

EMS Performance Measures that Matter

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SAFE-D

Texas State Association of Fire and Emergency Districts

Objectives

- ✓ High level discussion of the QA methods and PI Cycle
- ✓ National EMS Quality Alliance and other evidenced based performance measurement projects
- ✓ NEMSQA measures and current benchmarks
- ✓ Other metric areas (Ops, finance, satisfaction)
- ✓ Never events
- ✓ Measurement tools samples
- ✓ The Carrot and Stick

Acknowledgements

Former employee of ESO Solutions and remain a shareholder. Any reference to ESO data products is for illustration purposes only and not an endorsement of their solutions.

A special thanks to Dr. Jeff Jarvis of the Fort Worth Fire Department and the NEMSQA Advisory Board for sharing resources used in this presentation.

Where to Start?

***“It does not matter what you measure.
Pick something and measure it the
same way every time.”***

Individual vs System Performance

One last thing...

Quality is not about being good...

**It is about understanding your
weaknesses and doing something
about them.**

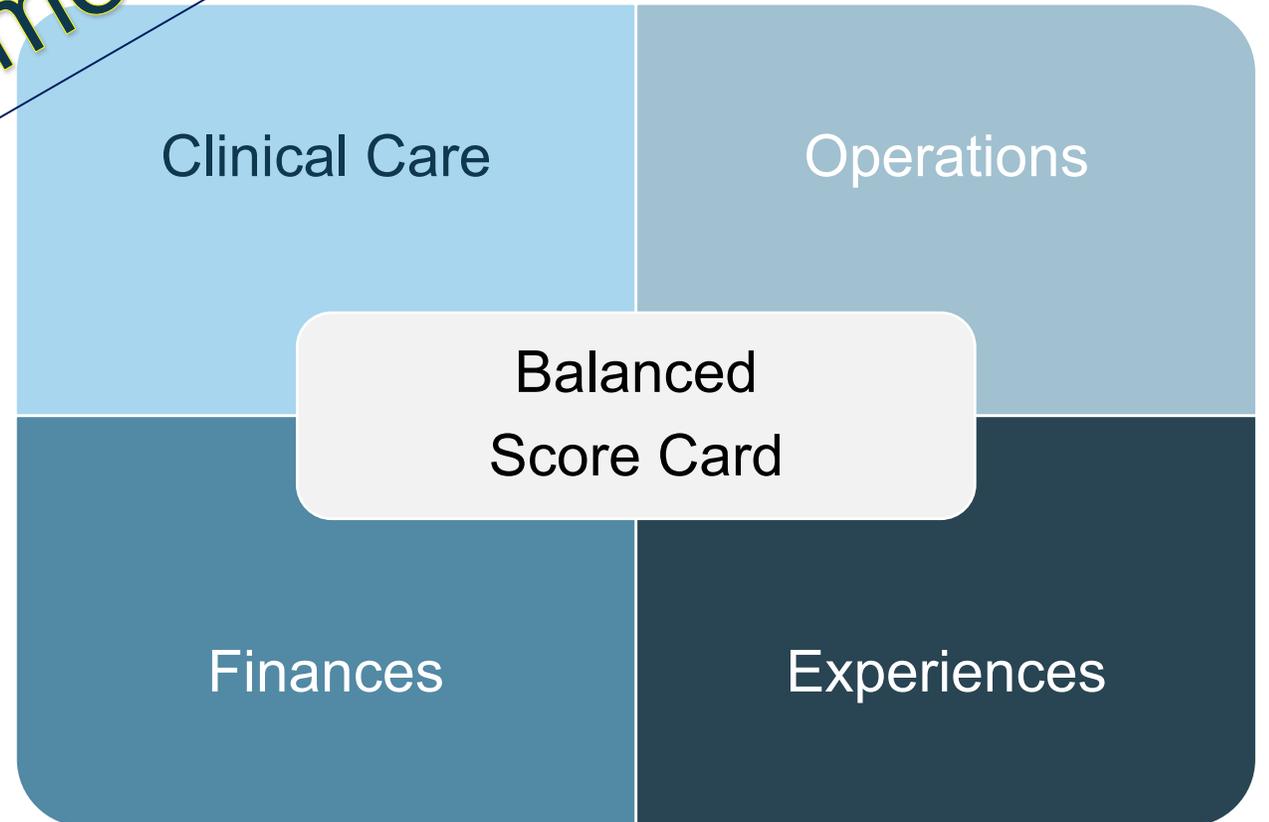
One last thing...

Quality is not about being good...

It is about **understanding your**
weaknesses and ~~doing something~~
~~about them.~~

Why do performance measures matter?

Not Just For
Response Times Anymore!



Performance Improvement Cycle

Pick a measure

Establish a baseline

- **rend**

Identify opportunities

Action Plan

Implement

Remeasure

In control?

- Yes – pick a new measure and sample occasionally
- No – keep working

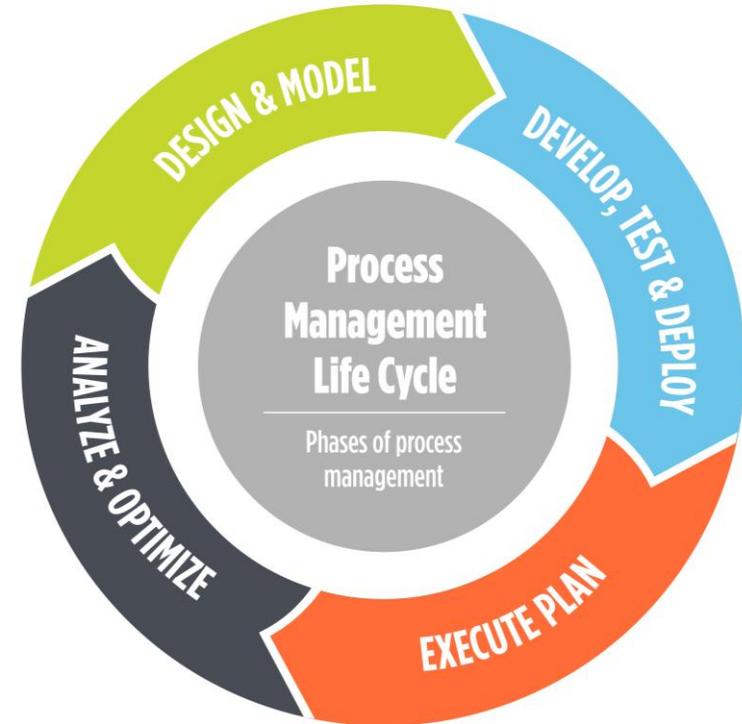


Chart Audits

Avoid 100% chart audits, except:

- New or promoting employee
- New procedure, medication or protocol
- AMA Refusals
- High risk, low frequency event
- Complaints

Sampling

- Pick a topic monthly
- Randomly select 5% or 30 whichever is more
- Review with an open mind



Nationally Endorsed, Evidenced Based

National EMS Quality Alliance (NEMSQA)

- 20+ nationally endorsed, evidenced based measures
- Technical specifications available on the web
- Most vendors offer benchmarking

American Heart Association Mission Lifeline



National data for EMS

All agencies in Texas required to report data

Near real time submission for situational awareness

Basis for national data comparison

Backbone of EMS research

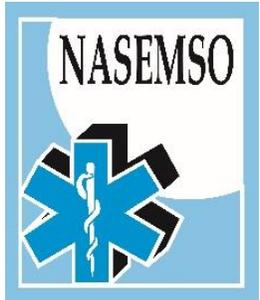
Develop national,
standardized EMS
measures

- Develop additional/new NEMSQA measures
- Develop measure endorsement process.
- Define measure maintenance and update processes
- Seek grant funding for measure development or implementation
- Promote and support national benchmarking efforts

Increase
implementation of
national standardized
EMS measures

- Increase utilization of NEMSQA Measures
- Explore integration of NEMSQA measures in accreditation/certifications.
- Establish relationship with EMS ePCR/data vendors to incorporate NEMSQA measure into their products.

Participation from Across the Industry



EMS Agencies

Individuals in EMS



What are the measures?

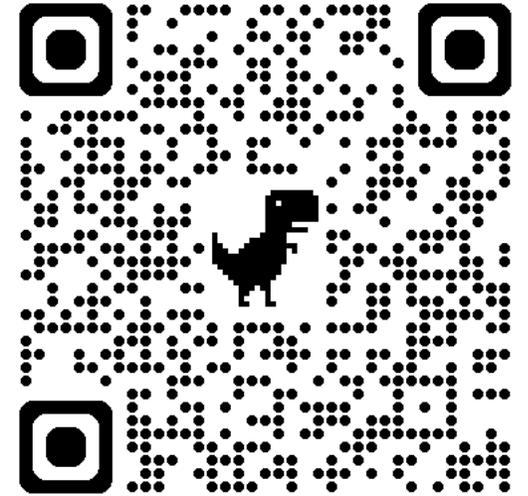
21 Validated Performance Measures

- Safety
- Airway
- Trauma
- Neurological
- Medical

Measures stratified by adult and pediatric (<18)

In development:

- Agitation Sedation Monitoring
- Post Crash Care w/ NHTSA



NEMSQA Measures

Peak Benchmark: NEMSQA Syncope-01 ECG Performed for Syncope Patients



This measure is enabled with Peak Benchmarking, a practice focusing on achieving the highest level of performance within a group. Using the [ESO Data Collaborative](#), we calculated the median and top 10% agency performance over the past year.

Total Records

Total Records: 101,991

ECG Performed for Syncope Patients

% Patients with 12-Lead ECG

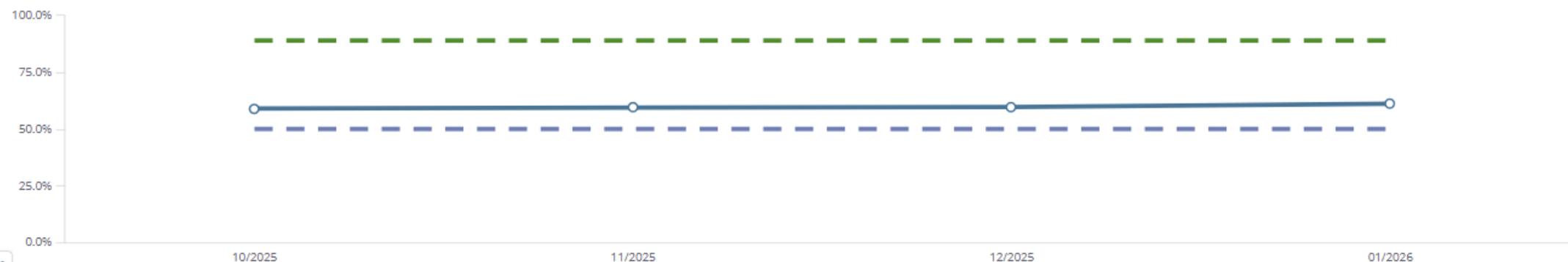
60%

Patients with 12-Lead ECG **61,019**

Measure Description:

Percentage of EMS responses originating from a 911 request for patients with syncope during which a 12-lead (or greater) ECG is performed.

ECG Performed For Syncope Patients



Airway 0-1: FPS w/o Hypoxia or Hypotension

Numerator	Successful invasive airway on 1 st Attempt without SpO2 <90 OR SBP < 90 within 5 3 minutes before AND 5 minutes after attempt.
Denominator	All 1 st attempts at invasive airway from 911 call
Exclusions	Cardiac arrest prior to EMS arrival Hypoxia or hypotension before 5 min prior to attempt
Stratifications	Adult, Pedi, SGA, ETI, All Invasive Airway

	Numerator	Denominator	Performance
Biospatial National	6,433	27,312	24%

Airway 0-5: Adequate Oxygenation Before Intubation

Numerator	Intubations with SpO2 \geq 94% for at least 3 minutes prior to attempt.
Denominator	All ETI attempts from 911 call
Exclusions	Cardiac arrest prior to EMS arrival Intubation PTA
Stratifications	Adult, Pedi

	Numerator	Denominator	Performance
Biospatial National	7,999	31,776	25%

Airway 18: Waveform Capnography Airway Device Monitoring

Numerator	Invasive airways with placement confirmed and monitored using waveform capnography.
Denominator	All invasive airways placed during a 911 call
Exclusions	Cardiac arrest prior to EMS arrival Intubation PTA
Stratifications	Adult, Pedi

	Numerator	Denominator	Performance
Biospatial National	3,682	122,823	3%

eAirway.04 Airway Device Placement Confirmed Method = "Waveform Capnography"

Asthma 01: Administration of Beta-Agonists for Asthma (*was Pediatric 02*)

Numerator	Responses with administration of an aerosolized beta agonist
Denominator	All 911 responses with primary or secondary impression of asthma or acute bronchospasm
Exclusions	None
Stratifications	Adult, Pedi

	Numerator	Denominator	Performance
Redlener, et al.	12,380	20,295	61%

Hypoglycemia 01: Treatment Administered for Hypoglycemia

Numerator	Responses with administration of glucose
Denominator	All 911 responses with: (impression of AMS <u>or</u> GCS < 15 <u>or</u> AVPU <A) AND blood glucose <60
Exclusions	None
Stratifications	Adult, Pedi

	Numerator	Denominator	Performance
Redlener, et al.	62,190	90,001	69.1%

Pediatrics 03b: Documentation of Estimated Weight in Kilograms

Numerator	Patients with a documented weight
Denominator	All 911 responses with pt age <18 AND who received a medication
Exclusions	None
Stratifications	None

	Numerator	Denominator	Performance
None available			

Respiratory 01: Respiratory Assessment

Numerator	Responses with at least one SpO2 and RR documented
Denominator	All 911 responses with: (impression of respiratory distress or respiratory disorder)
Exclusions	None
Stratifications	Adult, Pedi

	Numerator	Denominator	Performance
Biospatial	95,230	116,561	81.7%

Respiratory 02: Oxygen Administration in Hypoxia

Numerator	Responses with oxygen administered
Denominator	All 911 responses with: Any SpO2 < 90%
Exclusions	Age <24 hours
Stratifications	Adult, Pedi

	Numerator	Denominator	Performance
Biospatial	892,170	1,832,288	49%

Safety 01: Use of Lights & Sirens During 911 Response

Numerator	Responses WIHTOUT Lights & Sirens
Denominator	All 911 responses
Exclusions	None
Stratifications	None

	Numerator	Denominator	Performance
Redlenner, et al	3,047,841	26,502,968	11.5%

Safety 02: Use of Lights & Sirens During Transport

Numerator	Transports WIHTOUT Lights & Sirens
Denominator	All 911 transports
Exclusions	None
Stratifications	None

	Numerator	Denominator	Performance
Redlenner, et al	8,476,487	15,873,573	53.4%

Safety 04: Pediatric Restraint Device Used During Transport

Numerator	Transports using pediatric restraint device
Denominator	All 911 transports of patients <8
Exclusions	Cardiac arrest, severe trauma, immobilization, active airway management
Stratifications	None

	Numerator	Denominator	Performance
Biospatial	72,176	581,909	12%

Safety 02: Patients with Status Epilepticus Receiving Intervention

Numerator	Patients who received a benzodiazepine
Denominator	All patients with impression of status epilepticus
Exclusions	None
Stratifications	Adult, pediatric

	Numerator	Denominator	Performance
Redlener, et al	21,014	79,904	26.3%

Stroke 01: Suspected Stroke Receiving Prehospital Stroke Assessment

Numerator	Patients who had a stroke scale documented
Denominator	All patients with impression of stroke
Exclusions	GCS < 9, AVPU = Unresponsive
Stratifications	None

	Numerator	Denominator	Performance
Redlener, et al	198,112	287,119	63.9%

Syncope 01: ECG Performed for Syncope

Numerator	Patients who had a 12-lead ECG performed
Denominator	All patients with impression of syncope or transient alteration of awareness
Exclusions	None
Stratifications	Adult, pediatric

	Numerator	Denominator	Performance
Biospatial	275,206	965,195	29%

TBI 01: Clinical Assessment for Patients with Traumatic Brain Injury

Numerator	Patients who had at least one SBP, SpO2, and EtCO2 assessed and documented
Denominator	All patients with impression of traumatic brain injury AND GCS <15 or AVPU <A
Exclusions	None
Stratifications	Adult, pediatric

	Numerator	Denominator	Performance
Biospatial	17,278	105,921	16%

Trauma 01: Pain Assessment of Injured Patients

Numerator	Patients who had at least one pain score assessed and documented
Denominator	All patients with injury AND GCS = 15 or AVPU = A
Exclusions	None
Stratifications	Adult, pediatric

	Numerator	Denominator	Performance
Redlener, et al	1,681,797	2,766,114	60.8%

Trauma 03: Effectiveness of Pain Management for Injured Patients

Numerator	Patients who had at least two pain scores assessed and last < initial
Denominator	All patients with injury AND GCS = 15 or AVPU = A AND initial PS \geq 1
Exclusions	None
Stratifications	Adult, pediatric

	Numerator	Denominator	Performance
Redlener, et al	221,765	1,386,035	16.0%

Trauma 04: Trauma Patients Transported to the Trauma Center

Numerator	Patients transported to a trauma center
Denominator	All patients meeting 2021 ACS Trauma Triage – Red or Yellow Criteria
Exclusions	None
Stratifications	Geriatric, adult, pediatric

	Numerator	Denominator	Performance
Redlenner, et al	19,914	142,244	21.4%

Trauma 14: Trauma Call Rate

Numerator	Patients with prehospital trauma pre-notification
Denominator	All patients meeting 2021 ACS Trauma Triage – Red or Yellow Criteria
Exclusions	None
Stratifications	Geriatric, adult, pediatric

	Numerator	Denominator	Performance
Biospatial	54,369	124,132	44%

TTR 01: Vital Signs Documented Among Non-Transports

Numerator	Patients with at least one SBP/DBP, HR, RR, SpO2, and GCS assessed and documented
Denominator	All patients from 911 response without transport
Exclusions	Cardiac Arrest prior to EMS arrival
Stratifications	Adult, pediatric

	Numerator	Denominator	Performance
Biospatial	1,907,267	2,706,964	70%

Operational/Safety Measures

Miles between incidents

Mission failure rate

Time worked

- Overtime
- Consecutive hours worked

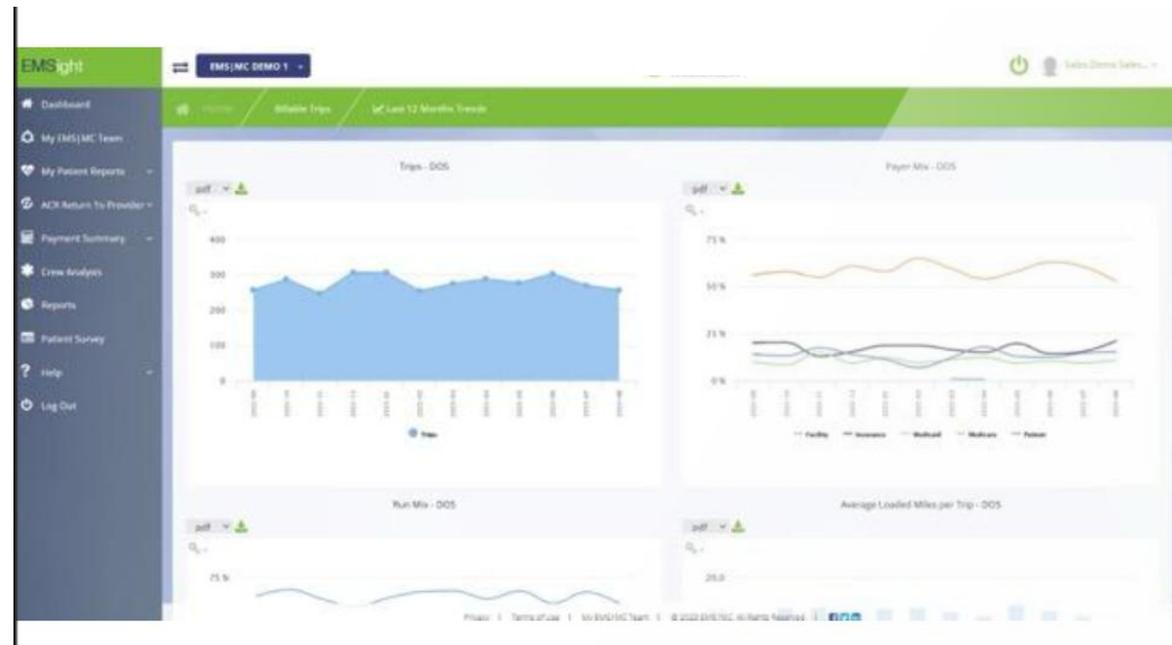
Financial Measures

Cost per unit hour

Cost per transport

Revenue per transport

AR days outstanding



Experience Measures

Employee Engagement



Customer Satisfaction



Never Events

Sentinel events with potentially fatal consequences

- Unrecognized missed airways
- Mission failures
- Failure to respond

District-operated EMS

- Monitor them

Contracted EMS

- Build them into your contract
- Financial penalties

TABLE 6: NEVER EVENTS	
Occurrence of a Never Event is Reportable Within 24 Hours to ALCO EMS Never Event Compliance Begins on Implementation Date of Services	
CATEGORY 1: CARDIORESPIRATORY NEVER EVENTS	
Failure to transport a STEMI patient to a designated STEMI center	
Unrecognized endotracheal tube placement in esophagus	
CATEGORY 2: STROKE/NEURO NEVER EVENTS	
Failure to transport a Stroke Alert patient to a designated stroke center	
CATEGORY 3: TRAUMA NEVER EVENTS	
Failure to transport a Critical Trauma Patient (as defined in most current ALCO EMS policies) to a designated trauma center	
CATEGORY 4: CLINICAL EQUITY NEVER EVENTS	
Failure to document Race on a patient care report	
Failure to document Resident Status (Homeless/Not Homeless) on a patient care report	
CATEGORY 5: OTHER NEVER EVENTS	
Failure to achieve Priority 1 response time performance standards in East, South and West geographic areas during any measurement interval	
Failure to document use of red lights and sirens during response and transport for 911 calls	
Death or serious adverse consequence associated with administration of incorrect medication or dosage	
Patient death or serious adverse consequence associated with improper use or failure of a medical device or equipment	
Patient death or serious injury associated with patient elopement from vehicle or custody	
Patient death or serious adverse consequence associated with known hypoglycemia during interval of EMS care	
Failure to respond to a Priority 1 911 dispatch	
Failure to respond to a Priority 2 – 4 dispatch	
Failure to report a Never Event within 24 hours in the manner required by ALCO EMS policy	
(Red) Liquidated Damages of \$10,000 per occurrence (Yellow) Liquidated Damages of \$2,500 per occurrence (Green) Liquidated Damages of \$250 per occurrence	



- Measure Development Process
- NEMSQA Measures**
- NEMSQA Measure Technical Documents
- NEMSQA Measure FAQ
- NEMSQA Measure Feedback
- Measure Development Projects

Airway-05: Adequate Oxygen Saturation Achieved Before Intubation Procedure

Measure Score Interpretation: For this measure, a higher score indicates better quality

Measure Description	
Percentage of intubation procedures performed during an EMS response originating from a 911 request in which adequate patient oxygen levels were achieved prior to intubation procedure	
Measure Components	
Initial Population	All endotracheal intubation procedures performed during an EMS response originating from a 911 request
Initial Population Pseudocode	NEMISIS
	<p>eProcedures.03 Procedure is in</p> <p>(</p> <p>112798008 Insertion of endotracheal tube (procedure);</p> <p>16883004 Endotracheal intubation, emergency procedure (procedure);</p> <p>182682004 Emergency laryngeal intubation (procedure);</p> <p>232674004 Orotracheal intubation (procedure);</p> <p>232677006 Tracheal intubation using rigid bronchoscope (procedure);</p> <p>232678001 Orotracheal fiberoptic intubation (procedure);</p>

Tools

Google SmartSheet or Excel (Yugo)

- Manual abstraction and calculation



ePCR Platform (Ford or Chevy)

- All major system have built in measures



Biospatial (Lexus)

- 3rd party data product owned by ImageTrend
- Data visualization and benchmarking



FirstWatch (Cyber Truck)

- 3rd party data visualization and performance improvement
- Combine multiple data sources (ePCR, outcomes, CAD)
- Purpose-built, excellent performance improvement workflows



Fall Out Examination

Show Filters

Dispatched ↓	Age/Gender ↓	Primary Impression ↓	Secondary Impression ↓	Primary Diagnosis ↓	Stroke Diagnosed ↓	Stroke Alert ↓	LKW ↓
01/04/2014 15:21:03	58 yo Male	Hypertension	UNKNOWN	CVA (cerebrovascular accident)	YES	NO	INVALID
01/12/2014 02:30:24	53 yo Female	Altered Level of Consciousness	UNKNOWN	CVA (cerebral infarction)	YES	NO	INVALID
02/10/2014 21:05:48	42 yo Female	Generalized Weakness	UNKNOWN	CVA (cerebral infarction)	YES	NO	INVALID
02/13/2014 20:47:09	81 yo Male	Generalized Weakness	Abdominal Pain/Problems	Cerebellar hemorrhage	YES	NO	00:41:27
03/20/2014 16:54:33	41 yo Female	Generalized Weakness	UNKNOWN	CVA (cerebral infarction)	YES	NO	INVALID
03/22/2014 09:50:20	66 yo Male	Respiratory Distress	UNKNOWN	CVA (cerebral infarction)	YES	NO	INVALID
03/27/2014 14:13:39	85 yo Male	Traumatic injury	UNKNOWN	Stroke	YES	NO	INVALID
01/07/2014 12:34:59	89 yo Male	Generalized Weakness	UNKNOWN	Stroke	YES	NO	INVALID
01/11/2014 12:25:03	79 yo Male	Generalized Weakness	UNKNOWN	Ataxia	YES	NO	INVALID
01/18/2014 20:35:40	63 yo Male	Traumatic injury	UNKNOWN	Subarachnoid hemorrhage	YES	NO	INVALID
01/19/2014 00:28:04	61 yo Male	Other	UNKNOWN	Cerebellar hemorrhage	YES	NO	INVALID
02/04/2014 01:50:50	54 yo Male	No Complaints or Injury/Illness N...	UNKNOWN	Stroke	YES	NO	INVALID
Impression		77	78	81	82	83	84
No Matching Clinical Impression		35	36	41	30	18	-
Total		79	91	92	63	34	359



HCEC NEMSQA Dashboard

Population

Population 1

Incident_DateTime

Last

1

Years

Asthma-01

46.0%

Hypoglycemia-01

22.5%

Pediatrics-03

100.0%

Respiratory-01

98.1%

Safety-01

0.2%

Trauma-01

95.7%



Respiratory-01 Details Dashboard

Respiratory Assessment

Incident Date

Last

1

Years



Population 1

98.1%

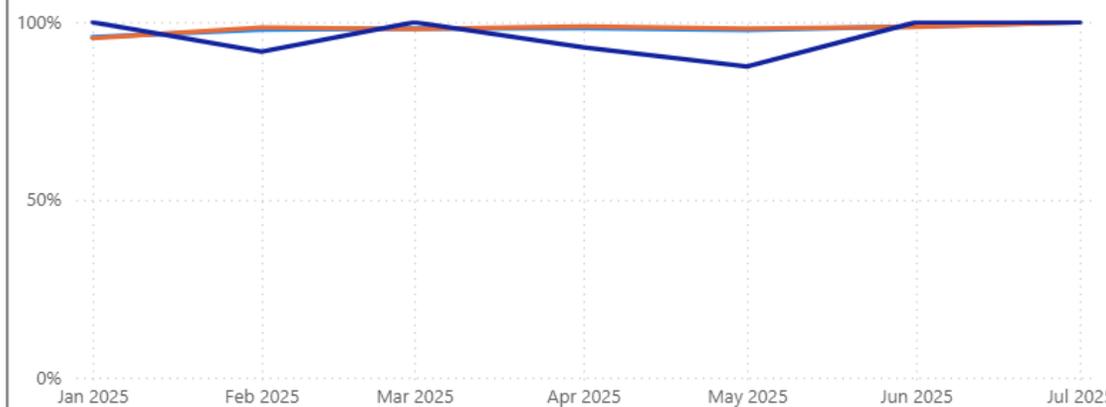
Population 2

98.3%

Population 3

95.2%

Population ● Population 1 ● Population 2 ● Population 3



Incident Date

Incident Number

Population(s)

Numerator

Link

Measure Description:

Percentage of EMS responses originating from a 911 request for patients with primary or secondary impression of respiratory distress who had a respiratory assessment.

Initial Patient Population:

All EMS responses originating from a 911 request for patients with a primary or secondary impression of respiratory distress.

Denominator:

Population 1:

EMS responses in the initial population

Population 2:

EMS responses in the initial population for patients greater than or equal to 18 years of age.

Population 3:

EMS responses in the initial population for patients less than 18 years of age.

Numerator:

EMS responses for patients who received both a SPO2 and respiratory rate measurement during the EMS response.

Denominator Exceptions:

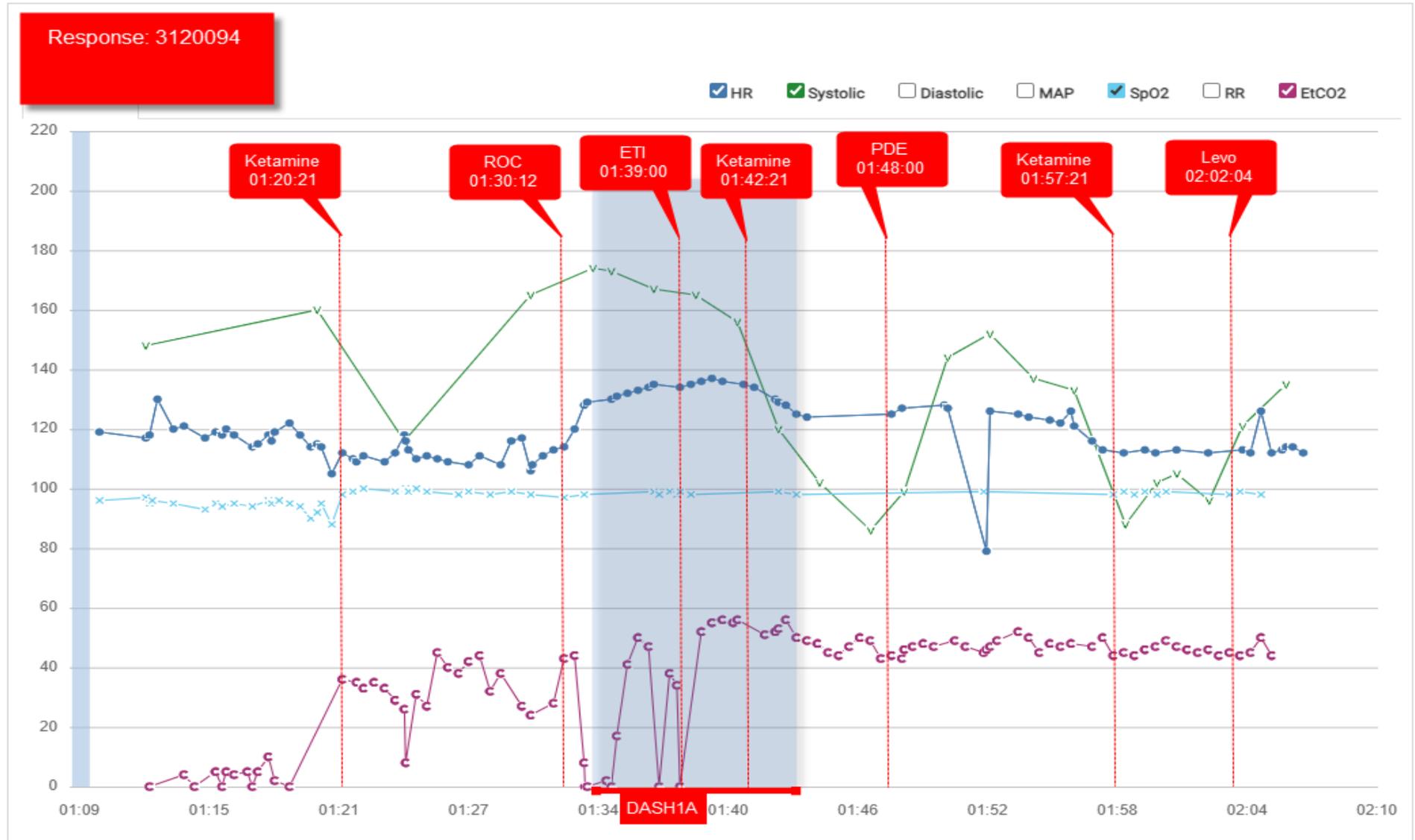
None

Denominator Exclusions:

Apply Denominator Exclusion to Populations 1 and 3:

Patients less than 24 hours of age.

Going deeper...



Benchmarking

2025 ESO EMS INDEX

INSIGHTS AND BEST PRACTICES FOR EMS AGENCIES

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2025 Measures Report

Measuring What Matters in Prehospital Trauma



Prepared by
NEMSQA Measure Analysis
& Research Committee

“If I looked at the data, I would have to do something about it.”

Now that you have looked...

For more information

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