

2018 ESO EMS INDEX:

INSIGHTS AND BEST PRACTICES FOR EMS AGENCIES

AUTHORS

DR. BRENT MYERS, CHIEF MEDICAL OFFICER, ESO

ALLEN JOHNSON, VICE PRESIDENT FOR HEALTH DATA EXCHANGE, ESO

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CONTEXT AND OVERVIEW FOR THE INDEX



Everywhere we look, EMS is undergoing both subtle and not-so-subtle changes, with an increased emphasis on how and when dollars are spent, what results are being measured, how to best serve rural areas, and the increasing opioid crisis.

To that end, earlier this year, we identified a number of trends we believe will have an impact on EMS organizations in 2018. The prevailing theme is data. Or, rather, the need for smarter use of data to make more informed decisions, share important information from multiple sources, and improve interoperability between departments and other systems to ensure positive outcomes for both patients and the organizations that serve them.

We have data to share. This year, we are launching the inaugural ESO EMS Index to help EMS leaders answer the following questions, among others:

The appropriate metrics for evaluating the success of your EMS organization will vary depending upon a number of factors, including the size of population served and geographic location. However, we believe an objective look at aggregate data across the United States can give you a good idea how you are performing compared to your peers.

The purpose of this index is to serve as a point of reference for EMS organizations to identify which areas are in alignment and which areas represent opportunity for improvement – or at least further assessment and evaluation. This quantitative approach to measuring performance gives EMS organizations a framework to continually refine tactics, improve efficiency and outcomes, and allocate resources appropriately.



IS MY ORGANIZATION ALIGNED WITH OTHER ORGANIZATIONS AROUND THE COUNTRY WHEN IT COMES TO RESPONDING TO CERTAIN EVENTS, SUCH AS STROKE IDENTIFICATION AND ASSESSMENT?



ARE WE ABOVE OR BELOW THE NATIONAL AVERAGE WHEN IT COMES TO RESPONDING TO OVERDOSE EVENTS?



WHAT ARE THE BEST PRACTICES FOR EACH METRIC IN THIS INDEX?

This index uses data compiled from nearly 1,000 agencies and represents:



**5.02 MILLION
PATIENT
ENCOUNTERS**

LIMITATIONS

This index is retrospective and looks at aggregate data from 2017. 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 it serves as a body of literature that adds to the discussion and conversation around best practices for each of the measures identified in this Index to improve positive patient outcomes.

THE KEY METRICS MEASURED ARE:



**STROKE ASSESSMENT
PERFORMANCE**



**PERCENT OF PATIENTS WHO
ARE SUFFERING FROM OVERDOSE**



**ETCO2 AFTER ADVANCED
AIRWAY PROCEDURE**



**12-LEAD PERFORMANCE
IN ADULT CHEST PAIN**

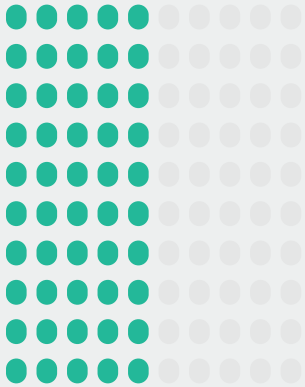


**ASPIRIN ADMINISTRATION
IN ADULT CHEST PAIN**

We hope you find this Index helpful, enlightening and empowering. We're always here to answer any questions, clarify any of the data, and share our expertise. Enjoy.

5 KEY FINDINGS

The ESO EMS Index looked at 5.02 million patient encounters from January 1 -December 31, 2017 across a number of events. At a macro level, the Index revealed the following 5 metrics.



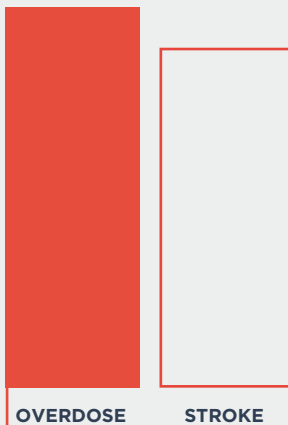
IN ONLY

50%

of situations is a complete stroke assessment documented for a primary impression of stroke.

The data show that EMS providers are omitting the complete stroke assessment or failing to document the assessment after a primary impression of stroke is identified.

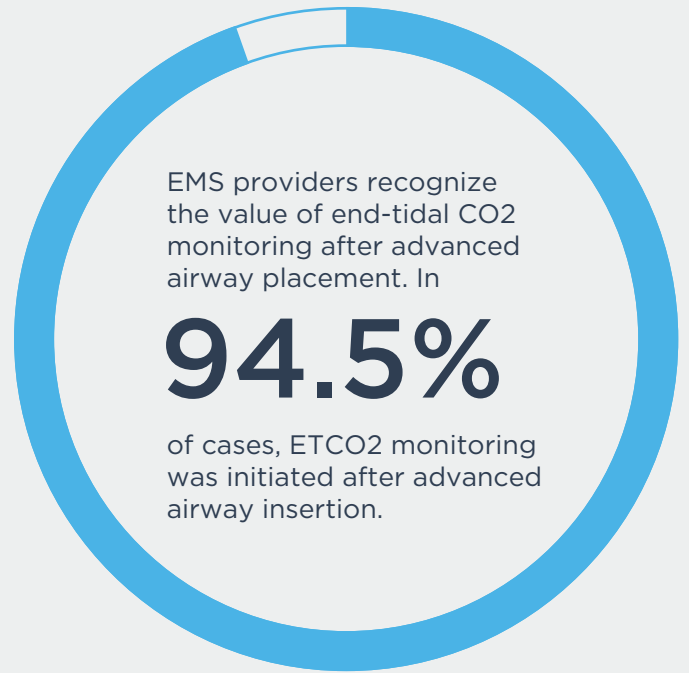
Overdose encounters outpaced cases where stroke is the primary impression.



THERE WERE NEARLY

12%

more overdose cases reported in 2017 than strokes, aligning with much of what paramedics are reporting the last few years.



EMS providers recognize the value of end-tidal CO2 monitoring after advanced airway placement. In

94.5%

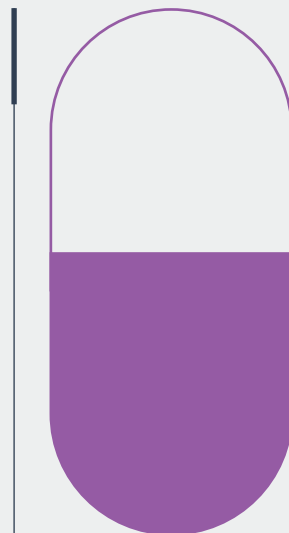
of cases, ETCO2 monitoring was initiated after advanced airway insertion.

12-lead performance in chest pain still needs attention.

ONLY 75.9%



of non-traumatic adult chest pain encounters received a 12-lead EKG.



Aspirin administration is hit or miss. Just more than half

55.3%

of the reported cases of non-traumatic chest pain patients over the age of 35 received aspirin administration for chest pain.

MORE MEN THAN WOMEN OVERDOSED

Men accounted for

28%



more overdose encounters than women.

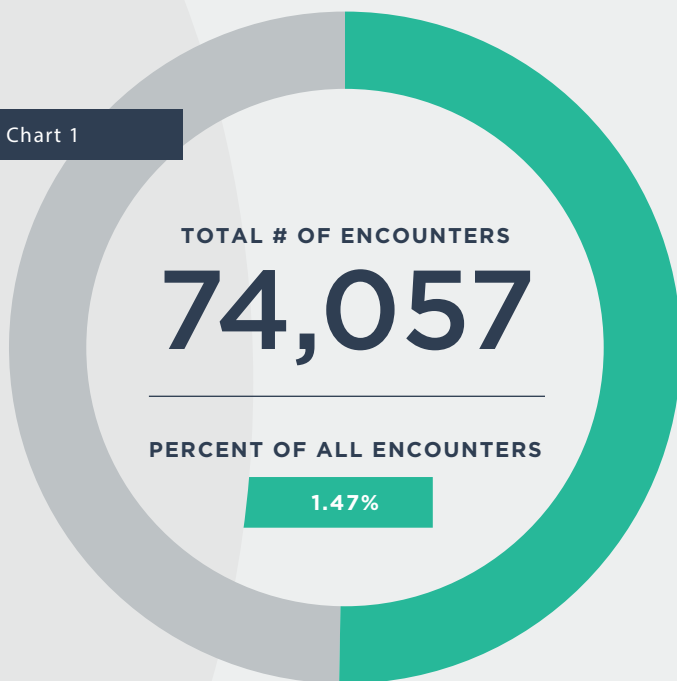
INDEX METRICS



STROKE ASSESSMENT PERFORMANCE

The stroke assessment performance metric looks at how many people with a primary impression of stroke received a formal stroke assessment that was appropriately documented. As treatment for stroke continues to evolve, it is becoming increasingly important to not only identify a stroke but to determine the severity of the stroke using a validated, formal stroke assessment. The treatment options and hospital destinations for patients will vary depending on a number of factors, including the severity as determined by a formalized assessment.

Chart 1 below shows there were 74,057 encounters where the primary impression was stroke, but only 37,325 were actually given a complete stroke assessment (or documented a stroke assessment) - or 50.5%.



NO ASSESSMENT PERFORMANCE
36,732

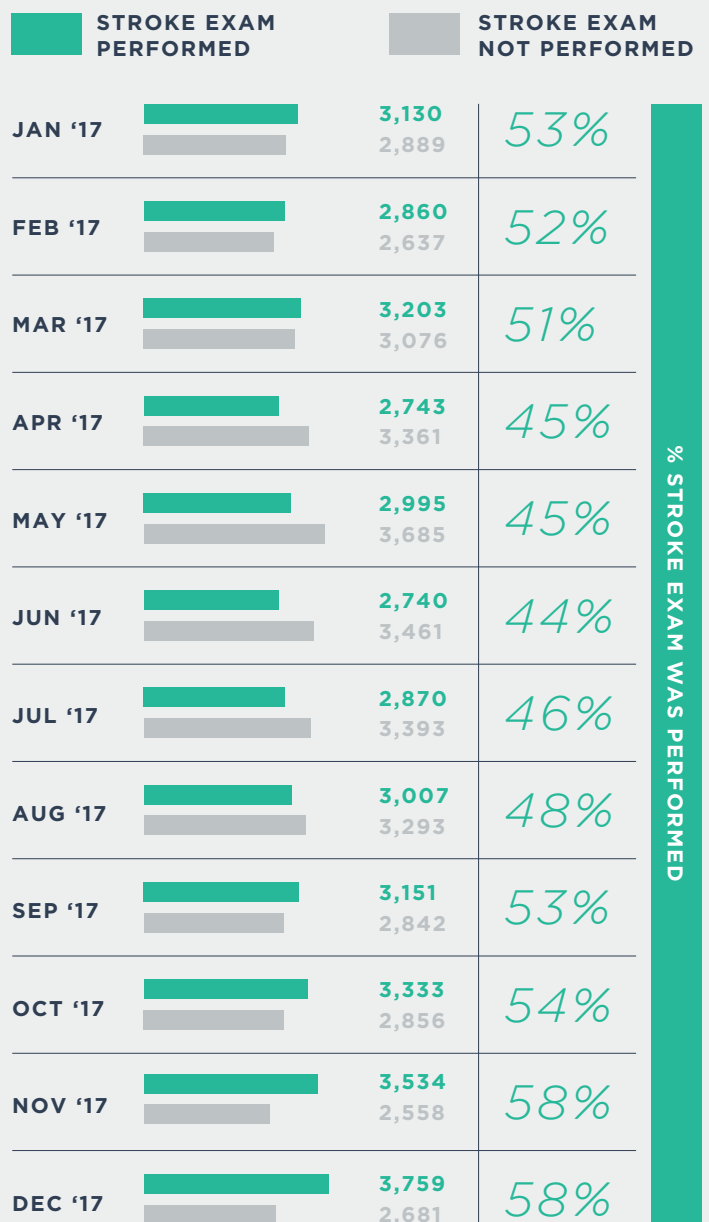
ASSESSMENT PERFORMANCE
37,325

PERCENT COMPLETE STROKE ASSESSMENT DOCUMENTED

50.5%

Chart 2 looks at stroke encounters monthly. Interestingly, EMS providers start strong the first three months of the year and end strong the last four months of the year, performing a complete stroke assessment more often than not. After March and before September (Spring and Summer months), the numbers flip and stroke assessment performance declines (or documentation of stroke assessment declines).

Chart 2



INSIGHT

According to the Centers for Disease Control and Prevention (CDC), stroke is the 5th-leading cause of death in the United States, accounting for more than



**140,000
DEATHS
ANNUALLY**

In addition to being one of the leading causes of death, stroke is also one of the leading causes of long-term disability and the leading preventable cause of disability, according to the American Stroke Association.

Early identification of possible stroke patients promotes better outcomes by getting the patient to the right facility faster. With the expansion of endovascular treatment windows, there is greater reason to send patients to a facility where endovascular treatment options are available.

BEST PRACTICE



Stroke assessment in patients with sudden onset of even vague neurological systems can be the difference between a successful or unsuccessful patient outcome.



Properly document stroke assessment using EHR tools that yield discrete data to enable retrospective analysis of the predictive value of these tools.



Monitor stroke-assessment rates for patients with sudden onset of neurological symptoms and provide performance feedback often by reinforcing outstanding performance and encouraging low performers.



Partner with your local stroke center to get outcome data on 100% of suspected strokes and any missed strokes.



Enhanced care, including mechanical thrombectomy, makes formal stroke assessment all the more important.



Look at how your organization is performing with stroke assessment against the data in this report. Are you above the average? Below the average?

INDEX METRICS

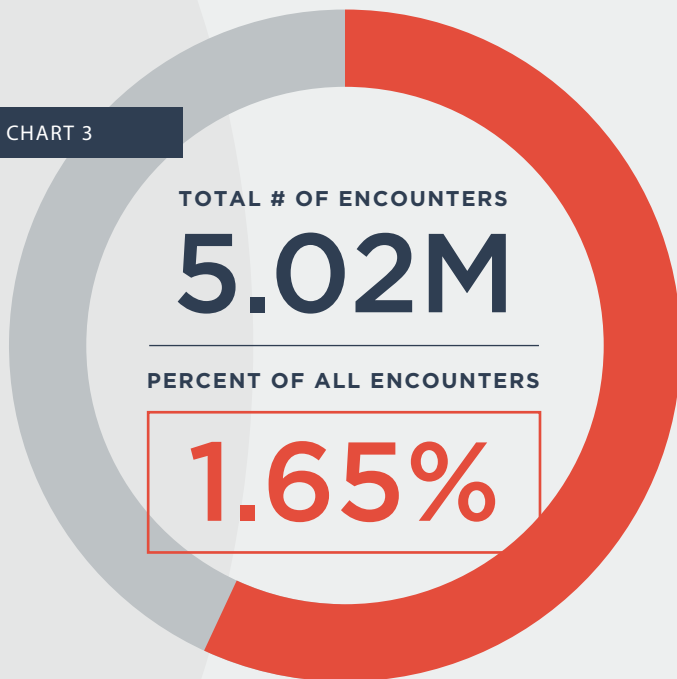


OVERDOSE

The overdose metric looks at the number of patients identified as an overdose case compared to the total volume of calls. Chart 3 shows that of the 5.02 million encounters in our sample, 82,973 had a primary impression related to overdose (or 1.65%). Men accounted for 28% more overdose encounters than women.

Chart 4 shows the monthly breakdown of overdose encounters, with cases peaking in the summer months (May - September).

CHART 3



FEMALE OVERDOSE PATIENTS

35,297

MALE OVERDOSE PATIENTS

47,118

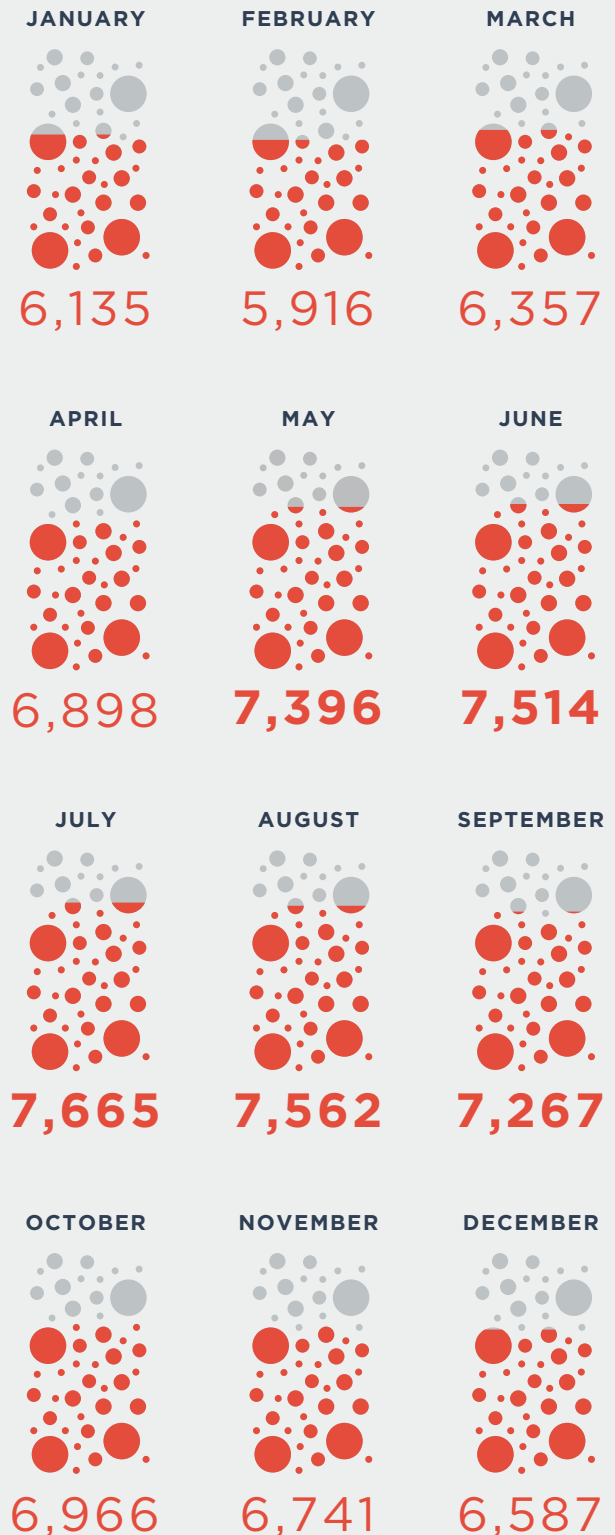
PRIMARY IMPRESSION

Overdose (all NEMSIS 3 types),
 Poisoning/drug ingestion
 (NEMSIS 2)

Interestingly, there were

**↑ 11.35%
 MORE**

overdose encounters than stroke as a primary impression. This is in alignment with what paramedics have been experiencing the last few years based on our dataset.



INSIGHT

The opioid epidemic is a full-blown national crisis. According to the CDC, more than



**60% OF DRUG
OVERDOSE
DEATHS
INVOLVE
AN OPIOID**



**AMERICANS PER DAY
DIE FROM OPIOID
OVERDOSE**

and since 1999, the number of deaths involving opioid overdoses has quadrupled.

BEST PRACTICE



Monitor incidences and anticipate trends.



If your ePCR vendor offers extended data collection for opioid cases, make this a validation rule. More data and information on the incidence and situational issues related to overdose events will provide valuable insights.

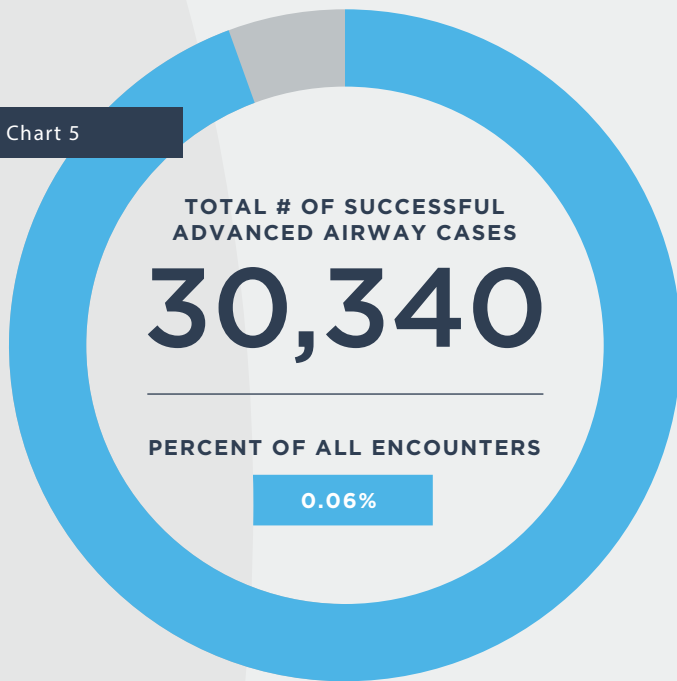


Investigate novel approaches to encourage overdose patients to seek rehabilitation.

INDEX METRICS

ETCO2 BEST PRACTICE

The measurement of exhaled carbon dioxide, referred to as end-tidal CO₂ (ETCO₂) following advanced airway placement, is an industry best practice and should be measured in every agency. The use of ETCO₂ monitoring confirms proper placement, can alert the provider of accidental dislodgement, and the second-by-second waveform provides definitive proof that the tube remained in place during the encounter. Chart 5 shows that in 94.5% of advanced airway cases, EMS providers are following this ETCO₂ best practice. There were 30,340 cases in our sample, with only 1,652 not receiving ETCO₂ monitoring in some form.



ETCO₂ MONITORING NOT USED AFTER ADVANCED AIRWAY

1,652

ETCO₂ MONITORING USED AFTER ADVANCED AIRWAY

28,688

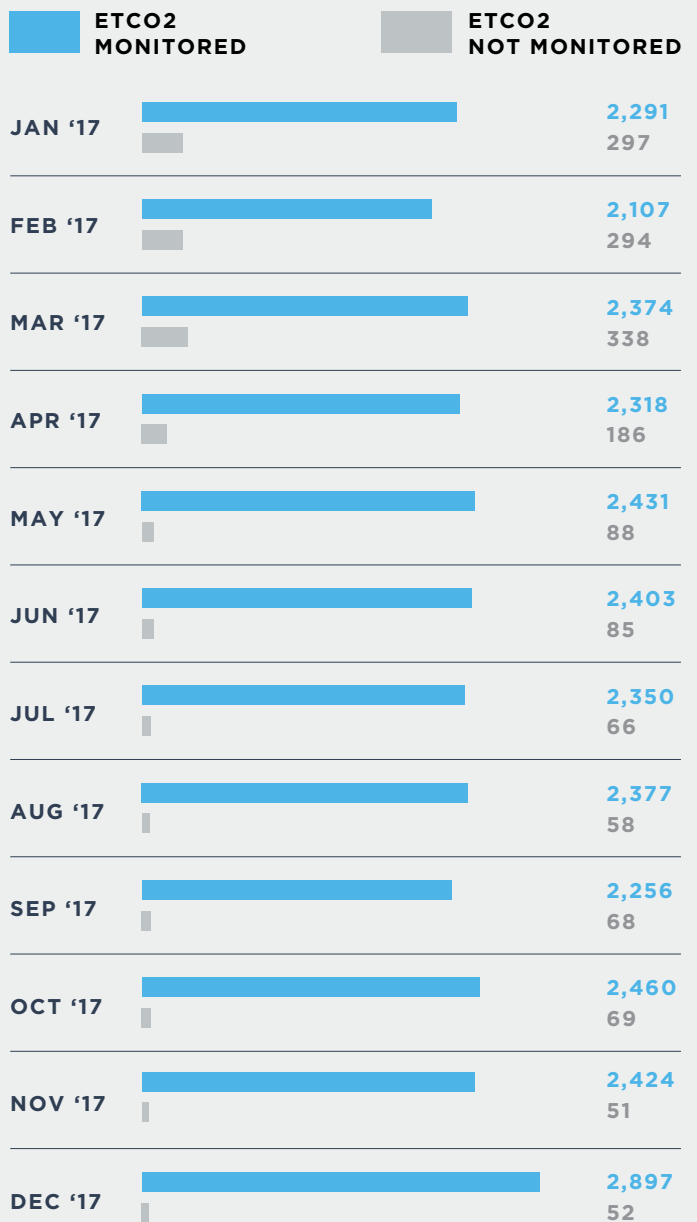
PERCENT ETCO₂ USED

94.5%



Chart 6 looks at the monthly encounters, showing seasonality does not play a role in ETCO₂ events and the number of encounters remains steady over the course of the year.

CHART 6



INSIGHT

According to the American Heart Association, the use of capnography is essential for three reasons:

TO ENSURE THE ADVANCED AIRWAY REMAINS IN PLACE

TO ASSESS THE QUALITY OF CPR

TO PROVIDE AN EARLY INDICATOR OF RETURN OF SPONTANEOUS CIRCULATION (ROSC)

Following these measures helps determine and monitor ETCO₂ levels to ensure they are in the acceptable range.

Moreover, given the need to move patients and the generally more austere environment in the out-of-hospital vs. the in-hospital environment, EMS airways in all types of patients have an increased risk of becoming dislodged. Therefore, even in the absence of the need for cardiac compressions, measurement of ETCO₂ remains essential.

BEST PRACTICE



Follow the gold standard for tube placement confirmation.



Establish the expectation that if a patient has an advanced airway, ETCO₂ monitoring is in place as well.



Monitor compliance and provide reinforcement for outstanding performance and coach poor performers toward success.

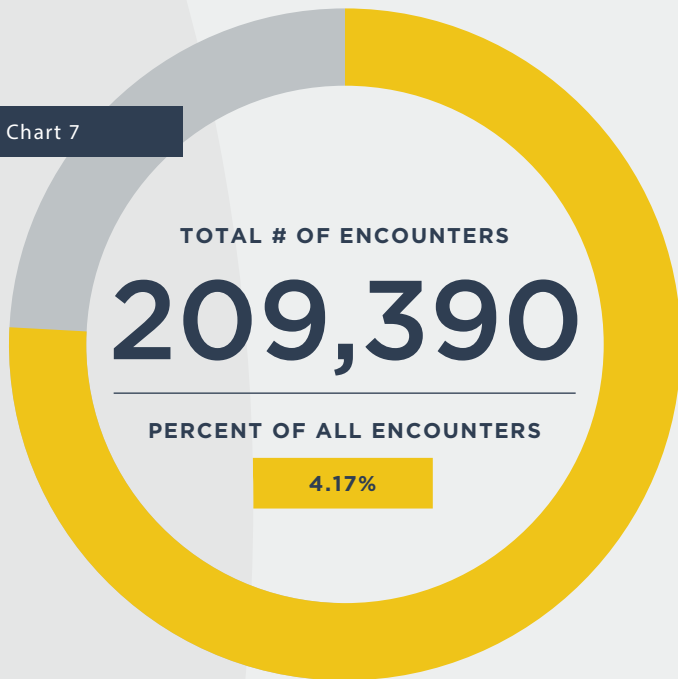


Teach crews to monitor ETCO₂ levels during cardiac arrest and for all intubated patients, and adjust ventilation rates to optimize outcomes.

INDEX METRICS

12-LEAD PERFORMANCE

The 12-Lead Performance metric looks at how often a 12-lead electrocardiogram (EKG) was performed after non-traumatic chest pain was identified as a primary impression in individuals over the age of 35. Chart 7 shows that in nearly 76% of the cases, an EKG was used.



12-LEAD NOT PERFORMED
50,377

12-LEAD PERFORMED
159,073

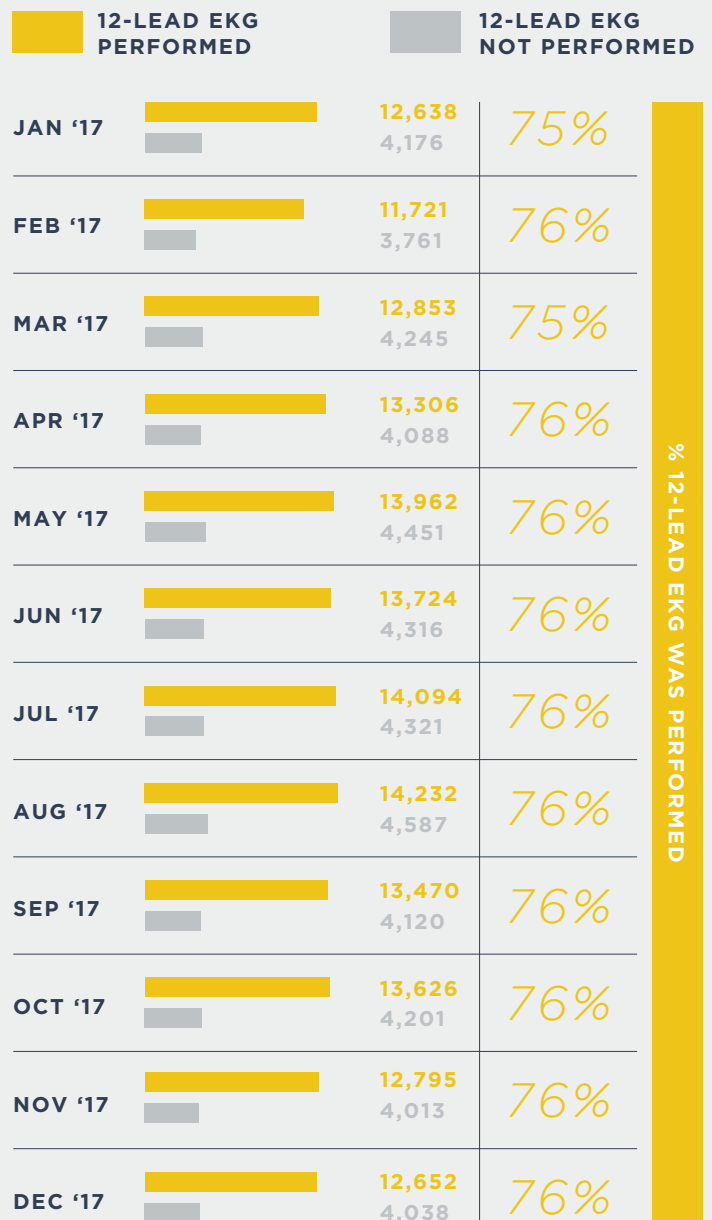
PERCENT EKG USED

75.9%



Chart 8 highlights monthly performance of EKG use on patients and is fairly consistent throughout the year, even as volume in the hotter summer months increases.

CHART 8



INSIGHT



As Tom Bouthillet states about who should receive a 12-lead EKG:

The primary purpose of the 12-lead EKG is to screen patients for cardiac ischemia, especially for acute ST-elevation myocardial infarction. This allows EMS personnel to triage suspected acute STEMI patients to the most appropriate hospital (not necessarily the closest hospital) and it should allow prehospital activation of the cardiac cath lab, which is particularly important on nights, weekends and holidays when the cath team needs to be called in from home.

BEST PRACTICE



Monitor 12-lead performance and time to 12-lead for chest pain patients.



Consider expanding performance metrics to include other patients that should receive 12 leads, including those experiencing abdominal pain, respiratory distress, altered level of consciousness, and general weakness.

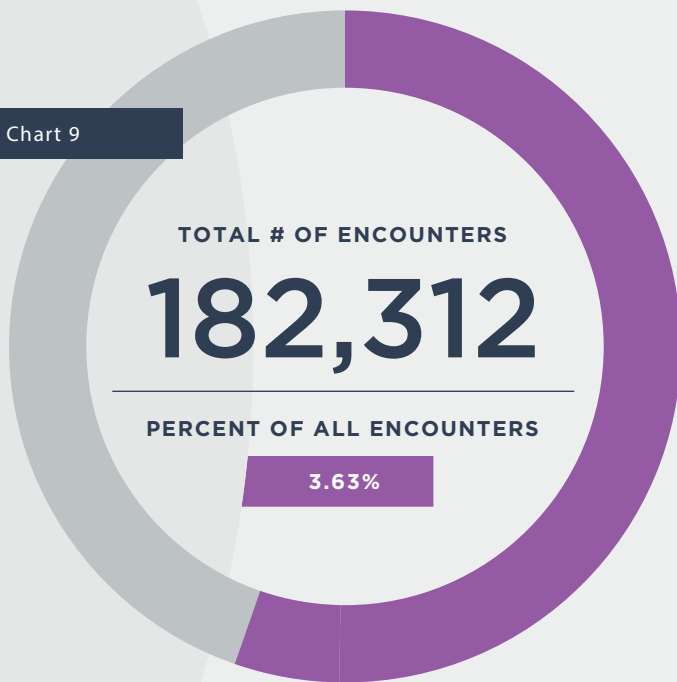


Partner with your local hospital to receive outcomes information for all chest pain patients, especially any suspected STEMI or missed STEMI.

INDEX METRICS

ASPIRIN ADMINISTRATION FOR CHEST PAIN

The aspirin administration for chest pain metric looks at the number of patients over the age of 35 with a primary impression of non-traumatic chest pain that received aspirin or had a documented aspirin allergy. Chart 9 shows that in only 56% of the cases, aspirin administration protocol was followed.



ASPIRIN NOT ADMINISTERED

81,442

ASPIRIN ADMINISTERED

100,870

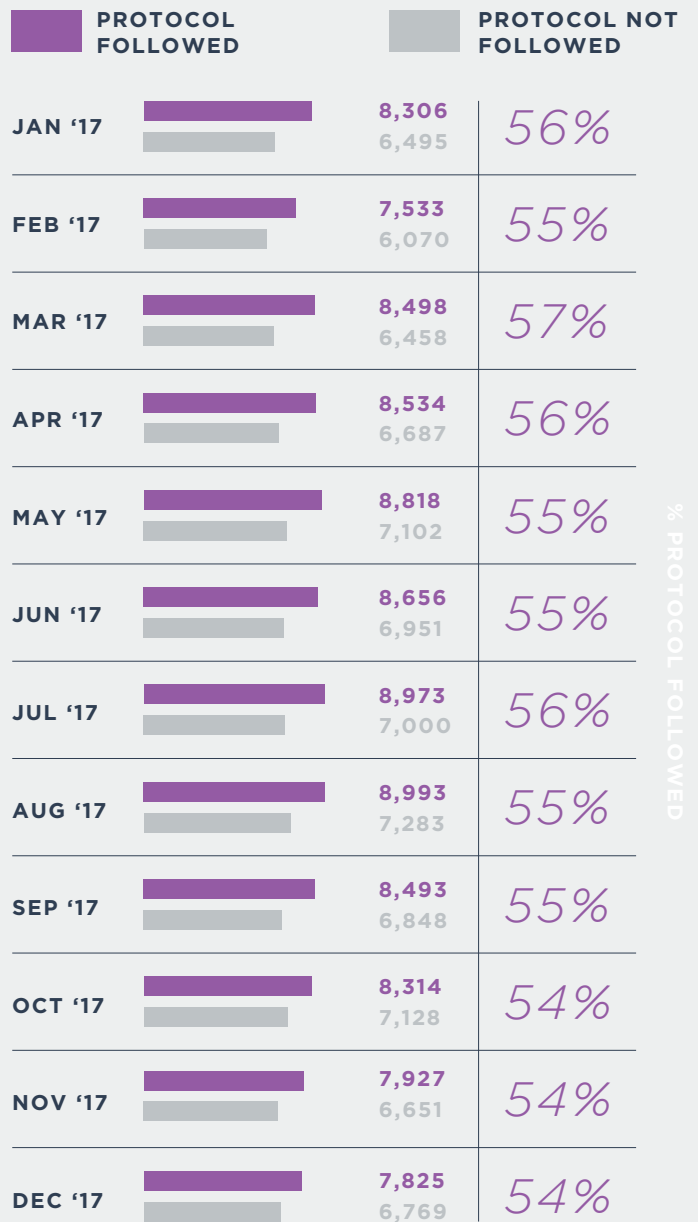
PERCENT WHERE ASPIRIN WAS ADMINISTERED

55.3%



Chart 10 looks at monthly cases and aspirin administration. Similar to the 12-lead EKG performance, protocol remained consistent as the volume of cases increased during summer months.

Chart 10



INSIGHT

The CDC identifies heart disease as the number one cause of death in the United States, accounting for more than

630,000



DEATHS ANNUALLY

Multiple studies have shown early administration of aspirin to be effective in reducing deaths from acute coronary syndrome by as much as

23%

BEST PRACTICE



Make aspirin administration a focal point for chest pain care.



Monitor protocol compliance and provide performance feedback to crews.



Consider pre-arrival instructions for dispatch initiated aspirin administration.



Assure appropriate documentation if aspirin was administered by patient, bystander, or first response prior to EMS arrival.

METHODOLOGY

The dataset for the ESO EMS Index is real-world data, compiled and aggregated from more than 1,000 agencies across the United States that use ESO's products and services. These data are based on 5.02 million anonymized patient encounters between January 1, 2017 and December 31, 2017, representing a full calendar year.



**THERE IS A 95%
CONFIDENCE
LEVEL IN THE
NUMBERS USED
IN THIS REPORT
WITHIN A
1% +/- RANGE.**

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 as a foundation, you can do your own analysis to serve as the basis for other modeling and outcomes.

The metrics shown in this study 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 nationally.

IF YOU HAVE FURTHER QUESTIONS, DON'T HESITATE TO REACH OUT TO ESO ABOUT HOW TO BEST USE AND INTERPRET THIS DATA FOR YOUR ORGANIZATION AT

WWW.ESOSOLUTIONS.COM/EHR-DEMO

ABOUT ESO

ESO Solutions, Inc., is dedicated to improving community health and safety through the power of data. Since its founding in 2004, the company has been a pioneer in electronic patient care records (ePCR) software for emergency medical services, fire departments and ambulance services. Today, ESO serves more than 13,000 agencies throughout the U.S. The company's healthcare, public safety and technology experts deliver the most innovative software and data solutions on the market, including the industry-leading ESO Electronic Health Record (EHR); ESO Health Data Exchange (HDE), the first-of-its-kind healthcare interoperability platform; record management system (RMS) for fire departments; and ambulance revenue recovery/billing software. ESO is also playing a leading role in helping EMS provider organizations across the nation successfully transition to NEMSIS Version 3 and new state standards for electronic patient care reporting.