Calls to US Poison Centers Reporting Opioid Overdose Due to Intentional Abuse and Misuse Exposures

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No financial conflicts of interest to disclose.
Well, first....

Prescriptions on the rise

Nonmedical use on the rise

ED visits on the rise

Mortality on the rise
Prescription Opioid Variety

Hydrocodone
Oxycodone
Tramadol
Propoxyphene
Codeine

Oxymorphone
Methadone
Hydromorphone
Meperidine
Fentanyl
Morphine
Which opioids are most responsible?

Do those most implicated in deaths reflect availability?

Does potency matter?
Methods: Source Data

- **RADARS® System Poison Center Program**
  - Database of surveillance information
  - 48 regional US Poison Centers in 46 states covering 93% of total US population.
  - 2.3 million exposure cases per year.

- **IMS Health**: National prescription rates
  - Amount of drug dispensed
Methods: Study Criteria

- **54 Months**, Jan 2010 – Jun 2014

- Poison Center cases of opioid exposure
  - Oxycodone, hydrocodone, morphine, hydromorphone, oxymorphone, & tramadol

- **Exclusion criteria:**
  - Non-Tablet form
    - E.g. **Fentanyl**: parenteral route of administration
  - Multiple product exposures
Methods: Primary Outcome

- **Death or Major Medical Effect***

  *Categorized according to American Association of Poison Control Centers (AAPCC)*

  **Life-threatening or significant disability or disfigurement**

  **Examples:** Repeated seizures, respiratory compromise requiring intubation, V-Tach with hypotension, cardiac or respiratory arrest, esophageal stricture, & DIC...
Results: 11,380 cases

<table>
<thead>
<tr>
<th>Rank Order</th>
<th>Opioid Drug</th>
<th>Rate of Death or Major Medical Effect per 100,000 Grams</th>
<th>MME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hydromorphone</td>
<td>5.99</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Oxymorphone</td>
<td>5.73</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Hydrocodone</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Oxycodone</td>
<td>0.48</td>
<td>1.5</td>
</tr>
<tr>
<td>5</td>
<td>Morphine</td>
<td>0.21</td>
<td>0.1</td>
</tr>
<tr>
<td>6</td>
<td>Tramadol</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1.7 deaths or Major Medical Effect
## Results: NNH

- Number of Grams dispensed to cause one Death or Major Medical Effect

<table>
<thead>
<tr>
<th>Opioid Drug</th>
<th>Number of Grams Dispensed to Cause one Death or Major Medical Effect (NNH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydromorphone</td>
<td>16,686</td>
</tr>
<tr>
<td>Oxymorphone</td>
<td>17,450</td>
</tr>
<tr>
<td>Hydrocodone</td>
<td>44,506</td>
</tr>
<tr>
<td>Oxycodone</td>
<td>71,719</td>
</tr>
<tr>
<td>Morphine</td>
<td>208,398</td>
</tr>
<tr>
<td>Tramadol</td>
<td>486,700</td>
</tr>
</tbody>
</table>
Death and Major Medical Effect occur at vastly different rates among opioid analgesics.

More drug $\rightarrow$ More outcomes…
…at greater rates with more potent opioids.

- Death and Major Medical Effect occur at vastly different rates among opioid analgesics.
- Potency demonstrates a highly positive linear relationship with Death and Major Medical Effect.
For every 1 death there are...

- 10 treatment admissions for abuse
- 32 emergency dept visits for misuse or abuse
- 130 people who abuse or are dependent
- 825 nonmedical users
Limitations

- RADARS System database includes **reported cases**
  - Representing only a fraction of total exposures

- **Single-substance cases** reflect the majority (89%) of all exposures captured by RADARS®
  - Only 42% of fatalities are due to single-substance exposures
References

- Substance Abuse and Mental Health Services Administration. Results from the 2010 National Survey on Drug Use and Health: volume 1: summary of national findings. Rockville, MD: Substance Abuse and Mental Health Services Administration, Office of Applied Studies; 2011.

Acknowledgements

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Dispensing Denominators
- # units (grams) dispensed
- # prescriptions
- # pills dispensed
- # individuals filling prescriptions