Naloxone Use by EMS Providers

Exploring Naloxone Uptake and Use

Food and Drug Administration

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Disclosures:

Nothing to Disclose

Note: The findings and conclusions in this article are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention or the Agency for Toxic Substances and Disease Registry.
Overall Goal of Session

- Participants will better understand the barriers of Naloxone administration in the EMS setting

- Background on Naloxone Use and EMS:
  - General Practice
  - Barriers to Administration
Naloxone Use and EMS

- Many Naloxone distribution programs exist.

- EMS use is unique:
  - EMS is part of the health care system
  - Governed by Scope of Practice Model Policy (NHTSA)
  - Also overseen by State and Local EMS Directors

- According to one study, Naloxone is the drug most commonly administered to adolescents in the prehospital setting (Seidel JS. Emergency medical services and the adolescent patient. J Adolesc Health. 1991;12(2):95---100).

- Research Question: What were the barriers to Naloxone use among EMS providers
Disparity in Naloxone Administration by Emergency Medical Service Providers and the Burden of Drug Overdose in US Rural Communities

Drug overdose is a major cause of injury-related death in the United States.\(^1\) In 2011, the number of deaths associated with opioid prescription pain relievers was 16,917,\(^2\) and an additional 43,977 deaths were heroin-related.\(^3\) In addition to death, the burden of lost productivity and medical costs associated with opioid-related poisoning is $20.4 billion annually (in 2009 dollars).\(^4\) The growing number of overdose deaths suggests that primary prevention efforts need to be strengthened and augmented. In an effort to reduce deaths through any means available, recent attention has focused on the ability of emergency medical services (EMS) providers to save lives at the scene of an opioid drug overdose.

In addition to life support measures to ensure adequate airway support, breathing, and circulation, many EMS providers are equipped with an opioid antagonist medication,

**Objectives.** We determined the factors that affect naloxone (Narcan) administration in drug overdoses, including the certification level of emergency medical technicians (EMTs).

**Methods.** In 2012, 42 states contributed all or a portion of their ambulatory data to the National Emergency Medical Services Information System. We used a logistic regression model to measure the association between naloxone administration and emergency medical services certification level, age, gender, geographic location, and patient primary symptom.

**Results.** The odds of naloxone administration were much higher among EMT-intermediates than among EMT-basics (adjusted odds ratio [AOR]=5.4; 95% confidence interval [CI]=4.5, 6.5). Naloxone use was higher in suburban areas than in urban areas (AOR=1.41; 95% CI=1.3, 1.5), followed by rural areas (AOR=1.23; 95% CI=1.1, 1.3). Although the odds of naloxone administration were 23% higher in rural areas than in urban areas, the opioid drug overdose rate is 45% higher in rural communities.

**Conclusions.** Naloxone is less often administered by EMT-basics, who are more common in rural areas. In most states, the scope-of-practice model prohibits naloxone administration by basic EMTs. Reducing this barrier could help prevent drug overdose death. (Am J Public Health. Published online ahead of print April 23, 2015: e1–e7. doi:10.2105/AJPH.2014.302520)
Data Source

Data Used:
- National EMS Information System: 2012
- 19.8 million records of EMS events
- Includes non injury
- Includes Inter-facility transfers
- 42 States participate
- 12 States give all data

Research Dataset:
- Most variables were publically available
- The National Highway Transportation Safety Administration granted Special Permission to use Level of Service Provider variable (EMT Basic, EMT Intermediate, EMT Paramedic, Nurse and Physician)
Emergency Medical Services

Levels of Certification:

- Basic EMT: ~ 80-120 hours of training, Basic Life Support, driving the ambulance
- Intermediate EMT: ~ 120-500 hours of training, Basic Life Support, basic medications, driving the ambulance
- Paramedic: 1200-1500 hours of training, Basic Life support, managing patient care. Trained in use of 30-40 different medications to keep patients breathing.
- Nurse: Professional certification (usually dispatched in air medical services)
- Physician: Professional certification (usually dispatched in air medical services)
Emergency Medical Services: Rural

Rural Paramedic Paradox*:

- The further one moves from an emergency medical facility
- The more one needs a higher level of local EMS capability
- And the less likely that that EMS capability will be available

Differences in Rural EMS:
  - Geography
  - Population density
  - Call volumes
  - Availability of training and education
  - Transport times

Rural Land Mass is 80% of the US
- Urban centers are served by 80% of the EMS population
- Only 20% of EMS workforce serves 80% of US land mass
Methods

Defining a Drug Overdose within NEMSIS:
- Dispatch Complaint labeled as “Ingestion/Poisoning” or “Drug Poisoning.”
- Injury “Ingestion/Poisoning” or “Drug Poisoning.”

Statistical Procedure:
- Logistic Regression
- Dependent Variable: Naloxone Administration (Yes or No)
- Independent Variables:
  - EMS Certification Level (EMT Basic, EMT Intermediate, EMT Paramedic, Nurse and Physician)
  - Age
  - Gender
  - Urbanicity
  - Primary symptom
### Results

Logistic Regression analysis factors that were associated with Naloxone administration among EMS Providers. National EMS Information System 2012 (read=262,676, used in model =217,333)

<table>
<thead>
<tr>
<th>Primary Symptom</th>
<th>Odds Ratio Estimate</th>
<th>Lower CI</th>
<th>Upper CI</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bleeding</td>
<td>0.700</td>
<td>0.297</td>
<td>1.384</td>
<td>0.356</td>
</tr>
<tr>
<td>Breathing Problem</td>
<td>20.128</td>
<td>16.934</td>
<td>24.013</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Change in responsiveness</td>
<td>13.703</td>
<td>11.898</td>
<td>15.880</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Choking</td>
<td>2.176</td>
<td>0.355</td>
<td>7.029</td>
<td>0.282</td>
</tr>
<tr>
<td>Death</td>
<td>23.344</td>
<td>17.861</td>
<td>30.408</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Device/Equipment Problem</td>
<td>&lt;0.001</td>
<td>.</td>
<td>7.964</td>
<td>0.968</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>&lt;0.001</td>
<td>.</td>
<td>1.068</td>
<td>0.915</td>
</tr>
<tr>
<td>Drainage/Discharge</td>
<td>&lt;0.001</td>
<td>.</td>
<td>5.647</td>
<td>0.954</td>
</tr>
<tr>
<td>Fever</td>
<td>5.046</td>
<td>1.939</td>
<td>10.815</td>
<td>0.000</td>
</tr>
<tr>
<td>Malaise</td>
<td>1.945</td>
<td>1.497</td>
<td>2.507</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Mass/Lesion</td>
<td>0.970</td>
<td>0.055</td>
<td>4.454</td>
<td>0.976</td>
</tr>
<tr>
<td>Mental/Psych</td>
<td>1.585</td>
<td>1.351</td>
<td>1.867</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Nausea/Vomiting</td>
<td>1.046</td>
<td>0.821</td>
<td>1.325</td>
<td>0.712</td>
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<tr>
<td>Pain</td>
<td>0.609</td>
<td>0.450</td>
<td>0.812</td>
<td>0.001</td>
</tr>
<tr>
<td>Palpitations</td>
<td>0.865</td>
<td>0.339</td>
<td>1.795</td>
<td>0.729</td>
</tr>
<tr>
<td>Rash/Itching</td>
<td>&lt;0.001</td>
<td>.</td>
<td>0.627</td>
<td>0.885</td>
</tr>
<tr>
<td>Swelling</td>
<td>0.776</td>
<td>0.128</td>
<td>2.456</td>
<td>0.723</td>
</tr>
<tr>
<td>Transport Only</td>
<td>0.446</td>
<td>0.211</td>
<td>0.822</td>
<td>0.019</td>
</tr>
<tr>
<td>Weakness</td>
<td>1.812</td>
<td>1.485</td>
<td>2.211</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Wound</td>
<td>0.492</td>
<td>0.081</td>
<td>1.550</td>
<td>0.320</td>
</tr>
</tbody>
</table>
## Results

Logistic Regression analysis factors that were associated with Naloxone administration among EMS Providers. National EMS Information System 2012 (read=262,676, used in model =217,333)

<table>
<thead>
<tr>
<th></th>
<th>Odds Ratio Estimate</th>
<th>Lower CI</th>
<th>Upper CI</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>0.919</td>
<td>0.885</td>
<td>0.954</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ages 0-19</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ages 20-29</td>
<td>2.512</td>
<td>2.335</td>
<td>2.706</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>ages 30-39</td>
<td>2.380</td>
<td>2.205</td>
<td>2.570</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>ages 40-49</td>
<td>2.008</td>
<td>1.859</td>
<td>2.170</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>ages 50-59</td>
<td>1.940</td>
<td>1.791</td>
<td>2.102</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>ages 60-99</td>
<td>1.830</td>
<td>1.669</td>
<td>2.005</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td><strong>Urbanicity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>1.225</td>
<td>1.153</td>
<td>1.302</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Suburban</td>
<td>1.410</td>
<td>1.321</td>
<td>1.505</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Wilderness</td>
<td>1.123</td>
<td>0.990</td>
<td>1.270</td>
<td>0.0679</td>
</tr>
<tr>
<td><strong>Level of Service</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMT-Basic</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMT-Intermediate</td>
<td>5.449</td>
<td>4.552</td>
<td>6.538</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>EMT-Paramedic</td>
<td>5.157</td>
<td>4.497</td>
<td>5.950</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Nurse</td>
<td>3.568</td>
<td>2.916</td>
<td>4.364</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Physician</td>
<td>3.158</td>
<td>2.183</td>
<td>4.463</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>
Opioid Overdose Mortality and Odds of Naloxone Administration by EMS within levels of Urbanicity
(rate source: Paulozi, 2008)
Policy Implications: How do we Save More Lives?

- NHTSA published “Scope of Practice Model” Guidance governing EMT Basic ability to administer medicine:

  Pharmacological Interventions
  - Assist patients in taking their own prescribed medications
  - Administration of the following over-the-counter medications with appropriate medical oversight:
    - Oral glucose for suspected hypoglycemia
    - Aspirin for chest pain of suspected ischemic origin

- Intranasal Naloxone is nearly as effective as intravenous Naloxone (Robertson 2009, Barton 2005, Merlin 2010).
Opportunities for Action: How do we Save More Lives?

- Rural Implications for Opioid Overdose:
  - EMTs-Basic are more common in rural areas.
  - Drug Overdose problem is higher in rural areas.
  - EMS service in rural areas is markedly different than urban areas, for a variety of reasons (e.g., geography, population density, call volumes, availability of training and education, transport times...)
  - Study suggests that rural communities suffer more from Naloxone restrictions.

- Manuscript provides support for the changing:
  - Changing the “Scope of Practice Model” (February 2007)
  - For States to develop policy/regulations/laws to allow intranasal naloxone use for EMTs Basic.
  - Additional training for EMTs Basic.
  - At the time of the study 12 States allowed, currently ~ 24 States now
Recommendations:
- More training for EMT Basics to get the additional certification.
- Concentrate training effort in rural communities.
Thank you!
Questions and Comments

For more information please contact Centers for Disease Control and Prevention

1600 Clifton Road NE, Atlanta, GA 30333
Telephone: 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
E-mail: cdcinfo@cdc.gov Web: http://www.cdc.gov

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