS data set. Also the EMS community has historically evaluated its services based on process measures, such as response time and procedural attempts, which may not be relevant to patient-centered or systems-based outcomes. Despite a growing understanding that metrics such as these may be inadequate at demonstrating quality of care, the culture in EMS has been slow to transition to emphasis on clinical outcomes measures, possibly because they are more difficult to measure accurately.

Traditionally, there was little evidence to guide the provision of out-of-hospital patient care, and much of what was implemented in EMS was based on either consensus or best practices in the emergency department setting. With recent growth in the out-of-hospital evidence-base, the Federal Interagency Committee on EMS (FICEMS) and the National EMS Advisory Council (NEMSAC) proposed in 2009 the National Prehospital EBG Model Process as a means for developing, implementing, and evaluating guidelines for out-of-hospital care. In the model, effectiveness and uptake of EBGs should be measured with integrated quality improvement (QI) and monitoring systems. When recommendations exist to guide evidence-based out-of-hospital care, measurable outcomes should be available to minimize variation in care. However, most of the out-of-hospital EBGs that have been published to date do not propose metrics for QI.

With metrics lacking, the National Association of State EMS Officials (NASEMSO), through temporary funding from the National Highway Traffic Safety Administration (NHTSA), led the EMS Compass initiative to develop metrics for out-of-hospital care. Since 2014, EMS Compass has focused on engaging local, state, and national stakeholders to develop and test evidence-based, EMS-relevant measures to improve quality of care and to develop a system to support continuous updates to the measures,

using data elements from the National EMS Information System (NEMSIS) when possible. As the public proposed initial metrics for EMS Compass, the Steering Committee has noted the challenge of finding an evidence base for many of these measures. Funding is lacking to ensure long-term sustainability of a single body such as EMS Compass for ongoing vetting and validation of proposed metrics. Finally, many of the metrics that have been identified by EMS Compass are not measurable with the existing NEMSIS data dictionary, even though there are numerous variables that States are required to report to the NEMSIS database.

Therefore, the National EMS Advisory Council (NEMSAC) recommends that:

1. The Federal Interagency Committee on EMS (FICEMS):
 - a. Unify ongoing efforts with out-of-hospital EBG dissemination, implementation, and evaluation; quality metric development and testing; and EMS data collection, reporting and analysis such that as individual groups develop guidelines for implementation and disseminate them via the Prehospital Guidelines Consortium, they also propose relevant quality metrics that can be vetted and validated by one entity with suggested data variables for reporting through the NEMSIS database.
2. The National Highway Traffic Safety Administration:
 - a. Should embrace the Triple Aim of improving the patient experience of care, improving the health of populations, and reducing the per capita cost of health care. In addition to this Triple Aim, system readiness, health equity, and improving the work life of health care clinicians and staff should also be considered. These improvement science concepts should be integrated into future revisions of the following documents:
 - i. EMS Agenda for the Future
 - ii. EMS Scope of Practice Model
 - iii. EMS Education Agenda for the Future
 - b. Disseminate information about how to specifically and practically integrate improvement science into EMS at local and state levels, including comprehensive training to educate those who perform EMS QI in the proper mechanics of quality data collection.
 - c. Analyze the utility of NEMSIS data variables in the next revision, so that the utility of data elements that States are required to report better corresponds to identified metrics that can be meaningfully linked to patient-centered and/or systems-based outcomes
 - d. Develop a joint strategy with electronic health record (EHR) software manufacturers, hospital systems, and EMS agencies on how to both link and facilitate bidirectional sharing of health information between the out-of-hospital and hospital settings

B. Scope and Definition

The national significance of this issue is that approximately 16 million people are transported to emergency departments each year via EMS, yet there is no existing method in place to measure the quality of that care in an evidence-based manner

across all illness and injury presentations, using a national database.

This advisory is in line with the NEMSAC core values of being visionary, strategic, and diligent. This is visionary because it defines an ideal state in which improvement science is integral to EMS through alignment of currently separate initiatives regarding EBG development, quality metric definition, and national data reporting. It is strategic because it seeks to provide advice regarding how EMS is shaped in the future through integration of the Triple Aim into nationally relevant EMS agenda documents. Finally, it is diligent because the recommendations in the advisory are based on an evaluation of existing gaps in EMS.

C. Analysis

Value in healthcare is defined as quality relative to cost. As the NEMSAC simultaneously proposes advisories regarding payment reform in EMS to shift from a fee for service model to a value-based one, it is essential for the EMS industry to define what quality care is, so that a reimbursement model based on value can be meaningfully defined. Quality in healthcare has been defined as the simultaneous pursuit of several aims: improving the experience of care, improving the health of populations, reducing per capita costs of health care, and improving the work life of health care clinicians and staff. The benefit of integrating these aims into national agendas that shape administration, education, patient care, and research in EMS is that a focus on quality will be at the center of every aspect of EMS in the future.

Quality improvement requires measurement. In order to measure quality of care, evidence-based and agreed upon metrics must exist. Measures should be meaningful across the spectrum of care, and represent the best evidence for improving either individual patient outcomes or overall population health. Over the last few years, there have been several efforts to develop standardized performance measures for EMS. Some examples include: EMS Compass, the Cardiac Arrest Registry to Enhance Survival (CARES), and the American Heart Association's Mission: Lifeline EMS Recognition. EMS performance measures should be coordinated at the national level to avoid confusion and promote benchmarking without being duplicative. Ideally, there should be a single body responsible for endorsing and disseminating validated metrics using a consistent process, and this body should thoroughly understand performance improvement including barriers, benefits, and harms.

Measurement requires data. NEMSIS is the national repository used to house EMS data from every state in the nation, and represents millions of patient care records. EMS systems currently vary widely in their ability to collect patient and systems data and allow analysis at a local, state, and national level. NEMSIS was developed to help states collect more standardized elements and eventually submit the data to a national EMS database. Currently over 500 individual elements exist in NEMSIS, a subset of which State are encouraged to report to the national database. NEMSIS has the potential to be a useful repository for large amounts of meaningful data. While collection of a broad range of data points may have future application and utility, this must be balanced with the burden on

the individual EMS provider to record accurate data that will be meaningful when aggregated. As such, the data points should be carefully evaluated and refined to include those that can both be accurately entered by the provider and meaningfully used to benchmark patient-centered or systems-based outcomes.

Health information must be accessible across the continuum of emergency care. The Health Insurance Portability and Accountability Act (HIPAA) has been misinterpreted such that many hospitals have created barriers to sharing information across the continuum of care with EMS agencies. Many hospitals deny outcome information to EMS for quality improvement purposes, inappropriately citing HIPAA privacy concerns. Education aimed at hospitals and incentives or encouragement to systematically share outcome data is needed. This sharing is foundational to being able to evaluate EMS impact on patient outcomes and significantly improve the evidence base for both individual EMS interventions as well as overall impact on population health going forward. The success of system level performance and quality patient care hinges on linkage of patient experience throughout the system of care, rather than isolating care into segments.

Ensuring value in EMS across the nation requires a definition of quality that is evidence-based and grounded in validated metrics that can be followed over time through the measurement of data that is reported accurately and linked to patient-centered and/or system-based outcomes across the continuum of care.

D. Strategic Vision

Improvement science is infused into all aspects of EMS, such that EBGs created using the National Prehospital EBG Model Process drive the development of relevant, validated patient-centered and/or systems-based outcomes measures that can be assessed at local, state, or national levels using high-quality data reported through NEMSIS. These measures can be tracked over time and prompt improvements in patient care, population health, the cost of healthcare, and/or the work life of clinicians and staff.

E. Strategic Goals

1. By 2020, each out-of-hospital EBG that has been developed has proposed quality metrics that are relevant and either patient-centered or systems-focused, such that they can be utilized to measure the effectiveness of EBG implementation, ideally using NEMSIS-based data variables.
2. By 2020, the Triple Aim is noted in the EMS Agenda for the Future, the EMS Scope of Practice Model, and the EMS Education Agenda for the Future.
3. By 2020, NHTSA has publicly disseminated an improvement science implementation guide.
4. By 2020, the most recent version of NEMSIS has a data dictionary that has been evaluated and refined to include variables mapped directly to identified patient-centered and/or systems-based outcomes.
5. By 2020, at least two major EHR software vendors have successfully linked health

information for mutual use by both EMS agencies and hospitals.

Recommended Actions and Strategies

National EMS Advisory Council: N/A

Federal Interagency Committee on Emergency Medical Services

Recommendation 1: The NEMSAC recommends that the FICEMS unify ongoing efforts with out-of-hospital EBG dissemination, implementation, and evaluation; quality metric development and testing; and EMS data collection, reporting and analysis such that as individual groups develop guidelines for implementation and disseminate them via the Prehospital Guidelines Consortium, they also propose relevant quality metrics that can be vetted and validated by one entity with suggested data variables for reporting through the NEMSIS database.

National Highway Traffic Safety Administration

Recommendation 2: The NEMSAC recommends that NHTSA should embrace the Triple Aim of improving the patient experience of care, improving the health of populations, and reducing the per capita cost of health care by integrating concepts of improvement science into future revisions of the following documents:

1. EMS Agenda for the Future
2. EMS Scope of Practice Model
3. EMS Education Agenda for the Future

Recommendation 3: The NEMSAC recommends that NHTSA should disseminate information about how to specifically and practically integrate improvement science into EMS at local and state levels, including comprehensive training to educate those who perform EMS QI in the proper mechanics of quality data collection and analysis.

Recommendation 4: The NEMSAC recommends that NHTSA analyze the utility of NEMSIS data variables in the next revision, so that the utility of data elements that States are required to report better corresponds to identified metrics that can be meaningfully linked to patient-centered and/or systems-based outcomes

Recommendation 5: The NEMSAC recommends that NHTSA should develop a joint strategy with EHR software manufacturers, hospital systems, and EMS agencies on how to both link and facilitate bidirectional sharing of health information between the out-of-hospital and hospital settings

Other Department of Transportation: N/A

Reference Material:

A. Crosswalk with other standards documents or past recommendations

This advisory is in line with many components of the FICEMS Strategic Plan as noted below:

1. **Objective 1.1: Identify and promote the development and use of EMS performance measures and benchmarks.** This advisory aims to further refine the process by which EMS performance measures are both developed and utilized, so that they are aligned with EBGs and measured by data reported through NEMSIS.

2. **Objective 1.3: Promote measurement and reporting of the relationship between EMS care and outcomes, especially for time-critical and sensitive conditions.** This advisory promotes the integration of improvement science into documents of national relevance that shape EMS administration, education, patient care, and research. In addition, it calls for the linkage of outcomes-based data across the continuum of emergency care.
3. **Objective 1.4: Identify and promote best practices to reduce regional disparities in care, including support States in improving data quality.** This advisory requests that the data quality in NEMSIS be enhanced by refining the data elements that are reported at the national level to include those that are specifically linked to outcomes. Equipping States to track relevant outcomes based on high quality data will enhance their ability to identify and reduce regional disparities in care.
4. **Objective 2.2: Promote standardization and quality improvement of prehospital EMS data by supporting the adoption and implementation of NEMSIS-compliant systems.** This advisory calls for the unification of quality metric development and data collection/reporting via NEMSIS. Refining NEMSIS to include data that is useful for quality improvement promotes standardization.
5. **Objective 2.4: Improve linkages between NEMSIS data and other databases, registries, or other sources to measure system effectiveness and improve clinical outcomes.** This advisory calls for the linkage of outcomes-based data across the continuum of emergency care.
6. **Objective 2.5: Promote the evaluation of the characteristics of EMS systems that are associated with high-quality care and improved patient outcomes.** This advisory calls for the integration of improvement science concepts into nationally relevant EMS documents, which will promote the evaluation of EMS systems using a data-driven approach.

B. Resources/references related to the issue

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17. National Highway Traffic Safety Administration Office of EMS. EMS Education Agenda for the Future: A Systems Approach. 2000. Available at: <http://www.nhtsa.gov/people/injury/ems/EdAgenda/final/>
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20. NEMSAC Advisory Council, Subcommittee of Data Integration and Technology December 2, 2016. Standardized Training for Local Data Managers to Ensure High-Quality Data.
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