EMS Naloxone Administration for Implication of Opioid Overdose and Its Potential Disparities

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Outline

• Background
• Research Question
• Method
• Results
• Limitations
• Conclusion
Public Health Concern:
• Drug overdose deaths are a significant public health burden in the United States.
• In 2016, 42,249 deaths in the U.S. involved with opioids, and opioid overdose deaths were five times higher compared to 1999 (Centers for Disease Control and Prevention [CDC], 2017).
• In 2016, Florida had a higher age-adjusted fatality rate (23.73 per 100,000 population) compared to California, Texas, New York (11.15, 10.09, 17.86, respectively) (CDC WISQARS).
Naloxone (Narcan®):
• Medication to prevent and counter opioid overdoses (Substance Abuse and Mental Health Services Administration [SAMHSA], 2016)
• Route of administration: intranasal, intramuscular, subcutaneous, or intravenous (SAMHSA, 2016)
• Non-addictive (CDC, 2017; SAMHSA, 2016)
• How well does the Emergency Medical Services (EMS) naloxone administration data estimate opioid overdose incidence?
Method

• Data Sources:
  ▪ Emergency Medical Services Tracking and Reporting Systems (EMSTARS)
  ▪ Florida Agency for Health Care Administration (AHCA) emergency department and hospital inpatient data

• Case Definition:
  ▪ Hospital Data: Any diagnosis fields (965.00, 965.01, 965.02, 965.09) or any external cause of injury (E-Code) fields (E850.0, E850.1, E850.2)
  ▪ EMS Data: Administration of naloxone (MedicationGiven variable=4375)
Method (Continued)

• Data linkage with EMSTARS and AHCA data
  ▪ Years 2010-2014
Method (Continued)

EMSTARS Database

Emergency Department Data

Selected Naloxone Cases

Pre-Determined Matching Algorithm*

Inpatient Data

Linked Dataset

* Based on patient social security numbers (SSN) and dates of admission
Results - Linking Diagram

2010-2014 EMSTARS 10,777,040 records

Naloxone Administration 64,173 records

Emergency Department Data Matching Algorithm* Inpatient Data

Total Selected Cases: 35,939
35,358 (98%) indicated “treated and transported by EMS”

* 5,025,408 EMS records linked to hospital records from 2010 to 2014 (in general)
Results - Risk Factors and Modeling

- Risk Factors: Race/Ethnicity, Gender, Age, Urban/Rural Settings

- Chi-Square test was performed for all risk factors and results indicated all were correlated with the outcome—confirmed opioid overdose

- Stepwise Logistic Regression was conducted and results showed that all risk factors should remain in the model

- Among the “treated and transported” cases, 16.34% (5,778) were hospital-confirmed opioid overdose
Results by Race/Ethnicity, Gender, & Urban-Rural Classification

- Highest among Whites and those living in mostly urban settings

Percentage of Hospital-Confirmed Opioid Overdose

- White: 17.92%
- Black: 7.45%
- Hispanic: 12.87%
- Female: 16.74%
- Male: 15.93%
- Completely rural: 4.35%
- Mostly rural: 12.66%
- Mostly urban: 16.64%
Results by Age Group

• Highest among age group 18-45 years old

*Y/o indicates years old
### Results - Odds Ratio

#### Odds Ratio

<table>
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<tr>
<th>Race/Ethnicity</th>
<th>Adjusted OR</th>
<th>95% Confidence Interval</th>
<th>P-value</th>
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<tbody>
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<td>Black</td>
<td>0.351</td>
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<td>0.548 - 0.695</td>
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<tr>
<td>White</td>
<td>Ref</td>
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</table>

<table>
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<tr>
<th>Urban/Rural</th>
<th>Adjusted OR</th>
<th>95% Confidence Interval</th>
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<td>0.626 – 0.799</td>
<td>&lt;0.0001</td>
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<tr>
<td>Mostly Urban</td>
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</table>

All P-values are less than 0.05. Patients that are older than 75 years old were selected as reference group.

* y/o indicates years old
Limitations

• Low data linkage rate
  ▪ Potential undocumented groups who either do not have or refuse to provide a SSN

• Time constraints which prevent further in-depth analysis

• Multiple hospital drug overdose ICD case definition
  ▪ Principal diagnosis or first E-Code V.S. Any diagnosis/E-Code fields
• Limited information on validation and research of naloxone administration proxy indicator

• Utilized EMSTARS version 1.4 for data linkage
  ▪ EMSTARS version 3 in transition
Conclusions

• Better understanding on using EMS naloxone administration to estimate opioid overdose

• Address limitations in the use of this data linkage method

• Potential recommendations to enhance EMS data surveillance
  ▪ Expand case definitions criteria to capture more information
References


References (Continued)


References (Continued)

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• Division of Emergency Preparedness and Community Support
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Florida Agency for Health Care Administration
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Any Questions?