Using NEMSIS Data: Community Assessment, Surveillance and Change

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NEMSIS Technical Assistance Center

Session Objectives

- Highlights
  - What is the National EMS Information System?
  - Data availability and validity issues
  - Additional value/challenges of NEMSIS V3
  - Available EMSIS tools
  - NEMSIS V3 migration and versioning process

EMS as Public Health Sentinels

CHAPTER

27 The Role of Prehospital Care Providers in the Advancement of Public Health

N. Clay Mann
Jerris R. Hedges

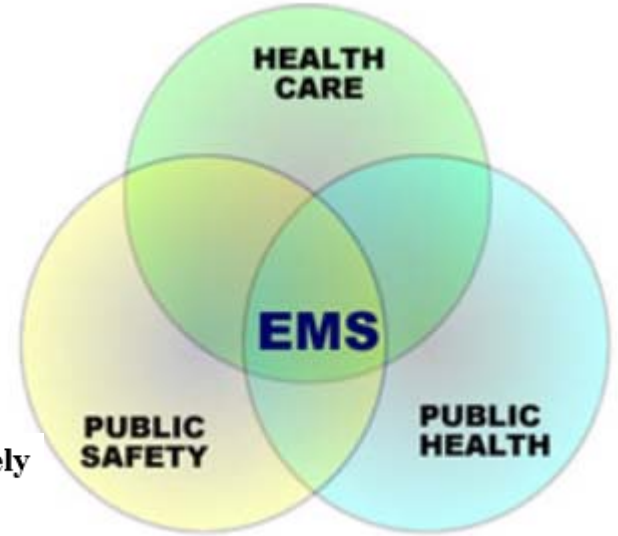
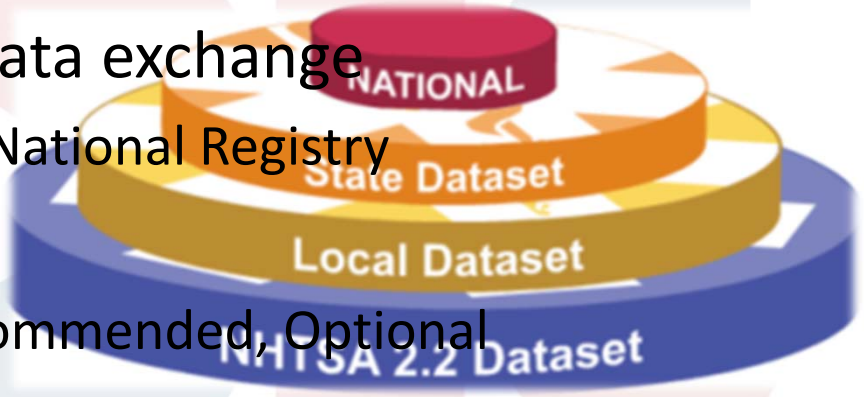


Table 1: Public safety and health issues that may be monitored and positively impacted by EMS personnel

- Abuse among the elderly
- Basic care and nutritional needs among the elderly
- Child abuse and neglect
- Substance abuse
- Fire hazards
- Domestic violence
- Poisoning hazards
- Fall hazards among the elderly
- Unsafe highway intersections
- Infectious disease outbreaks

Important Attributes of NEMSIS

- NEMSIS Standard
  - Seeks a complete census
    - V2: 49 states and territories, 30 million EMS activations
    - V3: 34 states and territories, 14 million EMS activations
  - Products tested for compliance to the standard
    - Both field (ePCR systems) and State (aggregation systems)
  - Standard (structure) for data exchange
    - Always agency to State to National Registry
  - Complete data collection
    - Mandatory, Required, Recommended, Optional
  - NEMSIS is EMS activation-based, not patient-based



Growth of NEMSIS

Statistical Year	Reporting States[1]	Reporting Agencies[2]	Number of Events	Treated and Transported 911 Response[2]
2009	26	1,673	5,767,090	3,367,668
2010	31	3,529	9,874,748	4,874,061
2011	35	5,395	14,371,941	7,701,605
2012	43	6,415	19,831,189	10,733,925
2013	45	8,183	23,897,212	12,595,958
2014	48	8,785	25,835,729	13,769,286
2015	49	10,137	30,206,450	15,729,516
2016	49	9,993	29,919,652	15,361,777

[1] Number of reporting states and territories of the United States.
[2]Only including the events that are 911 calls, treated and Transported by EMS.

Value/Challenges of NEMSIS Version 3

- **Improves Data Quality**
  - Standard business rules (400+)
  - Pertinent negatives
- **Enhance Performance Assessment**
  - Provider performance, protocol adherence
- **Improves Data Transfer Automation**
  - "Real Time" - Via Web Services
- **National ANSI Standard (HL7)**
  - Synchronization of clinical content

Pertinent Negatives

eMedications.03

State National

eMedications.03 - Medication Given

Definition

The medication given to the patient

National Element	Yes	Pertinent Negatives (PN)	Yes
State Element	Yes	NOT Values	Yes
Version 2 Element	E18_03	Is Nillable	Yes
Usage	Required	Recurrence	1 : 1

Associated Performance Measure Initiatives

Airway Cardiac Arrest Pediatric STEMI Stroke Trauma

Attributes

NOT Values (NV)

7701001 - Not Applicable
7701003 - Not Recorded

Pertinent Negatives (PN)

8801001 - Contraindication Noted
8801003 - Denied By Order
8801007 - Medication Allergy
8801009 - Medication Already Taken
8801019 - Refused
8801023 - Unable to Complete

Constraints

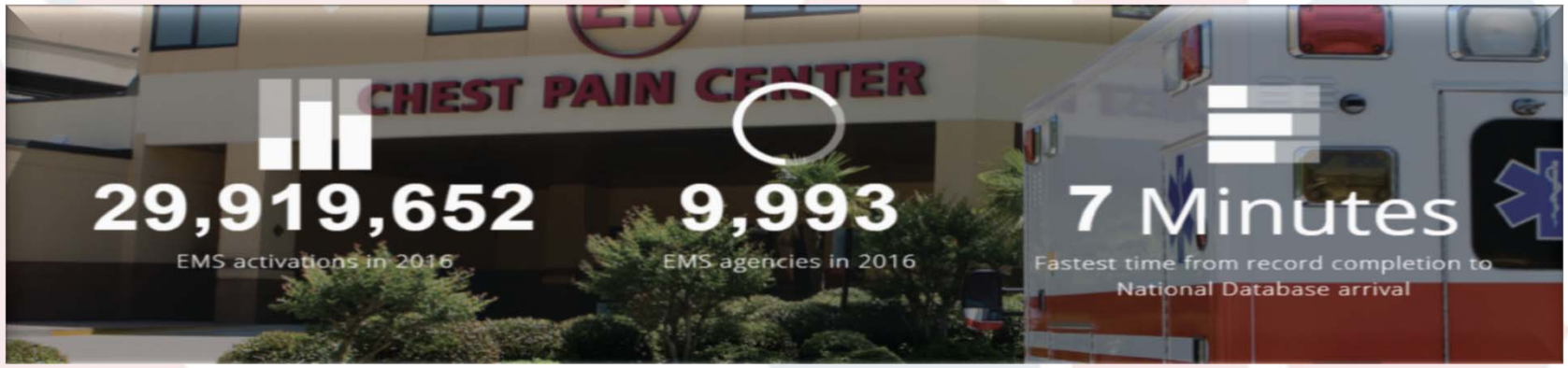
Data Type	minLength	maxLength
string	2	7

Data Element Comment

List of medications based on RxNorm (RXCUI) code.

Data Exchange is Automated

- Record closure in a patient's home in Lincoln NE to arrival at the National Repository
  - 7 minutes



Health Care Standards

ICD-10-CM or PCS

Assessment / Care of the Patient

- Impressions
- Symptoms
- Cause of Injury
- Incident Location Type
- Patient Activity

Patient History

- Medical/Surgical History
- Mediation Allergies
- Environmental Allergies

SNOMED CT ….for Procedures

- Procedures
  - Allowed by the State
  - Allowed by the EMS Agency
  - Administered by EMS
  - Environmental Allergies

RxNorm …for Medications

- Medications
  - Allowed by the State
  - Allowed by the EMS Agency
  - Administered by EMS
- Use by the Patient
  - Current Medications
  - Allergies

Available NEMSIS Data

https://nemsis.org/using-ems-data/request-research-data/

NEMSIS > Using EMS Data > Request Research Data

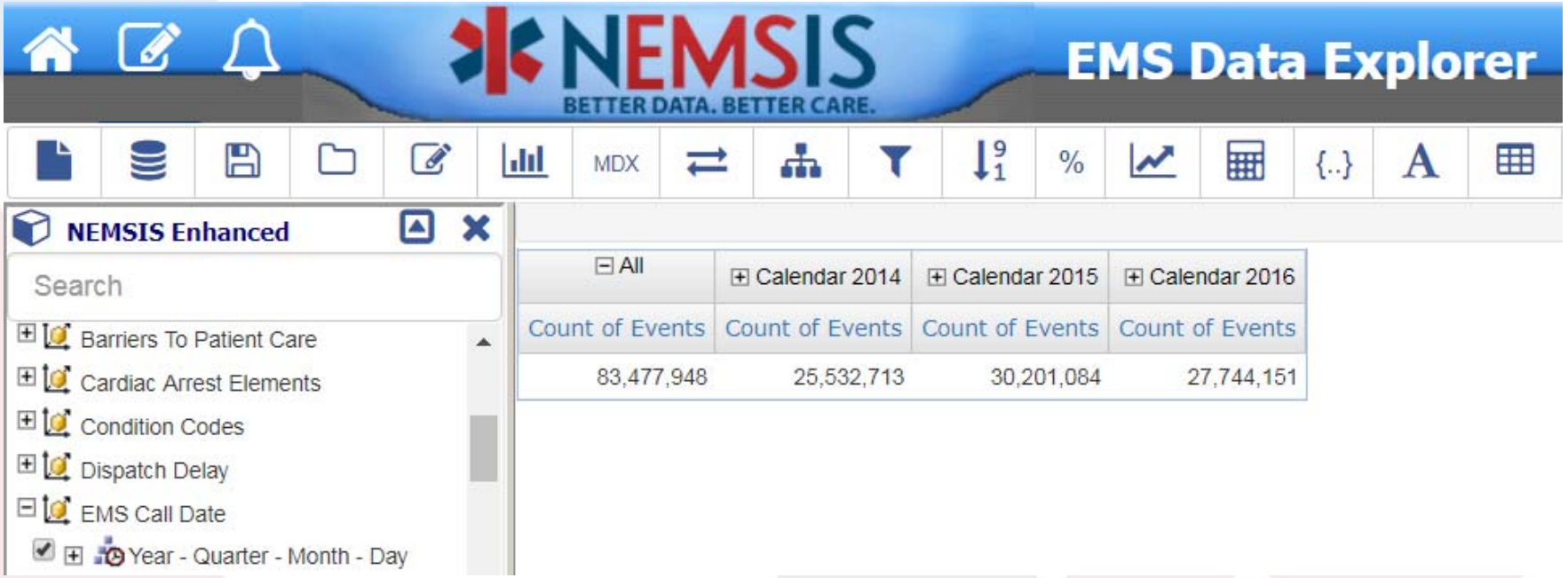
THE 2016 NEMSIS PUBLIC-RELEASE RESEARCH DATASET IS AVAILABLE TO YOU

2016 NEMSIS Public-Release Research Dataset includes 29,919,652 EMS activations submitted by 9,993 EMS agencies serving 49 states and territories during the 2016 calendar year. The dataset does not contain information that identifies patients, EMS agencies, receiving hospitals, or reporting states. EMS events submitted by states to NEMSIS do not necessarily represent all EMS events occurring within a state. In addition, states may vary in criteria used to determine the types of EMS events submitted to the NEMSIS dataset.

To determine which states contributed to the 2016 dataset, click on this link. Please review the User Manual associated with the NEMSIS Public-Release Research Dataset and the data dictionary for this dataset. Initial SAS code is available to import an ASCII file to SAS, translate M:M tables to flat file, generate a data specification files and, transform age and date/time.

Available NEMSIS Tools

- Version 2 OLAP Cube (EMS Data Explorer)



Available V3 NEMSIS Tools

State Surveillance Dashboard - Flu Symptoms

Data Set Size

Activations: 2,610,604

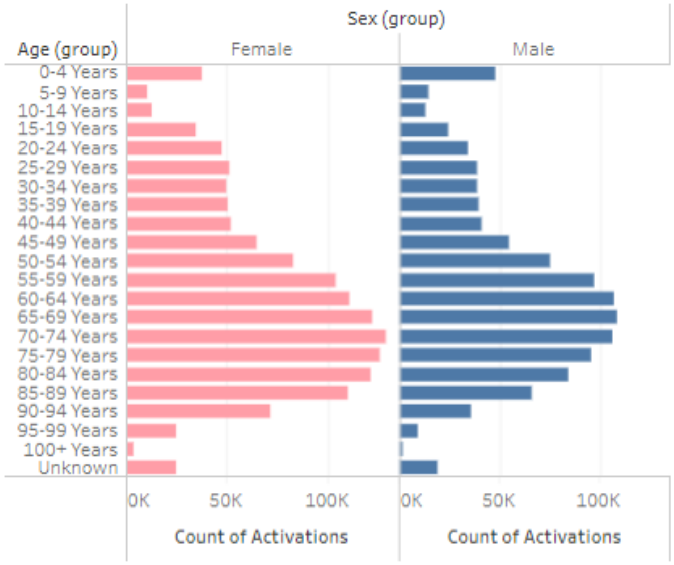
EMS Agencies: 4,534

Unit Notified by Dispatch Date: 1/15/2014 – 10/1/2018

Type of Service Requested: (All)

EMS Agency Id: (None)

Patient Demographics



Date and Time

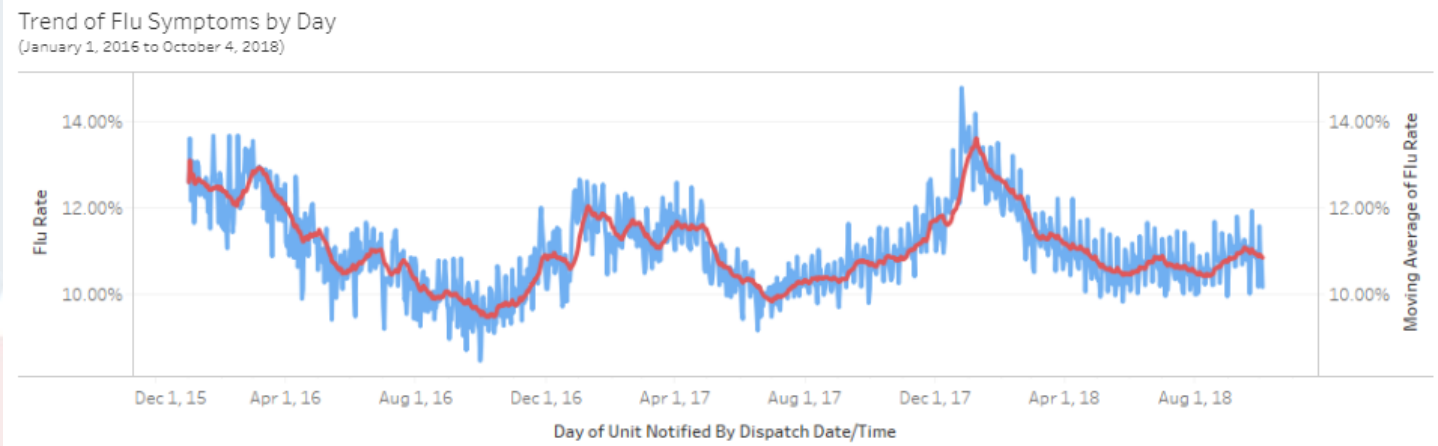
Month and Year

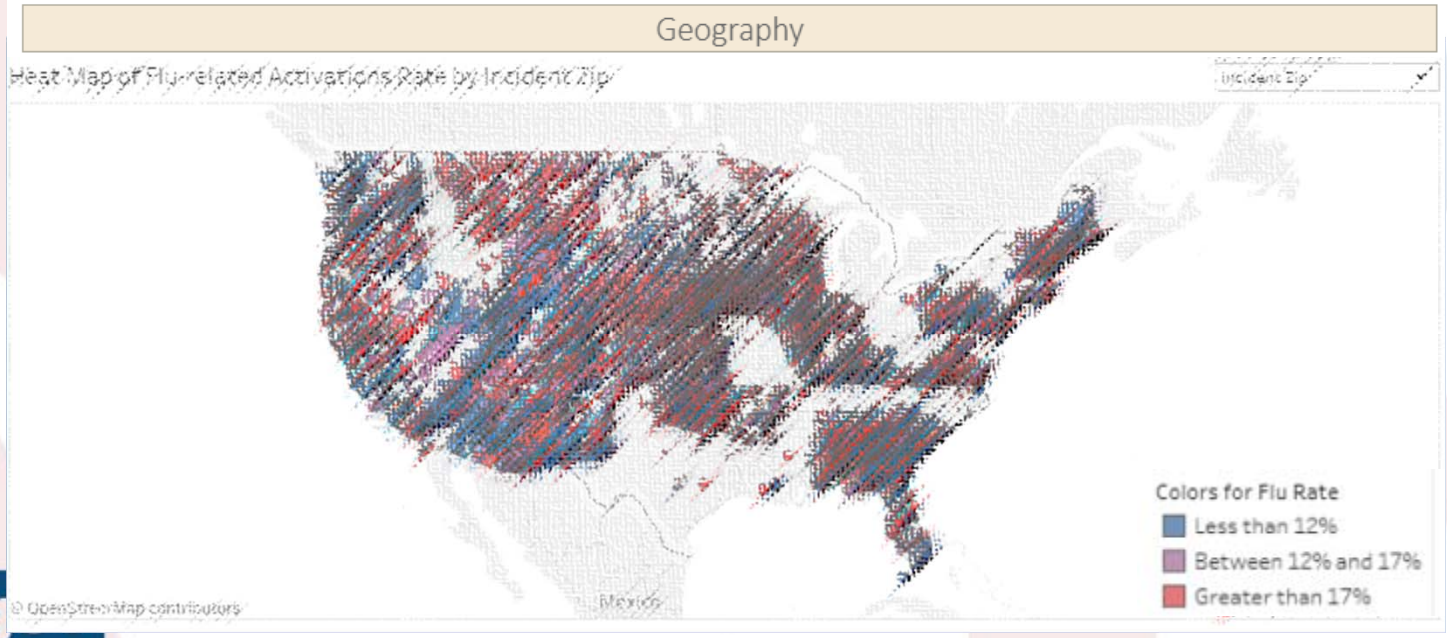
Year	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2016	12.5%	12.4%	12.4%	11.4%	10.6%	10.9%	10.4%	10.0%	9.7%	9.7%	10.5%	10.9%
2017	11.8%	11.5%	11.3%	11.5%	10.5%	10.0%	10.2%	10.3%	10.6%	10.8%	11.4%	12.4%
2018	12.9%	12.0%	11.2%	10.9%	10.5%	10.7%	10.6%	10.6%	11.0%	10.8%		

Day of Week and Time of Day

Time of Day	Day of Week						
	Sunday	Monday	Tuesday	Wednesd..	Thursday	Friday	Saturday
12am to 6am	2.196%	2.138%	2.012%	1.948%	1.957%	1.972%	2.130%
6am to 12pm	3.302%	4.435%	4.270%	4.247%	4.181%	4.160%	3.414%
12pm to 6pm	3.926%	5.033%	4.899%	4.933%	4.880%	4.893%	4.093%
6pm to 12am	3.526%	3.630%	3.503%	3.514%	3.504%	3.666%	3.636%

Flu Surveillance Dashboard





Opioid Epidemic

State Naloxone Administration Dashboard

Data Set Size

Activations: 154,524

EMS Agencies: 3,421

EMS Agency

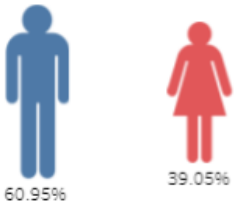
(All)

Unit Notified by Dispatch Date

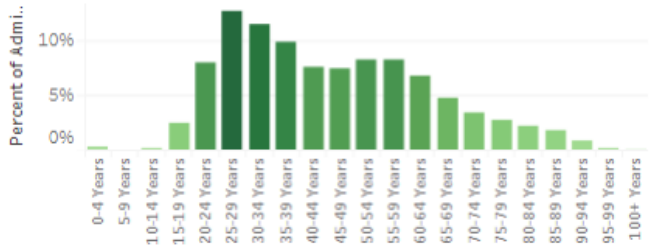
January 1, 2016 — August 31, 2018

Patient Demographics

Sex



Age (years)



Date and Time

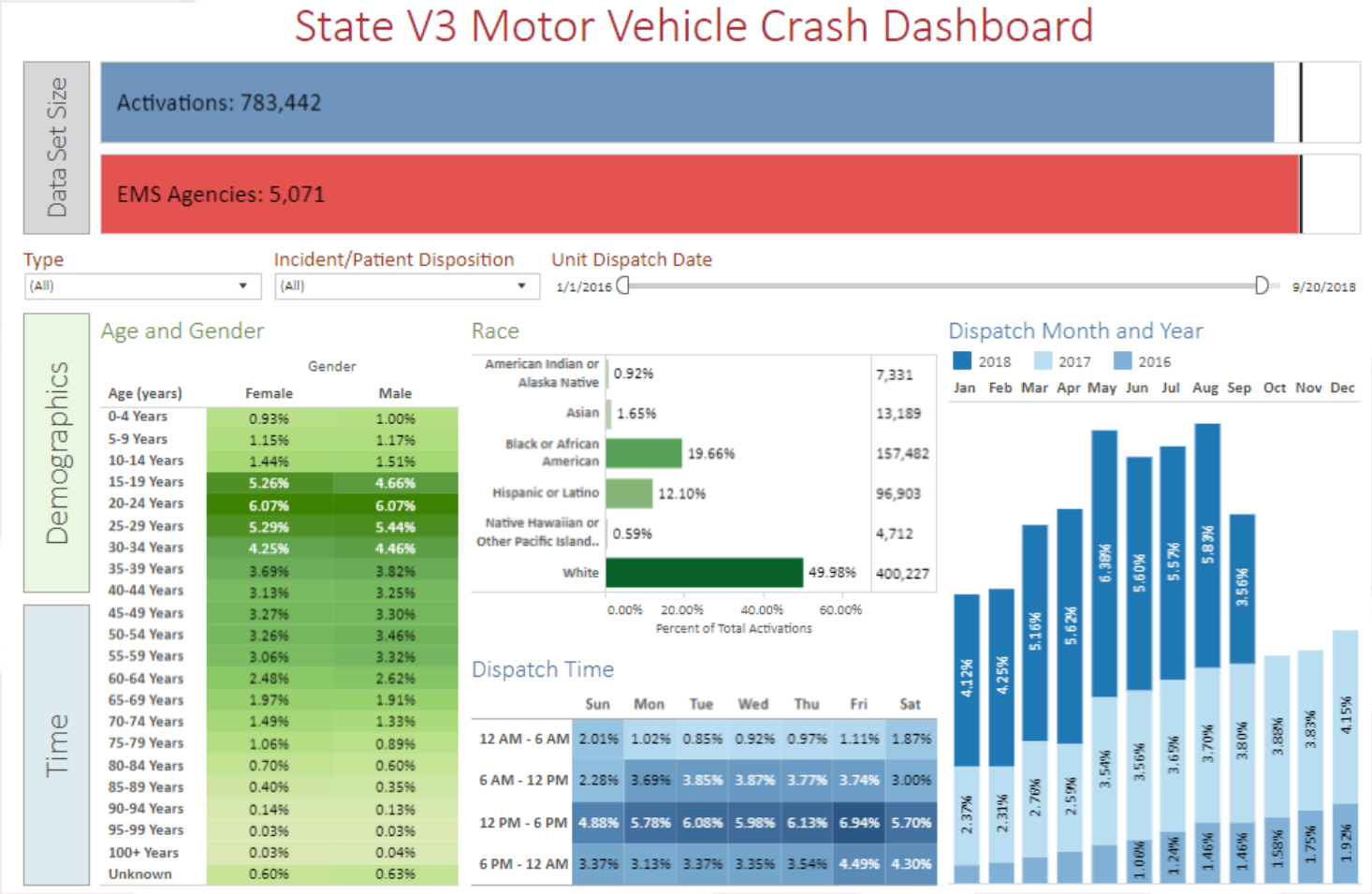
Month and Year

Year	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2016	0.66%	0.81%	0.88%	0.83%	0.76%	0.79%	0.86%	0.83%	0.87%	0.87%	0.79%	0.73%
2017	0.65%	0.71%	0.73%	0.83%	0.80%	0.85%	0.78%	0.76%	0.73%	0.67%	0.69%	0.70%
2018	0.60%	0.60%	0.65%	0.65%	0.66%	0.67%	0.63%	0.63%				

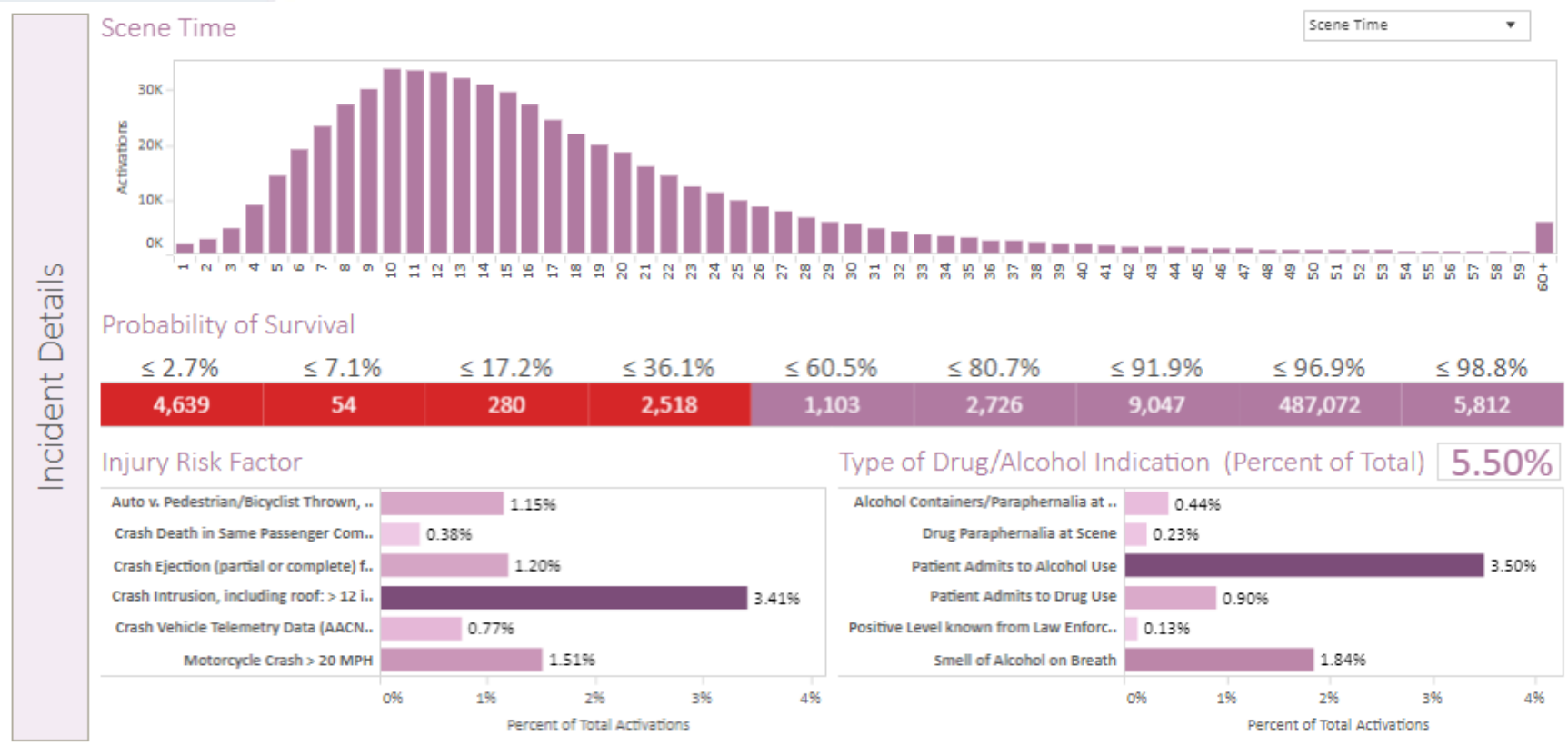
Day of Week and Time of Day

Time of Day	Day of Week						
	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
12am to 6am	0.79%	0.64%	0.66%	0.69%	0.72%	0.75%	0.83%
6am to 12pm	0.70%	0.50%	0.52%	0.52%	0.54%	0.57%	0.69%
12pm to 6pm	0.77%	0.61%	0.61%	0.63%	0.62%	0.65%	0.79%
6pm to 12am	0.86%	0.84%	0.84%	0.85%	0.88%	0.96%	0.92%

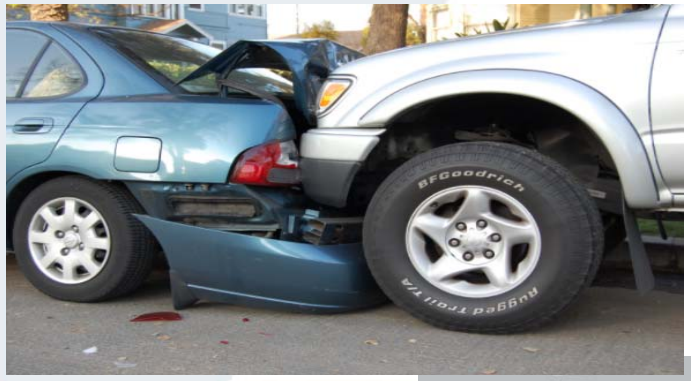
Vehicular Injuries and Death

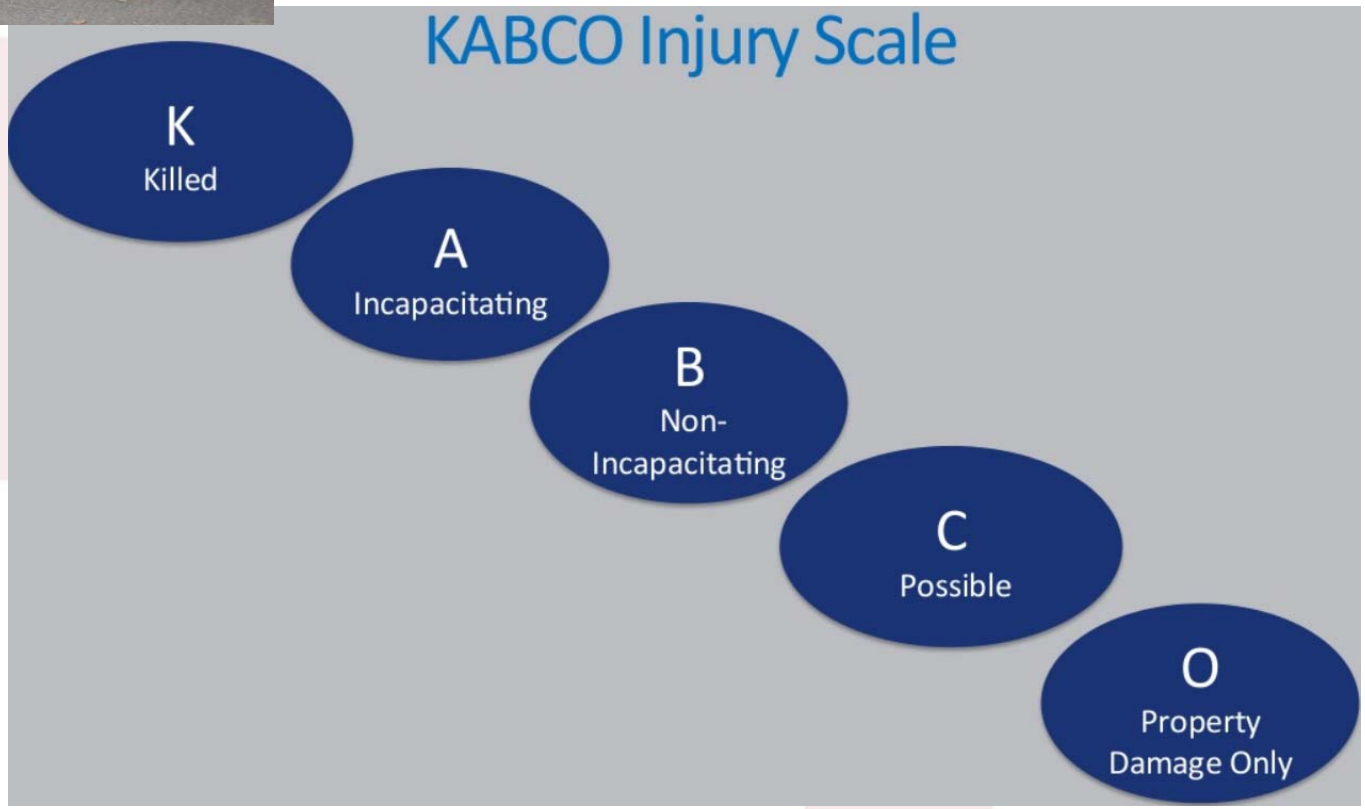


Assessment of Injury Severity



Use of KABCO



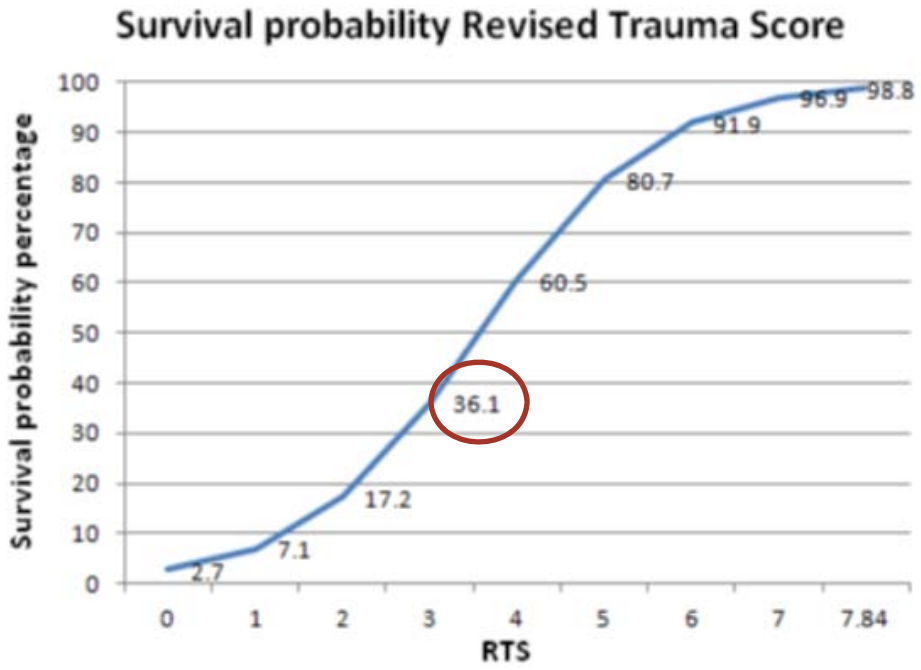

KABCO Injury Scale
K
Killed
A
Incapacitating
B
Non-
Incapacitating
C
Possible
O
Property
Damage Only

Revised Trauma Score (RTS)

GCS	SBP	RR	Coded Value
13-15	>89	10-29	4
9-12	76-89	>29	3
6-8	50-75	6-9	2
4-5	1-49	1-5	1
3	0	0	0

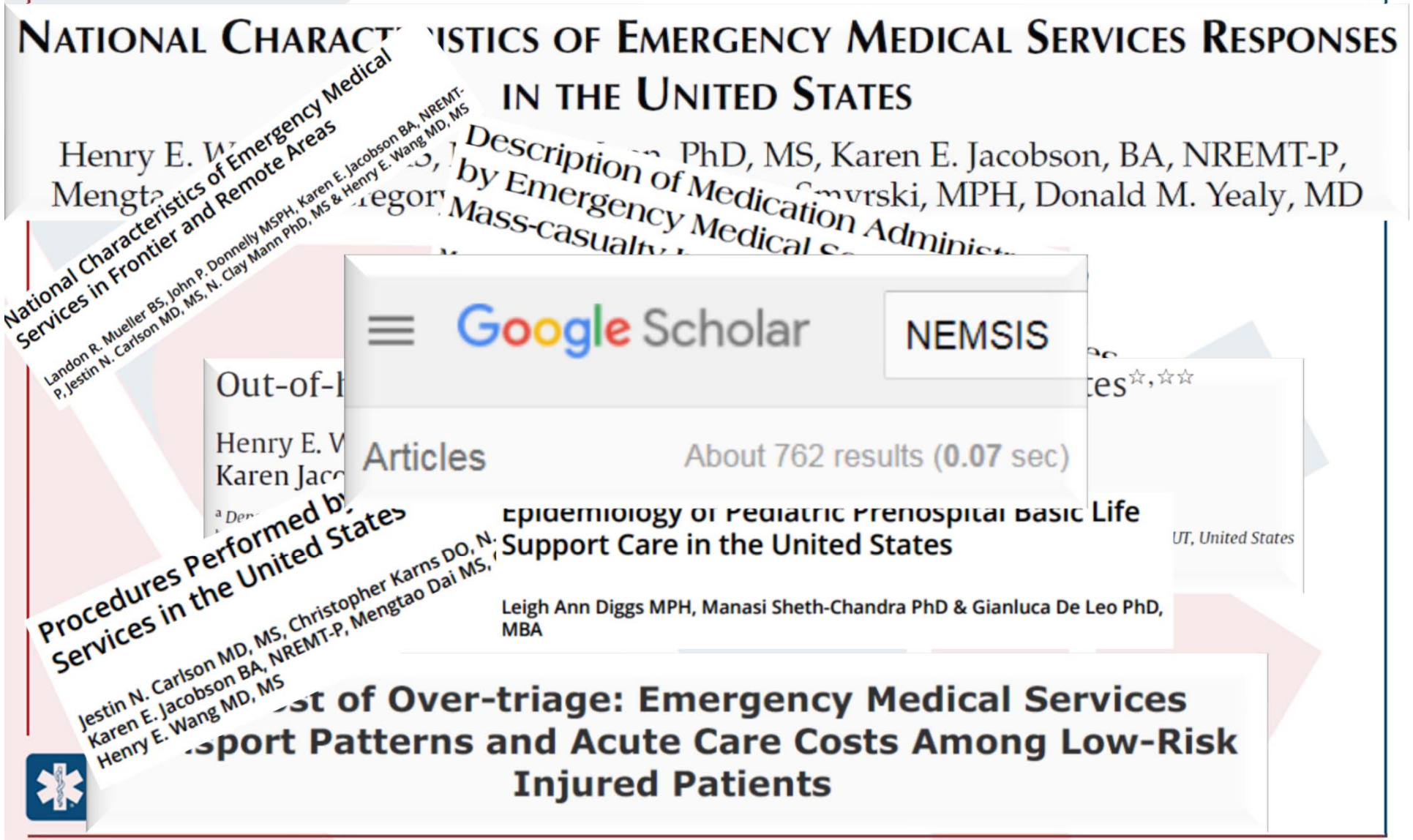
RTS = 0.9368 GCS + 0.7326 SBP + 0.2908 RR

+ Easier to use
+ Part of TRISS (most widely used)
- Survival basis: MTOS (1990)

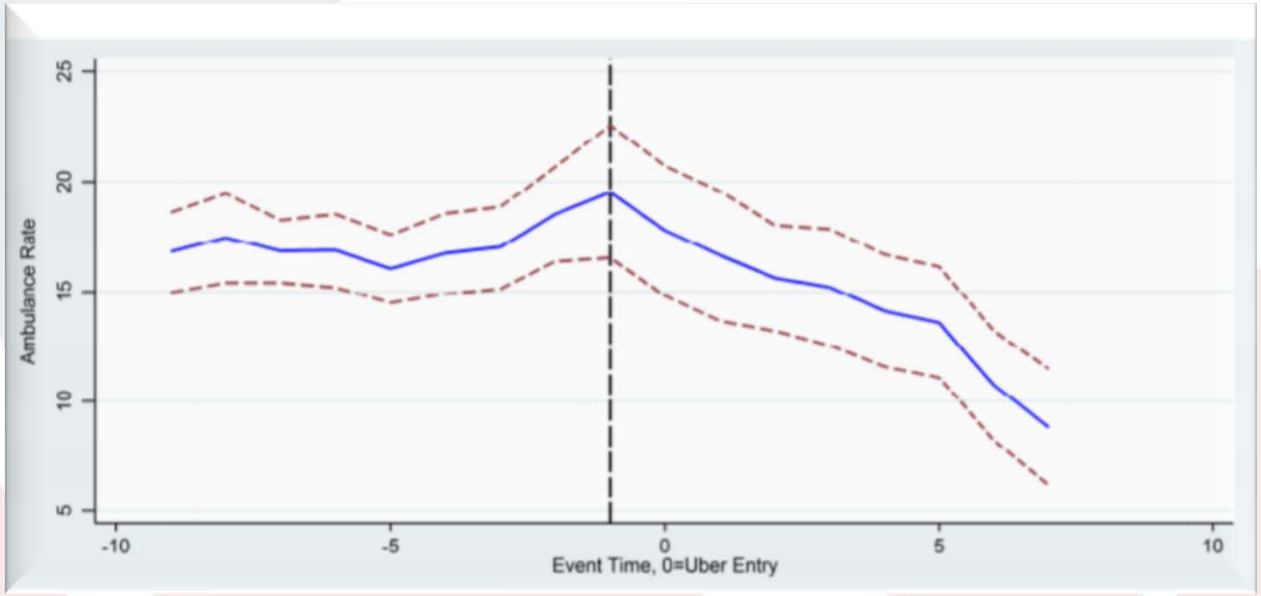


Champion HR et al. A Revision of the Trauma Score, J Trauma 29:623-629,1989.

Brief Reflection on Research!



Did UberX reduce ambulance volume?



Leon S. Moskatel & David J.G. Slusky, 2017. "Did UberX Reduce Ambulance Volume?," WORKING PAPERS SERIES IN THEORETICAL AND APPLIED ECONOMICS 201708, University of Kansas, Department of Economics, revised Oct 2017.

Pre/Post Uber introduction study including 43 states and 766 cities.

7% decrease in the per capita ambulance rate when Uber enters a city.

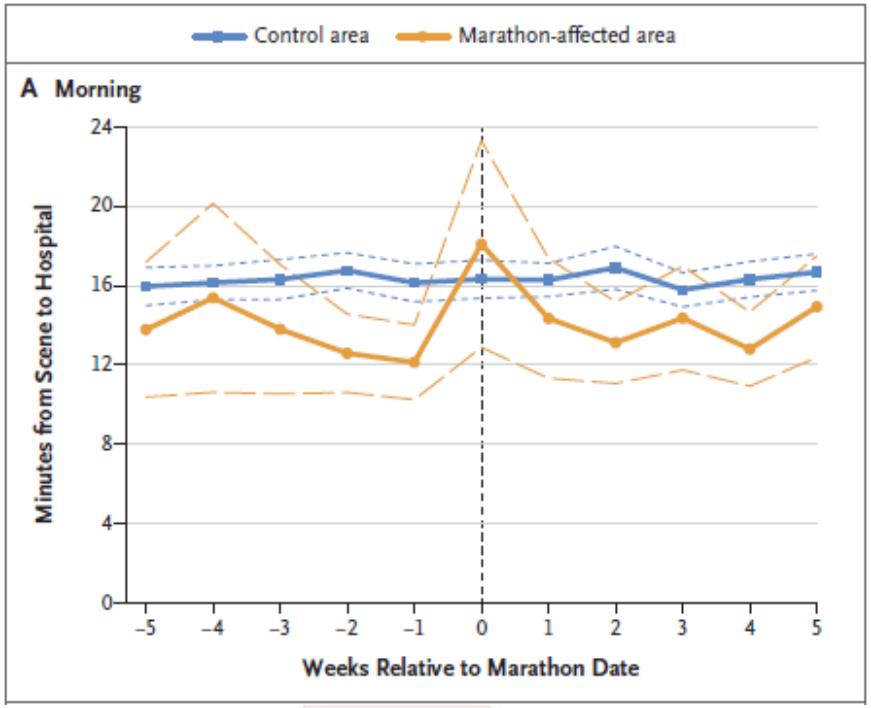
Do neighborhoods behind street barriers set up for marathons receive delayed EMS care compared to neighborhoods not close to the barriers?

Jena AB, (2017). Delays in Emergency Care and Mortality during Major U.S. Marathons. N Engl J Med, Apr 13(376), 1441-1450.

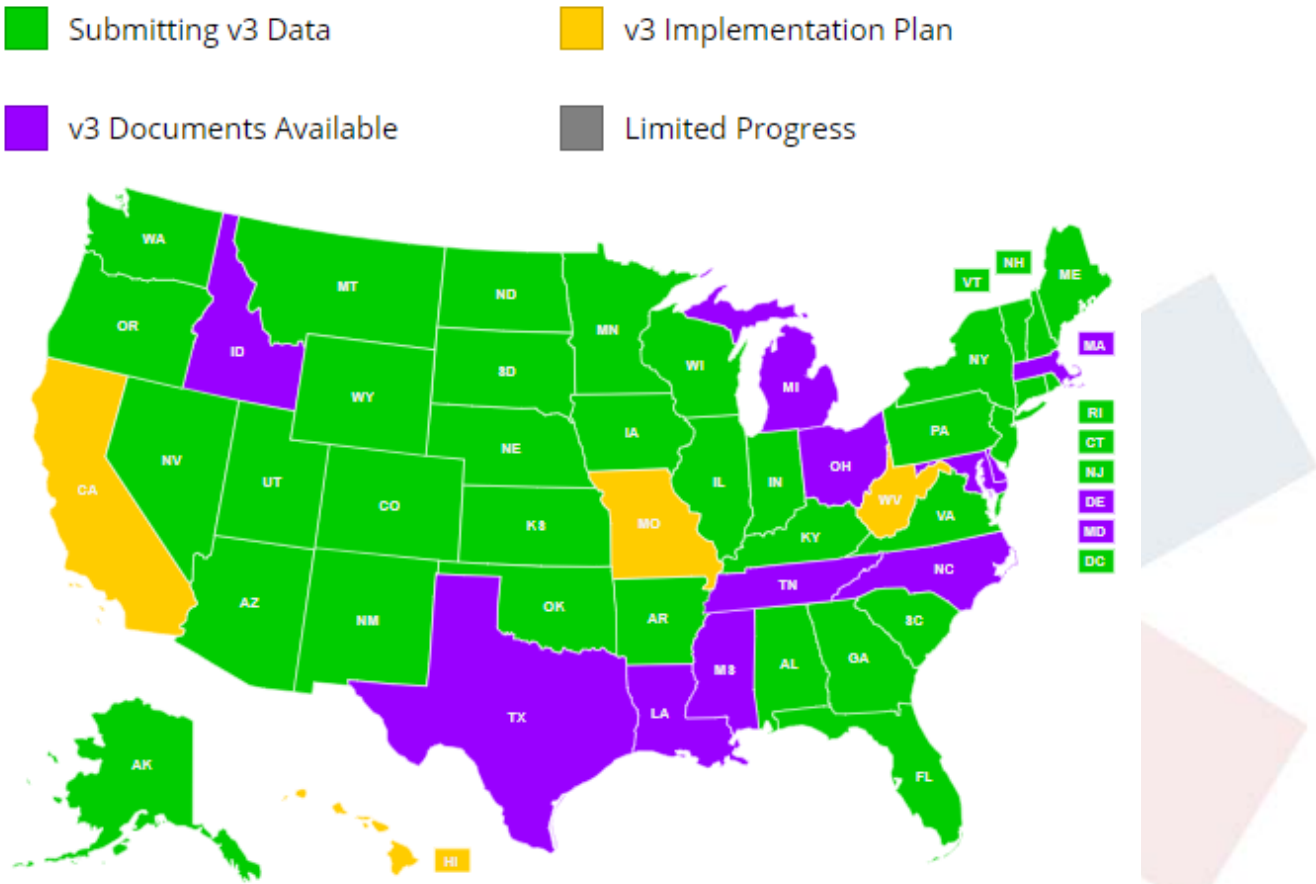
11 largest US urban marathons…3 yrs.

62,890 EMS activations for >65 yrs. chest pain patients.

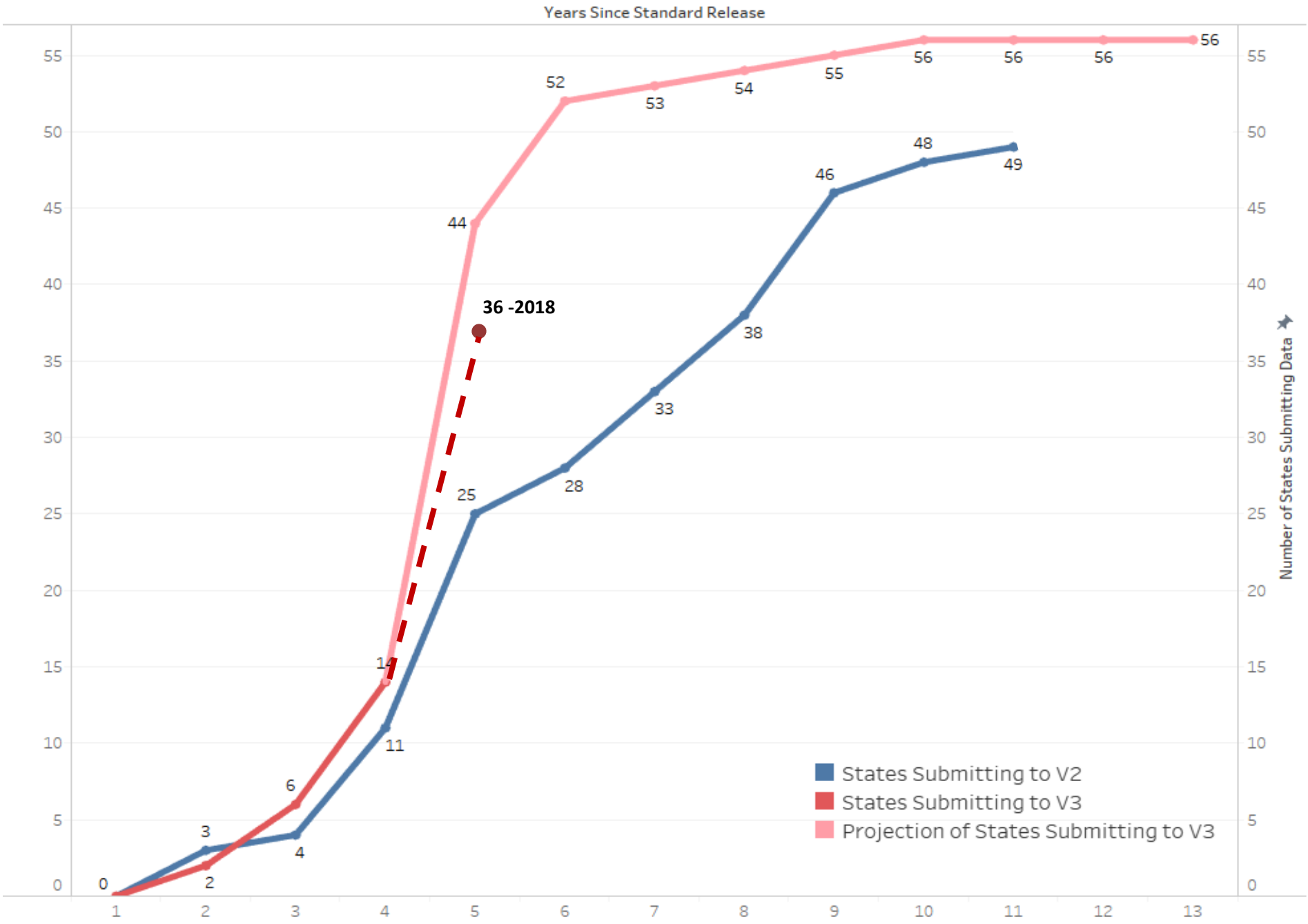
On average, transport times increased 4.4 mins.



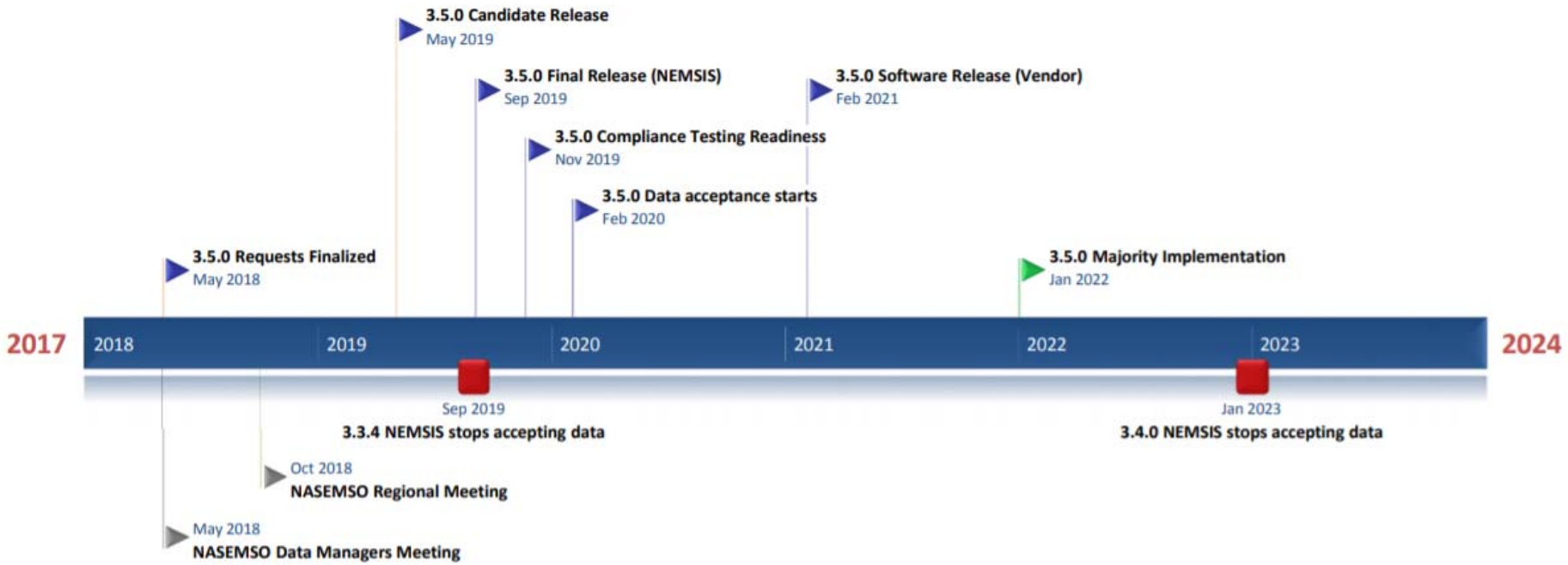
NEMSIS V3 Migration and Versioning Process



V2 and V3 State Submission to NEMSIS by Year



NEMSIS Versioning Process




Questions!

Clay,

Wanted to reach out to thank you and the staff at the TAC for your support for our project. I know Jeremy primarily engaged your team for the data but we recognize that none of this work would have been possible without your support.

I also wanted to send over the most recent Altmetrics which provides an idea of the impact and dissemination of the study so far. It has performed in the 99th percentile and is in the top 5% of all research outputs tracked by Altmetrics.

Thanks again!

Ash

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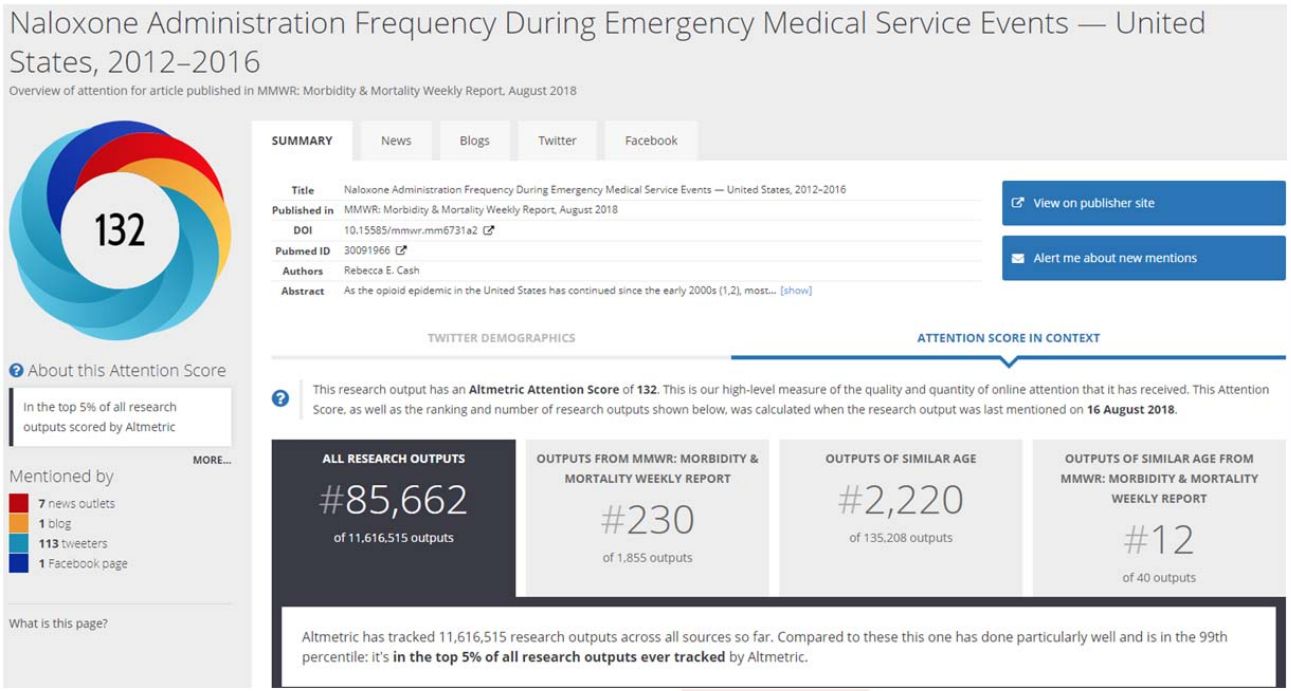
W: www.NREMT.org E: apanch



Naloxone Administration Frequency During Emergency Medical Service Events — United States, 2012–2016

Overview of attention for article published in MMWR: Morbidity & Mortality Weekly Report, August 2018

132

About this Attention Score

In the top 5% of all research outputs scored by Altmetric

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7 news outlets
1 blog
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What is this page?

SUMMARY | News | Blogs | Twitter | Facebook

Title: Naloxone Administration Frequency During Emergency Medical Service Events — United States, 2012–2016
Published in: MMWR: Morbidity & Mortality Weekly Report, August 2018
DOI: 10.15585/mmwr.mm6731a2
Pubmed ID: 30091966
Authors: Rebecca E. Cash
Abstract: As the opioid epidemic in the United States has continued since the early 2000s (1,2), most... [show]

View on publisher site

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TWITTER DEMOGRAPHICS | ATTENTION SCORE IN CONTEXT

This research output has an **Altmetric Attention Score** of **132**. This is our high-level measure of the quality and quantity of online attention that it has received. This Attention Score, as well as the ranking and number of research outputs shown below, was calculated when the research output was last mentioned on **16 August 2018**.

ALL RESEARCH OUTPUTS	OUTPUTS FROM MMWR: MORBIDITY & MORTALITY WEEKLY REPORT	OUTPUTS OF SIMILAR AGE	OUTPUTS OF SIMILAR AGE FROM MMWR: MORBIDITY & MORTALITY WEEKLY REPORT
#85,662	#230	#2,220	#12
of 11,616,515 outputs	of 1,855 outputs	of 135,208 outputs	of 40 outputs

Altmetric has tracked 11,616,515 research outputs across all sources so far. Compared to these this one has done particularly well and is in the 99th percentile: it's **in the top 5% of all research outputs ever tracked** by Altmetric.

Word to the Wise: States

- Lift the NEMSIS Burden on States:
  - Only collect the National elements
    - No custom elements
    - Ready-made Schematron file (complete validity rules)
  - Legislate: “the latest NEMSIS standard”
  - Don’t use business rules to influence user navigation
  - Maintain a StateDataSet file
  - Correctly apply NOT values