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Opioid Use Disorder at Delivery Hospitalization in Maine: Prevalence and characteristics (2009-2017)

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Introduction
A recent multistate analysis found Maine had the second highest average annual increase in opioid use disorder at delivery hospitalization since 1999, with 34.1 per 1,000 deliveries with opioid use disorder in 2012.

Purpose
To estimate the prevalence, characteristics, and geographic distribution of delivery hospitalizations with opioid use disorder (OUD) among women delivering in Maine using more recent state-level data.

Methods
- Categorized deliveries according to prevalence of OUD and other substance use, mental health diagnoses, and medical conditions - according to maternal characteristics and geographic distribution.
- Because our analysis spanned the transition from ICD-9 to ICD-10 (October 1st, 2015), we used codes from both revisions in this analysis.
- Ran log-binomial regressions to assess the trends in prevalence of OUD at delivery hospitalization over the study period.
- Calculated prevalence ratios (PR) and 95% confidence intervals (CI) for the co-occurrence of other substance use disorders, mental health diagnoses and medical conditions among women with OUD as compared with women without OUD.
- Examined trends in prevalence of OUD at delivery hospitalization by county over time, comparing deliveries by rural-urban designation of county.

Results

<table>
<thead>
<tr>
<th>Period</th>
<th>Delivery Hospitalizations</th>
<th>Prevalence of OUD</th>
<th>Average Annual Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009-2011</td>
<td>109,044</td>
<td>26.8 (95% CI: 23.5, 29.8)</td>
<td>5.8% (95% CI: 4.5%, 7.2%)</td>
</tr>
<tr>
<td>2012-2014</td>
<td>181,400</td>
<td>29.3 (95% CI: 26.8, 31.8)</td>
<td>8.1% (95% CI: 6.4%, 9.7%)</td>
</tr>
<tr>
<td>2015-2017</td>
<td>228,000</td>
<td>31.6 (95% CI: 29.1, 34.1)</td>
<td>9.8% (95% CI: 8.1%, 11.4%)</td>
</tr>
</tbody>
</table>

- 4 out of 5 of the counties with the highest rates of opioid use disorder at delivery (>50 per 1,000 deliveries) during the 2015 - 2017 period were rural counties: Knox, Piscataquis, Somerset, Waldo.
- Penobscot was the only urban county (containing the metropolitan area of Bangor) with a prevalence of OUD at delivery >=50 per 1,000 during the study period.

Figure 2. Prevalence of opioid use disorder among delivery hospitalizations in Maine (n=109,044)

Conclusions
- Opioid use disorder among deliveries in Maine has increased since 2009, accounting for 1 out of every 30 deliveries in 2017.
- Women with OUD at delivery were more likely to experience mental health disorders, other substance use, and complications of their substance use than women without OUD.
- The majority of counties with the highest rates of OUD at delivery (5 to >7%) are rural counties in midcoast, central and northern Maine.

Limitations
- ICD-9 to ICD-10 change at the 3rd quarter of 2015.
- Relies on the accuracy of the coding practices of medical coders at the inpatient facilities in Maine.
- Unable to confirm the presence of the diagnoses and procedures examined in this study with chart review.

Implications
Continued prevention and treatment of OUD among reproductive age women, particularly in rural areas of Maine, is needed.

Further examination of OUD at delivery hospitalization in Maine using linked maternal and infant data is needed to inform policy decisions and services provided to women with OUD during pregnancy.

Table 1. Selected maternal conditions among delivery hospitalizations in Maine, 2009-2017

<table>
<thead>
<tr>
<th>Condition</th>
<th>Deliveries among Women with Opioid Use Disorder</th>
<th>Deliveries among Women without Opioid Use Disorder</th>
<th>PR</th>
<th>95% CI</th>
<th>p-value *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>181 (5.1)</td>
<td>1,959 (1.9)</td>
<td>2.7</td>
<td>(2.3, 3.1)</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Major Depression</td>
<td>140 (4.0)</td>
<td>1,486 (1.4)</td>
<td>2.9</td>
<td>(2.4, 3.4)</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Alcohol abuse or dependence</td>
<td>30 (0.9)</td>
<td>92 (0.9)</td>
<td>8.8</td>
<td>(6.5, 14.7)</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Other drug abuse or dependence</td>
<td>93 (2.6)</td>
<td>171 (2.0)</td>
<td>6.3</td>
<td>(4.8, 8.4)</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Cannabis use</td>
<td>208 (5.9)</td>
<td>1,132 (1.1)</td>
<td>5.5</td>
<td>(4.8, 6.4)</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Nicotine use</td>
<td>2,356 (64.0)</td>
<td>11,277 (10.7)</td>
<td>10.7</td>
<td>(9.5, 12.0)</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Hepatitis C</td>
<td>268 (7.6)</td>
<td>228 (2.0)</td>
<td>13.2</td>
<td>(9.6, 17.2)</td>
<td>&lt;.01</td>
</tr>
</tbody>
</table>

*All analyses were performed using Stata version 14.2 (StataCorp, College Station, TX) between December 2016 and April 2017.

Data Source
Maine hospital discharge data provided by the Maine Health Data Organization, a state agency that maintains a comprehensive health information database for every hospital (linked to encounter in the data).

Reference:

Abbreviations: PR, Prevalence ratio; CI, Confidence interval.
* p-values comparing deliveries of women with opioid use disorder to deliveries of women without opioid use disorder.
+ Non-opioid and non-alcohol abuse or dependence.