California EMS System Core Quality Measures Data Years 2012/2013

Emergency Medical Services Authority
California Health and Human Services Agency

EMSA #166 - Appendix E
EMS System Quality Improvement Program Guidelines

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STATUTORY AUTHORITY

The California EMS Authority (EMSA or authority) is charged with creating a "statewide system for emergency medical services" and the responsibility for the "coordination and integration of all state activities concerning emergency medical services" (HS 1797.1). Moreover, the authority is required to assess each EMS area or the system's service area, utilizing regional and local information, for "the purpose of determining the need for additional emergency medical services, coordination of emergency medical services and the effectiveness of emergency medical services" (HS1797.102). And local EMS agencies are required to plan, implement, and evaluate an EMS system (HS 1797.204).

Health and Safety Code 1797.103 identifies that one of the required elements of an EMS system is data collection and evaluation. Additionally, the development of quality improvement guidelines must be established (HS 1797.174). As a result of this statutory mandate, EMSA has developed regulations requiring the system data collection and evaluation, collection of prehospital care reports (CCR, Title 22, Division 9, Chapter 4, Section 100147, 100169, 100170).

Additionally, EMS system quality improvement regulations have been established (CCR, Title 22, Division 9, Chapter 12) that define the requirements for local EMS agencies, EMS service providers, and base hospitals in their role as part of the EMS system. These requirements include, but are not limited to the implementation of an EMSA approved EMS Quality Improvement program (EMS QI) and the use of defined indicators to assess the local EMS system as found in EMSA #166, Appendix E. This evaluation and EMS QI information must be submitted annually to EMSA, as part of its required EMS plan (HS 1797.254), in order to allow EMSA to evaluate if the plan effectively meets the needs of the persons served.

A report to the Legislature must be made on the effectiveness of EMS systems annually related to the EMS system's impact on death and disability (HS 1797.121).

In order to achieve this mandate to evaluate system impact on patients, the continuum of care from dispatch to pre-hospital to hospital disposition must be connected. Only in this way, we can begin to understand how care provided by EMS personnel translates to improved outcomes and system effectiveness.

PROJECT HISTORY

The purpose of the EMS system core measures project is to increase the accessibility and accuracy of pre-hospital data for public, policy, academic and research purposes to facilitate EMS system evaluation and improvement through a grant from the California Health Care Foundation (CHCF). Ultimately, the project highlights opportunities to improve the quality of patient care delivered within an EMS system.

During the 1 year period, from July 31, 2013 to June 30, 2014, The California EMS Authority (EMSA) is performing the following activities to deliver a set of publicly available data reports:

1. Create a formal data system profile and written analysis to identify areas for data quality improvement and inform an action plan to address the issues.

2. Work to reveal opportunities for both short-term and long-term data improvement plans.

3. Focus on achieving reliable measures that are high value and feasible within a short-term time frame.

4. Refine and publish core measure sets that describe the coordination and effectiveness of EMS utilizing regional and local information for California. This project focuses upon the following core measure sets:

- Trauma
- Acute Coronary Syndrome/Heart Attack
- Cardiac Arrest
- Stroke
- Respiratory
- Pain Intervention
- Pediatric
- Skill Performance by EMS Providers
- EMS Response and Transport
- Public Education Bystander CPR

5. Conduct data workshops for local EMS agencies across the state to implement improved data collection and reporting practices with those Local Emergency Medical Services Agencies who participate in California Emergency Medical Services Information System.

WHAT ARE CORE MEASURES?

They are the use of standardized – or core – performance measures or quality indicators in examining an EMS system or treating an identified patient condition.

CORE MEASURES DEFINITION

The preliminary California EMS Core Measures were derived largely from a set of quality indicators developed through a project by the National Quality Forum. Additionally, NHSTA has published Performance Measures for emergency medical services. These California core measures will begin to benchmark the performance of EMS systems, perform recommended treatments determined to get the best results for patients with certain medical conditions, and transport patients to the most appropriate hospital. Information about these treatments are taken from the pre-hospital care reports and converted into a percentage.

The measures are based on scientific evidence about processes and treatments that are known to get the best results for a condition or illness. Core Measures help emergency medical services systems improve the quality of patient care by focusing on the actual results of care.

COMPARING PERFORMANCE

Emergency medical services systems across the state will be measured and compared on their performance in these Core Measures. There will be a delay between when data is reported from EMS systems and when it is available for review. This is because EMSA will have to wait for all local systems in the state to be compiled before it can post its quality data for a given period. This way, EMS systems and consumers can compare California program from the same time period.

In the future, EMS providers should utilize these core measures to assist in continuous quality improvement activities.

SYSTEM EVALUATION

The recurring theme in evaluation of the EMS system using these core measures consists of:

- Arrival at the scene in a timely manner,
- Timely, focused patient assessment,
- Delivery of time-sensitive prehospital therapy, and
- Transport to a hospital capable of providing necessary care

FUTURE CORE MEASURES

It is anticipated that the proposed EMS system cores measures may be modified and future core measures added in the future.

CORE MEASURES TASK FORCE

A task force has been convened to review the core measures and make recommendations. The task force consists of key data and quality leaders from local EMS agencies, medical directors, hospitals, and pre-hospital EMS providers.

QUALIFYING DATA

The data derived for all measures will come from the calendar years of 2012 and 2013. Reports will be run by calendar year to obtain longitudinal comparisons.

STANDARD ELEMENTS FOR EVERY MEASURE

The following standard elements are necessary to sort by time and location:

- Date/Time E05_01
- County E08_13
- LEMSA C01_01

REFERENCE INFORMATION

The California EMS System Core Quality Measures contains various references and coding from other documents. All data elements and values referenced in the Core Measures are coded using NEMSIS. Please refer to the following documents regarding the codes found in each measure:

NEMSIS 2.2.1 Data Dictionary – Updated 4/9/2012 (http://www.nemsis.org/v2/downloads/documents/NEMSIS_Data_Dictionary_v2.2.1_04092012.pdf)

NHTSA: Emergency Medical Services Performance Measures – Updated 12/2009 (www.ems.gov/pdf/811211.pdf)

Utstein Definitions (http://circ.ahajournals.org/content/110/21/3385.full)

Pediatric patients are defined throughout this document as being younger than age 14

INSTRUCTIONS FOR RUNNING MEASURE REPORTS

- Run each core measure exactly as specified on each core measure specification sheet.

- If the core measure cannot be run as specified, run the measure based on the intent of the core measure according to the question provided in the description box on the specification sheet.

- If a core measure is ran based on intent (as described above), the LEMSA must provide the methodology that was used, including all elements and values, to achieve a value for the core measure. This must be provided when submitting the report to EMSA.

SAMPLING

- Sampling may be used to generate a reportable value for a measure based on the standard methodology of random sampling as follows:

    - Identify the denominator population (this needs to be provided on the reporting spreadsheet)
    - Identify numerator population based on core measure
    - Assign unique ID number to all numerator records
    - Using a random number generator, identify the records to be included in the sample.

- Sampling size must be a minimum of 30 records.

- When submitting your report, it must be specified that sampling was used.

EMS SYSTEM CORE MEASURES FOR CALIFORNIA - 2013

CCR Title 22, Div 9, Chap 12 100404	SET NAME	SET ID	PERFORMANCE MEASURE NAME	YEAR BEGIN TO BE MEASURED
D Clinical Care and Patient Outcome	**Trauma (n=2)**	TRA-1	Scene time for severely injured trauma patients	2013
		TRA-2	Direct transport to trauma center for severely injured trauma patients meeting criteria	2013
	Acute Coronary Syndrome (n=4)	ACS-1	Aspirin administration for chest pain/discomfort	2013
		ACS-2	12 lead ECG performance	2013
		ACS-3	Scene time for suspected heart attack patients	2013
		ACS-5	Direct transport to designated STEMI receiving center for suspected patients meeting criteria	2013
	Cardiac Arrest (n=3)	CAR-2	Out-of-hospital cardiac arrests return of spontaneous circulation	2013
		CAR-3	Out-of-hospital cardiac arrests survival to emergency department discharge	2013
		CAR-4	Out-of-hospital cardiac arrests survival to hospital discharge	2013
	Stroke (n=3)	STR-2	Glucose testing for suspected stroke patients	2013
		STR-3	Scene time for suspected stroke patients	2013
		STR-5	Direct transport to stroke center for suspected stroke patients meeting criteria	2013
	Respiratory (n=1)	RES-2	Beta2 agonist administration for adults	2013
	Pediatric (n=1)	PED-1	Pediatric asthma patients receiving bronchodilators	2013
	Pain Intervention (n=1)	PAI-1	Pain intervention	2013

(Continued)

CCR Title 22, Div 9, Chap 12 100404	SET NAME	SET ID	PERFORMANCE MEASURE NAME	YEAR BEGIN TO BE MEASURED
E **Skills Maintenance and Competency**	**Performance of Skills (n=2)**	SKL-1	Endotracheal intubation success rate	2013
		SKL-2	End-Tidal CO2 performed on any successful endotracheal intubation	2013
F **Transportation and Facilities**	**Response and Transport (n=3)**	RST-1	Ambulance response time by ambulance zone (Emergency)	2013
		RST-2	Ambulance response time by ambulance zone (Non-Emergency)	2013
		RST-3	Transport of patients to hospital	2013

Core Measures Specification Sheets

SCENE TIME FOR SEVERELY INJURED TRAUMA PATIENTS

MEASURE SET	Trauma	
SET MEASURE ID #	TRA-1	
PERFORMANCE MEASURE NAME	Scene time for severely injured trauma patients	
Description	What is the 90th percentile for on scene time value for severely injured trauma patients (RTS<5) who were transported from the scene by ground ambulance?	
Type of Measure	Process	
Reporting Value and Units	Time (Minutes and Seconds)	
Continuous Variable Statement (Population)	Time (in minutes) from time ground ambulance arrives at the scene until the time ambulance departs from the scene for Trauma patients, meeting criteria for transport to a trauma center (using revised trauma score or RTS<5), who received transport by ground ambulance to a hospital by EMS personnel (EMT, AEMT, and Paramedic).	
Inclusion Criteria	**Criteria**	**Data Elements**
	• All events for which E02_04 "type of service requested" has value 30 "911 response (scene),"; and vehicle type corresponds to ground ambulance; • E02_20 "response mode to scene" has a value of 390 "lights and sirens" • Values for "arrived at scene" E05_06 and "unit left scene" E05_09 are present and logical; • Patients with E09_15 "provider primary impression" value 1740 "blunt injury" or 1741 "penetrating injury", or E09_16 "provider secondary impression" value 1875 "blunt injury" or 1876 "penetrating injury" and: • patients with E14_27 "Revised Trauma Score" <5; OR • All events for which E02_04 "type of service requested" has value 30 "911 response (scene),"; and vehicle type corresponds to ground	• Type of Service Requested (E02_04) • Response mode to scene (E02_20) • Arrived at Scene (E05_06) • Unit Left Scene (E05_09) • Provider Primary Impression (E09_15) • Provider Secondary Impression (E09_16) • Revised Trauma Score (E14_27) • Systolic Blood Pressure (E14_04) • Total GCS Value (E14_19) • Respiratory Rate (E14_11) • Date of Birth (E06_16) • Age Units (E06_15) • Age (E06_14)

	ambulance; and E02_20 "response mode to scene" has a value of 390 "lights and sirens" and values for "arrived at scene" E05_06 and "unit left scene" E05_09 are present and logical; • Patients with E09_15 "provider primary impression" values 1740 "blunt injury" or 1741 "penetrating injury", or E09_16 "provider secondary impression" values 1875 "blunt injury" or 1876 "penetrating injury" **and**: • E14_19 "Total Glasgow Coma Score" value < 14; and • E14_04 "systolic blood pressure" value < 90; and • E14_11 "respiratory rate" value < 10 or > 29 for patients aged 1 year or older or E14_11 "respiratory rate" value < 20 for patients less than 1 year of age	
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Indicator Formula Numeric Expression	The formula is the 90th Percentile of the given numbers or distribution in their ascending order.	
Example of Final Reporting Value (number and units)	14 minutes, 34 seconds (14:34)	
Sampling	Yes	
Aggregation	Yes	
Blinded	Yes	
Minimum Data Values	30	
Data Collection Approach	☐ Retrospective data sources for required data elements include administrative data and pre-hospital care records. ☐ Variation may exist in the assignment of coding; therefore, coding practices may require evaluation to ensure consistency.	
Suggested Display Format &	Process control or run chart by month	

Frequency	
Suggested Statistical Measures	90th Percentile Measurement. Aggregate measure of central tendency and quantile (fractile) measurement to determine the span of frequency distributions.
Trending Analysis	Yes
Benchmark Analysis	(TBD)

DIRECT TRANSPORT TO TRAUMA CENTER FOR SEVERELY INJURED TRAUMA PATIENTS MEETING CRITERIA

MEASURE SET	Trauma	
SET MEASURE ID #	TRA-2	
PERFORMANCE MEASURE NAME	Direct transport to trauma center for severely injured trauma patients meeting criteria	
Description	What is the percentage of severely injured trauma patients (RTS<5) who were transported from the scene directly to a trauma center by a ground ambulance?	
Type of Measure	Process	
Reporting Value and Units	(%) Percentage	
Denominator Statement (population)	All trauma patients, meeting trauma criteria (using a Revised Trauma Score or RTS<5) for transport from scene to a trauma center	
Denominator Inclusion Criteria	**Criteria**	**Data Elements**
	• All events for which E02_04 "type of service requested" has value 30 "911 response (scene),"; and vehicle type corresponds to ground ambulance; • E02_20 "response mode to scene" has a value of 390 "lights and sirens" • Values for "arrived at scene" E05_06 and "unit left scene" E05_09 are present and logical; • Patients with E09_15 "provider primary impression" value 1740 "blunt injury" or 1741 "penetrating injury", or E09_16 "provider secondary impression" value 1875 "blunt injury" or 1876 "penetrating injury" and: • patients with E14_27 "Revised Trauma Score" <5; OR • All events for which E02_04 "type of service requested" has value 30 "911 response (scene),"; and vehicle type corresponds to ground ambulance; and E02_20 "response mode to scene" has a value of 390 "lights and sirens" and values for "arrived at scene" E05_06 and "unit left scene" E05_09 are present and logical;	• Provider Primary Impression (E09_15) • Provider Secondary Impression (E09_16) • Type of Service Requested (E02_04) • Revised Trauma Score (E14_27) • Systolic Blood Pressure (E14_04) • Total GCS Value (E14_19) • Respiratory Rate (E14_11) • Date of Birth (E06_16) • Age Units (E06_15) • Age (E06_14)

	• Patients with E09_15 “provider primary impression” values 1740 “blunt injury” or 1741 “penetrating injury”, or E09_16 “provider secondary impression” values 1875 “blunt injury” or 1876 “penetrating injury” and: • E14_19 “Total Glasgow Coma Score” value < 14; and • E14_04 “systolic blood pressure” value < 90; and • E14_11 ”respiratory rate” value < 10 or > 29 for patients aged 1 year or older or E14_11 ”respiratory rate” value < 20 for patients less than 1 year of age	
Exclusion Criteria	**Criteria**	**Data Elements**
	• All patients who were not transported to trauma center	
Numerator Statement (sub-population)	Trauma patients, meeting criteria for transport to a trauma center, who received transport by ambulance directly to a trauma center by Ambulance	
Numerator Inclusion Criteria	**Criteria**	**Data Elements**
	• All events for which E02_04 “type of service requested” has value 30 “911 response (scene),”; and vehicle type corresponds to ground ambulance; and E02_20 “response mode to scene” has a value of 390 “lights and sirens” and values for “arrived at scene” E05_06 and “unit left scene” E05_09 are present and logical; • Patients with E09_15 “provider primary impression” value 1740 “blunt injury” or 1741 “penetrating injury”, or E09_16 “provider secondary impression” value 1875 “blunt injury” or 1876 “penetrating injury” and: • patients with E14_27 “Revised Trauma Score” <5; And • Patients who have “destination/transferred to” code (E20_02) of a trauma center **OR**	• Revised Trauma Score (E14_27) • Incident/Patient Disposition (E20_10) • Hospital Destination (E20_02)

	• All events for which E02_04 "type of service requested" has value 30 "911 response (scene),"; and vehicle type corresponds to ground ambulance; and E02_20 "response mode to scene" has a value of 390 "lights and sirens" and values for "arrived at scene" E05_06 and "unit left scene" E05_09 are present and logical; • Patients with E09_15 "provider primary impression" values 1740 "blunt injury" or 1741 "penetrating injury", or E09_16 "provider secondary impression" values 1875 "blunt injury" or 1876 "penetrating injury" and: • E14_19 "Total Glasgow Coma Score" value < 14; and • E14_04 "systolic blood pressure" value < 90; and • E14_11 "respiratory rate" value < 10 or > 29 for patients aged 1 year or older or E14_11 "respiratory rate" value < 20 for patients less than 1 year of age And • Patients who have "destination/transferred to" code (E20_02) of a trauma center	
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Indicator Formula Numeric Expression	The formula is to divide (/) the numerator (N) by the denominator (D) and then multiply (x) by 100 to obtain the (%) value the indicator is to report. Therefore the indicator expressed numerically is N/D =%	
Example of Final Reporting Value (number and units)	90%	
Sampling	Yes	
Aggregation	Yes	
Blinded	Yes	
Minimum Data Values	30	

Data Collection Approach	☐ Retrospective data sources for required data elements include administrative data and pre-hospital care records. ☐ Variation may exist in the assignment of coding; therefore, coding practices may require evaluation to ensure consistency.
Suggested Display Format & Frequency	Process control or run chart by month
Suggested Statistical Measures	Mean (x); Mode (m)
Trending Analysis	Yes
Benchmark Analysis	(TBD)

ASPIRIN ADMINISTRATION FOR CHEST PAIN/DISCOMFORT RATE

MEASURE SET	Acute Coronary Syndrome (ACS)	
SET MEASURE ID #	ACS-1	
PERFORMANCE MEASURE NAME	Aspirin administration for chest pain/discomfort rate	
Description	What is the percent of patients age 35 and older with suspected cardiac chest pain who received aspirin prior to hospital by pre-hospital personnel?	
Type of Measure	Process	
Reporting Value and Units	(%) Percentage	
Improvement Noted As	An increase in the rate in terms of the percentage	
Denominator Statement (population)	Number of patients over age 35 creating a provider impression of chest pain/discomfort who are eligible for aspirin administration	
Denominator Inclusion Criteria	**Criteria**	**Data Elements**
	• Patients with E09_15 1650 **"**Chest pain – suspected cardiac origin" or E09_16 value 1785 "chest pain – suspected cardiac origin"; • Patients aged 35 years and older • All events for which E02_04 "type of service requested" has value 30 "911 response (scene),"	• Provider Primary Impression (E09_15) • Provider Secondary Impression (E09_16) • Age (E06_14) • Age Units E06_15) • Date of Birth (E06_16)
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Numerator Statement (sub-population)	Number of patients creating a provider impression of chest pain/discomfort who are eligible for and receive aspirin administration	
Numerator Inclusion Criteria	**Criteria**	**Data Elements**

	• Patients with E09_15 1650 **"**Chest pain – suspected cardiac origin "or E09_16 value 1785 "chest pain – suspected cardiac origin"; • Patients aged 35 years and older And • E18_03 "medications given" equal to 8625 "aspirin"	• Medications given (E18_03)
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Indicator Formula Numeric Expression	The formula is to divide (/) the numerator (N) by the denominator (D) and then multiply (x) by 100 to obtain the (%) value the indicator is to report. Therefore the indicator expressed numerically is N/D =%	
Example of Final Reporting Value (number and units)	90%	
Sampling	Yes	
Aggregation	Yes	
Blinded	Yes	
Minimum Data Values	30	
Data Collection Approach	☐ Retrospective data sources for required data elements include administrative data and pre-hospital care records. ☐ Variation may exist in the assignment of coding; therefore, coding practices may require evaluation to ensure consistency.	
Suggested Display Format & Frequency	Process control or run chart by month	
Suggested Statistical Measures	Mean (x); Mode (m)	
Trending Analysis	Yes	
Benchmark Analysis	(TBD)	

12 LEAD ECG PERFORMANCE

MEASURE SET	Acute Coronary Syndrome (ACS)	
SET MEASURE ID #	ACS-2	
PERFORMANCE MEASURE NAME	12 Lead ECG Performance	
Description	What is the percentage of patients with cardiac chest pain discomfort who received 12 lead by paramedics?	
Type of Measure	Process	
Reporting Value and Units	(%) Percentage	
Denominator Statement (population)	Number of patients creating a provider impression of chest pain/discomfort	
Denominator Inclusion Criteria	**Criteria**	**Data Elements**
	• Patients with E09_15 1650 Chest pain – suspected cardiac origin **or** E09_16 value 1785 "chest pain – suspected cardiac origin"; • Patients aged 35 years and older • All events for which E02_04 "type of service requested" has value 30 "911 response (scene),"	• Provider Primary Impression (E09_15) • Provider Secondary Impression (E09_16) • Age (E06_14) • Age Units (E06_15) • Date of Birth (E06_16)
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Numerator Statement (sub-population)	Number of patients creating a provider impression of chest pain/discomfort who have 12-lead EKG performed	
Numerator Inclusion Criteria	**Criteria**	**Data Elements**
	• Patients with E09_15 1650 Chest pain – suspected cardiac origin or E09_16 value 1785 "chest pain – suspected cardiac origin"; and • Patients aged 35 years and older and	• Provider Primary Impression (E09_15) • Provider Secondary Impression (E09_16) • Age (E06_14) • Age Units (E06_15) • Date of Birth (E06_16)

	• Have a E19_03 “procedure” value 89.820 “12 lead -(Obtain)” or 89.821 “12 Lead (Transmitted)	• Procedures Performed (E19_03)
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Indicator Formula Numeric Expression	The formula is to divide (/) the numerator (N) by the denominator (D) and then multiply (x) by 100 to obtain the (%) value the indicator is to report. Therefore the indicator expressed numerically is N/D =%	
Example of Final Reporting Value (number and units)	90%	
Sampling	Yes	
Aggregation	Yes	
Blinded	Yes	
Minimum Data Values	30	
Data Collection Approach	☐ Retrospective data sources for required data elements include administrative data and pre-hospital care records. ☐ Variation may exist in the assignment of coding; therefore, coding practices may require evaluation to ensure consistency.	
Suggested Display Format & Frequency	Process control or run chart by month	
Suggested Statistical Measures	Mean (x); Mode (m)	
Trending Analysis	Yes	
Benchmark Analysis	(TBD)	

SCENE TIME FOR SUSPECTED HEART ATTACK PATIENTS

MEASURE SET	Acute Coronary Syndrome	
SET MEASURE ID #	ACS-3	
PERFORMANCE MEASURE NAME	Scene time for suspected heart attack patients	
Description	What is the 90th percentile for ground ambulance scene time of STEMI patients?	
Type of Measure	Process	
Reporting Value and Units	Time (Minutes and Seconds)	
Continuous Variable Statement (Population)	The 90th percentile time interval in an emergency from the time ground ambulance "arrived at scene" to "unit left scene", for a given period of time, of patients having a recorded "STEMI" value for an indicator like E14_03 "cardiac rhythm"	
Denominator Inclusion Criteria	**Criteria**	**Data Elements**
	• All events for which E02_04 "type of service requested" has value 30 "911 response (scene),"; and vehicle type corresponds to ground ambulance; and • E02_20 "response mode to scene" has a value of 390 "lights and sirens" • Values for "arrived at scene" E05_06 and "unit left scene" E05_09 are present and logical; • Patients aged 35 years and older • Patient has a "STEMI" value recorded for an indicator like E14_03 "cardiac rhythm", such as 3005, 3010, 3015	• Type of Service Requested (E02_04) • Arrived at Scene (E05_06) • Unit Left Scene (E05_09) • Cardiac Rhythm (E14_03) • Age (E06_14) • Age Units (E06_15) • Date of Birth (E06_16)
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Indicator Formula Numeric Expression	The formula is the 90th Percentile of the given numbers or distribution in their ascending order.	
Example of Final Reporting Value (number and units)	14 minutes, 20 seconds (14:20)	

Sampling	Yes
Aggregation	Yes
Blinded	Yes
Minimum Data Values	30
Data Collection Approach	☐ Retrospective data sources for required data elements include administrative data and pre-hospital care records. ☐ Variation may exist in the assignment of coding; therefore, coding practices may require evaluation to ensure consistency.
Suggested Display Format & Frequency	Process control or run chart by month
Suggested Statistical Measures	Mean (x); Mode (m)
Trending Analysis	Yes
Benchmark Analysis	(TBD)

DIRECT TRANSPORT TO DESIGNATED STEMI RECEIVING CENTER FOR SUSPECTED PATIENTS MEETING CRITERIA

MEASURE SET	Acute Coronary Syndrome	
SET MEASURE ID #	ACS-5	
PERFORMANCE MEASURE NAME	Direct transport to designated STEMI receiving center for suspected patients meeting criteria	
Description	What percentage of suspected STEMI patients are transported by ground ambulance directly to a designated STEMI receiving center?	
Type of Measure	Process	
Reporting Value and Units	(%) Percentage	
Denominator Statement (population)	Number of patients having a recorded “STEMI” value for an indicator like E14_03 “cardiac rhythm”	
Denominator Inclusion Criteria	**Criteria**	**Data Elements**
	• Patients aged 35 years and older • Patients having E14_03 “cardiac rhythm” recorded with a “STEMI” value, such as 30005, 3010, 3015 • All events for which E02_04 “type of service requested” has value 30 “911 response (scene),”; and vehicle type corresponds to ground ambulance;	• Age (E06_14) • Age Units (E06_15) • Date of Birth (E06_16) • Cardiac Rhythm (E14_03)
Exclusion Criteria		
	None	
Numerator Statement (sub-population)	Number of patients having a recorded “STEMI” value for an indicator like E14_03 “cardiac rhythm” that have an E20_02 “destination/ transferred to code” of an interventional cardiac cath center (STEMI Center)	
Numerator Inclusion Criteria	**Criteria**	**Data Elements**

	• Patients aged 35 years and older • Patients having E14_03 "cardiac rhythm" recorded with a "STEMI" value, such as 30005, 3010, 3015 And • that have an E20_02 "destination/transferred to code" of an interventional cardiac cath center (STEMI Center)	• Age (E06_14) • Age Units (E06_15) • Date of Birth (E06_16) • Cardiac Rhythm (E14_03) • Destination/Transferred to Code (E20_02)
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Indicator Formula Numeric Expression	The formula is to divide (/) the numerator (N) by the denominator (D) and then multiply (x) by 100 to obtain the (%) value the indicator is to report. Therefore the indicator expressed numerically is N/D =%	
Example of Final Reporting Value (number and units)	90%	
Sampling	Yes	
Aggregation	Yes	
Blinded	Yes	
Minimum Data Values	30	
Data Collection Approach	☐ Retrospective data sources for required data elements include administrative data and pre-hospital care records. ☐ Variation may exist in the assignment of coding; therefore, coding practices may require evaluation to ensure consistency.	
Suggested Display Format & Frequency	Process control or run chart by month	
Suggested Statistical Measures	Mean (x); Mode (m)	
Trending Analysis	Yes	
Benchmark Analysis	(TBD)	
Rationale for Data	Need to find sources supporting this measure	
References	NEMSIS Core Measure Indicator 9	

OUT-OF-HOSPITAL CARDIAC ARRESTS RETURN OF SPONTANEOUS CIRCULATION

MEASURE SET	Cardiac Arrest	
SET MEASURE ID #	CAR-2	
PERFORMANCE MEASURE NAME	Out-of-hospital cardiac arrests return of spontaneous circulation	
Description	Per Utstein definition of ROSC (see references section): What is the percentage of patients experiencing cardiac origin cardiac arrest who have ROSC?	
Type of Measure	Process	
Reporting Value and Units	(%) Percentage	
Denominator Statement (population)	Total number of patients in a given period experiencing cardiac origin cardiac arrest	
Denominator Inclusion Criteria	**Criteria**	**Data Elements**
	• Patients having a recorded E11_01 “cardiac arrest” value of 2240 “yes, Prior to EMS arrival” or value of 2245 “yes, after EMS arrival”; • E11_02 “cardiac arrest etiology” value of 2250 “presumed cardiac” • E11_03 “resuscitation attempted” values 2280 “attempted defibrillation” or 2285 “attempted ventilation” or 2290 “initiated chest compressions”	• Cardiac Arrest (E11_01) • Cardiac Arrest Etiology (E11_02) • Resuscitation Attempted (E11_03) • Age (E06_14) • Age Units (E06_15) • Date of Birth (E06_16)
Exclusion Criteria	**Criteria**	**Data Elements**
	• Traumatic Cardiac Arrest	
Numerator Statement (sub-population)	Number of patients experiencing cardiac origin cardiac arrest who have a return of spontaneous circulation (ROSC)	
Numerator Inclusion Criteria	**Criteria**	**Data Elements**
	• Patients having a recorded E11_01 “cardiac arrest” value of 2240 “yes, Prior to EMS arrival” or value of 2245 “yes, after EMS arrival”;	• Cardiac Arrest (E11_01) • Cardiac Arrest Etiology (E11_02) • Resuscitation Attempted (E11_03)

	• E11_02 “cardiac arrest etiology” value of 2250 “presumed cardiac” • E11_03 “resuscitation attempted” values 2280 “attempted defibrillation” or 2285 “attempted ventilation” or 2290 “initiated chest compressions” And • E11_06 “any return of spontaneous circulation” values 2370 “yes, prior to ED Arrival Only” or 2375 “yes, prior to ED arrival and at the ED”	• Any Return to Spontaneous Circulation (E11_06)
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Indicator Formula Numeric Expression	The formula is to divide (/) the numerator (N) by the denominator (D) and then multiply (x) by 100 to obtain the (%) value the indicator is to report. Therefore the indicator expressed numerically is N/D =%	
Example of Final Reporting Value (number and units)	25%	
Sampling	No	
Aggregation	Yes	
Blinded	Yes	
Minimum Data Values	30	
Data Collection Approach	☐ Retrospective data sources for required data elements include administrative data and pre-hospital care records. ☐ Variation may exist in the assignment of coding; therefore, coding practices may require evaluation to ensure consistency.	
Suggested Display Format & Frequency	Process control or run chart by month	
Suggested Statistical Measures	Mean (x); Mode (m)	
Trending Analysis	Yes	
Benchmark Analysis	(TBD)	

OUT-OF-HOSPITAL CARDIAC ARRESTS SURVIVAL TO ED DISCHARGE

MEASURE SET	Cardiac Arrest	
SET MEASURE ID #	CAR-3	
PERFORMANCE MEASURE NAME	Out-of-hospital Cardiac Arrests Survival to ED discharge	
Description	Per Utstein definition of ROSC (see references section): What is the percentage of patients experiencing cardiac origin cardiac arrest, where resuscitation was attempted, who survived to ED discharge?	
Type of Measure	Outcome	
Reporting Value and Units	(%) Percentage	
Denominator Statement (population)	Total number of patients experiencing cardiac origin cardiac arrest with resuscitation attempted in a given period	
Denominator Inclusion Criteria	**Criteria**	**Data Elements**
	• Patients having a recorded E11_01 "cardiac arrest" value of 2240 "yes, Prior to EMS arrival" or value of 2245 "yes, after EMS arrival"; • E11_02 "cardiac arrest etiology" value of 2250 "presumed cardiac" • E11_03 "resuscitation attempted" values 2280 "attempted defibrillation" or 2285 "attempted ventilation" or 2290 "initiated chest compressions"	• Cardiac Arrest (E11_01) • Cardiac Arrest Etiology (E11_02) • Resuscitation Attempted (E11_03) • Age (E06_14) • Age Units (E06_15) • Date of Birth (E06_16)
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Numerator Statement (sub-population)	Number of patients experiencing cardiac origin cardiac arrest who survive to ED discharge	
Numerator Inclusion Criteria	**Criteria**	**Data Elements**
	• Patients having a recorded E11_01 "cardiac arrest" value of 2240 "yes, Prior to EMS arrival" or value of 2245 "yes, after EMS arrival"; • E11_02 "cardiac arrest etiology" value of 2250 "presumed	• Cardiac Arrest (E11_01) • Cardiac Arrest Etiology (E11_02) • Resuscitation Attempted (E11_03) • Emergency Department

	cardiac” • E11_03 “resuscitation attempted” values 2280 “attempted defibrillation” or 2285 “attempted ventilation” or 2290 “initiated chest compressions” And • E22_01 “emergency department disposition” values 5335 “admitted to hospital floor” or 5340 “admitted to hospital ICU” or 5355 “released” or 5360 “transferred”	Disposition (E22_01)
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Indicator Formula Numeric Expression	The formula is to divide (/) the numerator (N) by the denominator (D) and then multiply (x) by 100 to obtain the (%) value the indicator is to report. Therefore the indicator expressed numerically is N/D =%	
Example of Final Reporting Value (number and units)	25%	
Sampling	Yes	
Aggregation	Yes	
Blinded	Yes	
Minimum Data Values	30	
Data Collection Approach	☐ Retrospective data sources for required data elements include administrative data and pre-hospital care records. ☐ Variation may exist in the assignment of coding; therefore, coding practices may require evaluation to ensure consistency.	
Suggested Display Format & Frequency	Process control or run chart by month	
Suggested Statistical Measures	Mean (x); Mode (m)	
Trending Analysis	Yes	
Benchmark Analysis	(TBD)	

OUT-OF-HOSPITAL CARDIAC ARRESTS SURVIVAL TO HOSPITAL DISCHARGE

MEASURE SET	Cardiac Arrest	
SET MEASURE ID #	CAR-4	
PERFORMANCE MEASURE NAME	Out-of-hospital Cardiac Arrests Survival to hospital discharge	
Description	Per Utstein definition of ROSC (see references section): What is the percentage of patients experiencing cardiac origin cardiac arrest, where resuscitation was attempted, who survived to hospital discharge?	
Type of Measure	Outcome	
Reporting Value and Units	(%) Percentage	
Denominator Statement (population)	Total number of patients experiencing cardiac origin cardiac arrest in a given period	
Denominator Inclusion Criteria	**Criteria**	**Data Elements**
	• Patients having a recorded E11_01 “cardiac arrest” value of 2240 “yes, Prior to EMS arrival” or value of 2245 “yes, after EMS arrival”; • E11_02 “cardiac arrest etiology” value of 2250 “presumed cardiac” • E11_03 “resuscitation attempted” values 2280 “attempted defibrillation” or 2285 “attempted ventilation” or 2290 “initiated chest compressions”	• Cardiac Arrest (E11_01) • Cardiac Arrest Etiology (E11_02) • Resuscitation Attempted (E11_03) • Age (E06_14) • Age Units (E06_15) • Date of Birth (E06_16)
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Numerator Statement (sub-population)	Number of patients experiencing cardiac origin cardiac arrest who survive to discharge from the hospital	
Numerator Inclusion Criteria	**Criteria**	**Data Elements**
	• Patients having a recorded E11_01 “cardiac arrest” value of 2240 “yes, Prior to EMS arrival” or value of 2245 “yes, after EMS arrival”;	• Cardiac Arrest (E11_01) • Cardiac Arrest Etiology (E11_02) • Resuscitation

	• E11_02 “cardiac arrest etiology” value of 2250 “presumed cardiac” • E11_03 “resuscitation attempted” values 2280 “attempted defibrillation” or 2285 “attempted ventilation” or 2290 “initiated chest compressions” And • E22_02 “hospital disposition” values 5370 “discharged” or 5375 “transfer to hospital” or 5380 “transfer to nursing home” or 5385 “transfer to other” or 5390 “transfer to rehabilitation facility”	Attempted (E11_03) • Hospital Disposition (E22_02)
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Indicator Formula Numeric Expression	The formula is to divide (/) the numerator (N) by the denominator (D) and then multiply (x) by 100 to obtain the (%) value the indicator is to report. Therefore the indicator expressed numerically is N/D =%	
Example of Final Reporting Value (number and units)	25%	
Sampling	Yes	
Aggregation	Yes	
Blinded	Yes	
Minimum Data Values	30	
Data Collection Approach	☐ Retrospective data sources for required data elements include administrative data and pre-hospital care records. ☐ Variation may exist in the assignment of coding; therefore, coding practices may require evaluation to ensure consistency.	
Suggested Display Format & Frequency	Process control or run chart by month	
Suggested Statistical Measures	Mean (x); Mode (m)	
Trending Analysis	Yes	
Benchmark Analysis	(TBD)	

GLUCOSE TESTING FOR SUSPECTED ACUTE STROKE PATIENTS

MEASURE SET	Stroke	
SET MEASURE ID #	STR-2	
PERFORMANCE MEASURE NAME	Glucose Testing for Suspected Acute Stroke Patients	
Description	What is the percentage of suspected acute stroke patients who received a glucose test in a pre-hospital setting?	
Type of Measure	Process	
Reporting Value and Units	(%) Percentage	
Denominator Statement (population)	All Suspected Acute Stroke patients	
Denominator Inclusion Criteria	**Criteria**	**Data Elements**
	• Patients with E09_15 value 1730 value "neurological deficit (includes CVA/TIA)" or E09_16 value 1865 "neurological deficit (includes CVA/TIA)" • Patients aged 18 years of age or older • All events for which E02_04 "type of service requested" has value 30 "911 response (scene),""	• Provider Primary Impression (E09_15) • Provider Secondary Impression (E09_16) • Age (E06_14) • Age Units (E06_15) • Date of Birth (E06_16)
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Numerator Statement (sub-population)	Glucose level checked on all suspected acute stroke patients	
Numerator Inclusion Criteria	**Criteria**	**Data Elements**
	• Patients with E09_15 value 1730 value "neurological deficit (includes CVA/TIA)" or E09_16 value 1865 "neurological deficit (includes CVA/TIA)" • Patients aged 18 years of age or older And • Patient received glucose testing E19_03 "procedure" with a value of 38.995 "blood glucose	• Provider Primary Impression (E09_15) • Provider Secondary Impression (E09_16) • Procedure (E19_03)

	analysis”	
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Indicator Formula Numeric Expression	The formula is to divide (/) the numerator (N) by the denominator (D) and then multiply (x) by 100 to obtain the (%) value the indicator is to report. Therefore the indicator expressed numerically is N/D =%	
Example of Final Reporting Value (number and units)	90%	
Sampling	Yes	
Aggregation	Yes	
Blinded	Yes	
Minimum Data Values	30	
Data Collection Approach	☐ Retrospective data sources for required data elements include administrative data and pre-hospital care records. ☐ Variation may exist in the assignment of coding; therefore, coding practices may require evaluation to ensure consistency.	
Suggested Display Format & Frequency	Process control or run chart by month	
Suggested Statistical Measures	Mean (x); Mode (m)	
Trending Analysis	Yes	
Benchmark Analysis	(TBD)	

SCENE TIME FOR SUSPECTED ACUTE STROKE PATIENTS

MEASURE SET	Stroke	
SET MEASURE ID #	STR-3	
PERFORMANCE MEASURE NAME	Scene time for suspected acute stroke patients	
Description	What is the 90th percentile for on scene time value for suspected acute stroke patients who were transported from the scene by ground ambulance?	
Type of Measure	Process	
Reporting Value and Units	Time (Minutes and Seconds)	
Continuous Variable Statement (population)	All suspected stroke patients	
Denominator Inclusion Criteria	**Criteria**	**Data Elements**
	• All events for which E02_04 "type of service requested" has value 30 "911 response (scene)," vehicle type corresponds to ground ambulance; and • Values for "arrived at scene" E05_06 and "unit left scene" E05_09 are present and pass logic test; • Patients with E09_15 value 1730 value "neurological deficit (includes CVA/TIA)" or E09_16 value 1865 "neurological deficit (includes CVA/TIA)" • Patients aged 18 years of age or older	• Provider Primary Impression (E09_15) • Provider Secondary Impression (E09_16) • Type of Service Requested (E02_04) • Unit Arrived at Scene (E05_06) • Unit Left Scene (E05_09) • Age (E06_14) • Age Units (E06_15) • Date of Birth (E06_16)
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Indicator Formula Numeric Expression	The formula is the 90th Percentile of the given numbers or distribution in their ascending order.	
Example of Final Reporting Value (number and units)	14 minutes, 20 seconds (14:20)	
Sampling	Yes	

Aggregation	Yes
Blinded	Yes
Minimum Data Values	30
Data Collection Approach	☐ Retrospective data sources for required data elements include administrative data and pre-hospital care records. ☐ Variation may exist in the assignment of coding; therefore, coding practices may require evaluation to ensure consistency.
Suggested Display Format & Frequency	Process control or run chart by month
Suggested Statistical Measures	Mean (x); Mode (m)
Trending Analysis	Yes
Benchmark Analysis	(TBD)

DIRECT TRANSPORT TO STROKE CENTER FOR SUSPECTED ACUTE STROKE PATIENTS MEETING CRITERIA

MEASURE SET	Stroke	
SET MEASURE ID #	STR-5	
PERFORMANCE MEASURE NAME	Direct transport to stroke center for suspected acute stroke patients meeting criteria	
Description	What percent of suspected acute stroke patients were transported from the scene by ground ambulance directly to a designated stroke center?	
Type of Measure	Process	
Reporting Value and Units	(%) Percentage	
Denominator Statement (population)	All acute stroke patients, meeting local stroke criteria for transport to a designated stroke center	
Denominator Inclusion Criteria	**Criteria**	**Data Elements**
	• Patients with E09_15 value 1730 value "neurological deficit (includes CVA/TIA)" or E09_16 value 1865 "neurological deficit (includes CVA/TIA)" • Patients aged 18 years of age or older • All events for which E02_04 "type of service requested" has value 30 "911 response (scene)," vehicle type corresponds to ground ambulance;	• Provider Primary Impression (E09_15) • Provider Secondary Impression (E09_16) • Age (E06_14) • Age Units (E06_15) • Date of Birth (E06_16) • Type of Service Requested (E02_04)
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Numerator Statement (sub-population)	Suspected acute stroke patients, meeting local stroke criteria, who received transport by ground ambulance directly to a designated stroke center	
Numerator Inclusion Criteria	**Criteria**	**Data Elements**
	• Patients with E09_15 value 1730 value	• Provider Primary Impression (E09_15)

	"neurological deficit (includes CVA/TIA)" or E09_16 value 1865 "neurological deficit (includes CVA/TIA)" • Patients aged 18 years of age or older And • E20_01 "Destination Transferred To, Name" represents a stroke center	• Provider Secondary Impression (E09_16) • Destination/Transferred To (E20_01)
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Indicator Formula Numeric Expression	The formula is to divide (/) the numerator (N) by the denominator (D) and then multiply (x) by 100 to obtain the (%) value the indicator is to report. Therefore the indicator expressed numerically is N/D =%	
Example of Final Reporting Value	90%	
Sampling	Yes	
Aggregation	Yes	
Blinded	Yes	
Minimum Data Values	30	
Data Collection Approach	☐ Retrospective data sources for required data elements include administrative data and pre-hospital care records. ☐ Variation may exist in the assignment of coding; therefore, coding practices may require evaluation to ensure consistency.	
Suggested Display Format & Frequency	Process control or run chart by month	
Suggested Statistical Measures	Mean (x); Mode (m)	
Trending Analysis	Yes	
Benchmark Analysis	(TBD)	

BETA2 AGONIST ADMINISTRATION

Measure Set	Respiratory	
Set Measure ID #	RES-2	
Performance Measure Name	Beta2 agonist administration	
Description	What is the percentage of beta2 agonist (bronchodilator or Ipratropium) administration by EMS personnel for patients older than 14 years old with signs and symptoms of suspected bronchospasm?	
Type of Measure	Process	
Reporting Value and Units	(%) Percentage	
Denominator Statement (population)	Adult patients with suspected bronchospasm	
Denominator Inclusion Criteria	**Criteria**	**Data Elements**
	• Patients for whom E09_15 "provider's primary impression" has value 1701 "shortness of breath – suspected asthma/COPD" or for whom E09_16 "provider's secondary impression" has value 1835 – "shortness of breath – suspected asthma/COPD" • Patients aged 14 years or older	• Provider Primary Impression (E09_15) • Provider Secondary Impression (E09_16) • Age (E06_14) • Age Units (E06_15) • Date of Birth (E06_16)
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Numerator Statement (sub-population)	Adult patients who received beta2 agonist by EMS personnel in the pre-hospital setting.	
Numerator Inclusion Criteria	**Criteria**	**Data Elements**
	• Patients for whom E09_15 "provider's primary impression" has value 1701 "shortness of breath – suspected asthma/COPD" or for whom E09_16 "provider's secondary impression" has value 1835 – "shortness of breath – suspected asthma/COPD" • Patients aged 14 years or older	• Provider Primary Impression (NEMSIS E09_15) • Provider Secondary Impression (NEMSIS E09_16) • Age (E06_14) • Age Units (E06_15) • Date of Birth (E06_16) • Medication Given (E18_03**)**

	And • Who have a E18_03 value 8620 “aerosolized or nebulized beta-2 specific bronchodilator”, 8635 “Beta agonist”, or 8700 “Ipratropium Bromide”; or a E18_03 element indicating any of the above	• Medication Given (E18_03) • Medication Route (E18_04)
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Indicator Formula Numeric Expression	The formula is to divide (/) the numerator (N) by the denominator (D) and then multiply (x) by 100 to obtain the (%) value the indicator is to report. Therefore the indicator expressed numerically is N/D =%	
Example of Final Reporting Value (number and units)	90%	
Sampling	Yes	
Aggregation	Yes	
Blinded	Yes	
Minimum Data Values	30	
Data Collection Approach	☐ Retrospective data sources for required data elements include administrative data and pre-hospital care records. ☐ Variation may exist in the assignment of coding; therefore, coding practices may require evaluation to ensure consistency.	
Suggested Display Format & Frequency	Process control or run chart by month	
Suggested Statistical Measures	Mean (x); Mode (m)	
Trending Analysis	Yes	
Benchmark Analysis	(TBD)	

PEDIATRIC ASTHMA PATIENTS RECEIVING BRONCHODILATORS

MEASURE SET	Pediatric	
SET MEASURE ID #	PED-1	
PERFORMANCE MEASURE NAME	Pediatric asthma patients receiving bronchodilators	
Description	What is the percentage of beta2 agonist (bronchodilator or Ipratropium) administration by EMS personnel for pediatric patients younger than 14 years old with signs and symptoms of suspected bronchospasm?	
Type of Measure	Process	
Reporting Value and Units	(%) Percentage	
Denominator Statement (population)	All pediatric patients with suspected bronchospasm	
Denominator Inclusion Criteria	**Criteria**	**Data Elements**
	• Patients for whom E09_15 "provider's primary impression" has value 1701 "shortness of breath – suspected asthma/COPD" or for whom E09_16 "provider's secondary impression" has value 1835 – "shortness of breath – suspected asthma/COPD" • Patients less than 14 years of age	• Provider Primary Impression (E09_15) • Provider Secondary Impression (E09_16) • Age (E06_14) • Age Units (E06_15) • Date of Birth (E06_16)
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Numerator Statement (sub-population)	All pediatric patients with respiratory distress from Asthma receiving bronchodilators	
Numerator Inclusion Criteria	**Criteria**	**Data Elements**
	• Patients for whom E09_15 "provider's primary impression" has value 1701 "shortness of breath – suspected asthma/COPD" or for whom E09_16 "provider's secondary impression" has value 1835 – "shortness of breath – suspected asthma/COPD"	• Provider Primary Impression (E09_15) • Provider Secondary Impression (E09_16) • Age (E06_14) • Age Units (E06_15) • Date of Birth (E06_16) • Medication Given (E18_03)

	• Patients less than 14 years of age And • Who have a E18_03 value 8620 “aerosolized or nebulized beta-2 specific bronchodilator”, 8635 “Beta agonist”, or 8700 “Ipratropium Bromide”; or a E18_03 element indicating any of the above	• Medication Given (E18_03)
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Indicator Formula Numeric Expression	The formula is to divide (/) the numerator (N) by the denominator (D) and then multiply (x) by 100 to obtain the (%) value the indicator is to report. Therefore the indicator expressed numerically is N/D =%	
Example of Final Reporting Value (number and units)	90%	
Sampling	Yes	
Aggregation	Yes	
Blinded	Yes	
Minimum Data Values	30	
Data Collection Approach	☐ Retrospective data sources for required data elements include administrative data and pre-hospital care records. ☐ Variation may exist in the assignment of coding; therefore, coding practices may require evaluation to ensure consistency.	
Suggested Display Format & Frequency	Process control or run chart by month	
Suggested Statistical Measures	Mean (x); Mode (m)	
Trending Analysis	Yes	
Benchmark Analysis	(TBD)	

PAIN INTERVENTION

MEASURE SET	Pain Intervention	
SET MEASURE ID #	PAI-1	
PERFORMANCE MEASURE NAME	Pain intervention	
Description	What is the percentage of adult patients with pain (value of 7 or greater on a 10 point scale) that received a pain intervention by EMS personnel?	
Type of Measure	Process	
Reporting Value and Units	Percentage	
Denominator Statement (Population)	The total number of events over a given period in which patients reported as having a pain value of 7 or greater in the pre-hospital setting.	
Denominator Inclusion Criteria	**Criteria**	**Data Elements**
	• Events in which patients had recorded a pain value of 7 or greater for E14_23 • Patient aged 14 years or older (E06_14)	• Pain Scale (E14_23) • Age (E06_14) • Age Units (E06_15) • Date of Birth (E06_16)
Exclusion Criteria	**Criteria**	**Data Elements**
	• Patients with no value recorded for E14_01, who have no value for either E18_01 or E19_01, to indicate the intervention occurred after pain measurement;	• Date Time Vitals Taken (E14_01) • Date Time Medication Administered (E18_01) • Date Time Procedure Performed Successfully (E19_01)
Numerator Statement (sub-population)	The total number of patients over a given period in which patient reported as having a pain value of 7 or greater who received pain intervention in the pre-hospital setting	
Numerator Inclusion Criteria	**Criteria**	**Data Elements**
	• Events in which patients had recorded a pain value of 7 or greater for E14_23 • Patient aged 14 years or older (E06_14) And • Associated value for NEMSIS E14_01, • Who have at least one value for E18_03 or E19_03 representing a accepted intervention	• Pain Scale (E14_23) • Age (E06_14) • Age Units (E06_15) • Date of Birth (E06_16) • Date Time Vitals Taken (E14_01) • Date Time Medication Administered (E18_01) • Medication Given (E18_03) • Procedure (E19_03)

	recognized for pain relief, and the related NEMSIS E18_01 or NEMSIS E19_01 elements indicate the interventions occurred after the pain scale was assessed.	• Date Time Procedure Performed Successfully (E19_01)
Exclusion Criteria	**Criteria**	**Data Elements**
	• Patients with no value recorded for NEMSIS E14_01 associated with administration of the pain scale E14_23; or who have no logical values for E18_01 or E19_01 to indicate the intervention occurred after assessment of pain scale >=7	• Date Time Vitals Taken (E14_01) • Date Time Medication Administered (E18_01) • Date Time Procedure Performed Successfully (E19_01)
Indicator Formula Numeric Expression	The formula is to divide (/) the numerator (N) by the denominator (D) and then multiply (x) by 100 to obtain the (%) value the indicator is to report. Therefore the indicator expressed numerically is N/D =%	
Example of Final Reporting Value (number and units)	90%	
Sampling	Yes	
Aggregation	Yes	
Blinded	Yes	
Minimum Data Values	30	
Data Collection Approach	☐ Retrospective data sources for required data elements include administrative data and pre-hospital care records. ☐ Variation may exist in the assignment of coding; therefore, coding practices may require evaluation to ensure consistency.	
Suggested Display Format & Frequency	Process control or run chart by month	
Suggested Statistical Measures	Mean (x); Mode (m)	
Trending Analysis	Yes	
Benchmark Analysis	(TBD)	

ENDOTRACHEAL INTUBATION SUCCESS RATE

MEASURE SET	Performance of Skills	
SET MEASURE ID #	SKL-1	
PERFORMANCE MEASURE NAME	Endotracheal intubation success rate	
Description	What is the percentage of patients who received successful endotracheal intubation within two attempts in a pre-hospital setting?	
Type of Measure	Process	
Reporting Value and Units	(%) Percentage	
Denominator Statement (population)	All endotracheal intubation attempts	
Denominator Inclusion Criteria	**Criteria**	**Data Elements**
	• Events in which E19_03 "procedure" has values indicating intubation such as 96.040 "endotracheal intubation" or 96.041 "airway – intubation, other (stoma, nasal)" with related element E19_05 "number of procedure attempts"	• Procedure (E19_03) • Attempts (E19_05)
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Numerator Statement (sub-population)	All Successful endotracheal intubations, defined as success within 2 attempts.	
Numerator Inclusion Criteria	**Criteria**	**Data Elements**
	• Events in which E19_03 "procedure" has values indicating intubation such as 96.040 "endotracheal intubation" or 96.041 "airway – intubation, other (stoma, nasal)" with related element E19_05 "number of procedure attempts" And • E19_05 "number of procedure attempts" value listed as one or two; and • E19_06 "Procedure successful" noted as value of 1 "yes"	• Procedure (E19_03) • Attempts (E19_05) • Procedure Successful (E19_06)

Exclusion Criteria	Criteria	Data Elements
	None	
Indicator Formula Numeric Expression	The formula is to divide (/) the numerator (N) by the denominator (D) and then multiply (x) by 100 to obtain the (%) value the indicator is to report. Therefore the indicator expressed numerically is N/D =%	
Example of Final Reporting Value (number and units)	90%	
Sampling	Yes	
Aggregation	Yes	
Blinded	Yes	
Minimum Data Values	30	
Data Collection Approach	☐ Retrospective data sources for required data elements include administrative data and pre-hospital care records. ☐ Variation may exist in the assignment of coding; therefore, coding practices may require evaluation to ensure consistency.	
Suggested Display Format & Frequency	Process control or run chart by month	
Suggested Statistical Measures	Mean (x); Mode (m)	
Trending Analysis	Yes	
Benchmark Analysis	(TBD)	

END-TIDAL CO2 PERFORMED ON ANY ENDOTRACHEAL INTUBATION

MEASURE SET	Performance of Skills	
SET MEASURE ID #	SKL-2	
PERFORMANCE MEASURE NAME	End-tidal CO2 performed on any successful endotracheal intubation	
Description	What is the percentage of intubated patients where end-tidal CO2 or capnography is performed?	
Type of Measure	Process	
Reporting Value and Units	(%) Percentage	
Denominator Statement (population)	All successful endotracheal intubations	
Denominator Inclusion Criteria	**Criteria**	**Data Elements**
	• Events in which E19_03 "procedure" has values indicating intubation such as 96.040 "endotracheal intubation" or 96.041 "airway – intubation, other (stoma, nasal)" with related element E19_05 "number of procedure attempts" • E19_05 "number of procedure attempts" value listed as one or two; and • E19_06 "Procedure successful" noted as value of 1 "yes"	• Procedure (E19_03) • Attempts (E19_05) • Procedure Successful (E19_06)
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Numerator Statement (sub-population)	All successful endotracheal intubations where End-Tidal CO2 measurement was performed	
Numerator Inclusion Criteria	**Criteria**	**Data Elements**
	• Events in which E19_03 "procedure" has values indicating intubation such as 96.040 "endotracheal intubation" or 96.041 "airway – intubation, other (stoma, nasal)" with related element E19_05	• Procedure (E19_03) • Attempts (E19_05) • Procedure Successful (E19_06)

	"number of procedure attempts" • E19_05 "number of procedure attempts" value listed as one or two; and • E19_06 "Procedure successful" noted as value of 1 "yes" And • E19_03 "procedure" has values of 96.992 "airway-end tidal CO_2 intubation" or 89.391 "capnography"	
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Indicator Formula Numeric Expression	The formula is to divide (/) the numerator (N) by the denominator (D) and then multiply (x) by 100 to obtain the (%) value the indicator is to report. Therefore the indicator expressed numerically is N/D =%	
Example of Final Reporting Value (number and units)	90%	
Sampling	Yes	
Aggregation	Yes	
Blinded	Yes	
Minimum Data Values	30	
Data Collection Approach	☐ Retrospective data sources for required data elements include administrative data and pre-hospital care records. ☐ Variation may exist in the assignment of coding; therefore, coding practices may require evaluation to ensure consistency.	
Suggested Display Format & Frequency	Process control or run chart by month	
Suggested Statistical Measures	Mean (x); Mode (m)	
Trending Analysis	Yes	
Benchmark Analysis	(TBD)	

AMBULANCE RESPONSE TIME BY AMBULANCE ZONE (EMERGENCY)

MEASURE SET	Response and Transport	
SET MEASURE ID #	RST-1	
PERFORMANCE MEASURE NAME	Ambulance response time by ambulance zone (Emergency)	
Description	What is the 90th percentile time value of the Ambulance Response time in Ground Ambulance Transport Zone as defined by the EMS Plan?	
Type of Measure	Process	
Reporting Value and Units	Time (minutes and seconds)	
Continuous Variable Statement (population)	Time (in minutes and seconds) from time ambulance is en route to arrival at the scene for emergency responses (Code 3) to patients by BLS, LALS, or ALS ambulances. The 90th percentile time interval from "unit en route date/time" (E05-05) in an emergency to EMS "unit arrived on scene date/time" (E05-06), for a given period of time	
Inclusion Criteria	**Criteria**	**Data Elements**
	• All events in a particular ambulance zone • E02_04 "type of service requested" has value 30 "911 response (scene)"; and • E02_05 "Primary role of the unit" value is 75 "transport"; • E02_20 "response mode to scene" is 390 "lights and sirens"; • Values for E05_05 "unit en route date/time" and E05_06 "unit arrived on scene date/time" are present and logical.	• Ambulance Zone (Ground Ambulance Transport EOA area as defined by EMS plan) • Primary role of unit (E02_05) • Type of Service Requested (E02_04) • Response Mode to Scene (E02_20) • Unit En Route Date/Time (E05_05) • Unit Arrived on Scene Date/Time (E05_06)
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Indicator Formula Numeric Expression	The formula is the 90th Percentile of the given numbers or distribution in their ascending order.	
Example of Final Reporting Value (number and units)	8 minutes 30 seconds	

Sampling	Yes
Aggregation	Yes
Blinded	Yes
Minimum Data Values	30
Data Collection Approach	☐ Retrospective data sources for required data elements include administrative data and pre-hospital care records. ☐ Variation may exist in the assignment of coding; therefore, coding practices may require evaluation to ensure consistency.
Suggested Display Format & Frequency	Process control or run chart by month
Suggested Statistical Measures	90^{th} Percentile Measurement. Aggregate measure of central tendency and quantile (fractile) measurement to determine the span of frequency distributions.
Trending Analysis	Yes
Benchmark Analysis	(TBD)

AMBULANCE RESPONSE TIME BY AMBULANCE ZONE (NON-EMERGENCY)

MEASURE SET	Response and Transport	
SET MEASURE ID #	RST-2	
PERFORMANCE MEASURE NAME	Ambulance response time by ambulance zone (non-emergency)	
Description	What is the 90th percentile value of the ambulance response time for the Ground Ambulance Transport Zone as defined by the EMS Plan?	
Type of Measure	Process	
Reporting Value and Units	Time (minutes and seconds)	
Continuous Variable Statement (population)	Time (in minutes and seconds) from time ambulance is en route to arrival at the scene for non-emergency (**Code 2**) responses to patients by BLS, LALS, or ALS ambulances. The 90th percentile time interval from "unit en route date/time" (E05_05) in an emergency to EMS "unit arrived on scene date/time" (E05_06), for a given period of time	
Inclusion Criteria	**Criteria**	**Data Elements**
	• All events in a particular ambulance zone • E02_04 "type of service requested" has value 30 "911 response (scene)"; and • E02_05 "Primary role of the unit" value is 75 "transport"; • E02_20 "response mode to scene" is 395 "no lights and sirens"; • Values for E05_05 "unit en route date/time" and E05_06 "unit arrived on scene date/time" are present and logical.	• Ambulance Zone (Ground Ambulance Transport EOA area as defined by EMS plan) • Primary role of unit (E02_05) • Type of Service Requested (E02_04) • Response Mode to Scene (E02_20) • Unit En Route Date/Time (E05_05) • Unit Arrived on Scene Date/Time (E05_06)
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Indicator Formula Numeric Expression	The formula is the 90th Percentile of the given numbers or distribution in their ascending order.	
Example of Final Reporting Value (number and units)	8 minutes 30 seconds	
Sampling	Yes	

Aggregation	Yes
Blinded	Yes
Minimum Data Values	30
Data Collection Approach	☐ Retrospective data sources for required data elements include administrative data and pre-hospital care records. ☐ Variation may exist in the assignment of coding; therefore, coding practices may require evaluation to ensure consistency.
Suggested Display Format & Frequency	Process control or run chart by month
Suggested Statistical Measures	90^{th} Percentile Measurement. Aggregate measure of central tendency and quantile (fractile) measurement to determine the span of frequency distributions.
Trending Analysis	Yes
Benchmark Analysis	(TBD)

TRANSPORT OF PATIENTS TO HOSPITAL

MEASURE SET	Response and Transport	
SET MEASURE ID #	RST-3	
PERFORMANCE MEASURE NAME	Transport of patients to hospital	
Description	What is the percentage of EMS Patients transported to a General Acute Care Hospital with a Basic Permit for emergency services?	
Type of Measure	Process	
Reporting Value and Units	(%) Percentage	
Denominator Statement (population)	All 911 incidents which requested or required a response by at least one EMS unit, and the unit arrived at scene	
Denominator Inclusion Criteria	**Criteria**	**Data Elements**
	• All unique EMS incidents in a particular ambulance zone • E02_04 “type of service requested” has value 30 “911 response (scene)”; and • E02_05 “Primary role of the unit” value is 75 “transport”; • E02_20 “response mode to scene” is 3905 “lights and sirens”; • Values for E05_05 “unit en route date/time” and E05_06 “unit arrived on scene date/time” are present and logical.	• Ambulance Zone (Ground Ambulance Transport EOA area as defined by EMS plan) • Incident Number (E02_02) • Primary role of unit (E02_05) • Type of Service Requested (E02_04) • Response Mode to Scene (E02_20) • Unit En Route Date/Time (E05_05) • Unit Arrived on Scene Date/Time (E05_06)
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Numerator Statement (sub-population)	All patients who received transport to a General Acute Care Hospital, with a Basic Permit, by BLS, LALS, or ALS Ambulances	
Numerator Inclusion Criteria	**Criteria**	**Data Elements**
	• All unique EMS incidents in a particular ambulance zone • E02_04 “type of service requested” has value 30 “911 response (scene)”; and • E02_05 “Primary role of the unit” value is 75 “transport”; • E02_20 “response mode to	• Ambulance Zone (Ground Ambulance Transport EOA area as defined by EMS plan) • Incident Number (E02_02) • Primary role of unit (E02_05) • Type of Service Requested (E02_04) • Response Mode to Scene

	scene" is 3905 "lights and sirens"; • Values for E05_05 "unit en route date/time" and E05_06 "unit arrived on scene date/time" are present and logical And • E20_17 has a value of 5050 "hospital"	(E02_20) • Unit En Route Date/Time (E05_05) • Unit Arrived on Scene Date/Time (E05_06) • Patient Destination (E20_17)
Exclusion Criteria	**Criteria**	**Data Elements**
	None	
Indicator Formula Numeric Expression	The formula is to divide (/) the numerator (N) by the denominator (D) and then multiply (x) by 100 to obtain the (%) value the indicator is to report. Therefore the indicator expressed numerically is N/D =%	
Example of Final Reporting Value (number and units)	90%	
Sampling	Yes	
Aggregation	Yes	
Blinded	Yes	
Minimum Data Values	30	
Data Collection Approach	☐ Retrospective data sources for required data elements include administrative data and pre-hospital care records. ☐ Variation may exist in the assignment of coding; therefore, coding practices may require evaluation to ensure consistency.	
Suggested Display Format & Frequency	Process control or run chart by month	
Suggested Statistical Measures	Mean (x); Mode (m)	
Trending Analysis	Yes	
Benchmark Analysis	(TBD)	

California EMS System Core Quality Measures

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