

Recommendations for Surveillance of EMS Data for Opioid Overdoses

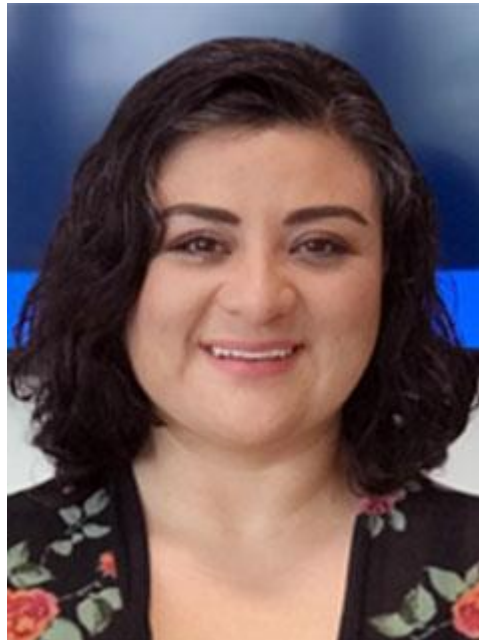
Webinar ISDS

March 2, 2019

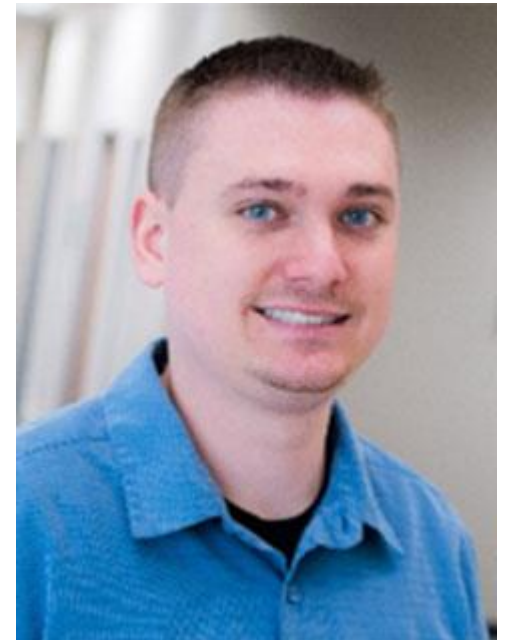
The Team



Todd Stout
Founder & President



Silvia R. Verdugo
Clinical Specialist



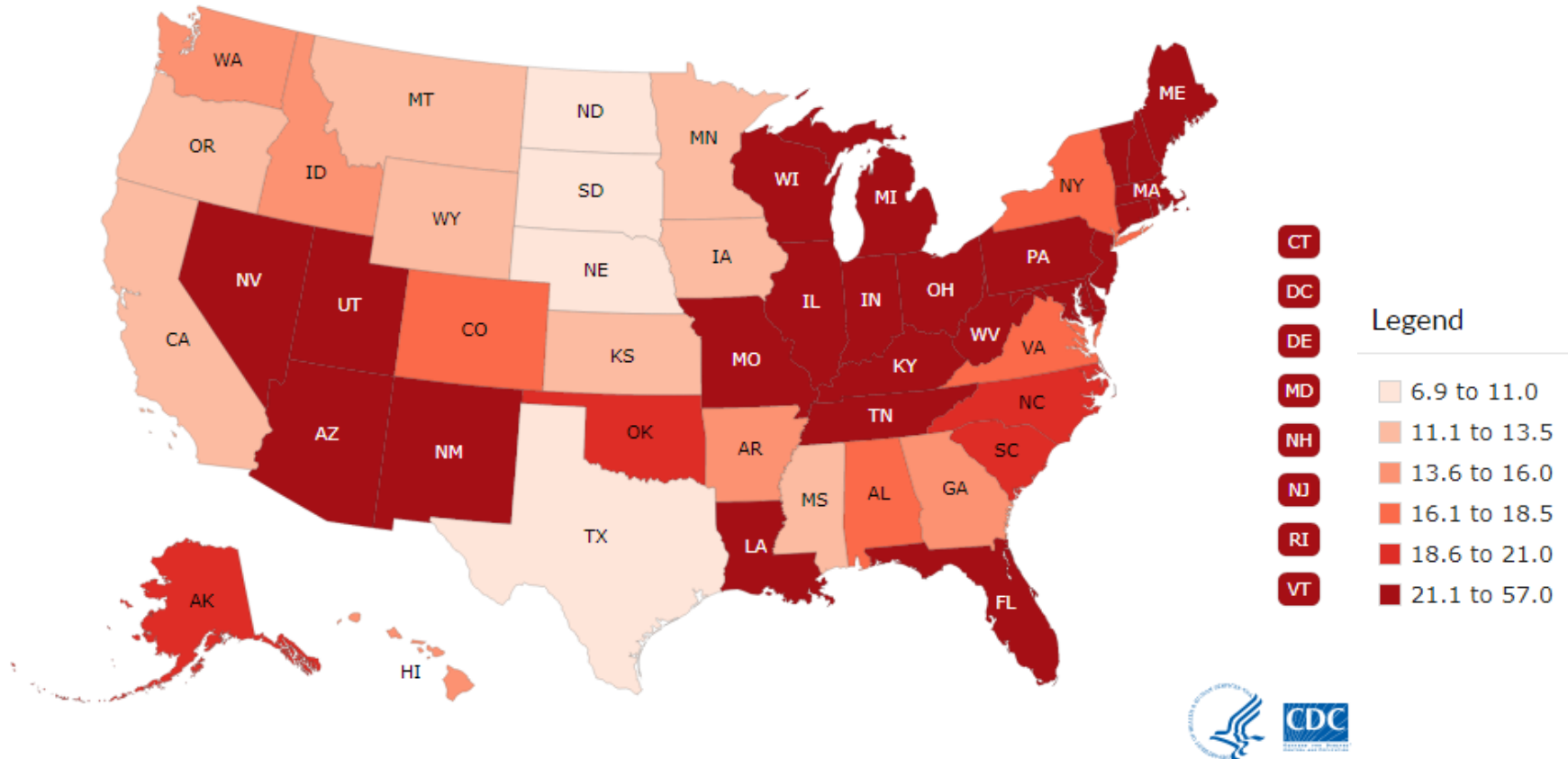
Mike Thompson
Technical Advisor

Overview

1. Background
2. Once Upon an EMS Call
3. EMS Data Sources
4. Data Mining
5. Examples
6. Future Steps

Background

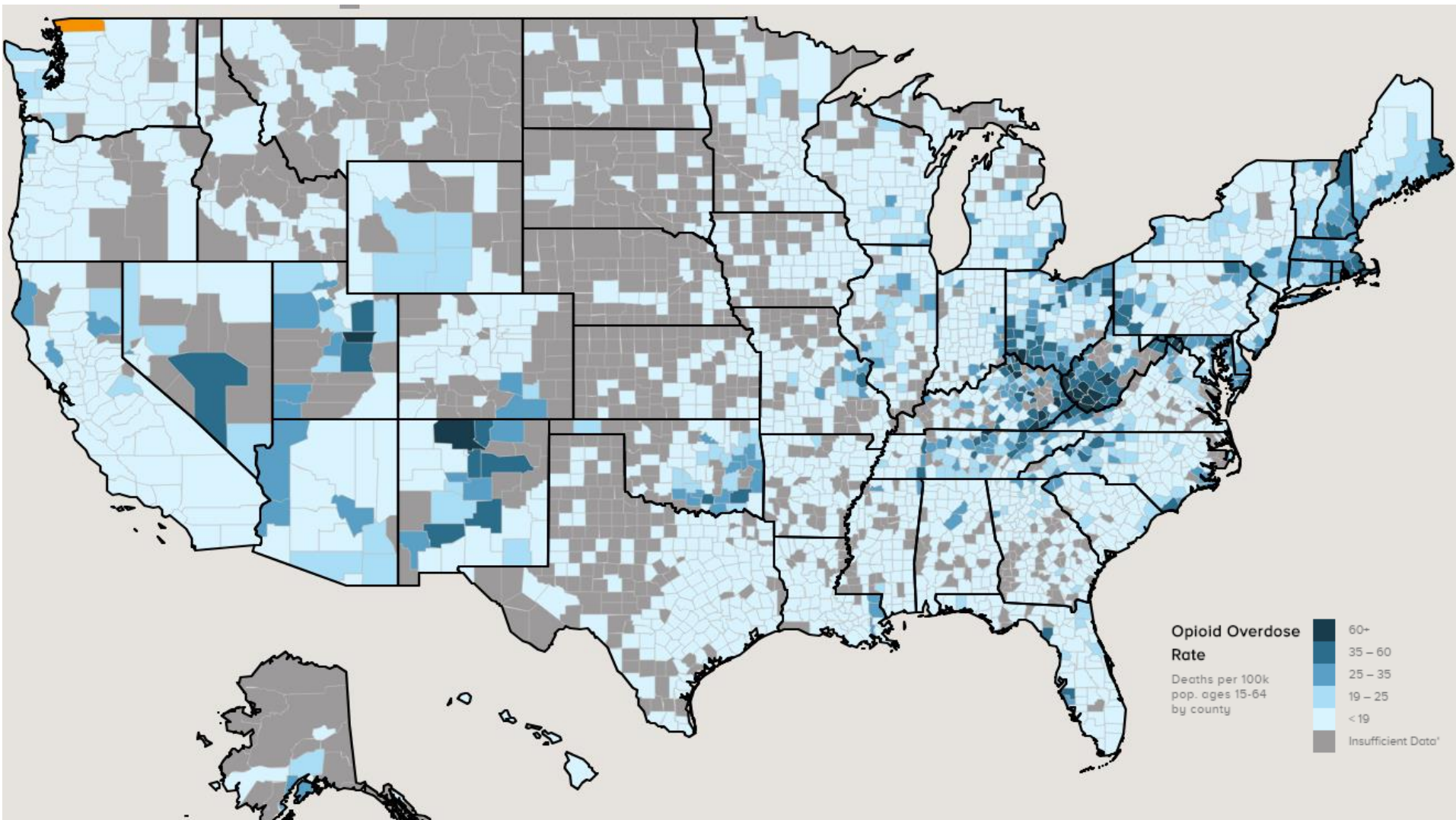
Number and age-adjusted rates of drug overdose deaths by state, US 2017



<https://www.cdc.gov/drugoverdose/data/statedeaths.html>



Opioid Overdose Deaths in the United States



Background

The death curve

Tens of thousands of Americans die each year from opioid overdoses

The federal response remains sluggish and inadequate

Drug overdose deaths skyrocketed among women



By [Jacqueline Howard](#), CNN

Opioid Overdose Deaths Quadruple, Centered in 8 States

Feb. 22, 2019, at 12:00 p.m.

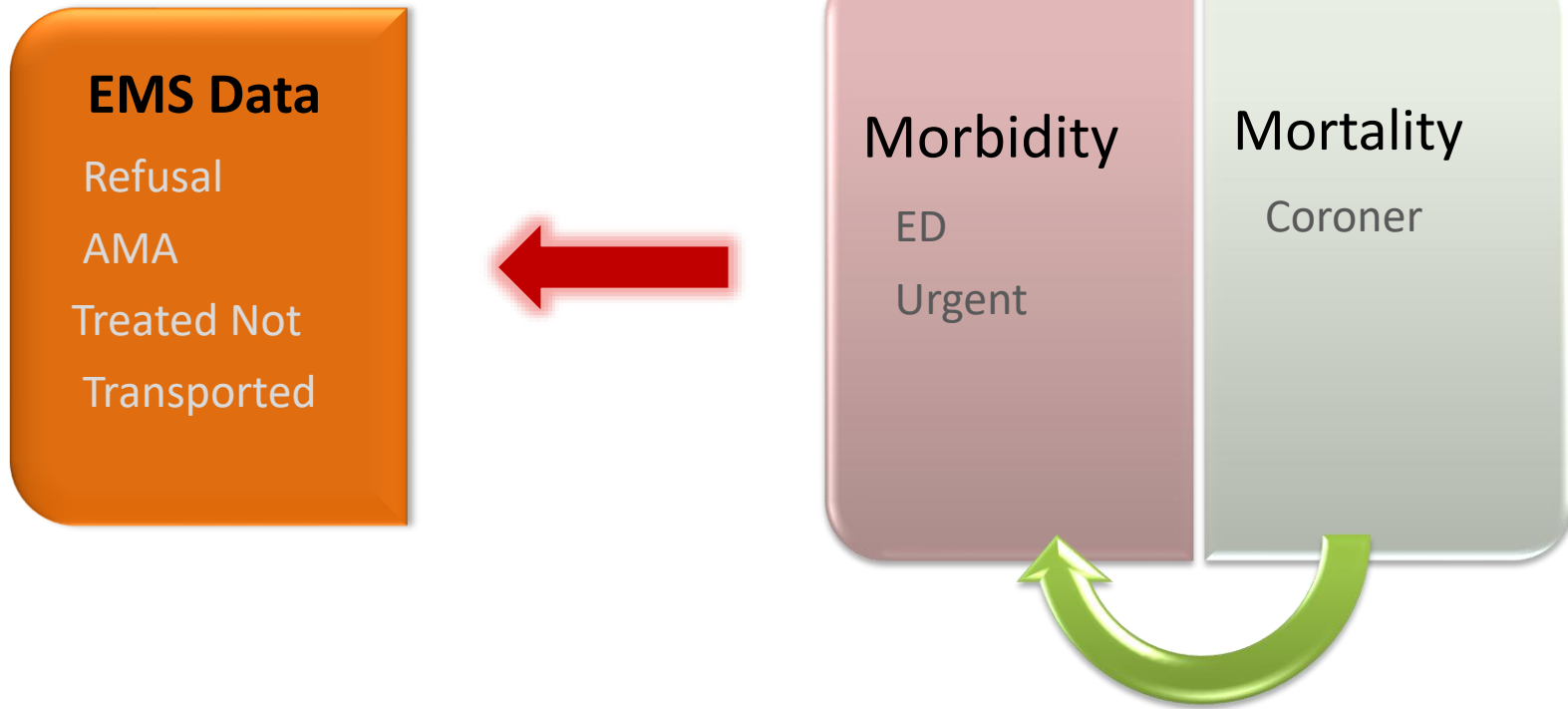


Fentanyl bust in New York finds enough to kill nearly 2 million people, DEA says

By [Nicole Chavez](#) and Taylor Romine, CNN

🕒 Updated 6:49 PM ET, Sat March 2, 2019

Background



Once Upon an EMS Call

911 Call



Image: Kalie Greenberg



Image: <https://prioritydispatch.net>

Ambulance



Image: Connor Orth



CAD



EMD



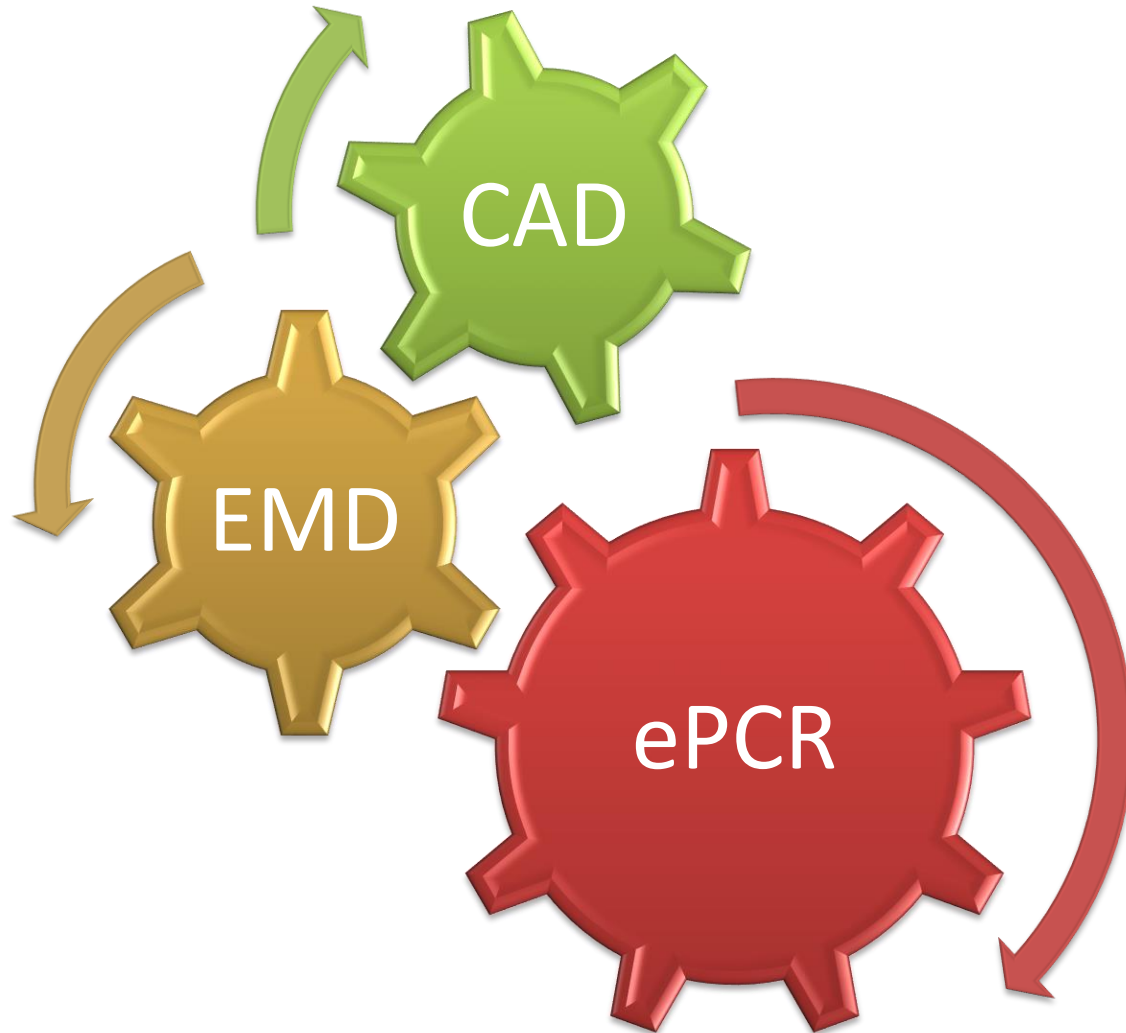
ePCR

CAD: Computer Aid Dispatch

EMD: Emergency Medical Dispatch

ePCR: Electronic Patient Care Record

EMS Data Source Components



Basic Question.....

What is an Opioid Overdose?

FirstWatch World

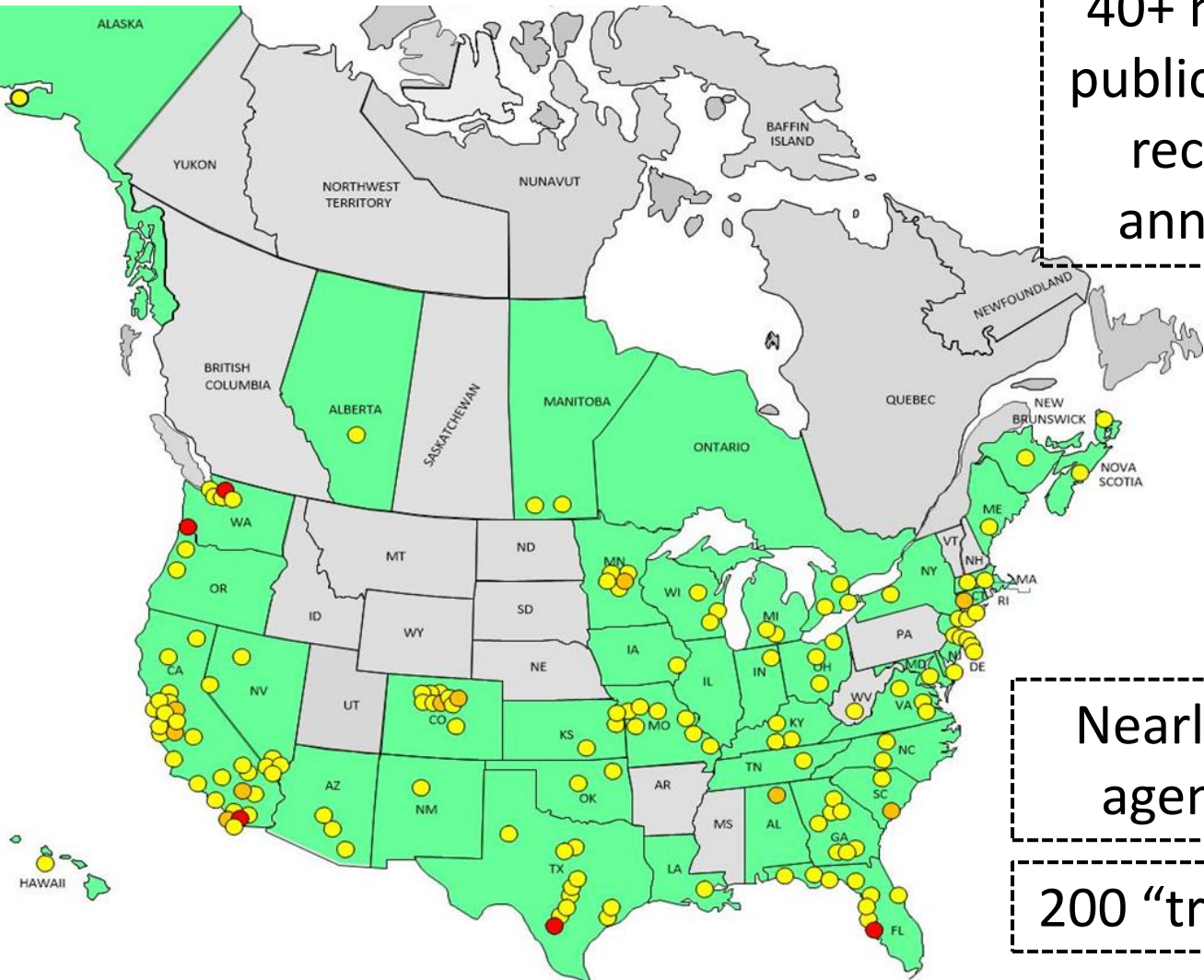
40+ million
public safety
records
annually

**FIRST
WATCH**

Every Record. In Real Time. Automatically.

Site License Legend

- 1 to 5 Agencies
- 5 to 20 Agencies
- 20 + Agencies



Nearly 500
agencies

200 "triggers"

**FIRST
WATCH**

Data Elements per Data Source:

CAD

Chief
Complaint/Problem

Comments

EMD

ProQA Determinant

ePCR

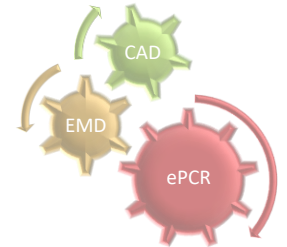
Provider
Impressions

Intervention
Procedures

Vital Signs

Narrative

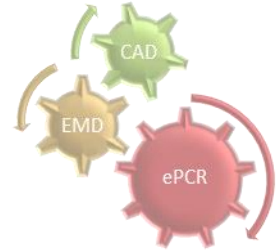
Data Mining: CAD



1. Chief Complaint - Problem:
 - a. Overdose/Ingestion/Poison
 - b. Unconsciousness

2. Dispatch Comments:
 - a. Free text search for keywords

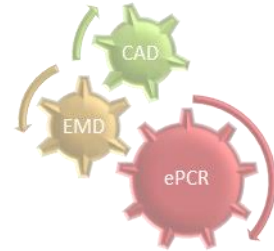
Data Mining: EMD



EMD Determininant:

- a. Card "23%"
- b. Card "31%"

Data Mining: ePCR



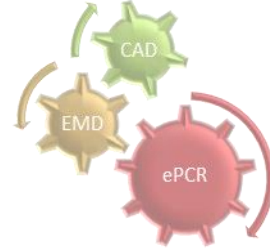
Primary and Secondary Provider Impressions:

- a. Poisoning
- b. Overdose
- c. Unconscious
- d. Altered Mental Status

eSituation.11 & 12:

T40.1X4
T40.2X4
T40.3X4
T40.4X4
T40.604A
T50.90
R41.8
R46.4

Data Mining: ePCR



Intervention or Procedure:

- a. Medication:
Naloxone/Narcan

eMedication.02 and/or .03
7242

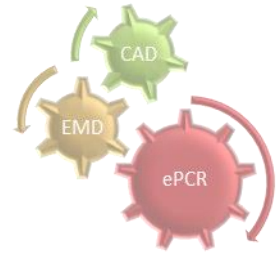
Vital Signs:

- a. Decreased Respiratory Rate – RR < 12
- b. Altered Level of Consciousness - Glasgow
Coma Scale < 13

eVitals.14:
< 12

eVitals.23:
< 13

Data Mining: ePCR



Free Text Search in Narrative:

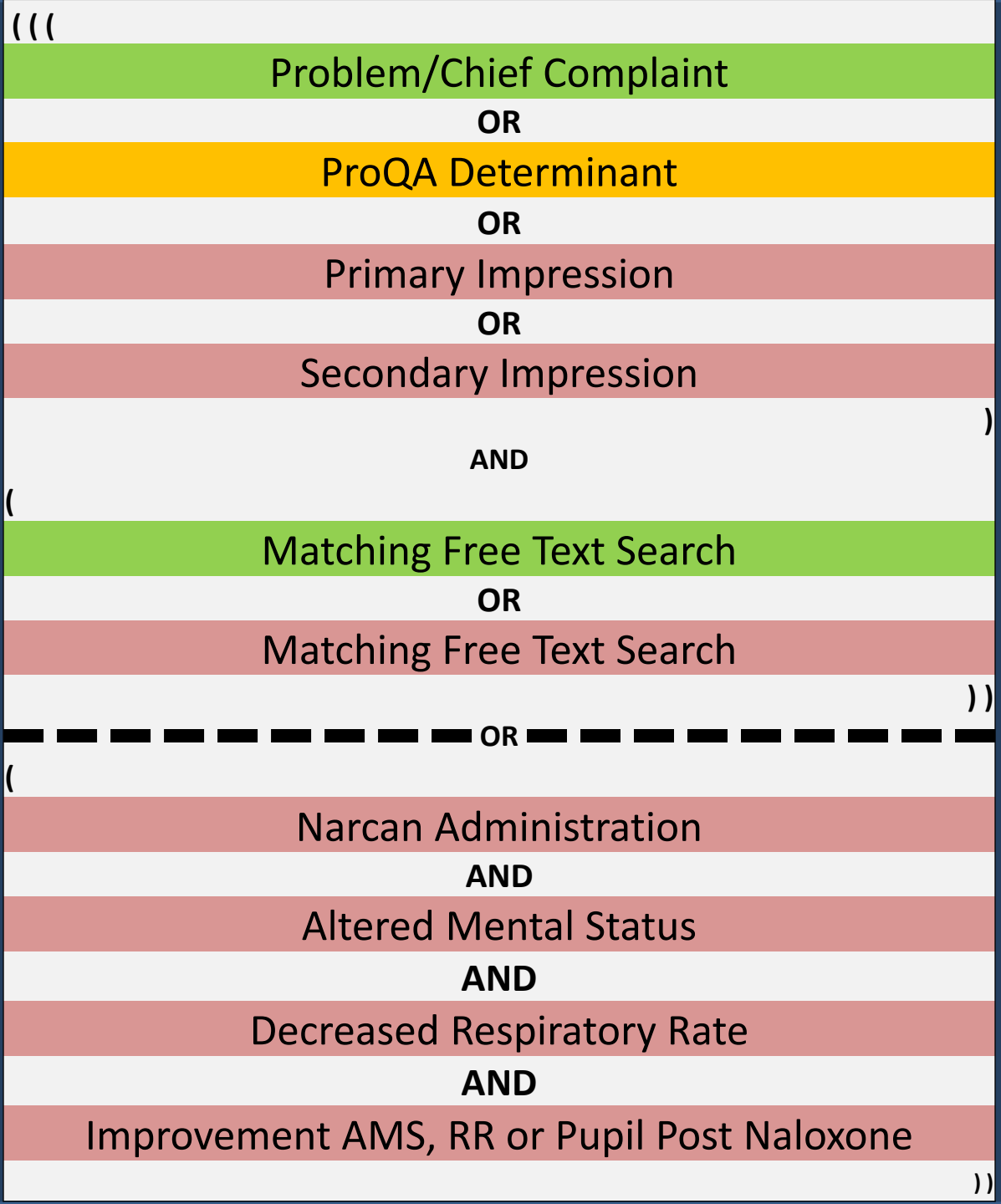
a. Overdose related Keywords (126)

eNarrative.01

Category:	#
Prescription Drug Names	100
Substance or Medication Use	17
Heroin and Overdose	4
Intravenous	3
Slang	2

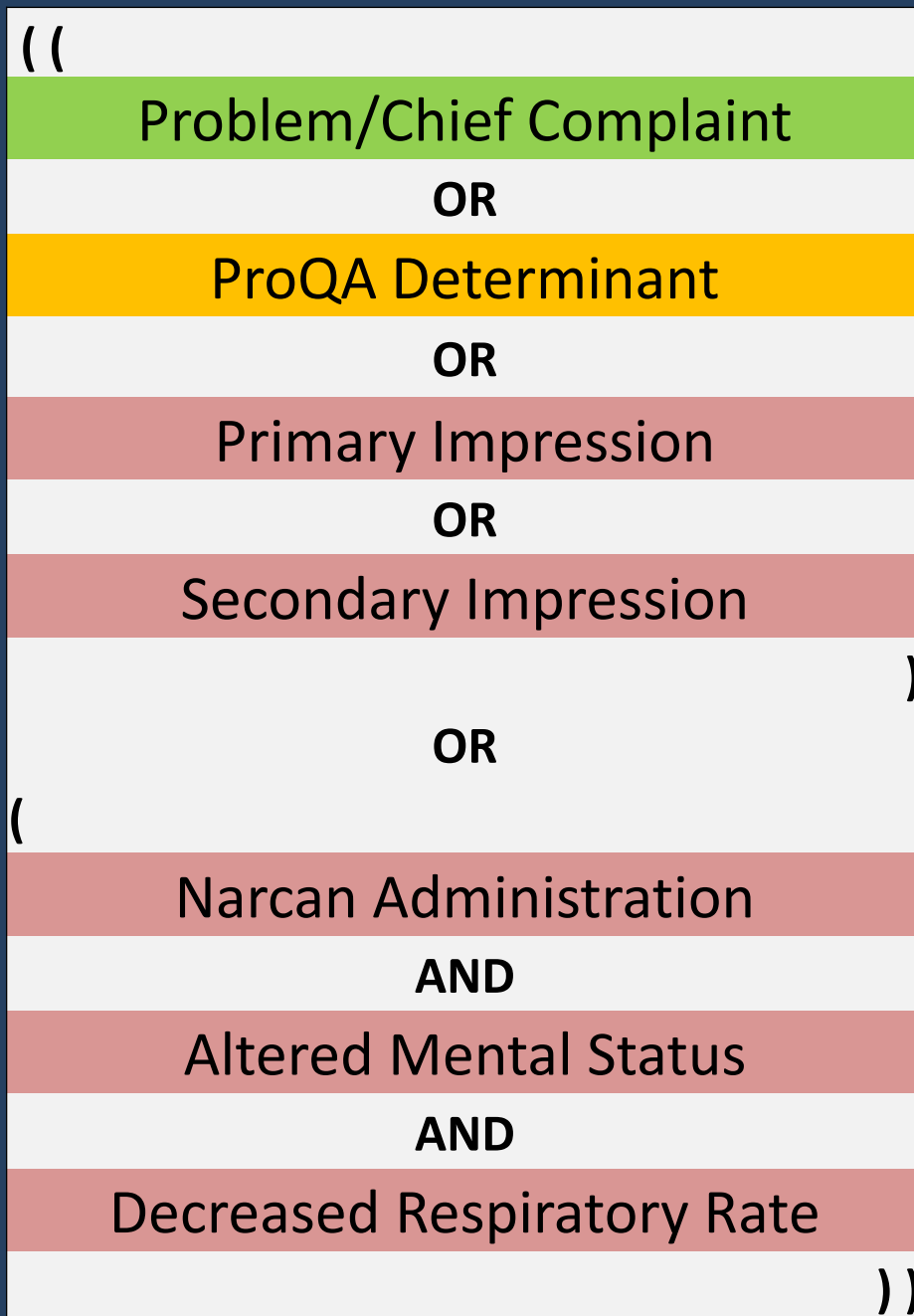
Opioid Overdose FirstWatch Trigger

“Highly Specific”



Opioid Overdose FirstWatch Trigger

“Highly Sensible”



Analysis

	Overdose Calls		Sensitivity	Specificity	PPV	NPV	*LR+	*LR-	
	Yes	No	% (IC 95%)	% (IC 95%)	% (IC 95%)	% (IC 95%)	(IC 95%)	(IC 95%)	
T1	Yes	76	30	48	99	71	99	2.53	0.002
	No	82	37772	(.401-.561)	(.998-.999)	(.201-.380)	(.997-.998)	(1.829-3.508)	(.001-.002)
T2	Yes	7	100	4	99	6	93	0.07	0.004
	No	151	37702	(.019-.092)	(.996-.997)	(.028-.134)	(.865-.971)	(.034-.143)	(.003-.004)
T3	Yes	75	22905	47	39	0.3	99	0.003	0.005
	No	83	14897	(.395-.555)	(.389-.399)	(.002-.004)	(.993-.995)	(.002-.004)	(.004-.006)
OD1	Yes	83	75	53	99	52	47	1.11	0.001
	No	75	37632	(.444-.604)	(.997-.998)	(.444-.604)	(.395-.555)	(.887-1.380)	(.001-.002)
OD2	Yes	133	87	84	99	60	99	1.53	0.007
	No	25	36930	(.773-.893)	(.997-.998)	(.536-.669)	(.998-.999)	(1.235-1.858)	(.0004-.001)

PPV: Positive Predictor Value, NPV: Negative Predictor Value, IC 95%: 95% Confidence Interval

* Likelihood Ratio weighed by prevalence

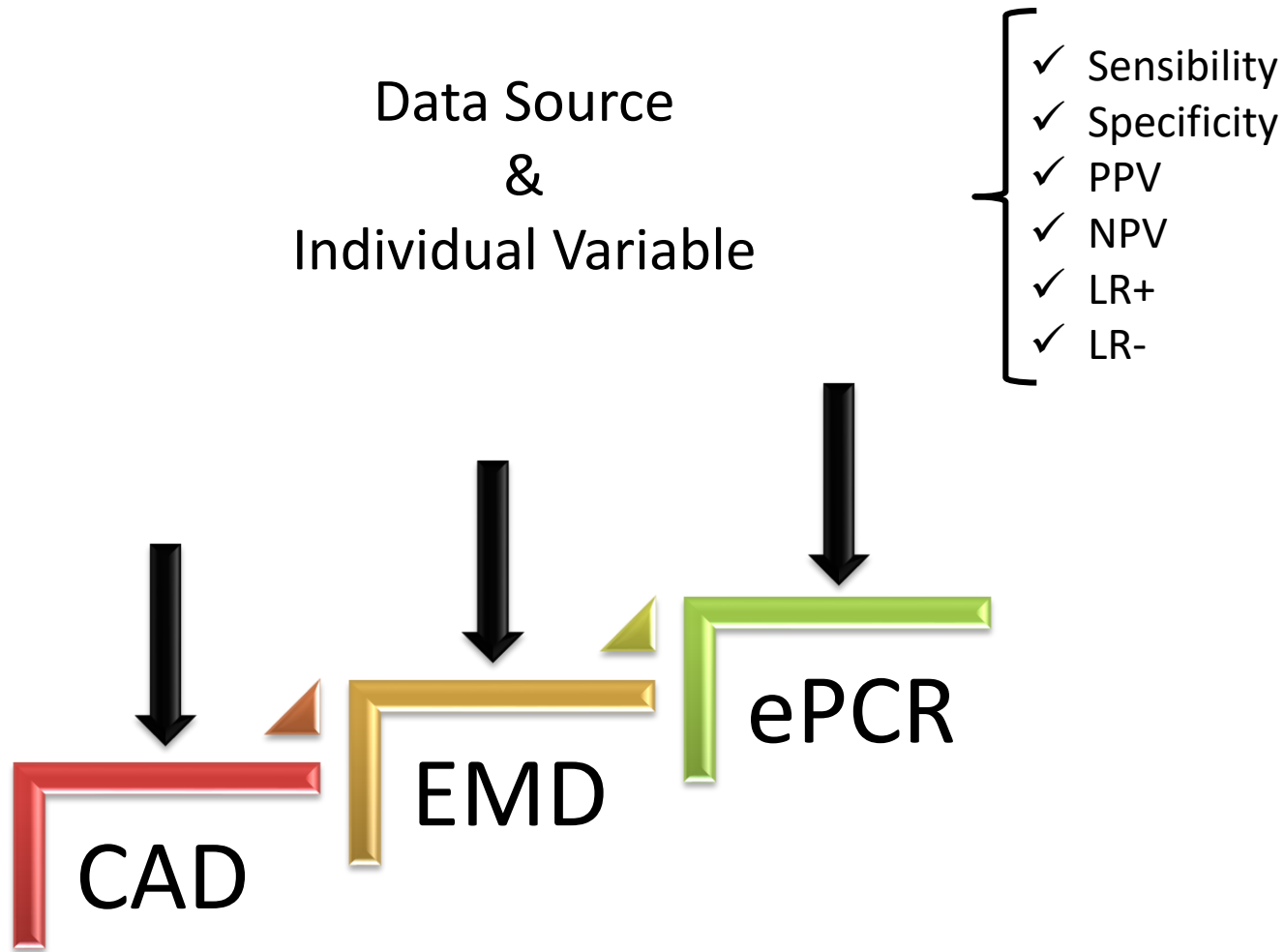
[Result](#) table from poster “Identification of Clinical Indicators of Opioid Overdose using innovative EMS software analytics”.

An Explanation.....

“Gold Standard”

- Filtered out non possible OD calls.
- Review 1 year data:
 - N= 29,559
 - Reviewed possible calls:
 - Improvement - 100%
 - Narcan Administration - 100%
 - Keywords - additional filtering criteria
- Clinical Review
- Additional random review of 200 calls

Future Steps.....



Information available at...

- Data Mining Information
 - www.firstwatch.net/finding-opioid-data
- EMS-Specific Opioid Resources
 - www.firstwatch.net/hi/opioids
- Can sign up for EMS-specific updates
 - www.firstwatch.net/hi

Our Contact Info

Todd Stout - Founder & President



Direct: 760-658-9842 Cell: 858-395-1728



tstout@firstwatch.net

Silvia R. Verdugo - Clinical Specialist



Direct: 760-658-9898 Cell: 619-343-0893



sverdugo@firstwatch.net

Mike Thompson - Technical Product Owner



Direct: 760-658-9828 Cell: 858-848-4747



mthompson@firstwatch.net