STATE OF INDIANA
EMS SYSTEM QUALITY IMPROVEMENT REPORT

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FORWARD

Thank you for your interest in improving the quality of care delivered by the Indiana Emergency Medical Services (EMS) system in Indiana. My name is Michael Kaufmann and five months ago, I was appointed to be the State EMS Medical Director for the department of homeland security. As an evidence -based clinician, data is the backbone of my medical decision making. Any system of care, including EMS should be no different. Several years ago, legislation was passed in the state of Indiana requiring EMS provider agencies to report EMS patient encounter data to the state EMS data registry. That registry is better known as ImageTrend. Despite that legal requirement, the quality and quantity of data being reported continues to be less than optimal. As such, one of the first priorities of my office has been to not only improve the quality and quantity of data reported by EMS provider agencies in our state, but to also use that data for evidence-based quality improvement. This report is the first attempt to provide that data, while at the same time highlighting some of the shortcomings of the way our data is captured and reported.

Pre-hospital (EMS) care is delivered in a challenging and often times, unique environment. Patients are often seriously ill or injured before EMS arrives and data is not always readily available. Documentation is many times done retrospectively after patient care has been delivered. Quality improvement program expectations, therefore, should not be linked to an individual case outcomes since an adverse or unexpected outcome may occur despite the fact that best possible care was provided in compliance to any given protocol. In addition, the pre-hospital environment makes performing many assessments, treatments and interventions more difficult. We must be cognizant of the overall context of the patient encounter being reviewed and continually refine and improve expectations to make sure the "customers" are getting the best care that can be provided. The cornerstone of any quality improvement process is the not just the quality of care delivered but also the accuracy of the documentation.

The National Association of EMS Physicians defines CQI as "the concept of a continual cycle of evaluation and improvement based on the findings of quality assurance."

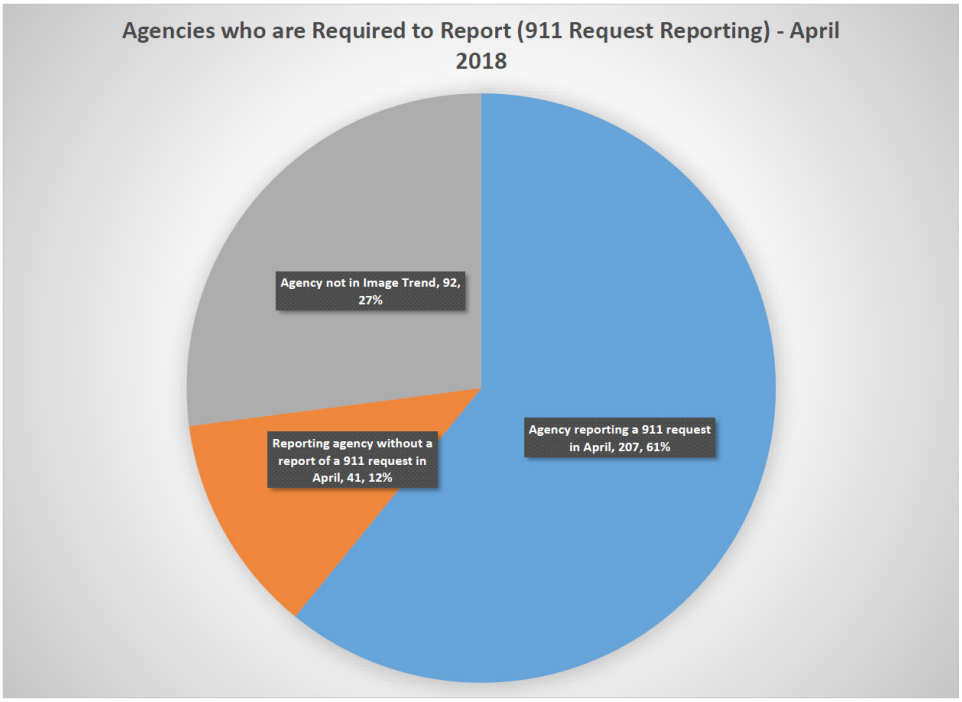
The spirit behind continuous quality improvement (CQI) is that problems often result from processes, not individual errors. CQI does not seek to blame, but to understand and improve the system. The goal of a CQI system is not to discipline a specific provider or agency but provide a mechanism to understand shortcomings. Shortcomings in patient care are the medical director's responsibility to address and should cause a closer look at the education, training and/or protocols and processes that are in place.

This report is the first attempt of its kind to look at EMS care in the state of Indiana from a system level. The data was pulled from the state EMS Registry (ImageTrend) and analyzed according to EMS Compass quality improvement metrics. This initial report only looks at data from April 2018 as it was felt that April was the first month since data reporting started that contained a relatively sufficient quantity and quality of data to accurately represent the Indiana EMS system.

OVERALL REPORTING

The agencies included in this chart are from a list of 340 EMS provider agencies who are required to report under current Indiana Administrative Rules (The Rules.) The numerator of this metric displays the number agencies with reports in the pool of data from which this document was generated (agencies that reported a 911 request to ImageTrend in April 2018). The remaining agencies are broken up into two categories based on their status of reporting in ImageTrend. For the month of April 2018, 61% of EMS provider agencies are actively reporting their data to ImageTrend. An additional 12% (41 agencies) have reported a patient encounter at least once to ImageTrend outside of April 2018 but have no reports entered for this month. This most likely represents that a test case had been entered but ongoing data reporting is not taking place. The remaining 92 agencies have never reported a patient encounter in ImageTrend.

DISCUSSION



The purpose of this chart is show the raw percentage of EMS provider agencies currently reporting data to ImageTrend. This depicts all agencies who are required to report. With only 61% of required agencies reporting, improving the quality of care in our state will be difficult. Improvement in data reporting will be necessary for any meaningful change to take place. The state rule requiring data to be reported has been in place now for many years. The specific data elements that must be reported has been defined (NEMSIS version 3) and the time frame for reporting has also recently been approved by the EMS Commission (within 24 hours of run completion. Rules for enforcement may be necessary to ensure compliance with state EMS data reporting requirements.

CORRECTIVE ACTION

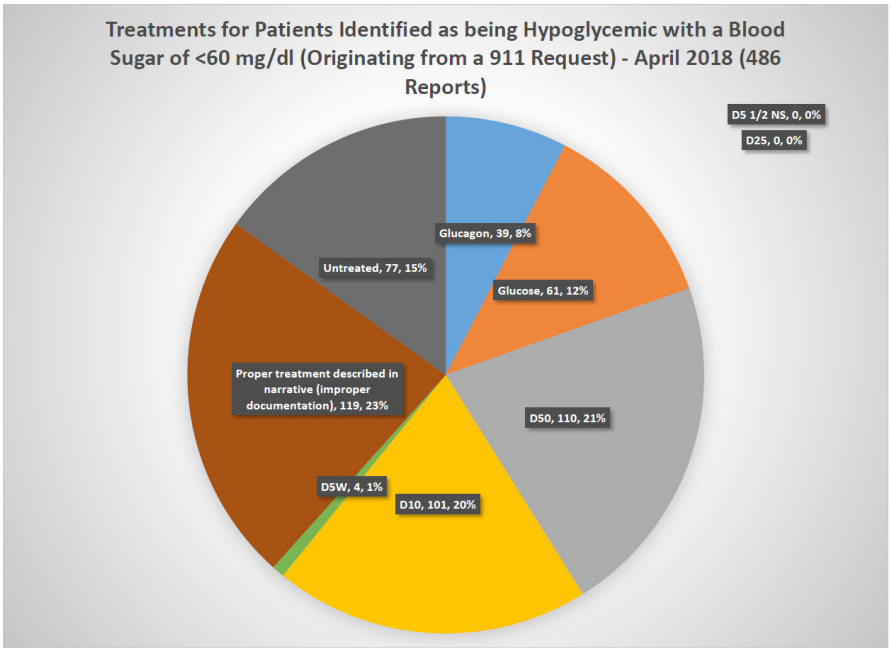
EMS provider agencies must ensure that all incident reports are being properly reported into ImageTrend. EMS provider agencies utilizing third party software for their patient care records will need to ensure that this process is being done. While it is understood that not all EMS provider agencies utilize a third party piece of software, a version of ImageTrend is available at no cost so that EMS provider agencies can directly submit their patient care data into the state EMS registry. The EMS Commission should consider a rule or non-rule policy to enforce better and more consistent reporting.

TREATING HYPOGLYCEMIA

Diabetic emergencies account for 3–4% of EMS calls. Of the various types of diabetic emergencies encountered by EMS, hypoglycemia is the most common. EMS can play a large role in reducing morbidity and mortality from this common life-threatening condition.

This report was built as an extension of the EMS Compass Hypoglycemia-01 metric. The alterations of the EMS Compass metric were subdividing the numerator based on the treatment that was given to the patient and the addition of searching in the patient care narratives for improper documentation of proper treatments. The denominator was interpreted to be patients with a blood sugar of less than 60 mg/dl who were recorded with a primary or secondary provider impression containing “hypoglycemia” in incident reports originating from a 911 request in April 2018. The medication counts were based on an EMS Compass specified medication being properly recorded in an incident report. Inclusion in the “Proper treatment described in narrative (improper documentation)” category was counted for all cases where a specified medication or procedure was described in the patient care narrative but not properly recorded. Limitations in the data filtering available in Image Trend resulted in minor inflations to some of the numbers reported here, but this effect is insignificant.

DISCUSSION



Hypoglycemia provides a unique perspective on the importance of proper reporting because of the large number of proper treatment options. With proper documentation of the treatments, trends in treatment choices or provider practice become apparent. However, without proper recording, the number of proper treatments makes determining if proper care was described in a patient care narrative extraordinarily difficult. Minimizing the complexity that surrounds determining if proper treatment was given will allow future reports to be more robust and accurate in describing the treatment of hypoglycemic patients. One specific difficulty that hypoglycemia creates is that, because giving a patient a provision of food is considered proper treatment by EMS Compass guidelines, a proper treatment procedure exists that no one properly records but many people do. Trying to determine if a patient was given a provision of food to treat their hypoglycemia from the narratives of thousands of cases of hypoglycemia is nearly impossible given the number of unique ways that giving a patient food can be described. For this reason, proper knowledge and use of the appropriate options in the system in order to eliminate the ambiguity surrounding treatment is always of utmost important.

CORRECTIVE ACTION

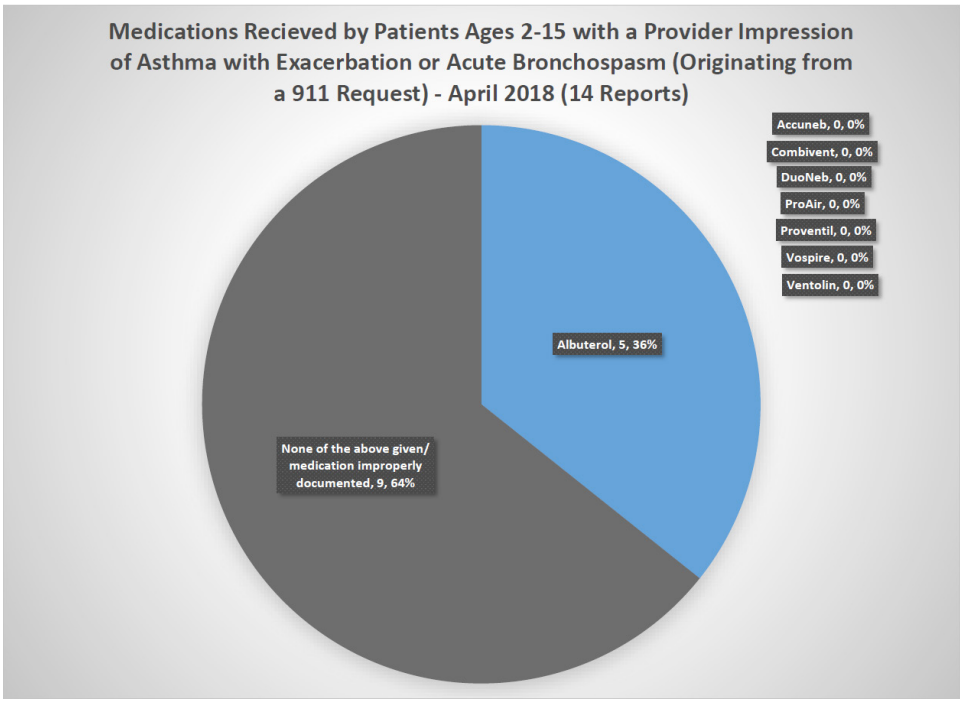
Ensure that EMS providers are aware of all treatment procedures and protocols that can be recorded in ImageTrend and that these procedures are being properly reported. Something as simple as knowing if the patient received food can make the difference in detecting proper treatment in an incident report. Without proper recording, procedures like this easily slip through the cracks of any data scraping system in place to detect them. For this reason, proper reporting is necessary if there is to be any chance of accurate numbers in a metric represented here.

MEDICATION FOR PEDIATRIC RESPIRATORY DISTRESS

Asthma is a chronic disease that affects 24 million people in the United States and causes 5,000 to 6,000 deaths each year. Childhood asthma (pediatric asthma) is the most common serious chronic disease in infants and children and often times under treated. It is estimated that asthma affects nearly 10% of all children. The treatment of acute asthma exacerbation consumes a significant portion of emergency medical services (EMS) system utilization. Prompt recognition and treatment of asthma, a leading cause of respiratory compromise, by EMS providers can quickly relieve symptoms and improve patient outcomes.

This metric attempts to describe the administration of medication in pediatric patients with a primary or secondary impression of asthma with exacerbation or acute bronchospasm originating from a 911 request. There are very few reports of this type of situation, but the metric describes all properly-documented, relevant medications that the patients received. It should be noted that this is primarily a display of a lack of reporting and the patient care narratives for these few reports all described a proper treatment or another resolution of the issue.

DISCUSSION



Along with the previously mentioned importance of properly documenting medications, looking at medications for pediatric patients with asthma with exacerbation or acute bronchospasm provides an example that speaks to the importance of the documentation of medications being given prior to EMS unit arrival. The documentation of the medication is the easiest way to know if the patient received proper treatment. Even if that treatment came before the EMS unit's arrival, that treatment needs to be acknowledged and documented for the report to be completed properly. For these treatments, the "prior to arrival" field should be used to indicate when the medication was given to the patient.

CORRECTIVE ACTION

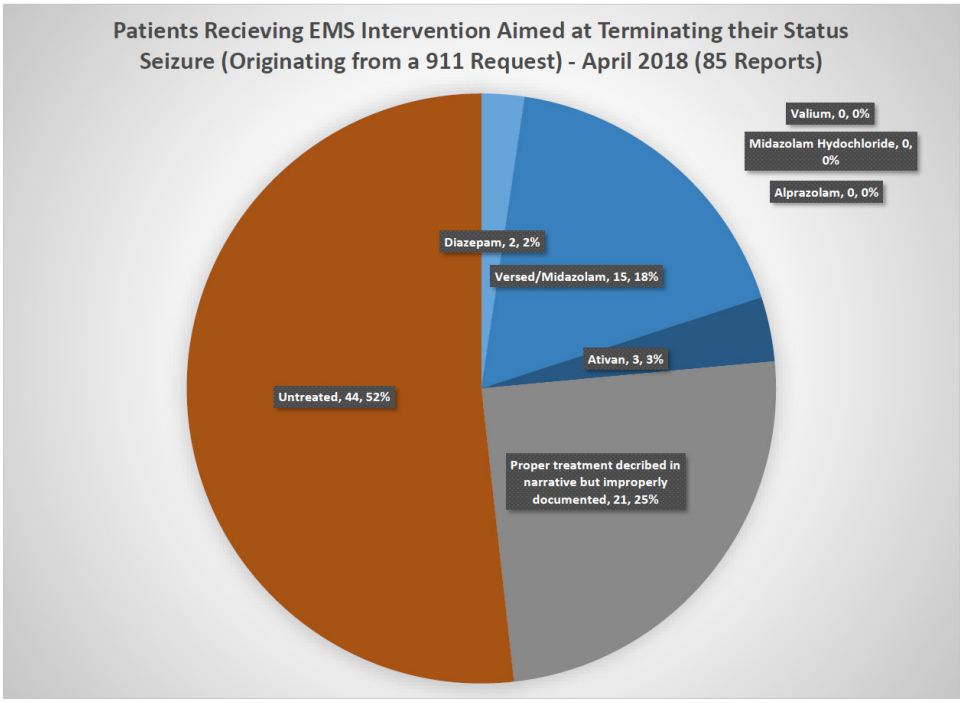
Record medications received by the patient before EMS intervention in the incident report as a given medication, and use the "prior to arrival" data label to indicate when the patient was given the medication.

MEDICATION FOR STATUS SEIZURES

Seizures are a common presentation in the prehospital setting and status epilepticus represents an emergency neurologic condition often treated by emergency responders. Status epilepticus is defined in the neurologic literature as continued seizure activity lasting longer than 30 minutes, or two or more seizures without the patient regaining normal consciousness over a 30-minute period. Once initial stabilization of the patient occurs, benzodiazepines are commonly administered as first-line therapy treatment. This EMS Compass metric is looking for a specified set of drugs being given to patients with ongoing status seizures originating from a 911 request. Proper medication documentation is counted toward the definitive administration of that drug. Any mention of a specified drug in a narrative is counted toward the improper documentation category. If a medication or treatment was administered that was not specified by EMS Compass, that counts as an entry for the untreated category of this metric. As a result, the untreated category may be inflated based on any other set of criteria. Note the only medications being considered are those listed in the chart.

DISCUSSION

This chart is an example of a treatment we might seek to improve that would have been misleading in the data that it is portraying. With about the same amount of medications being improperly documented as properly documented and many more likely missing from either category due to the limitations of the search, this data loses a lot of its value because of the number of improper records. It is difficult to know if the issue that this chart seems to display is an accurate representation of EMS practices. For this reason, it is important that we are confident in the recording being done properly.



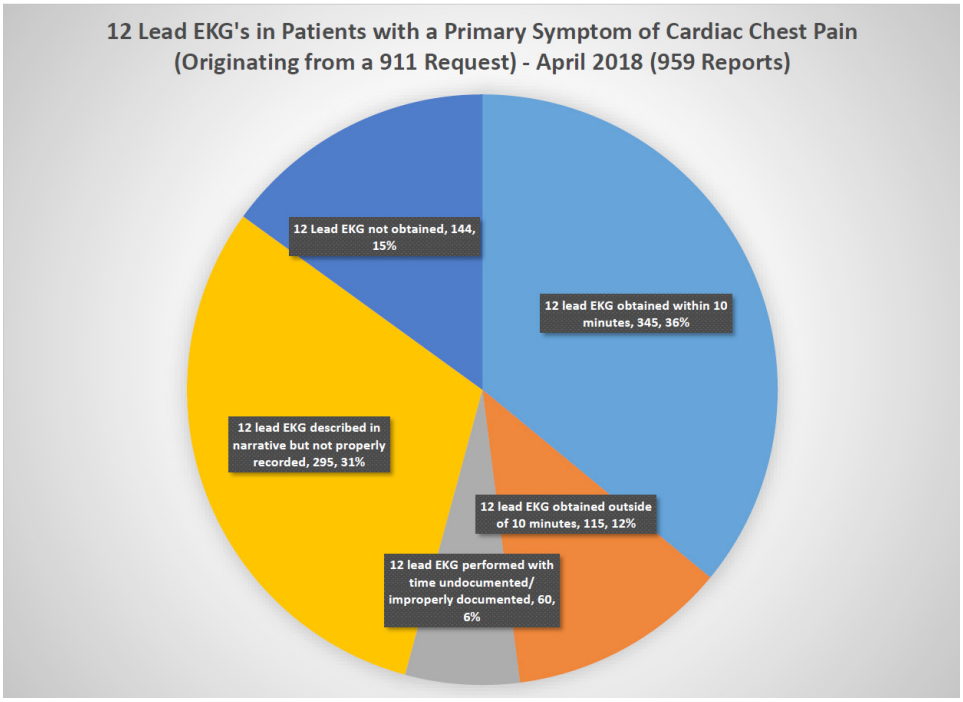
CORRECTIVE ACTION

Ensure all medications are being properly recorded. Ensure ALS treatment protocols include appropriate medications to terminate status seizure activity that meet or exceed the standard of care.

12 LEAD EKG PROCEDURES FOR CARDIAC CHEST PAIN

Early acquisition of a 12-lead EKG for all patients with a chief complaint of chest pain is critically important to the success of a prehospital 12-lead EKG program. Pre-hospital 12 lead EKG use is significantly associated with a reduction in mortality during the 30 days following hospitalization. This mortality benefit was seen in STEMI and in non-STEMI alike. This metric is aimed at assessing the administration and recording of 12 lead EKG's for patients recorded as having a primary symptom of cardiac chest pain in incident reports originating from a 911 request. The areas of the chart that represent administered EKG's that are said to be within 10 minutes or outside of 10 minutes are populated by incident reports where a 12 lead EKG is a properly recorded procedure and an entry exists for "unit arrived at patient to first 12 lead procedure in minutes" to indicate a properly recorded time. A properly recorded procedure without the associated time falls in the category of "12 lead EKG performed with time undocumented/improperly documented". If there is no properly recorded 12 lead EKG but the narrative of the incident describes a 12 lead, the incident is counted toward the improper procedure documentation portion of the graph. If the incident has no properly recorded 12 lead EKG and the narrative does not mention a 12 lead, the incident is counted toward a 12 lead EKG not being obtained.

DISCUSSION



With regards to documentation, 12 lead EKG's are a good example of a standard procedure. Proper documentation of procedures of this nature is important in enabling EMS providers to ensure patients are receiving proper and basic care consistent with written clinical guidelines. With the documentation error that the data displays, the insight that can be gained about the proper performance of the procedure itself is severely limited. This data serves as a display of magnitude of the problem that the improper reporting of procedures creates. The improper reporting of this procure in April resulted in uncertainty about the condition and care of 46% of cardiac chest pain patients. The proper recording of this, or any other procedure, requires the procedure to be recorded in the "procedure performed" data element field and all other relevant related fields, such as the time of the procedure, to be documented alongside the procedure in their corresponding appropriate field.

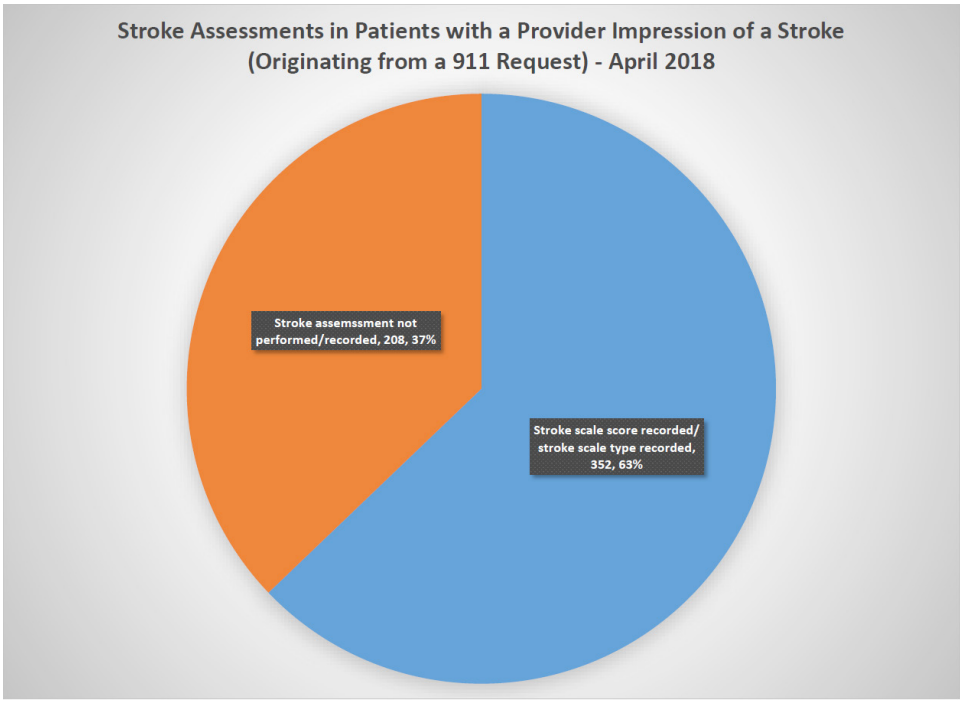
CORRECTIVE ACTION

Ensure that all procedures are recorded in the procedure performed data field. Such a common procedure can be easily mentioned in a narrative, but only mentioning the procedure in the narrative is improper recording.

STROKE ASSESSMENT

Stroke is a major cause of death and disability and a common clinical impression by EMS providers. Stroke scales are standardized assessment tools used to identify stroke and when performed, documented, and reported by EMS providers clearly makes a significant impact on patient outcomes. This metric describes how many patients received a stroke assessment out of all patients with a provider impression of a stroke originating from a 911 request. This metric counts any proper recording of an outcome of a stroke assessment and any positive record of a stroke assessment type as a stroke or stroke assessment being performed. Any improper entries and patients who did not receive a stroke assessment constitute the "Stroke assessment not performed/recorded" section of the chart.

DISCUSSION



Unlike previous reports included in this quality analysis document which mostly reflect quality of documentation, this data likely represents an accurate reflection of clinical care rendered. For the purposes of this report, multiple different stroke assessment tools were recognized. These included the Cincinnati, Los Angeles, Massachusetts, Miami Emergency Neurologic Deficit (MEND), NIH and F.A.S.T. Stroke scales. Correctly, theses scales would be recorded in the data field corresponding with the eVitals30 or eVitals29 NEMSIS data field. Because of previously mentioned data reporting errors, the narrative of each patient care record was also searched for key words that would indicate the performance of a stroke scale. Because of the statistically proven benefit of performing, documenting, and reporting a stroke scale in a patient suspected of having a stroke, it is surprising that 37% of patients with a primary provider impression of stroke did not document this critical assessment.

CORRECTIVE ACTION

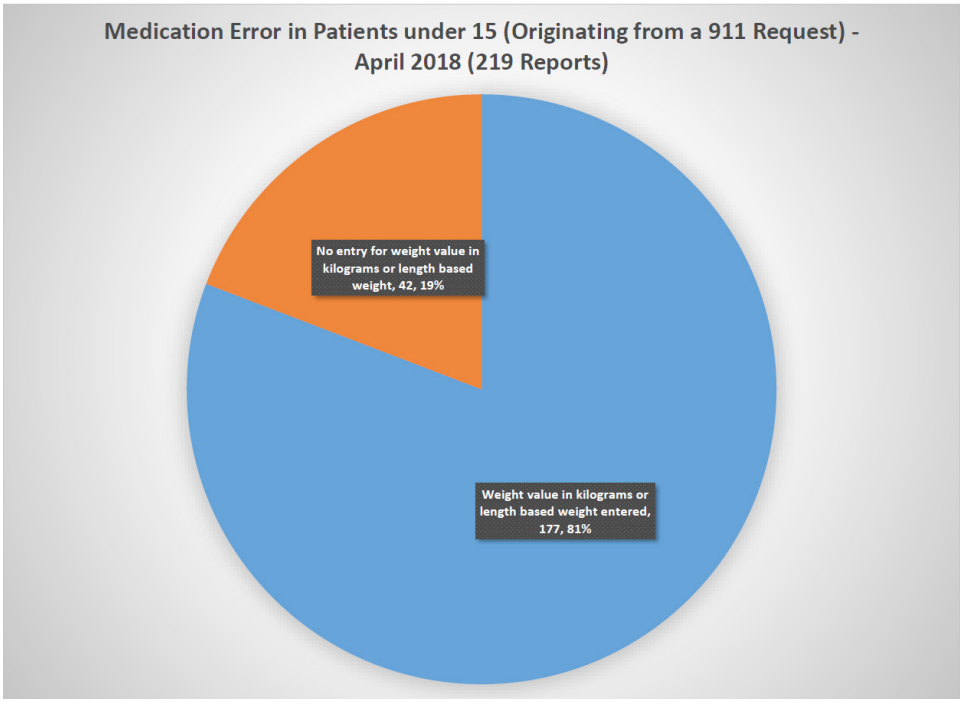
Ensure all medications are being properly recorded. Ensure ALS treatment protocols include appropriate medications to terminate status seizure activity that meet or exceed the standard of care.

PEDIATRIC MEDICATION ERROR

Medication errors are common in pediatric patients. Medication errors cause significant mortality and morbidity, including 7000 patient deaths annually from medication errors in the United States. Pediatric patients may have 3 times more medication errors than adult inpatients, and these errors are frequently harmful. This metric describes how frequently a weight in kilograms or a length based weight estimate is recorded for pediatric patients who received medication in EMS incidents originating from a 911 request. This metric includes all patients under the age of 15 that have any medication recorded as being given on a 911 request response. The metric counts each unique medication for every patient (i.e. for every different medication that was given to a patient, was there was a weight recorded in kilograms or a length based weight recorded).

DISCUSSION

Reporting a weight in kilograms or a length based weight for pediatric patients is another example of the importance of proper reporting. If this kind of medication error is truly an issue, we need to have proper recording to show it. Improper recording obscures the data and makes quality improvement difficult. Every time a procedure or protocol is done properly, it needs to be recorded so that it is possible to catch the times that it is not being done properly. This is the only way to improve patient care.



CORRECTIVE ACTION

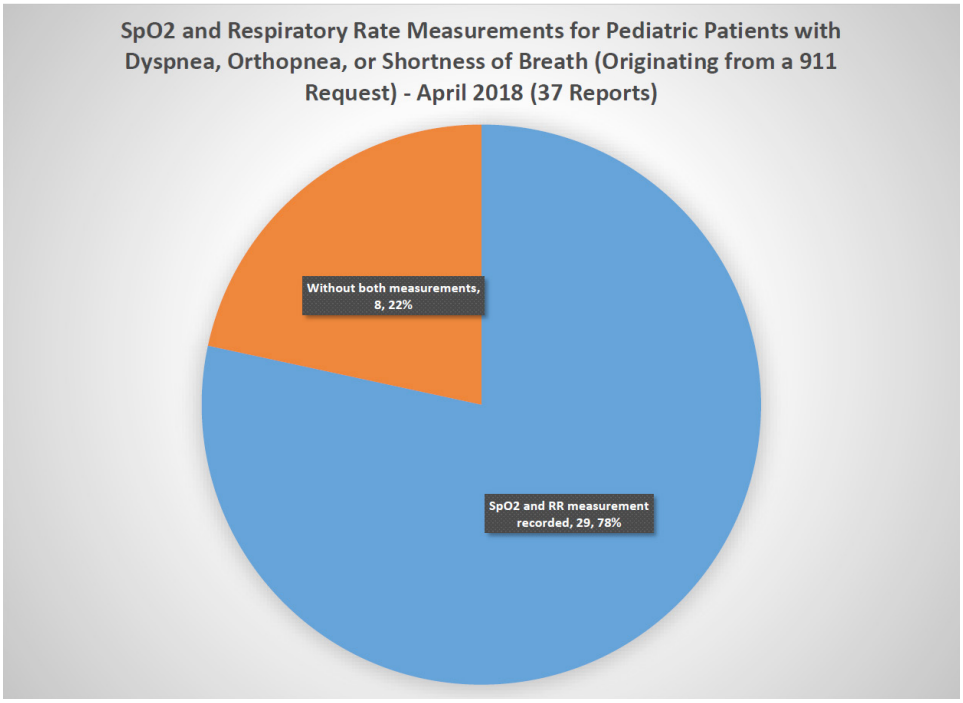
Always record all relevant measurements in the incident report. Proper reporting for patient information can help ensure proper care and help catch improper care. EMS providers and their medical directors must ensure that EMS treatment protocols reflect weight (in kilograms) based dosing of medications. For those patients in which weight cannot be determined, a length or age based tape or chart should be used to accurately estimate patient weight.

RESPIRATORY ASSESSMENT FOR PEDIATRIC PATIENTS WITH RESPIRATORY DISTRESS

Evaluating the pediatric patient with trouble breathing is a rapid identification of respiratory distress or respiratory failure. Respiratory distress is a compensatory mechanism and often indicates a sick child. The EMS Compass describes this metric as the "documented evidence that a respiratory assessment was performed on pediatric patients". This metric counts all pediatric patient under 15 who have a primary or secondary impression of EMS Compass described respiratory distress for responses where the type of service requested is a 911 request. This chart counts every unique respiratory assessment for those patients. An assessment counts toward being correct if a SpO2 measurement and respiratory rate are recorded in the same entry of the report.

DISCUSSION

A child with breathing difficulty requires a rapid, accurate assessment that is focused initially on the patient's appearance, work of breathing, and skin color and condition. Respiratory rate and SpO2 measurement are objective markers of respiratory assessment and should be performed and documented on all pediatric patients with respiratory complaints.



CORRECTIVE ACTION

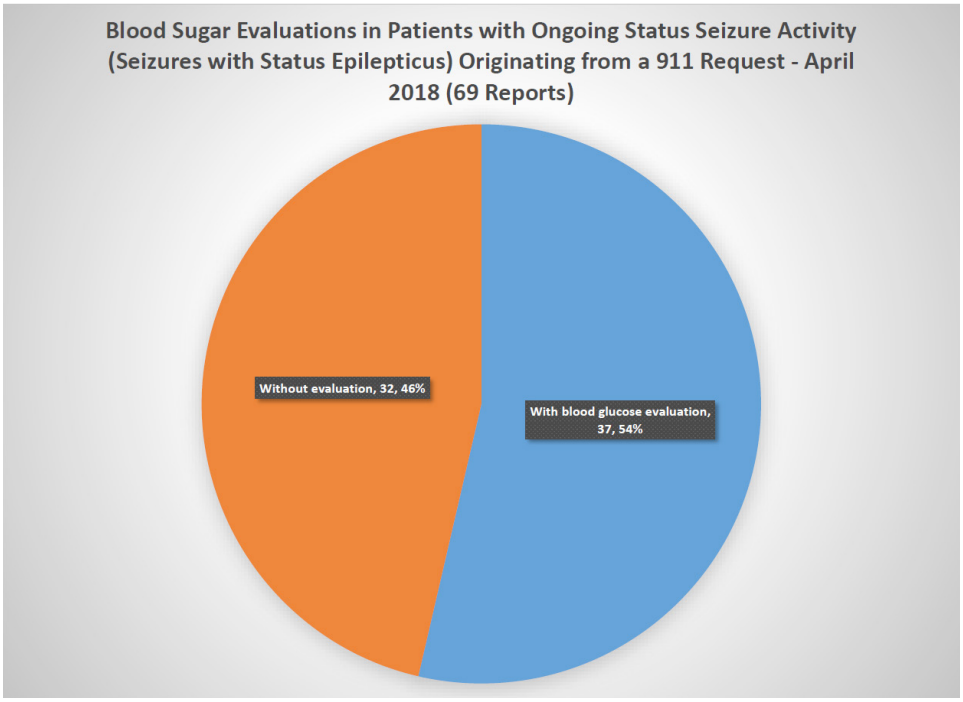
EMS provider agencies and their medical directors must ensure that pediatric assessment training is current, ongoing, and reinforced frequently. Likewise, it is important to have both working pulse oximeters and pediatric pulse oximetry probes. This critical assessment must be performed and documented to ensure proper care of the pediatric respiratory distress patient.

BLOOD GLUCOSE EVALUATION IN STATUS SEIZURE PATIENTS

Hypoglycemia is known to cause seizures. Although the frequency of hypoglycemia induced seizures is unknown, checking a blood sugar before or after the administration of anti-epileptic medications is necessary. This metric counts blood glucose measurements in ongoing status seizure patients originating from a 911 request. If a patient received one or more properly recorded blood glucose evaluations, they are counted as one patient having received a blood glucose measurement. This metric exists without any duplicates and reports only the proper documentation status of this evaluation.

DISCUSSION

Seizure is a frequent reason for Emergency Medical System activation. Many EMS protocols require glucose testing prior to or after treatment of the seizure. Blood sugar testing (accucheck testing) is quick, easy, and both a BLS and ALS level skill performed by EMSM providers. It is alarming that this basic evaluation is not performed in 46% of the data examined.



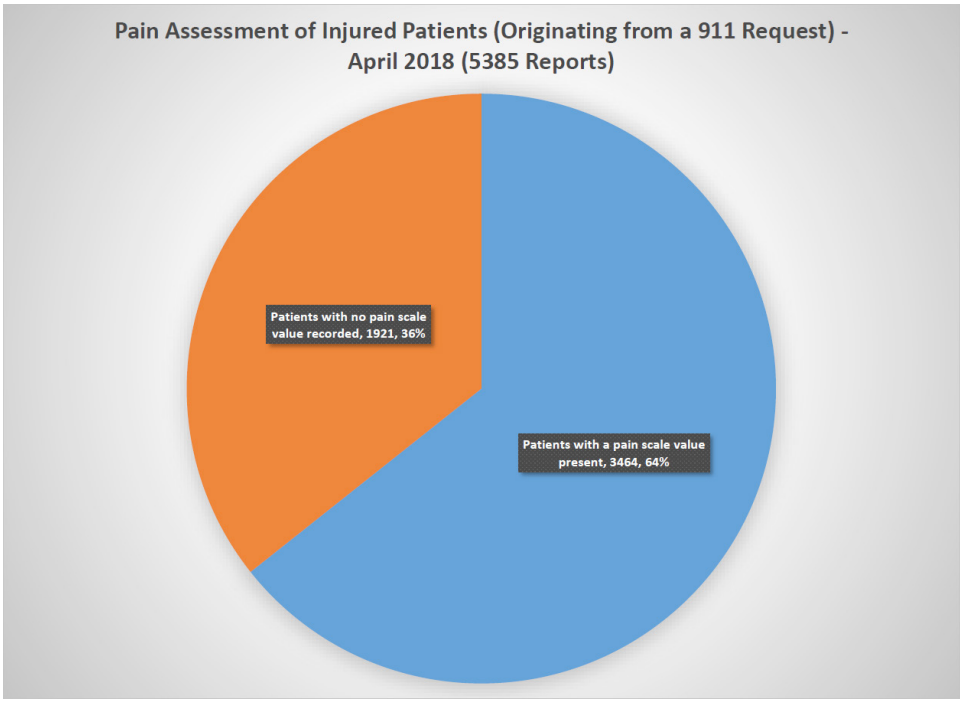
CORRECTIVE ACTION

Education and training of the importance of blood sugar testing should be a part of all EMS provider organizations. Although this is a basic skill and easy to perform, the data indicate that reinforcement of this assessment tool needs to be undertaken by EMS provider agency medical directors and EMS educators. Blood sugar testing should be performed either before or after anti-epileptic medication administration on all patients experiencing a seizure.

PAIN ASSESSMENT FOR TRAUMA PATIENTS

Acute pain in trauma patients in emergency care is often cited as being under-treated. Although administration of pain medications has more recently come under greater scrutiny, some still consider the pain scale to be the fifth vital sign. This metric counts what injury patients originating from a 911 request had a properly recorded pain scale value. Inclusion is based on a "yes" entry under "possible injury". This metric is primarily reporting lack of proper entry. It is difficult to tell if verbal or any other unrecorded pain assessment took place.

DISCUSSION



Pain is one of the most common reason patients seek medical attention. EMS providers routinely treat patients with pain and pain medication administration is a consistent protocol found in nearly all EMS provider agency medical treatment protocols. Although the recent opiate crisis has drawn more attention and training to the appropriate administration of pain medications, treating pain is still a necessary component of EMS provider patient care. Performing and documenting a pain scale score is an important and objective way to assess a trauma patient with a documented injury.

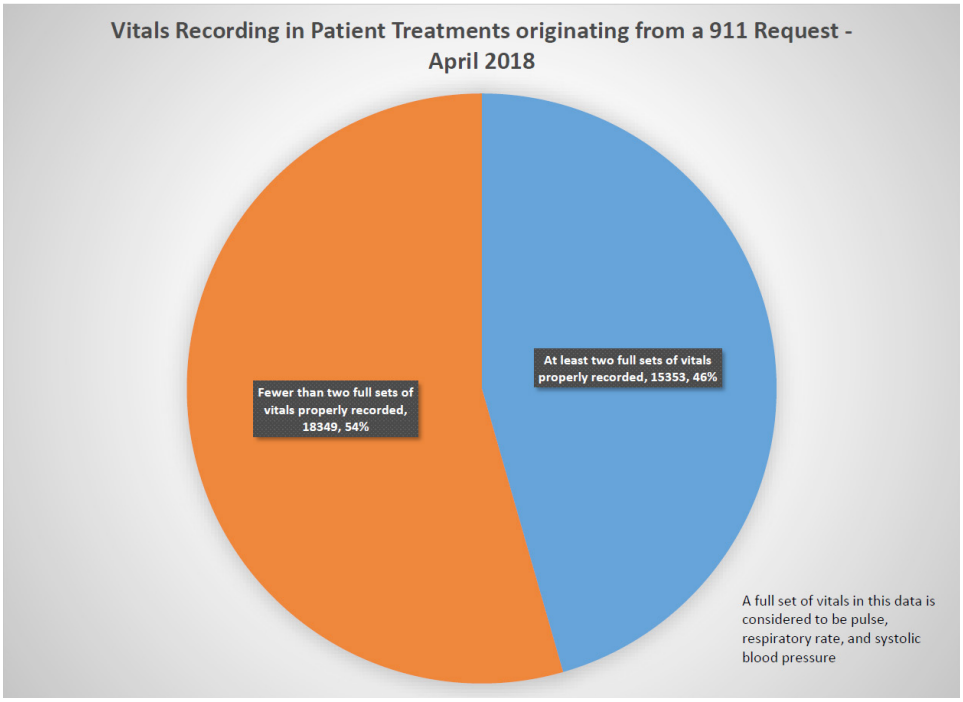
CORRECTIVE ACTION

Although a patient's response to pain assessment will be a subjective answer, EMS provider patient assessment of pain is important to assure proper treatment and use of various types of pain treatments. Pain scales that objectively measure a patient's pain should be incorporated into all EMS provider treatment protocols.

GENERAL PRACTICE VITALS RECORDING

Vital signs are an important component of patient care. They determine which treatment protocols to follow, provide critical information needed to make life-saving decisions, and confirm feedback on treatments performed. Accurate, documented vital signs are a very important part of EMS. The chart depicts the proportion of patients originating from a 911 request who had two full sets of vitals properly recorded. For the purposes of this graph, a full set of vitals is considered to be pulse, respiratory rate, and systolic blood pressure. A patient counts as having two full sets of vitals if the recorded vitals count is two or greater for all of the mentioned vitals.

DISCUSSION



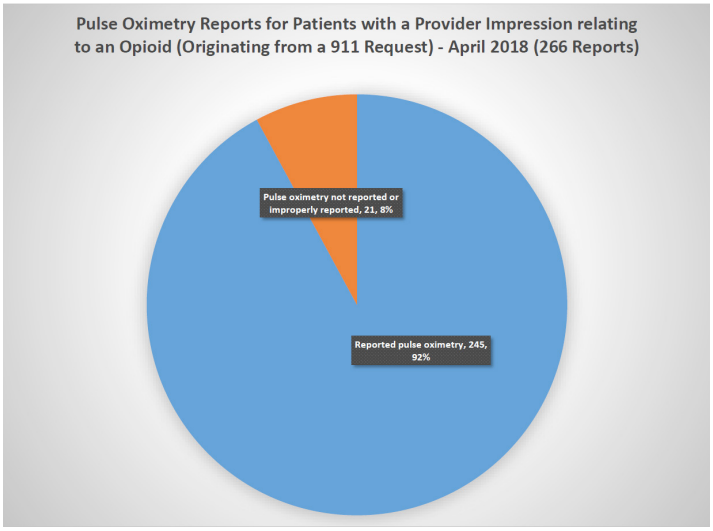
This general practice guideline assess the recording of two full sets of vitals for all patients. As an EMS clinical guideline for all patients, this is an assessment of vitals recording outside of any additional recording that may be necessary per procedure protocol. By investigating the general practice of recording vitals, we can see a lack of proper documentation in one of the most basic capacities. Recording vitals is important for patient care and also for the post-incident assessment of patient care by a doctor or in metric such as these. A trend of improperly recording vitals could lead to a loss of information substantial enough to make large scale assessments impossible, and the resulting misleading data could cause needed improvement to be overlooked. Recording vitals is a key part of the outlined clinical guidelines for every run, and proper and complete reporting depends on vitals being recorded.

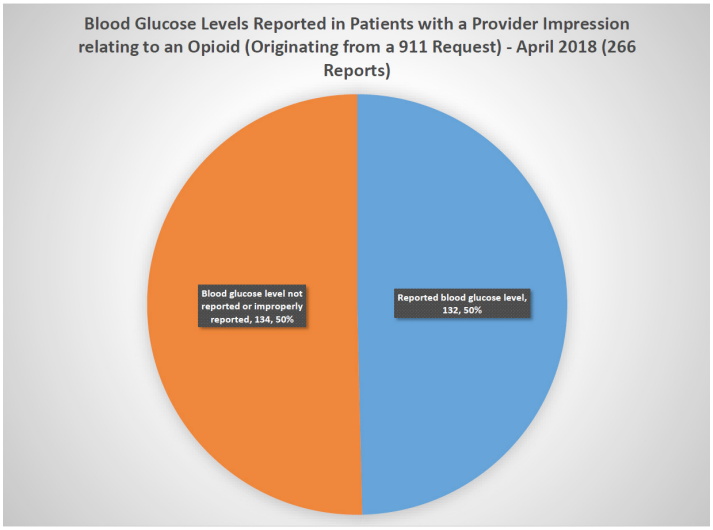
CORRECTIVE ACTION

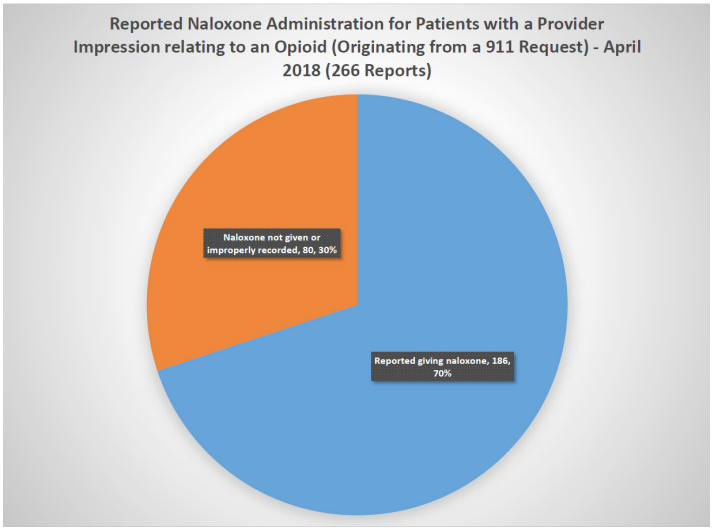
Ensure vitals are being consistently monitored and recorded for all patients.

TREATMENT PROTOCOLS FOR OPIOIDS

Opiate overdoses have been increasing in recent years. Opiate overdoes commonly present with altered mental status. Causes of altered mental status run the gamut from easily reversible (hypoglycemia) to permanent (stroke.) Developing a structured and systematic approach to altred mental status patients, including opioid overdose will allow EMS providers to develop and streamline the diagnostic work up and management of these patients. This graph displays three key treatment guidelines as outline by the NASEMSO “National Model EMS Clinical Guidelines” for opioid poisonings and overdoses. The included 911 request incidents are those with a provider impression containing any sort of opioid related condition. These counts include only proper documentation of the relevant fields. There is no duplication of any incident in the report.







DISCUSSION

The opioid data stands as a representation of how proper report would allow for a bigger picture analysis of a specific condition. With complete and proper reporting, we are able to get a closer look at the care patients are receiving by having more relevant data available. So, while this data may look good, in the context of all of the other reporting errors that are occurring, it is difficult to know if any of what the data shows is actionable information. Complete and proper recording would allow for quick and easy assessments of any treatment based on the clinical guidelines for that condition. Good data will enable high quality reports of this nature to be created, and the result of having a wide array of these charts would be improvement in patient care across the board.

CORRECTIVE ACTION

Properly report all relevant data elements for each incident. Doing so will allow quality improvement to be better in the future.