The Effectiveness of Reducing Illegal BAC Limits for Driving: Evidence for Lowering the Limit to .05 BAC in Canada

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Background
The international trend of lowering BAC limits has been continuing for some time now, with most industrialized nations of the world reducing their illegal limit to a BAC of .05 or lower. The illegal limit is .05 BAC in Australia, Austria, Belgium, Bulgaria, Croatia, Denmark, Finland, France, Germany, Greece, Israel, Italy, the Netherlands, Portugal, South Africa, Spain, and Turkey. Norway, Russia, and Sweden have a limit of .02 BAC, and Poland recently adopted .03 BAC. Several countries have reported studies indicating that lowering the illegal per se limit from .08 to .05 BAC reduces alcohol-related fatalities (e.g., Australia,1 Austria,2 France,3 and the Netherlands4).

This trend has not developed in a vacuum; a myriad of studies have indicated that lowering illegal BAC limits is in the best interest of the public. For example, laboratory studies indicate that impairment in critical driving functions begins at low BACs.5 Most subjects in laboratory studies are significantly impaired at .05 BAC with regard to visual acuity, vigilance, drowsiness, psychomotor skills, and information processing, compared to their performance at .00 BAC.6 The relative risk of being involved in a fatal crash as a driver is 4 to 10 times greater for drivers with BACs between .05 and .07, compared to drivers with .00 BACs.7 A recent study by the National Highway Traffic Safety Administration (NHTSA) in the United States indicates that drivers at .05 BAC have a 38% higher relative risk of being involved in any crash than drivers at .00 BAC.8 Leading medical, crash prevention, public health, and traffic safety organizations in the world support BAC limits at .05 or lower, including the World Medical Association, the American and British Medical Associations, the European Commission, the European Transport Safety Council, the World Health Organization, and the American College of Emergency Physicians.9

Summary of the Evidence for Lowering the BAC Limit to .05 or Less
Several countries have conducted evaluations of lowering their illegal BAC limits to .05 or less. For example, a long-term study of the .05 BAC law in the Netherlands (adopted in 1974) concluded that it contributed to a sustained decline in the total number of drinking drivers involved in crashes.4 Another study from France evaluated the impact of lowering its BAC limit from .08 to .05 in 1996. Annual alcohol-related crash fatalities fell from approximately 100 before the legal change to 64 in 1997 in the province of Haute-Savoie, where the study was conducted.3 Sweden’s more recent lowering of their limit to .02 BAC also showed positive results. Although Sweden adopted a .05 BAC limit in the 1950s, the move to an even lower limit in 1990 further improved traffic safety. Norström and Laurell10 reported that in the 6 years following the introduction of the .02 BAC limit, there was a 9.7% reduction in fatal crashes, an 11% reduction in single-vehicle crashes, and a 7.5% reduction in all crashes. Norström and Laurell noted that the most significant effects occurred in fatal and single-vehicle crashes, the two categories in which alcohol is most likely to be involved. This suggests
that crash reductions cannot be attributed solely to existing trends but were caused, in part, by the lower BAC limit. These results were supported by another study that estimated that the .02 BAC limit resulted in an approximate 10% decrease in fatal crashes and a 12% decrease in severe personal injury crashes.11

In 1988, the illegal BAC limit was lowered from .08 to .05 in Austria. A recent study of the new law found that there was an overall 9.4% decrease in alcohol-related crashes relative to the total number of crashes.2 However, they noted that intense media and enforcement campaigns also occurred around the time that the limit was lowered, making it nearly impossible to attribute the reductions to any one of these factors, at least in the short term. Bartl and Esberger concluded that “lowering the [illegal BAC-limit from .08 to .05% in combination with intensive police enforcement and reporting in the media leads to a positive short-term effect.” This provides support for the view that a .05 BAC illegal limit, as part of a comprehensive approach to fighting impaired driving, can have beneficial effects.

Henstridge et al.1 conducted a rigorous time-series analysis of random breath testing (RBT) and .05 BAC laws in Australia, controlling for many factors that the TIRF report implied had not been considered. The Australia study controlled for seasonal effects, weather, economic trends, road use, alcohol consumption, and day of the week. Although the primary focus of the Australian study was the impact of RBT, the findings on the effect of .05 BAC laws were also significant. The study statistically accounted for the effect of other alcohol countermeasures to determine the specific values of the declines that were attributable directly to either RBT or the lower .05 BAC limit. The study analyzed traffic data for periods ranging from 13 to 17 years and found that those Australian states lowering their BAC limits from .08 to .05 experienced meaningful declines in alcohol-related crash measures. After Queensland, Australia, reduced its per se BAC limit to .05 in 1982, they experienced an 18% reduction in fatal collisions and a 14% reduction in serious collisions. These results were not confounded by the effects of RBT, as it was not introduced until 8 years later. Similarly, the .05 BAC limit in New South Wales was estimated to have reduced serious collisions by 7%, fatal collisions by 8%, and single-vehicle nighttime collisions by 11%. This translated into the averting of an estimated 605 serious, 75 fatal, and 296 single-vehicle nighttime collisions per year. Although the .05 BAC limit was introduced only 2 years before RBT in New South Wales, the authors accounted for this in their analyses and attempted to determine the crash reductions specifically attributable to each of the interventions.

Smith12 evaluated the effects of lowering the BAC limit in Queensland from .08 to .05 BAC. The proxy measure of changes in nighttime crashes as compared to daytime crashes was used. There was a significant 8.2% reduction in nighttime serious injury crashes (requiring hospitalization) and a 5.5% reduction in nighttime property damage crashes associated with the .05 BAC limit in the first year. The author attributes some of the crash reductions in the second and third years after the adoption of .05 BAC to, in part, increased enforcement. When lowering the illegal BAC limit results in increased enforcement, it should be considered a benefit of the law, not a drawback, as implied by Smith.

In South Australia, the illegal BAC limit was not lowered to .05 until 1991. Kloeden and McLean13 reported that the number of nighttime drivers who had been drinking was reduced by 14.1% following the adoption of the law. A second study of South Australia found that the .05 BAC limit did not significantly affect the number of fatally injured drivers who were legally impaired.14 However, it did find that the proportion of impaired drivers at BACs of .15 or greater declined from 1991 to 1993. This last finding supports other
Australian research indicating that the lower BAC limit has a substantial effect on drivers with BACs higher than .15. Given that drivers at high-BAC levels are at the greatest relative risk of being involved in a crash, such reductions would substantially affect the number of alcohol-related deaths and injuries in Canada. The Traffic Injury Research Foundation (TIRF) has estimated that drivers with BACs higher than .15 are 244 times more likely to be involved in a fatal crash than drivers with zero BACs. The recent study by Zador et al. found that male drivers aged 21 to 34 with BACs of .15 or higher are 573 times more likely to be killed in a single-vehicle crash than sober drivers of the same age. Thus, even though a .05 BAC limit would appear to be aimed at drivers with moderate BACs, its potential effect on the behavior of high-BAC drivers has very important traffic safety implications.

The evidence on .05 BAC limits indicates that if Canada adopts a Criminal Code .05 limit, and the new law is publicized and enforced, substantial reductions in crashes involving drinking drivers could be realized. Table 1 summarizes the research on lowering the BAC limit to .05.

Table 1. Studies of the Effects of Lowering the Illegal BAC Limit to .05

<table>
<thead>
<tr>
<th>STUDY</th>
<th>RESULTS</th>
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<td>Noordzij (1994)</td>
<td>Percent of drivers with BACs &gt; .05 from roadside surveys decreased from over 15% in the years prior to the .05 limit to 2% in the first year and then leveling off at 12% for 10 years after the law change.</td>
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<td>Mercier-Guyon (1998)</td>
<td>Alcohol-related traffic crash fatalities decreased from 100 prior to lowering the limit to 64 in 1997 right after the law change in the French Province where the study was conducted.</td>
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<tr>
<td>Bartl &amp; Esberger (2002)</td>
<td>Found 9.4% decrease in alcohol-related crashes. “Lowering the legal BAC-limit from .08% to .05% in combination with intense police enforcement and reporting in the media leads to a positive short-term effect.”</td>
</tr>
<tr>
<td>Henstridge, Homel &amp; Mackay (1977)</td>
<td>Queensland experienced an 18% reduction in fatal crashes and a 14% reduction in serious crashes associated with lowering the BAC limit to .05%. These results were not confounded with the effects of random breath testing. New South Wales showed an 8% reduction in fatal cases, a 7% reduction in serious crashes, and an 11% reduction in single-vehicle nighttime crashes associated with lowering the BAC limit to .05.</td>
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<tr>
<td>Smith (1996)</td>
<td>Significant 8.2% reduction in nighttime serious injury crashes and a 5.5% reduction in nighttime property damage crashes associated with lowering the limit from .08 to .05. Partly the result of increased enforcement.</td>
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Summary of the Literature on Impairment at .05 BAC

Howat, Sleet, and Smith (1991) conducted a review of the literature from experimental and laboratory research on the impairment effects at .05 BAC. Many of the studies reviewed showed statistically significant decrements in driving performance at .05 BAC or below. The authors concluded that young and inexperienced drinkers appeared to be at the greatest risk at .05 BAC. They recommended that setting a uniform .05 BAC statutory limit should be one measure in a comprehensive approach to reducing impaired driving
including other legal, social, behavioral, and environmental strategies to deal with the problem.

Moskowitz and Fiorentino\(^5\) reviewed 112 scientific articles regarding the effects of alcohol on driving related skills that were published between 1981 and 1997. They concluded that by .05 BAC the majority of experimental studies examined reported significant impairment. After testing 168 drivers, Moskowitz \textit{et al.}\(^6\) concluded that the majority of the driving population is impaired in some important measures at BACs as low as .02 BAC.

The scientific evidence accumulated over the past 50 years indicates a direct relationship between rising BAC levels and the risk of being involved in a motor-vehicle crash, and documents that driving performance begins to deteriorate significantly at .05 BAC.\(^1\) Because alcohol has been shown to have a wide variation of effects from subject to subject, special attention needs to be given to the selection of a BAC level in which the vast majority of drinking drivers are likely to be affected. This level appears to be .05 BAC.

**Summary of the Literature on the Risk of a Crash at .05 BAC**

Two recent epidemiological studies\(^7\),\(^8\) of the relative risk of being involved in a crash at various positive BAC levels indicate that the risk of crashing is substantially higher at .05 BAC compared to drivers at .00 BAC. Zador \textit{et al.}\(^7\) estimate that the risk of being involved in a fatal crash for drivers at BACs as low as .02–.04 is anywhere from 2 times to 5 times higher than for drivers with BACs=.00, depending upon age and gender. That same study concluded that the risk of being killed as a driver in a single vehicle crash is 6 to 17 times greater for drivers at BACs between .05 and .07 compared to drivers with .00 BACs, and that the risk of just being involved as a driver in a fatal crash is 4 to 10 times greater at BACs between .05 and .07 than drivers with BACs=.00.

Compton \textit{et al.}\(^8\) estimated that the risk of being involved in any crash for drivers with BACs at .05 is 38\% higher than drivers with BACs=.00. At .06 BAC, that risk is 63\% higher, and at .07 BAC the risk is 109\% higher than drivers with BACs=.00.

**Conclusion**

When all of the international evidence on lowering BAC limits is assembled, reviewed, and summarized, it is concluded that Canada should strongly consider lowering the illegal (criminal) BAC limit to .05.

Mann, Macdonald, Stoduto, Bondy, & Shaikh\(^1\) reviewed all of the available scientific evidence in assessing the potential impact of lowering the BAC limit to .05 in Canada. They assessed research on the effects of alcohol on driving performance, epidemiological research on the risk of collision involvement at various BACs, research on the impact of lowering the BAC limit in other countries and jurisdictions, and other possible issues such as public acceptance, police discretion, and judicial outcomes. This very thoughtful and thorough review concluded that the potential impact of a .05 BAC in Canada could be a reduction in motor vehicle crash fatalities on the order of 6–18\%. This translates to 185 to 555 lives saved each year in Canada if .05 BAC Criminal Code is adopted.

More recently, Chamberlain and Solomon\(^9\) conducted an extensive review of all of the issues surrounding a .05 BAC criminal code limit for Canada. The review summarized the effects of low doses of alcohol on driving behavior, the relative risk of a crash at various BAC levels, the experience in other countries with lowering BAC limits, and answered criticisms of adopting a .05 BAC limit in Canada. This comprehensive review of the issues presents a compelling case for a .05 criminal BAC limit in Canada.
In general, the literature reveals that lowering the BAC illegal limit reduces drinking driver fatal crashes—whether it is from .10 BAC to .08 BAC or from .08 BAC to .05 BAC for adults, or from some higher BAC level to .02 BAC (or lower) for youth. The general public does not think people should drive after two or three drinks. This translates to .05 BAC for most people. Laboratory research shows that most people are significantly impaired with regard to critical driving tasks at .05 BAC. The overwhelming evidence from the scientific community supports the conclusion that lowering BAC limits is effective in reducing alcohol-related traffic fatalities.

References


13. Kloeden, C. N., & McLean, A. J. (1994). Late night drink driving in Adelaide two years after the introduction of the .05 limit. Adelaide, Australia: NHMRC Road Accident Research Unit.


