Effects of introducing an administrative .05% blood alcohol concentration limit on alcohol-related collisions in Canada

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Alcohol-related collisions and drunk-driving

- In 2010, 2,541 persons died in a motor vehicle crash and 11,338 were seriously injured

- Alcohol was respectively involved in 38.7 and 18.9 % of these crashes

- In 2012, 17.3% of Canadian drove after consuming any amount of alcohol in the past 30 days

- 3.6% drove when they thought to be over the legal limit
Lowering the BAC limit to prevent drunk-driving

- All States have adopted a .08% legal BAC limit

- Several other countries have a .05% or lower legal BAC limit

- Lowering the BAC limit appears to be an effective measure to prevent alcohol-related collisions
  - Affects drivers of all drinking levels
  - Effects are proportional to checkpoints
Is Canada lagging behind other countries?

- .08% BAC limit in the Criminal Code

- Except for Quebec, all provinces have a .05% or lower administrative BAC limit.

- Administrative laws ≠ offense

- Criminal laws = more serious
Deterrence theory and BAC laws

- Deterrence theory
  - Certainty
  - Severity
  - Celerity

Specific deterrence
- Personal experience
  - Recidivism

General deterrence
- Vicarious experience
  - Prevention
Few evidence on the effect of administrative laws

- Most studies assessed criminal laws

- Australian laws are more severe than Canadian ones

- One Canadian evaluation: 12-hour licence suspension in Ontario (Vingilis et al., 1988)

- Limited potential for generalization
Study’s objectives

• Estimate the effect of administrative BAC laws on alcohol-related collisions in Canada

• Estimate the effect of administrative BAC laws on enforcement activities
Methodology: date sources

- Data extracted from Traffic Injury Prevention Reports on the alcohol-crash problem

- Catalogues from Statistics Canada

- Longitudinal data: 10 Provinces x 24 years (1987-2010)
Methodology: Variables under study

Alcohol-related collisions:
• Fatally-injured drivers with BAC of .05% or more
• Fatally-injured drivers with BAC of .08% or more
• Fatally-injured drivers with BAC of .15% or more

Law enforcement variables:
• Impaired driving incidents reported by police officers
• Rate of impaired driving incidents reported by police officers per 100,000 population
• Ratio between impaired driving incidents and persons charged
Methodology: analytical strategy

- Linear regression models for correlated longitudinal data
- Main independent variables (effects) considered:
  - Introduction & presence of .05% or lower administrative BAC limit in the study period (1987 – 2010)
  - Provinces
  - Year (linear yearly trend)
  - Beer consumption
  - Unemployment rate
  - % of young drivers (16 to 24 years old)
  - Incarceration rate per 100,000 population
  - Number of police officers per 100,000 population
Results: trends in the % of fatally injured drivers

Figure 1. Percentage of fatally injured drivers with an illegal BAC
Results: Effects of administrative BAC laws on the percentage of fatally-injured drivers with positive BACs

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>BAC ≥ .05%</th>
<th>90% CI</th>
<th>BAC &gt; .08%</th>
<th>90% CI</th>
<th>BAC &gt; .15%</th>
<th>90% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>.05% BAC law</td>
<td>-3.67</td>
<td>(-6.84; -0.51)</td>
<td>-3.12</td>
<td>(-6.27; 0.02)</td>
<td>-3.00</td>
<td>(-5.80; -0.19)</td>
</tr>
<tr>
<td>Yearly trend</td>
<td>-0.32</td>
<td>(-0.49; -0.16)</td>
<td>-0.29</td>
<td>(-0.46; -0.13)</td>
<td>-0.29</td>
<td>(-0.43; -0.14)</td>
</tr>
<tr>
<td>Beer cons.</td>
<td>0.33</td>
<td>(0.17; 0.49)</td>
<td>0.31</td>
<td>(0.15; 0.46)</td>
<td>0.22</td>
<td>(0.08; 0.36)</td>
</tr>
</tbody>
</table>

Note: Dummy variables for provinces were included as fixed factors.
Results: Effects of administrative BAC laws on the percentage of fatally-injured drivers with positive BACs, continued

<table>
<thead>
<tr>
<th>Provinces</th>
<th>BAC ≥ .05%</th>
<th>BAC &gt; .08%</th>
<th>BAC &gt; .15%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saskatchewan</td>
<td>-7.44</td>
<td>-7.91</td>
<td>-14.14</td>
</tr>
<tr>
<td>Manitoba</td>
<td>-7.63</td>
<td>--8.11</td>
<td>-15.63</td>
</tr>
<tr>
<td>Ontario</td>
<td>-11.46</td>
<td>-13.17</td>
<td>-42.65</td>
</tr>
<tr>
<td>Nova Scotia</td>
<td>-7.70</td>
<td>-8.15</td>
<td>-16.01</td>
</tr>
<tr>
<td>Prince-Eduard-Island</td>
<td>-7.75</td>
<td>-7.89</td>
<td>--15.15</td>
</tr>
<tr>
<td>Newfoundland</td>
<td>-7.49</td>
<td>-7.92</td>
<td>-15.30</td>
</tr>
</tbody>
</table>
## Results: Effects of administrative BAC laws on enforcement activities

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>DWI incidents</th>
<th>DWI incidents per 100,000 population</th>
<th>DWI incidents : persons charged (ratio)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAC law</td>
<td>1991 (995; 2986)</td>
<td>-56.5 (-96.6; -16.5)</td>
<td>0.31 (0.24; 0.38)</td>
</tr>
<tr>
<td>Trend</td>
<td>-546 (-618; -474)</td>
<td>-21.5 (-24.6; -18.3)</td>
<td>0.009 (0.005; 0.013)</td>
</tr>
<tr>
<td>Beer cons.</td>
<td>---</td>
<td>-3.70 (-6.24; -1.16)</td>
<td>0.013 (0.009; 0.018)</td>
</tr>
<tr>
<td>Unemp. rate</td>
<td>-284 (-503; -65)</td>
<td>-14.9 (-25.2; -4.63)</td>
<td>---</td>
</tr>
<tr>
<td>% young drivers</td>
<td>-441 (-814; -67)</td>
<td>---</td>
<td>-0.07 (-0.10; -0.04)</td>
</tr>
<tr>
<td>Incarceration rate</td>
<td>---</td>
<td>1.60 (0.78; 2.43)</td>
<td>-0.002 (-0.004; -0.001)</td>
</tr>
<tr>
<td>Police officers per 100,000</td>
<td>229 (194; 264)</td>
<td>6.83 (5.19; 8.47)</td>
<td>-0.005 (-0.007; -0.002)</td>
</tr>
</tbody>
</table>
Discussion

- Administrative BAC laws are effective
- Decreases in all drinking levels
- Decreases comparable to those observed in other jurisdictions
- Decreases in the DWI rate and in the ratio of persons charged for DWI ≠ less safety
- Certainty and celerity are important features of a deterrence-based policy
Conclusion: what’s next

- Enforcement of administrative provisions

- Long-term effects and functional form of relationships: accident modification function?

- How administrative BAC laws affect the decision making process of drivers?