Quality Improvement in EMS: A Unique and Challenging Necessity

DEVIN TSAI, DO; BRYAN CHOI, MD; FRANCIS SULLIVAN, MD; KENNETH A. WILLIAMS, MD

ABSTRACT

Quality Improvement (QI) is required in all aspects of the healthcare field. Emergency Medical Services (EMS) poses unique QI challenges. This article explores some of these challenges and provides some points to consider when performing QI in EMS services.

KEYWORDS: Quality Improvement, pre-hospital emergency medical services

INTRODUCTION

As a medical provider, consider the following scenario. A patient shows up who may or may not be critically ill, but requires immediate assistance. You examine the patient and perform a few diagnostic tests. You give the patient treatment based upon what you think the patient's diagnosis is. Then, you hand the patient off to another provider and never find out what subsequently happened. You don't know if your assessment was accurate, if your treatment was appropriate and, ultimately, what the patient's outcome was. Unsettling, right? How can you assess the quality of your care?

EMS providers experience this scenario every day with just about every patient they see. How can an individual emergency medical technician (EMT) or ambulance service be expected to perform quality improvement in this setting?

In almost all areas of health care, there is constant evaluation of quality with a goal of continual improvement. There are accrediting bodies and healthcare commissions that review hospitals and health care professionals on how effectively they meet standards set by these entities. While many of those assessments are records-based, outcome knowledge and opportunities for direct observation abound. However, quality evaluation for EMS may not be quite as simple. Listed below are challenges faced when implementing QI programs for EMS:

1) The data-driven metrics typically relied upon by accrediting bodies are hard to develop for EMS.[1]
2) Many states have EMS protocols (standards of practice, guidelines) that vary by county, city, or even individual ambulance service. Therefore, EMTs may be held to different treatment standards across a statewide system.
3) Small or volunteer services with limited resources may not have the resources to have a fully functioning QI program. Many services have severe budgetary constraints.
4) Unlike physicians, EMS providers have different levels based on their training (EMT, Advanced EMT, Paramedic). This creates the problem of whether one level of provider should be held to the same standards as another when caring for the same patient and a similar concern exists related to the best provider to review care. Should review be by peers, or by those with a higher level of training? If by peers, what is the proper role for a physician medical director?
5) EMS agencies are not typically given access to other patient records (hospital, nursing home, dialysis, office, etc.), creating an obstacle to measuring outcomes.
6) With rare exception, EMS care is not directly supervised by the physician medical director, and QI review is based on chart audits and review of recorded data (radio transmissions, ECGs, etc.).

Despite these challenges, when it comes to EMS it is recognized that quality improvement should be performed[2] and that it does work.[3] Overcoming the unique challenges posed by EMS requires creativity and diligence. Core principles for implementation of EMS QI should include the following:

1) EMS is part of the health care team. EMS focuses on transport of patients to and between health care facilities, and in many areas is expanding its role to include prevention and follow-up activities (Mobile Integrated Healthcare/Community Paramedicine). Accepting EMS as crucial component of any comprehensive health care system is an essential first step in any QI program. In developing countries, individuals might walk, bike or hitch rides on the backs of motorcycles to come to a hospital (potentially travelling days to weeks). In such settings, precious care time is lost and patients may deteriorate due to this delay as well as any risk imposed by the transport itself. This situation occurs in the United States when patients choose to bypass the 911 EMS system when their situation indicates its use, and it is important to recognize the valuable service that EMS provides when properly used.

A focus of the National Highway Traffic Administration's *EMS Agenda for the Future* [4] is the integration of EMS with other healthcare organizations to identify and improve community health and safety issues. This integration

further solidifies EMS's place as part of the health care team. Describing what EMS does and where it is heading helps justify why EMS quality improvement is necessary. As EMS becomes recognized as a larger part of the health care milieu, it will be important to maintain high standards of care by performing QI. Resources that are exclusively dedicated to EMS quality improvement may be needed.

2) Augment the Feedback Process. When performing quality improvement, one simple model is to evaluate "structure, process, and outcomes." Evaluation of structure and process are possible within EMS services alone. However, evaluation of outcomes requires partnership with receiving facilities – access to records and relationships with individuals. Knowledge of outcomes is critical to effective quality improvement. There is no way to know which interventions are effective or appropriate when EMS providers are not given feedback on their care that is based on outcome measures. Ultimately, data must flow across agency and provider boundaries.[5] Typically, an EMS service medical director is well positioned to create a hospital-to-EMS liaison at hospitals where they are medical staff members, but EMS services typically transport to multiple hospitals, complicating even physician intervention to obtain outcome data. Methods must also be implemented to evaluate compliance with the established goals in conjunction with a feedback system to provide redirection towards them or recognition of attaining them.[6]

In Rhode Island, some effort has already begun to improve the feedback from in-hospital care and patient outcomes back to the pre-hospital providers. Specific efforts have been performed in stroke, myocardial infarction, and trauma care that have been well received in the EMS community.

3) Data collection. The old axiom that "numbers never lie" holds true in quality improvement. Defining quality is difficult because there are very few objective measures that apply in all circumstances. In addition, quality metrics are not very well defined in EMS. Despite these issues, there are some EMS metrics that can and should be measured. Response and scene times are measurable once clearly defined, as are metrics such as the percentage of patients with suspected cardiac chest pain, the percentage receiving aspirin, etc. As record keeping through electronic charting becomes more sophisticated, data collection will become less daunting of an endeavor.

Recently, in Rhode Island, a state-sponsored electronic patient care reporting system has become available to all EMS systems. Service chiefs, medical directors, and the Department of Health will now be able to have access to many metrics needed to improve data driven change. Computers are powerful QI tools, useful for gathering, storing, manipulating, and reporting data.[7]

In addition to the data collection that occurs at the state, county, or regional level, there is a national EMS data collection program called NEMSIS (National EMS Information System, www.NEMSIS.org). The primary goals of NEMSIS are:

1) Implement an electronic EMS documentation system in every EMS system
2) Implement a state EMS information system for every state
3) Implement a national EMS database

This powerful database approach is useful for both broad and narrow comparison of EMS systems. Growing since inception over 10 years ago, NEMSIS now accepts data from almost all states and thousands of EMS agencies, boasting a database that documents several million patient encounters.[8] In addition to the obvious quality improvement benefits of a powerful database engine with audit tools, the research implications of access to several million records are significant as well.

4) Quality organizations follow similar principles, healthcare industry or not. Quality organizations share several common characteristics: strong, visionary leadership to guide the organization and employees, prioritization of knowing and meeting client needs, planning for the future with a degree of flexibility, collection of relevant data coupled with fact-driven decision-making and measurable results, valuing employees and demonstrating this with appropriate assignment, and continuous quality improvement efforts.[9] Parallels from health care to the manufacturing and hospitality service industries have been made in the past and are in some cases appropriate.[10] However, it is inappropriate to apply the exact same quality paradigms to EMS. Unpredictability and variability in the prehospital care environment as well as varied presentation of even common disease processes are not factors in the manufacturing and service industry, and errors in judgment and patient care are held to an ethically different and much stricter societal standard.

Rather, EMS may be more closely compared with High Reliability Organizations (HROs), which are organizations where failure leads to catastrophic consequences.[11] Examples are nuclear power plants, commercial piloting, or air traffic control. However, EMS operates in a highly uncertain environment, with care often unwitnessed by supervisory personnel. Commercial pilots undergo quality improvement assessment in simulators and during check flights with experienced instructors. EMS is just beginning to use high-fidelity simulation, and cost is a significant limiting factor. QI supervisory presence is rare in EMS, although it occurs routinely due to emergency physician staffing on LifePACT, the pediatric and adult critical care transport team at Rhode Island Hospital/Hasbro Children's Hospital.[12] Both EMS systems and HROs often adopt the Incident Command System (ICS) for scene management, and many EMS systems have a "commitment to resilience," which blends an appreciation of a practiced routine and following orders with the ability to improvise or divert from protocol to complete a necessary

task. Also, quality EMS organizations routinely perform after-action meetings or debriefings and mortality and morbidity conferences, examining "near-misses" in particular to improve processes. In a HRO, this is called the "preoccupation with failure."

An organizational culture and infrastructure promoting excellence must be in place for any quality EMS organization. The culture must promote values that allow for both flexibility as well as consistency, recognize talent, and reward expertise. The infrastructure must be supported with personnel and technology to collect meaningful data, and results from data collection must be used to continually improve the organization. Every event requiring improvisation or a leading to a near miss should be examined closely for ways to improve performance or improve systems. Creating a quality EMS organization requires continual effort but reaps considerable reward.

CONCLUSION

As the evolution of EMS continues, it is important that growth occur in a manner that is safe and effective. The constant evaluation of change is the core of quality improvement in the EMS arena. EMS services, providers, and their physician medical directors face substantial challenges while providing error-intolerant care in a highly uncertain environment. Appreciation for these challenges and the unique QI issues faced by EMS services can help both to devise new approaches and to understand the limitations of EMS QI.

References

1. Moore L. Measuring quality and effectiveness of prehospital EMS. *Prehospital Emergency Care.* 1999;3(4):325-331.
2. Delbridge T, Paul B, Aufderheide TP, et al. EMS Agenda for the Future: Where We Are...Where We Want to Be. *Ann Emerg Med.* 1998:31(2):251-263.
3. Joyce SM, Dutkowski KL, Hynes T. Efficacy of an ems quality improvement program in improving documentation and performance. *Prehos Emerg Care.* 1997;1(3):140-144.
4. Delbridge TR, Anderson PB, et al. EMS Agenda for the Future. National Highway Traffic Safety Administration. http://www.nhtsa.gov/people/injury/ems/agenda. April 16, 1996. Accessed July 26, 2013.
5. Holroyd BR, Knopp R, Gallsen G. Medical control: quality assurance in prehospital care. *JAMA.* 1986;256:1027-1031.
6. Cooper GF, et al. *Advances in Quality Assurance, Advances in Trauma and Critical Care*. 2nd ed. 1987. St. Louis: Mosby.
7. Aghababian R, Williams K, Holbrook J, Lew R. Computer applications in quality assurance. *Emergency Medicine Clinics of North America.* August 1992;10(3):627-647.
8. Goodwin J. Delivering on the Data: More than 10 years in, where does NEMSIS stand? *Best Practices in Emergency Services* http://info.zolldata.com/Portals/152170/docs/delivering%20on%20the%20data%20%20best%20practices%20in%20emergency%20services.pdf. May 2013. Accessed September 4, 2013.
9. Lerner EB. *Evaluating and Improving Quality in EMS.* Dubuque, Iowa: Kendall/Hunt Professional. 2009.
10. Donabedian A. *Explorations in quality and approaches to its assessment.* Ann Arbor, MI: Health Administration Press. 1980.
11. Weick KE, Sutcliffe KM. *Managing the Unexpected: Assuring High Performance in an Age of Complexity.* San Francisco, CA: Jossey-Bass. 2001.
12. Williams K, Sullivan F. Critical Care Transport. *R I Med J.* 2013;96(12):39-43.

Authors

Devin Tsai, DO, is an Emergency Physician at Newport Hospital and Medical Consultant for the Newport County EMS collaborative.

Bryan Choi, MD, is an EMS Fellow in the Department of Emergency Medicine, The Alpert Medical School of Brown University.

Francis Sullivan, MD, is Clinical Associate Professor of Emergency Medicine, The Alpert Medical School of Brown University.

Kenneth A. Williams, MD, is Associate Professor of Emergency Medicine (Clinical), The Alpert Medical School of Brown University and Physician Medical Consultant, RI Department of Health, EMS Division.

Disclosures

The authors have no financial disclosures to report.

Correspondence

Devin Tsai, DO
Newport Hospital
Department of Emergency Medicine
11 Friendship St.
Newport, RI 02840
401-845-1593