Evaluation of the effectiveness of low blood alcohol concentration laws for younger drivers

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Authors' objectives
To determine whether low blood alcohol concentration (BAC) laws among younger drivers reduce motor vehicle injuries.

Searching

Study selection
Study designs of evaluations included in the review
Studies included were all ecological designs: interrupted time series and pre-post studies.

Specific interventions included in the review
Laws limiting the blood alcohol concentration (BAC) permitted in younger drivers. In Australia, these laws limited the BAC permitted in all first year drivers, most of whom were 20 years of age or younger. In the US, these laws generally limited the BAC permitted among drivers 20 years of age or younger.

Participants included in the review
Younger drivers subject to relevant laws.

Outcomes assessed in the review
Changes in rates of all motor vehicle crashes, crashes involving injury, and fatal crashes.

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the authors performed the selection.

Assessment of study quality
Methodological quality criteria for ecologic studies:

1. Whether ascertainment of exposure was the same for all members of the population.
2. Whether ascertainment of outcome was objective and the same for all members of the population.
3. Whether ascertainment of potential confounders was the same for all members of the population.
4. Whether the study measured variables most likely to confound the association of interest.

The authors do not state how the papers were assessed for quality, or how many of the authors performed the quality assessment.

Data extraction
The authors do not state how the data were extracted for the review, or how many of the authors performed the data
Methods of synthesis
How were the studies combined?
Non-quantitative overview.
How were differences between studies investigated?
Narrative description.

Results of the review
Two interrupted time series studies and 4 pre/post studies.

Included studies were heterogeneous in terms of types of interventions, participants and outcome measures. However, all 6 studies showed a reduction in injuries or crashes after the implementation of the law, although, for 3 studies, these reductions were not statistically significant. The study with the smallest reduction in injuries had a power of 70% to detect a 10% decline in serious injuries. Reductions in outcome in the other studies ranged from 11% to 33% with a cluster of parameter estimates just under 20%. One study evaluated laws with different levels of BAC and found a dose-response effect. The greatest reduction (22%) was reported for night-time, single vehicle fatalities in those states with zero BAC laws. In states with 0.02% BAC laws, the reduction average 17% and in states with 0.04 to 0.06% BAC laws, the reduction was 7%.

Authors' conclusions
Despite some methodological difficulties, the 6 ecologic studies reviewed represent accumulating evidence in support of the effectiveness of low BAC laws. The sum of the evidence is strengthened because similar results were found in different countries, using different outcome variables, and using different research methodologies. In addition, the largest US study found that laws with lower BAC limits resulted in greater casualty reduction, analogous to a dose response effect.

CRD commentary
The review methodology is rigorous. The review question was well defined. The literature search was comprehensive and inclusion criteria were described. The details of the primary studies were presented. The quality of the studies was assessed. Because there was no controlled studies, the review included only before-after ecologic studies. Authors discussed some potential biases. Particularly, possible bias due to the use of historical control cannot be ignored. In addition, publication bias may also be a problem. Review's conclusion is based on the available research evidence.

Implications of the review for practice and research
The authors suggested that additional evaluations of these laws may help to address the possibility of historical bias. Future research should also address the enforcement of zero tolerance laws, and studies should look at process measures such as arrest and conviction rates as well as at outcome measures.

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.