

2022 EMS INDEX:

# NORTH DAKOTA RURAL EMS COUNTS

The Center for Rural Health at the University of North Dakota was awarded a Flex EMS Supplement to implement a demonstration project on data collection and reporting for a set of rural-relevant EMS quality measures. The measures analyzed in the Index include five focus areas: Cardiac, Stroke, Pain, Vitals, and Safety. For a detailed description of each measure, consult the [Rural EMS Counts Measure Report Descriptions](#).

*PRESENTED BY*

**CENTER FOR RURAL HEALTH, UNIVERSITY OF NORTH DAKOTA  
SCHOOL OF MEDICINE & HEALTH SCIENCES**

**NORTH DAKOTA EMS ASSOCIATION**

**NORTH DAKOTA DEPARTMENT OF HEALTH**

**ESO**

**RURAL EMS  
COUNTS**



# CONTEXT AND OVERVIEW OF THE INDEX

Through a Flex grant provided by the Center for Rural Health at the University of North Dakota, the North Dakota Rural EMS Counts project has implemented a demonstration project on building consensus, data collection, and reporting for a suite of performance measures that matter for EMS in rural settings.

This Index serves as a point of reference for EMS organizations in North Dakota to identify which areas of their performance within the selected measures are in alignment with statewide performance measures, and which areas represent opportunity for improvement, more intensive local monitoring, or at least further assessment and evaluation.



**THIS INDEX PROVIDES A STARTING POINT OR BENCHMARK THAT YOU CAN USE TO EVALUATE PERFORMANCE COMPARED TO YOUR PEERS ACROSS THE STATE.**

By providing an objective look at aggregate data across the state of North Dakota, this Index provides a starting point or benchmark that you can use to evaluate performance compared to your peers across the state. A national benchmark is also provided based on data from the ESO Data Collaborative. The ESO Data Collaborative is comprised of more than 2,000 agencies and departments across the country, representing nearly 9.9 million responses between January 1, 2021 and December 31, 2021. This quantitative approach to measuring performance gives EMS organizations in North Dakota a framework to continually refine tactics, improve efficiency and outcomes, and allocate resources appropriately.

To that end, here are some of the questions we hope this 2022 EMS Index for North Dakota Rural EMS Counts will help you ask and investigate using your own data:



**Is my organization performing similarly to other organizations in North Dakota when it comes to time-sensitive clinical presentations, such as stroke or STEMI?**

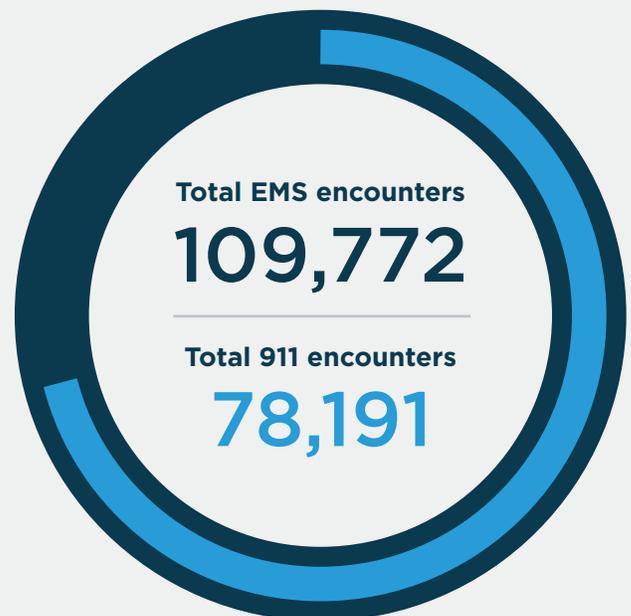
**Are we providing prehospital interventions for patients with moderate to severe pain?**

**Are we practicing judicious use of lights and sirens?**

**How does our rate of documented stroke assessment compare to the average across the state?**

**Are we consistently documenting vital signs?**

The Index uses data from the ND State EMS Repository, comprised of more than 120 agencies and departments across the state, representing nearly 110,000 EMS responses between January 1, 2021-December 31, 2021.



**Timeframe**

January 1, 2021 –  
December 31, 2021

**Total Number of Agencies**

127

## KEY AREAS OF FOCUS



CARDIAC



STROKE



PAIN



VITALS



SAFETY

## LIMITATIONS

This Index is retrospective and looks at aggregate data from 2021. There are no universal rules designed around these measures. The purpose of the Index is to be informative and directional, but it is not intended to be a scientific study, nor is it intended to be comprehensive in nature. We hope this document serves as a body of literature that adds to the discussion and conversation around best practices and quality improvement efforts to improve positive patient outcomes.

# INDEX METRICS



## CARDIAC

The three metrics analyzed in the Cardiac category focus on prehospital assessment of cardiac conditions:

### 12-lead Performed for Suspected Cardiac Chest Pain:

Percentage of patients with a 12-lead EKG performed when the EMS provider impression was related to suspected Acute Coronary Syndrome.

### 12-lead Performed for ED-Diagnosed STEMI/NSTEMI:

Percentage of patients with a 12-lead EKG performed when the ED ICD-10 diagnosis returned through ESO Health Data Exchange indicated STEMI/NSTEMI.

*Note: This measure only includes data from agencies and hospitals participating in ESO HDE.*

### Aspirin Administration for Suspected Cardiac Chest Pain:

Percentage of patients with documented aspirin administration when the EMS provider impression was related to non-traumatic chest pain.

Chart 2

### 12-lead Performed for ED-Diagnosed STEMI/NSTEMI

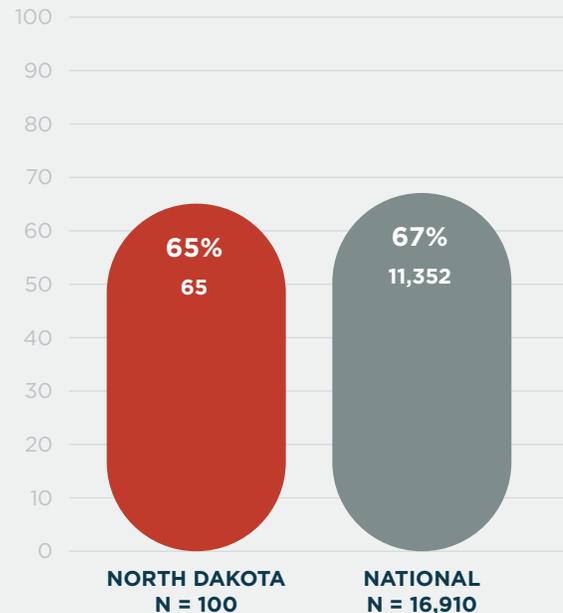


Chart 1

### 12-lead Performed for Suspected Cardiac Chest Pain

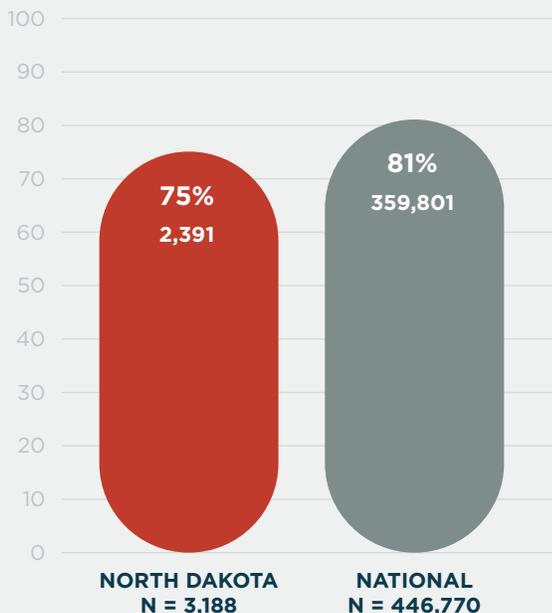
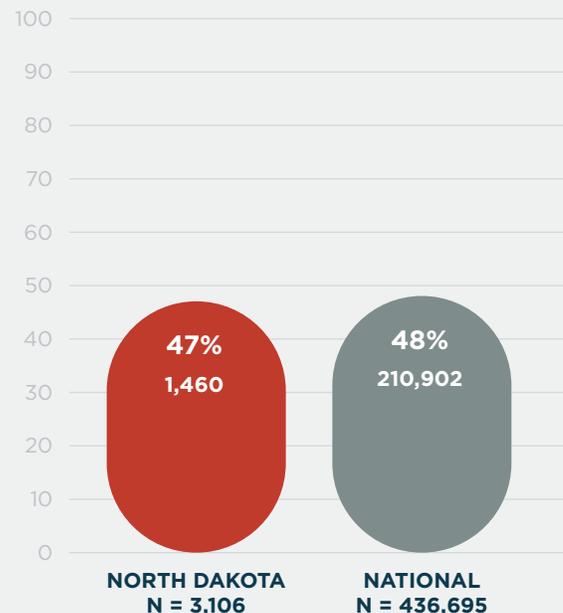


Chart 3

### Aspirin Administration for Suspected Cardiac Chest Pain



## INSIGHT

Early identification of STEMI in the prehospital setting can ensure that the catheterization laboratory (cath lab) is activated by the time the patient arrives, saving precious minutes that can lead to a better outcome.<sup>1-2</sup> The 12-lead EKG represents an essential tool for early identification of STEMI. Measuring EMS performance of 12-Lead EKG for suspected cardiac chest pain is an important quality metric, but it isn't the whole story. Sharing hospital outcome data with EMS clinicians can shed light on patients who experienced STEMI that was not recognized by EMS. This includes STEMI presentations beyond the classic symptom of chest pain. Research increasingly shows that women experiencing STEMI may present with signs and symptoms other than chest pain and do not have their STEMI recognized as the same rate as male patients. Reviewing unrecognized STEMI cases is a good first step to closing this gender gap.



### **EARLY ASPIRIN ADMINISTRATION HAS BEEN SHOWN TO REDUCE DEATHS FROM ACUTE CORONARY SYNDROME BY AS MUCH AS 23%.**

Nevertheless, we see low rates of documentation of aspirin. A 2018 review of ESO data showed that often EMS documented aspirin use in the narrative rather than the drop-down flow chart medications field and that aspirin administered or taken by the patient prior to EMS arrival was not always documented in the EMS record. Ensure that aspirin is part of your dispatch pre-arrival instructions for patients with suspected cardiac chest pain. This metric should be considered as a baseline upon which to evaluate your organization's policies and procedures for aspirin administration and documentation.



### **DID YOU KNOW?**

**You can document why a medication like aspirin was not given using your drop down menus. Reasons a medication was not given include contraindication noted, medication allergy, medication was already taken, and patient refusal.**

# INDEX METRICS



## STROKE

The Stroke metrics focus on documentation of stroke assessment and other important observations that give context to the patient's condition:

**Blood Glucose Check Performed for Suspected Stroke:** Percentage of adult patients with suspected stroke that received a blood glucose evaluation.

**Last Known Well or Time of Onset Recorded for Suspected Stroke:** Percentage of records for patients with suspected stroke or TIA who had time of onset or time last known well (LKW) documented in the appropriate discrete data field as part of the stroke assessment.

**Stroke Assessment Performed for Suspected Stroke:** Percentage of patients with suspected stroke who had a documented stroke assessment by EMS.

**Stroke Assessment Performed for ED-Diagnosed Stroke:** Percentage of patients with an ED ICD-10 diagnosis code indicating stroke who had a documented stroke assessment by EMS.

*Note: This measure only includes data from agencies and hospitals participating in ESO HDE.*

Chart 4

**Blood Glucose Check Performed for Suspected Stroke**

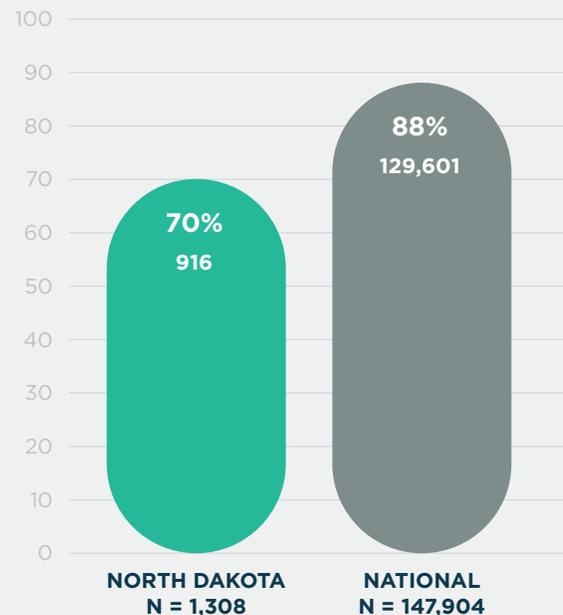


Chart 5

**Last Known Well or Time of Onset Recorded for Suspected Stroke**

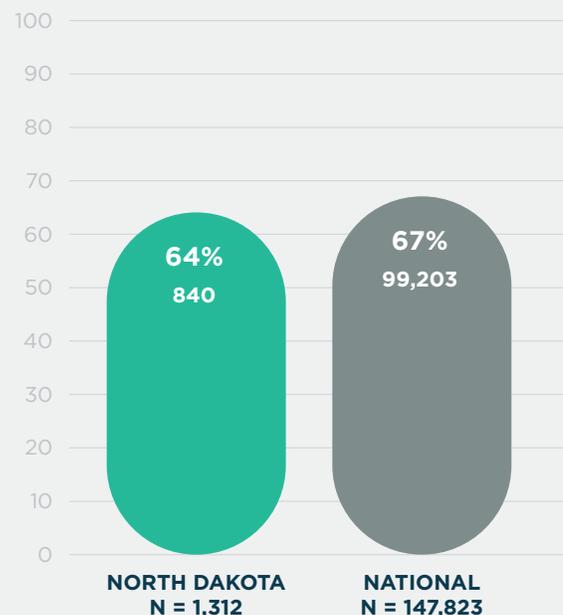


Chart 6

**Stroke Assessment Performed for Suspected Stroke**

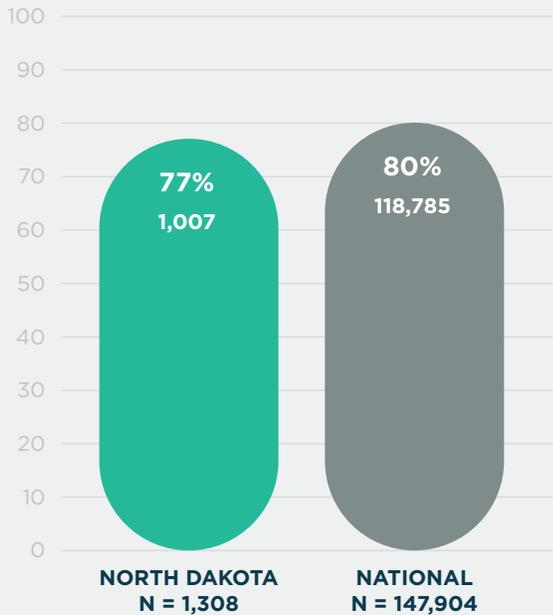
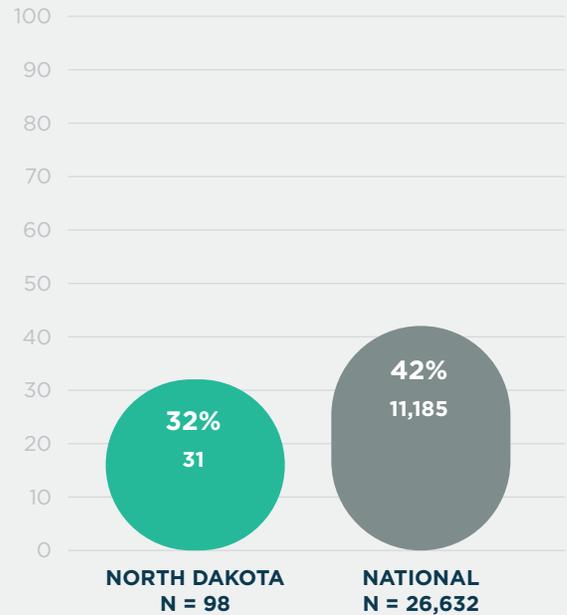


Chart 7

**Assessment Performed for ED-Diagnosed Stroke**



**INSIGHT**

In cases of suspected stroke, documenting a complete prehospital stroke screen is key for not only identifying stroke, but also for understanding stroke severity. Stroke severity has important implications for treatment options and hospital destinations. The rate of stroke assessment performed by EMS for suspected stroke is encouraging. Having linked hospital data allows us to see the other side of the equation: How often does EMS not recognize a patient who is having a stroke? Using the HDE outcome data, we see a lower rate of stroke assessment performed by EMS for ED-diagnosed stroke. Reviewing these cases as part of your quality management program and identifying the drivers behind unrecognized stroke is key to improving patient outcomes.



**ASSESSING AND DOCUMENTING THE PATIENT'S BLOOD GLUCOSE IS KEY FOR DISTINGUISHING HYPOGLYCEMIA FROM STROKE AS THE SIGNS AND SYMPTOMS OF THESE CONDITIONS ARE OFTEN SIMILAR.**

Recording last known well time has important implications for the types of treatment that are likely to result in positive outcomes. In these measures, documentation of last known well time shows substantial room for improvement.

# INDEX METRICS



## PAIN

The Pain measure explores the frequency of pain management interventions and how often those interventions resulted in pain reduction or relief. Research shows that pain is underassessed, so these measures only capture patients who received a pain assessment:

**Pain Management Intervention Performed for Pain Greater Than 4:** Percentage of patients with a pain score of five or greater from any cause (trauma, cardiac, other), that received some form of pain intervention and the percentage of patients with pain relief.

**Pain Intervention Resulted in Pain Reduction for Pain Greater Than 4:** Percentage of patients with a pain score of five or greater from any cause (trauma, cardiac, other), that had a last pain score lower than the first pain score during their EMS encounter.

Chart 8

**Pain Management Intervention Performed for Pain Greater Than 4**

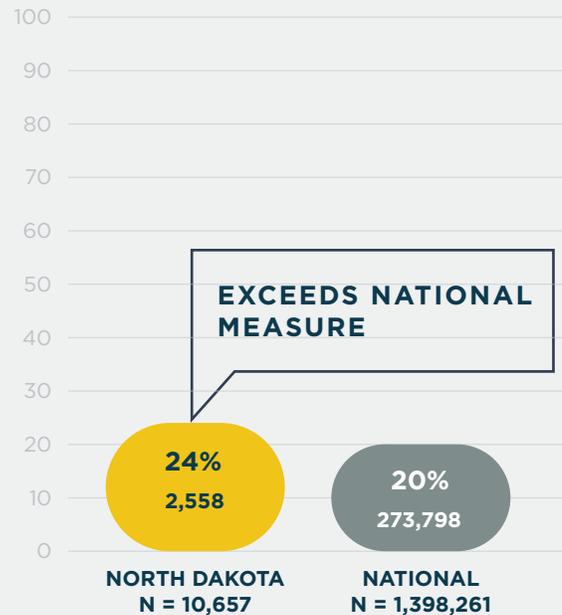
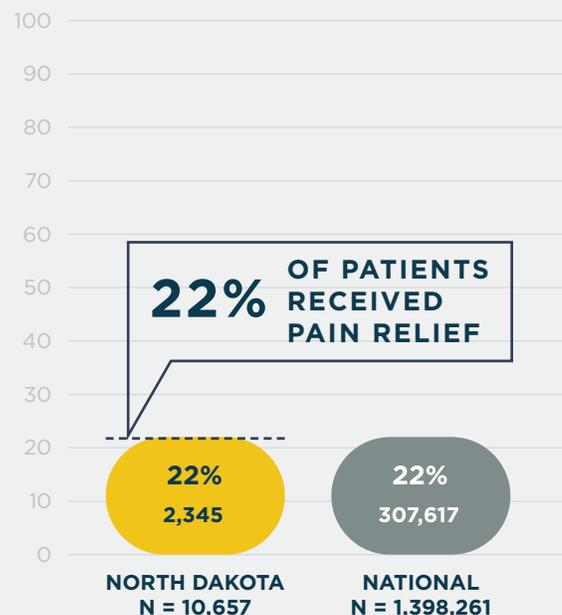


Chart 9

**Pain Intervention Resulted in Pain Reduction for Pain Greater Than 4**



## INSIGHT

Pain is one of the top reasons individuals visit the ED.<sup>3</sup> EMS should assess patients for pain and determine whether a pain management intervention (pharmacologic or non-pharmacologic) is appropriate. The metrics in this Index support evidence that that pain management intervention is not used frequently in the prehospital setting. Given that we can only gain insight from patients who received a pain assessment, pain may be even more undertreated than evidence shows.



### **PAIN MAY BE EVEN MORE UNDERTREATED THAN EVIDENCE SHOWS**

Review your agency's policies on prehospital pain management intervention to determine whether your agency has more opportunity to manage patients' pain. Consider pharmacologic and non-pharmacologic interventions. Basic life support (BLS)-only units may also consider including more options to provide pain relief. [New evidence-based guidelines on prehospital pain management](#) can help EMS agencies consider the variety of pain management interventions available.<sup>4</sup> A toolkit from the [National Association of State EMS Officials \(NASEMSO\)](#) also offers a toolkit for prehospital pain management, including a sample protocol. With the proper validated assessment tools and both pharmacologic and non-pharmacologic pain management options, EMS clinicians can feel equipped to deliver pain management to patients as appropriate.<sup>5</sup> Remember, BLS options for pain management include active listening, distraction, calming techniques, splinting, elevation, and ice or cold therapy.

# INDEX METRICS



## VITALS

The Vitals measure set focuses on the rate of documentation of vital signs, which is crucial in helping EMS clinicians make important decisions and in making sure patients get the right care:

**Set of Vital Signs Documented:** Percentage of all records with at least one set of vital signs (Systolic Blood Pressure, Glasgow Coma Scale Score, Pulse Rate, Respiratory Rate, and SpO<sub>2</sub>) gathered and documented in the appropriate vital signs data fields.

**Systolic Blood Pressure Documented:** Percentage of all records with at least one systolic blood pressure reading gathered and documented in the appropriate vital signs data field.

**Glasgow Coma Score (GCS) Documented:** Percentage of all records with at least one Glasgow Coma Scale score gathered and documented in the appropriate vital signs data field.

**Pulse Rate Documented:** Percentage of all records with at least one pulse rate gathered and documented in the appropriate vital signs data field.

**Respiratory Rate Documented:** Percentage of all records with at least one respiratory rate gathered and documented in the appropriate vital signs data field.

**SpO<sub>2</sub> Documented:** Percentage of all records with at least one pulse oximetry reading gathered and documented in the appropriate vital signs data field.

Chart 10

Set of Vital Signs Documented

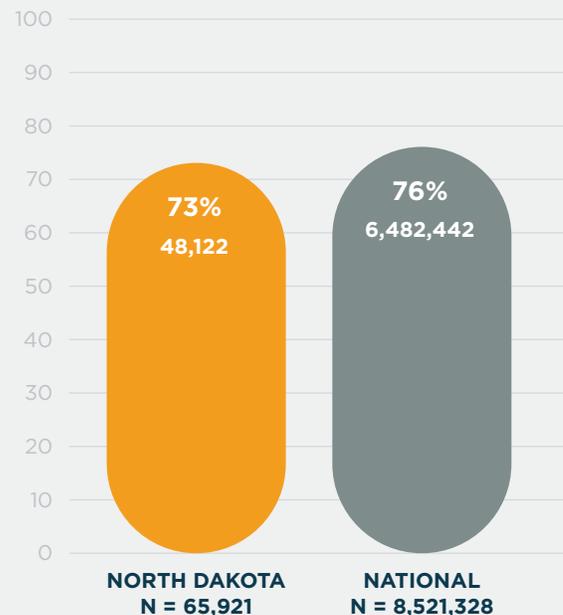


Chart 11

Systolic Blood Pressure Documented

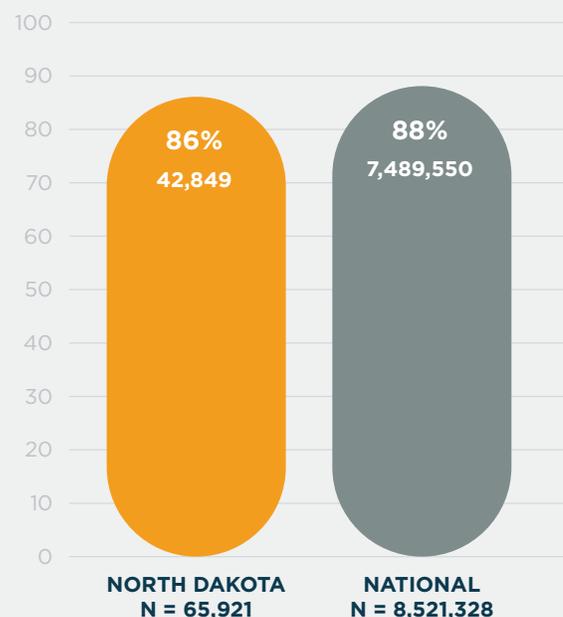


Chart 12

**Glasgow Coma Score (GCS)  
Documented**

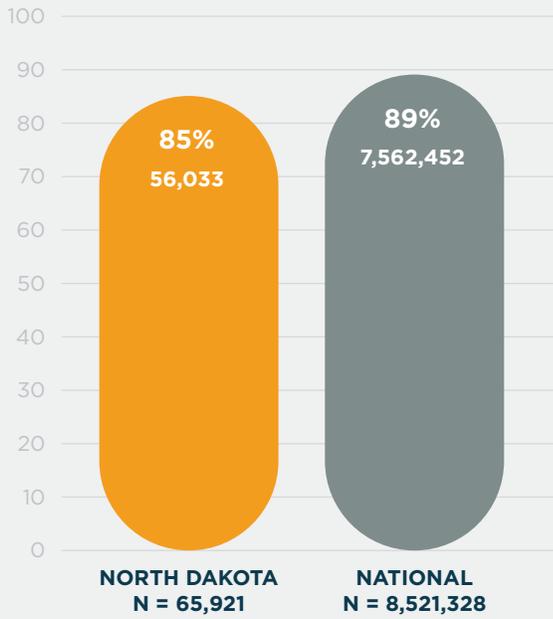


Chart 13

**Pulse Rate Documented**

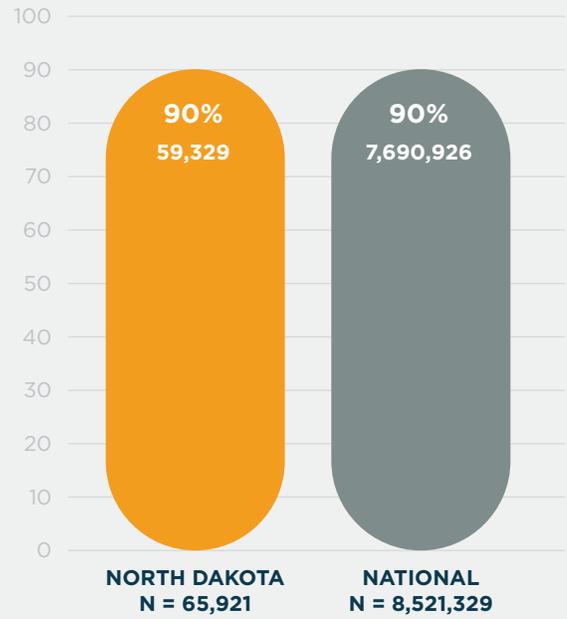


Chart 14

**Respiratory Rate Documented**

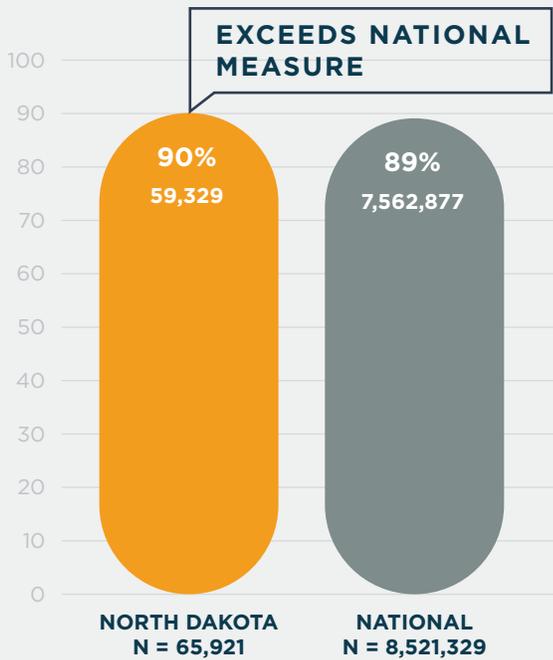
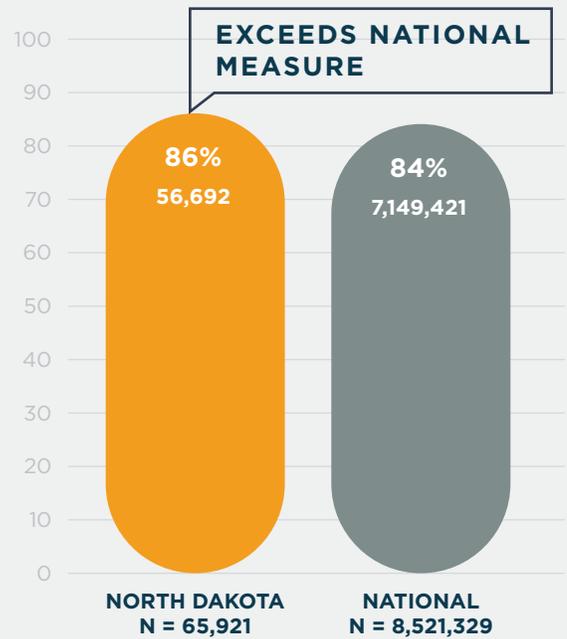


Chart 15

**SpO<sub>2</sub> Documented**



## INSIGHT

Documenting patient vital signs is an important part of painting the full clinical picture of a patient's condition. It not only helps in decision-making and treatment in the prehospital setting, but also helps determine the patient's care after their encounter with EMS. Complete documentation can also help an EMS provider justify their actions should the care provided ever come into question from a legal standpoint.



### **THOROUGH AND ACCURATE DOCUMENTATION CAN PROVIDE EVIDENCE OF EXCELLENT, HIGH-QUALITY CARE.<sup>7</sup>**

Data analysis shows that nearly every metric in this set has a favorable rate of completion of documentation, but given the importance of documentation in patient care, there are always opportunities for improvement. Agencies may also wish to break this metric down further by clinical or operational characteristics. For example, is the rate of complete vital sign documentation the same between EMS encounters with transport and without transport?

# INDEX METRICS



## SAFETY

The metrics associated with safety provide insight into patient, provider, and public safety:

**Lights and Sirens Not Used During Response to Scene:** Percentage of EMS encounters in which lights and sirens were not used during response.

**Lights and Sirens Not Used During Transport:** Percentage of EMS encounters during which lights and sirens were not used during patient transport.

**EtCO<sub>2</sub> Monitoring with Advanced Airway:** How often at least one EtCO<sub>2</sub> measurement was recorded when an advanced airway was used.



The use of lights and sirens for transport is a safety measure defined by the National EMS Quality Alliance (NEMSQA). The NEMSQA measure uses standard scoring in which higher scores indicate better quality, so to align with that measure we are focusing on the percentage of calls in which lights and sirens were not used.

Chart 16

Lights and Sirens Not Used During Response to Scene

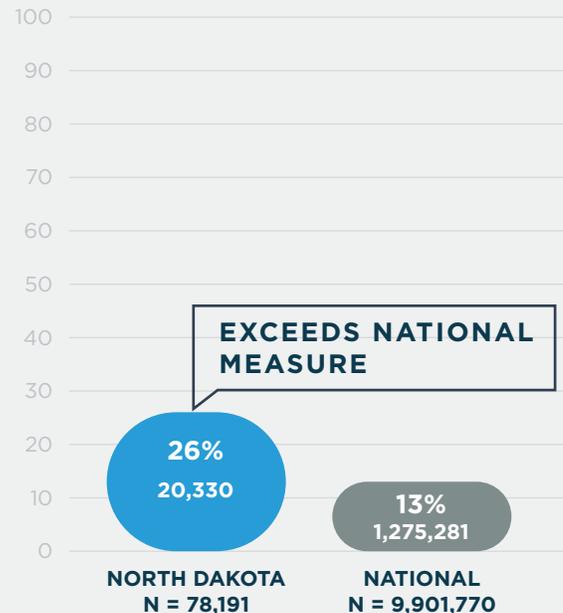


Chart 17

Lights and Sirens Not Used During Transport

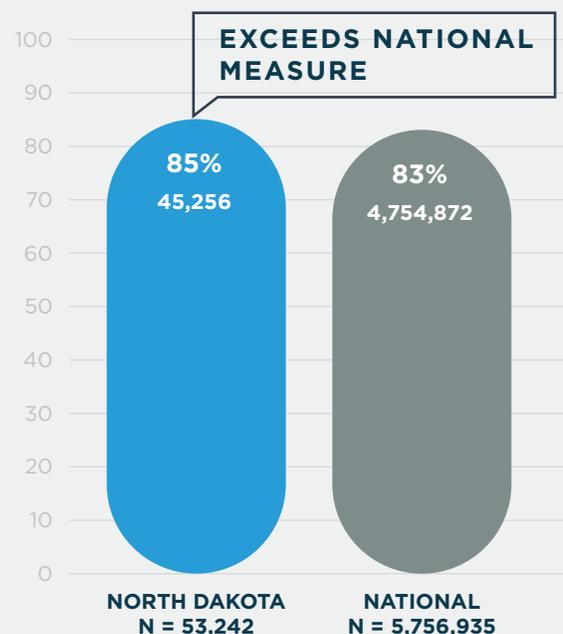
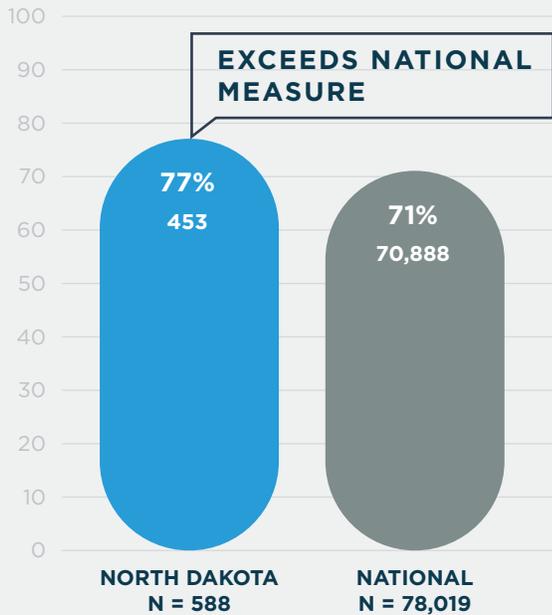


Chart 18

### EtCO<sub>2</sub> Monitoring with Advanced Airway



Advanced airways include endotracheal intubation as well as supraglottic devices.



### INSIGHT

The National EMS Quality Alliance (NEMSQA) has spearheaded the development of industry metrics that support limiting the use of lights and sirens to protect patients, EMS providers, and the public. The goal of the collaborative is to work with participating agencies to safely reduce lights and siren use to less than 30% of responses and less than 5% of transports for 911 EMS calls. We see a favorable rate of lights and sirens not used during transport, but there is a significant opportunity to improve lights and sirens not used during response to scene.



### MEASURING AND MONITORING ET<sub>CO</sub><sub>2</sub> LEVELS TO ENSURE THEY REMAIN WITHIN THE ACCEPTABLE RANGE

ET<sub>CO</sub><sub>2</sub> measurement following advanced airway placement is an industry best practice that should be in place at every agency. The use of ET<sub>CO</sub><sub>2</sub> monitoring confirms proper advanced airway placement, can alert the provider of accidental dislodgement, and the second-by-second wave form provides definitive evidence that the tube remained in place during the encounter. Measuring and monitoring ET<sub>CO</sub><sub>2</sub> levels to ensure they remain within the acceptable range is critical for patient safety, so there is opportunity for improvement in this metric. The National Association of EMS Physicians (NAEMSP) has published a publicly available [Airway Compendium](#) comprised of position statements and resources on prehospital airway management to help EMS agencies establish best practices.

# METHODOLOGY

The dataset used for the ND Rural EMS Counts EMS Index is real-world, de-identified data, compiled and aggregated from 127 agencies across North Dakota that submit their patient care records to the state. The data are based on more than 78,000 anonymized 911 calls between January 1, 2021 and December 31, 2021, representing a full calendar year.

## OK, NOW WHAT?

Organizations should use this information to understand why metrics are important and which metrics and drivers can have the biggest effect on your organization and the patients you serve. With this Index as a foundation, you can do your own analysis to serve as the basis for other modeling and outcomes. The metrics shown in this Index are by no means exhaustive. Every organization is unique and has its own strengths, structure, and goals. Because of these attributes, results achieved by one organization may not be attainable by another for a variety of reasons. However, these metrics should provide a foundation to compare your measurements and outcomes to what we are seeing statewide.

## OTHER ACTIONS YOU CAN TAKE TO DRIVE QUALITY IMPROVEMENT IN YOUR ORGANIZATION:



Use your ESO Analytics to measure your own agency's performance on these measures. Log in to ESO, click on Analytics > Repository Reports > North Dakota > Rural EMS Counts.



Attend the North Dakota EMS Association's monthly town hall meeting.



Tune into online educational opportunities quarterly and get continuing education credits.



Use one of the subject matter experts to start implementing quality improvement projects.



Watch North Dakota EMS show improvement in the areas we focus on and see how we stack up against other rural areas.

# REFERENCES

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# ABOUT



## CENTER FOR RURAL HEALTH, UNIVERSITY OF NORTH DAKOTA SCHOOL OF MEDICINE & HEALTH SCIENCES

The Center for Rural Health (CRH) at the University of North Dakota School of Medicine & Health Sciences connects resources and knowledge to strengthen the health of people in rural and tribal communities. Our programs serve people within the state, region, and nation. Established in 1980, we are the federally designated State Office of Rural Health for North Dakota. We are a department within the School of Medicine & Health Sciences at the University of North Dakota in Grand Forks, North Dakota.

We work in a variety of areas to bring together expertise and help share knowledge and tools with a broad range of rural and tribal stakeholders.



## North Dakota Emergency Medical Services Association

Founded in 1976, the North Dakota Emergency Medical Services Association (NDEMSEA) has been actively involved in emergency medical services (EMS) throughout North Dakota. NDEMSEA has dedicated its resources to sustaining and strengthening the EMS system in North Dakota. Since our inception we have been committed to providing a voice and resources to all of our members in order to ensure that pre-hospital patient care in North Dakota remains exceptional.



## NORTH DAKOTA DEPARTMENT OF HEALTH

To accomplish our mission, the North Dakota Department of Health is committed to: improving the health status of the people of North Dakota; improving access to and delivery of quality health care and wellness services; promoting a state of emergency readiness and response; achieving strategic outcomes using all available resources; strengthening and sustaining stakeholder engagement and collaboration; and managing emerging public health challenges.



## ESO

ESO (ESO Solutions, Inc.) is dedicated to improving community health and safety through the power of data. Since its founding in 2004, the company continues to pioneer innovative, user-friendly software to meet the changing needs of today's EMS agencies, fire departments, hospitals, and state EMS offices. ESO currently serves thousands of customers throughout North America with a broad software portfolio, including the industry-leading [ESO Electronic Health Record \(EHR\)](#), the next generation ePCR; [ESO Health Data Exchange \(HDE\)](#), the first-of-its-kind healthcare interoperability platform; [ESO Fire RMS](#), the gold standard for Record Management Systems; trauma, burn and stroke registry software; and ESO State Repository. ESO is headquartered in Austin, Texas. For more information, visit [www.eso.com](http://www.eso.com).