

Defining a Suite of Performance Measures for Emergency Medical Services (EMS) in Rural Settings: North Dakota Rural EMS Counts Project

Authors:

Christopher Price, MPA¹; Lindsey B. Narloch, MS²; Antonio R. Fernandez, PhD, NRP³; Nikiah Nudell, MS, NRP⁴; Karen E. Jacobson, BA⁵; Shila Blend, PhD, RN-BC⁶; Brad Gibbens, MPA⁷; Jason Eblen, BUS, NRP; Howard Walth, RN, NRP⁸; J. Brent Myers, MD, MPH³; Remle P. Crowe, PhD, NREMT³

Affiliations: 1. Division of EMS, North Dakota Department of Health 2. North Dakota EMS Association 3. ESO, Inc 4. UC Health 5. Jacobson Consulting, LLC; 6. ND IT Department 7. Center for Rural Health, University of North Dakota School of Medicine and Health Sciences 8. CHI St. Alexius Health

Introduction:

Prehospital care and patient health outcomes for rural populations are variable with noted disparities between urban and rural emergency medical services (EMS) responses. Challenges facing rural EMS agencies include coverage of large geographic areas, extended distances with longer transport times to appropriate facilities, reliance on unpaid personnel, and difficulty maintaining skills sets due to lower call volumes. The complexities and resource constraints of providing prehospital care in rural settings necessitate performance measures specifically relevant to these unique environments.

Objective:

Our objective was to define a suite of performance measures relevant to EMS organizations delivering care in rural areas through a systematic review and consensus building process conducted among panels of rural EMS subject matter experts.

Methods:

The North Dakota Rural EMS Counts project was one of four projects funded through a Medicare Rural Hospital Flexibility grant aimed to define performance measures for rural EMS. First, a systematic review of the academic literature was carried out using the PubMed database to establish the base of existing performance indicators applicable to prehospital practice. Additional relevant documents were identified via the websites of national EMS organizations including NHTSA, NASEMSO and NEMSQA. Two reviewers assessed the eligibility criteria for all retrieved documents with a third reviewer resolving any disagreements. All performance measures from papers meeting inclusion criteria were collated into a list and duplicate measures were removed by consensus among the three reviewers. Next, a modified Delphi approach was used to identify and prioritize rural EMS performance measures. A list of subject matter experts from North Dakota and nationally was developed using snowball sampling. In total, 37 experts served as panelists for the modified Delphi. Through a three-round process, participants rated measures from the systematic review and were given the opportunity to suggest additional measures. At least 80% of panelists had to rate a measure for the measure to advance to the final round. Initially planned as an in-person event but moved to videoconference due to the COVID-19 pandemic, a measure development conference was conducted with 12 subject matter experts

on rural EMS and quality improvement. The task of this group was to prioritize measures identified in the modified Delphi process and generate standardized definitions using the NEMSIS data standard to encourage widespread adoption among EMS agencies. Lastly, the implementation phase consisted of employing strategies to disseminate a group of prioritized measures and encourage adoption among EMS agencies in the state.

Results:

The systematic review identified 152 unique EMS-related performance measures grouped into 14 topic areas: airway management, anaphylaxis, asthma/bronchoconstriction, cardiac, cardiac arrest, congestive heart failure/pulmonary edema, global, hypoglycemia, obstetrics/gynecology/neonate/pediatric, pain management, safety, seizures, stroke/transient ischemic attack (TIA), and trauma. In round one of the modified Delphi, participants submitted 82 additional measures for voting. At the end of the three rounds, 182 EMS performance measures important for rural settings were identified. These measures were submitted to the measure development conference for prioritization and creation of operational definitions. Standard definitions were created for all 182 measures and the top three measures were identified in each of the 14 content areas. For example, the top three measures for stroke/TIA were: stroke assessment performed, blood glucose recorded, and documentation of last known well or time of onset.

For the implementation phase, the project steering committee prioritized five topic areas and selected measures for dissemination via the North Dakota state data platform. The five topic areas were: Cardiac, Stroke, Pain, Vital Sign Assessment, and Safety. All EMS agencies in the state were provided point and click access to all measures within these categories (18 measures in total) via the ND State EMS Data Repository (ESO, Austin Texas). Benchmarking at the state and national level was also provided. Further, a baseline index document was created and freely distributed to describe current performance at the state and national levels. This index document further included insights and best practices for improving performance on these key measures. Via the project website, EMS agencies in the state also have access to toolkits for quality improvement to help develop systems of care, workflows and standard operating procedures. Agencies who choose to participate in quality projects related to these prioritized measures are also assigned a subject matter expert to guide improvement efforts.

Conclusion:

Through a systematic review of the literature, a modified Delphi approach, and measure development conference, 182 performance measures in 14 categories were defined for rural EMS. Some measures apply to most, if not all, EMS encounters such as judicious use of lights and siren for response and transport. Meanwhile, measures focusing on events that are high criticality but low frequency, like stroke care, were also deemed important for measuring performance in rural settings. For these measures, standardized definitions allow for data collaboratives and quality improvement partnerships to pool resources for quality improvement in low-volume settings. State and regional leadership with rural EMS stakeholders may find value in using their own baseline data to prioritize topics from this suite of performance measures and use established improvement science frameworks to drive meaningful change.