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# Zero blood alcohol concentration limits for drivers under 21: lessons from Canada

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## ABSTRACT

Graduated licensing programs (GLPs) that include zero or low blood alcohol concentration (BAC) restrictions have proven to be a popular and effective measure for improving traffic safety among young people. However, a major drawback of such programs, at least in Canada, is that the BAC restriction is lifted on completion of the GLP, which typically occurs around the age of 18 or 19. This corresponds to the legal drinking age in Canada, a time when alcohol consumption and rates of binge drinking increase. It is not surprising, then, that 18–20 year-old drivers are dramatically overrepresented in alcohol-related deaths and injuries. One way to address this problem is to raise the legal drinking age, as has occurred in the United States. In jurisdictions, like Canada, that are unlikely to raise the legal drinking age, other measures are necessary to separate drinking from driving among 18–20 year-olds. This article recommends that the zero BAC restrictions be extended beyond the completion of the GLP, until drivers reach the age of 21. The scientific evidence for such a measure is reviewed, and the growing government support for enacting such BAC limits in Canada is described.

Over the past two decades, graduated licensing programs (GLPs) have proven to be one of the most popular and effective measures for improving traffic safety among young people.<sup>1–4</sup> These programs typically include a requirement that affected drivers maintain a zero or low blood alcohol concentration (BAC) while driving, on the theory that beginning drivers are already disadvantaged by their lack of driving experience, and should not have their judgment further impaired by alcohol. These BAC restrictions have consistently been shown to reduce both self-reported driving after drinking<sup>5</sup> and alcohol-related crashes among youth.<sup>6–8</sup>

A major drawback of the current system, at least in Canada, is that the zero BAC restriction is usually lifted on completion of the GLP, which typically occurs around the age of 18 or 19. This corresponds to the legal drinking age in all of the provinces and territories, a period during which alcohol consumption and rates of binge drinking increase.<sup>9</sup> Moreover, this is precisely the age at which teenage drivers are currently most vulnerable to alcohol-related crash deaths and injuries. A 1999 Canadian study reported that 18–19 year-olds accounted for almost 74% of all alcohol-related crash deaths among teenage drivers.<sup>10</sup> It is dangerous to expose 18–20 year-olds to their first experiences of unrestricted driving at the same time as their first legal use of alcohol.

We suspect that the situation in Canada is not unique. It is not uncommon for the legal drinking

age and the driver licensing age to coincide, nor is it uncommon for this cohort of young people to routinely engage in hazardous drinking. Even in Europe, where liberal drinking laws are often thought to promote more responsible drinking among youth, there is evidence that young people drink to excess as much as or more than their American counterparts.<sup>11, 12</sup> It is not surprising, then, that young people in numerous jurisdictions are dramatically overrepresented in traffic fatalities, and have a higher relative risk of alcohol-related crashes.<sup>13</sup> While the following discussion describes the development of extended zero BAC limits in Canadian jurisdictions, it is relevant to other jurisdictions with similar political and cultural climates. In particular, jurisdictions in which the minimum legal drinking age is unlikely to be raised need to explore other means of separating drinking from driving among 18–20 year-old drivers.

## THE CURRENT SITUATION IN CANADA

### Driver licensing

In Canada, the provinces and territories have exclusive legislative jurisdiction over the licensing of drivers and vehicles.<sup>14</sup> As a result, there are a variety of systems in place across Canada's 10 provinces and three territories, and we can provide only a general written overview. Table 1 presents more detailed information.

As illustrated in table 1, a beginner's or learner's permit is typically available at the age of 15, 15½ or, mostly commonly, 16, on completion of a written test. In most provinces and territories, the driver then enters the first stage of a GLP, which requires him or her to be supervised at all times while driving. The remaining restrictions, such as passenger, high-speed roadway and nighttime driving limits, vary greatly across jurisdictions. However, all 12 provinces and territories with a formal GLP now require beginning drivers to maintain a zero BAC while driving. After a prescribed period of driving only when supervised, the driver may obtain an intermediate license or, in some jurisdictions, graduate to full licensure.

Most GLPs can be completed in 1½ to 2¾ years, so it is possible for young drivers to be fully licensed by about the age of 18. In most jurisdictions, the zero BAC restriction will then be lifted, and the driver will only be subject to the general BAC restrictions that apply to all older, more experienced drivers (a 0.08% limit for a federal *Criminal Code* impaired driving offence, and typically a 0.05% limit for a 24-hour provincial administrative license suspension). Unfortunately, as table 2 shows, young drivers, particularly males,

**Table 1** Provincial and territorial 0.00% blood alcohol concentration (BAC) limits and graduated licensing

Province/territory	Minimum driving age	Minimum length of stage 1	Minimum length of stage 2	Additional 0.00% BAC limit	Minimum age at which 0.00% BAC limit ends	Legal drinking age
Alberta	14	12 months	24 months	n/a	17	18
British Columbia	16	12 months (9 with driver ed.)	24 months	n/a	18 years 9 months	19
Manitoba	15.5*	9 months	15 months	36 months	20.5	18
New Brunswick	16	12 months (4 with driver ed.)	24 months minus no. of months in stage 1	n/a	18	19
Newfoundland and Labrador	16	12 months (8 with driver ed.)	12 months	n/a	17 years 8 months	19
Nova Scotia	16	6 months (3 with driver ed.)	24 months	n/a†	18 years 3 months	19
Northwest Territories	15	12 months	12 months	n/a	17	19
Nunavut	15	No GLP, full license at 16 and no 0.00% BAC limit			n/a	15
Ontario	16	12 months (8 with driver ed.)	12 months	n/a	17 years 8 months	19
Prince Edward Island	16	12 months (9 with driver ed.)	12 months	12 months	18 years 9 months	19
Québec	16	12 months (8 with driver ed.)	24 months (or age 25)	n/a	18 years 8 months	18
Saskatchewan	15*	9 months	18 months (novice 1 plus novice 2)	n/a	17 years 3 months	19
Yukon	15	6 months and not before age 16	18 months	n/a	17.5	19

\*The minimum driving age for Manitoba and Saskatchewan applies to any driver who has enrolled in or completed an approved driver education program (driver ed.).

†Nova Scotia has enacted legislation which, when proclaimed in force, will increase the 0.00% BAC limit to a minimum of 4 years and 9 months for drivers who have successfully completed an approved driver education program.

GLP, graduated licensing program.

have a sharply rising relative risk of death starting at a BAC of 0.02%, one that far exceeds that of older drivers with comparable BACs. Thus, allowing young drivers to consume even moderate amounts of alcohol before driving significantly increases their crash risk.

### Alcohol consumption among youth

In 2005, the *Canadian Addiction Survey* (CAS)<sup>9</sup> provided a broad range of survey data on alcohol and drug consumption across the Canadian population. Among the most troubling findings was that, among current drinkers, 15–24 year-olds had the highest rates of consuming five or more drinks on a typical drinking day, and of weekly and monthly heavy drinking, in the past year (table 3). Moreover, within this high risk age group, 18–19 year-olds had the highest rates on all three measures.

The CAS statistics are similar to other survey data on binge drinking among Canadian youth.<sup>15</sup> A 2005 Ontario study found that 42% of grade 12 students reported binge drinking at least once in the past four weeks.<sup>16</sup> Similarly, while a 2004 national survey of Canadian undergraduate students found that they did not drink particularly frequently (1.3 times per week), they drank heavily per occasion (mean of 4.6 drinks at last drinking event).<sup>17</sup> Finally, Statistics Canada reported in 2003 that about 65% of 15–19 year-old current drinkers acknowledged binge drinking at least once in the past year, and almost 49% of these

binge drinkers reported doing so 12 or more times. The levels were even higher among 20–24 year-olds: about 76% acknowledged binge drinking at least once in the past year, and 56% of these reported doing so 12 or more times.<sup>18</sup> Moreover, binge drinking rates among Canadian youth appear to be increasing.<sup>19</sup> For example, a British Columbia study reported that, among high school students who drank, the rate of binge drinking had increased from 36% in 1992 to 44% in 1998.<sup>20</sup>

Even these disconcerting statistics may create a more positive impression than is warranted. For example, a 2005 British Columbia study noted that the CAS “greatly underestimated” alcohol use, in that total reported consumption in the CAS accounted for only 32–35% of known alcohol sales in Canada.<sup>21</sup> Moreover, another study noted that sales data fail to include alcohol from U-brews, U-vins, home production, lawful imports, and smuggling, and that, in Ontario, this unreported alcohol represents about 19.5% of total consumption.<sup>22</sup> Thus, the actual levels of binge drinking and alcohol-related harm among 16–24 year-olds may be far higher than the CAS, high school and campus surveys indicate.

These consumption patterns and the high BACs that they generate are associated with dramatically increased risks of traffic and other trauma deaths.<sup>23</sup> Although the number and percentage of alcohol-related traffic fatalities have fallen sharply in the last 25 years, at least 40% of crash deaths among 16–19

**Table 2** Relative risk of a fatal single-vehicle crash for males, at various blood alcohol concentrations (BACs)

Age (years)	BAC				
	0.02–0.049%	0.05–0.079%	0.08–0.099%	0.10–0.149%	0.15% +
16–20	5	17	52	241	15560
21–34	3	7	13	37	573
35+	3	6	11	29	382

Results expressed as relative risk as compared to drivers of the same age with 0.00% BAC.

Source: Zador *et al.*<sup>23</sup>

**Table 3** Consumption patterns among current drinkers: Canada, 2004

Age group (years)	≥5 Drinks on a typical drinking day (%)	Weekly heavy drinking*	Monthly heavy drinking*
15–17	28.8	7.6	35.7
18–19	42.5	16.1	51.8
20–24	31.6	14.9	47.0
25–34	22.0	6.5	30.4
35–44	14.0	5.3	24.2
45–54	13.2	6.0	22.0
All (15–75+)	16.0	6.2	25.5

\*Males consuming ≥5 drinks and females consuming ≥4 drinks on a single occasion. Source: Adlaf *et al.*<sup>9</sup>

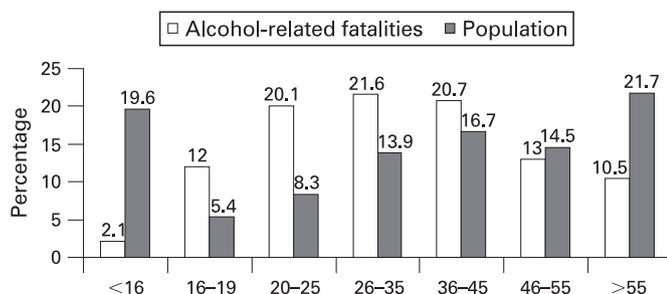
year-olds and 50% among 20–25 year-olds are still alcohol-related.<sup>24</sup> Moreover, as fig 1 illustrates, 16–25 year-olds are dramatically overrepresented on a per capita basis in alcohol-related crash deaths. This is due, in no small part, to the combination of their driving inexperience and their dangerous patterns of alcohol consumption. Thus, any efforts to reduce crash risk among Canadian youth must address their drinking patterns or, at the very least, attempt to separate drinking from driving.

## ADDRESSING THE YOUTH ALCOHOL CRASH PROBLEM

### Raising the minimum drinking age

One way to address the youth alcohol crash problem is to raise the minimum legal drinking age. There is very strong evidence, primarily from the United States, that higher minimum drinking ages significantly reduce alcohol consumption and related crashes. The Uniform Drinking Age Act,<sup>25</sup> which required all states to establish a minimum drinking age of 21 or forego federal highway funding, significantly reduced alcohol-related traffic crashes among the affected age group.<sup>26–28</sup> The reduction was attributable to the law's impact on reducing both teenage alcohol consumption and teenage drinking and driving.

In a comprehensive review of 241 studies published between 1960 and 1999,<sup>29</sup> the authors found that the minimum drinking age of 21 “appears to have been the most successful effort to date” to reduce teenage drinking, and that the “preponderance of evidence” indicates that it also reduced youth traffic crashes. The authors of another meta-analysis concluded that there is “strong evidence” (the highest level of confidence) that minimum drinking age laws, particularly those that set the age at 21, “are effective in preventing alcohol-related crashes and associated injuries”.<sup>6</sup> Indeed, the National Highway Traffic Safety Administration has estimated that between 1975 and 2005, the minimum drinking age laws cumulatively prevented over 24 560 traffic deaths among 18–20 year-olds.<sup>30</sup>



**Figure 1** Percentage of alcohol-related traffic deaths and population, by age group: Canada, 2003. Source: Solomon and Chamberlain.<sup>59</sup>

On the other hand, research indicates that a lower minimum drinking age leads to an earlier onset of drinking, which is associated with the subsequent development of a broad range of alcohol problems, including increased risk of impaired traffic crashes and other trauma.<sup>31–34</sup> This was confirmed by preliminary data from New Zealand, which lowered its minimum drinking age from 20 to 18 in 1999. The Alcohol Advisory Council of New Zealand estimated that this change resulted in an additional 16 deaths and 145 injuries per year among 18–19 year-olds alone.<sup>35</sup> Another New Zealand study reported that emergency room cases involving laboratory-confirmed intoxication among 18–19 year-olds increased by 54% in the 12 months following the lowering of the drinking age.<sup>36</sup> More recently, it was reported that 18–19 year-olds have experienced an increase in driving with excess alcohol, alcohol-related crashes, fatal alcohol-related crashes,<sup>37</sup> and alcohol-related driving prosecutions, since 1999.<sup>38</sup> The deleterious effects of the lower minimum age were evident in spite of a general downward trend in road crashes among young people.<sup>39</sup>

The Canadian Institute for Health Information found similar evidence of adverse effects when comparing rates of alcohol-related injuries across the provinces. In 2002–03, the rate of alcohol-related major injury among 18 year-olds was 9 per 100 000 in the jurisdictions with a legal drinking age of 19. In contrast, the rate of major injuries was 15 per 100 000 in the three provinces with a legal drinking age of 18 (Alberta, Manitoba and Québec).<sup>40</sup>

In some jurisdictions, particularly where alcohol is available for purchase at a range of private outlets, minimum drinking age laws are very unevenly or under-enforced,<sup>41</sup> and minors are often able to obtain alcohol.<sup>42</sup> The benefits of the laws, therefore, are not as substantial as they could be.<sup>43</sup> Nevertheless, even with less-than-optimal compliance rates, higher minimum drinking age laws have been very successful at reducing harmful drinking and traffic crashes among young people. They could be expected to be even more successful in jurisdictions like Canada, where the retail sale of alcohol occurs primarily through government monopoly stores, and where minimum purchase age laws are accordingly enforced more rigorously.<sup>44</sup>

Despite this evidence, proposals to raise the drinking age in Canada are likely to be met with considerable opposition. The alcohol industry and others have argued that raising the legal drinking age punishes “good” teenagers, increases the temptation to try alcohol given its status as a forbidden fruit, encourages teenagers to try other drugs, and is discriminatory.<sup>45</sup> While researchers have specifically addressed and dismissed these claims as being unsubstantiated,<sup>26 46</sup> there appears to be very little political support within the provinces and territories to raise the drinking age. Similarly, most European jurisdictions have even stronger traditions of legalized drinking by teenagers,<sup>47</sup> and proposals to raise the drinking age would likely receive short shrift. Thus, the problem of youth and alcohol-related crashes has to be addressed by other means.

### Extended zero BAC restrictions

Fortunately, many of the traffic safety benefits of a higher minimum drinking age can be achieved through zero BAC restrictions in GLPs, and particularly by extending the zero BAC restriction until drivers reach the age of 21. Given that the rates of alcohol-related crash death do not significantly decrease until after the age of 25,<sup>48</sup> it would be justifiable to extend the BAC restriction until at least the age of 21. Such a limit would help separate drinking from driving for a longer period of time, and

would encourage young drivers to make plans for alternative transportation if they plan on drinking. This should also help to instill the practice of separating drinking from driving as drivers enter adulthood.

Zero and low BAC restrictions have been shown to have very positive results.<sup>6 7 49</sup> During the 1980s, several American states introduced zero or low BAC limits for young drivers. According to a leading study, states that enacted such limits between 1983 and 1992 had a 16% decrease in the proportion of single-vehicle nighttime fatal crashes among affected drivers, while the proportion among this age group in the “control” states increased by 1%.<sup>7</sup> The authors estimated that, if the remaining 21 states had introduced a zero or low BAC limit for 15–20 year-old drivers during that timeframe, at least 375 fatal single-vehicle nighttime crashes would have been prevented each year among this constituency.<sup>7</sup> A meta-analysis of four American and two Australian studies on zero BAC restrictions reported that there was a post-law reduction in crashes in every single study, including reductions in fatal crashes ranging from 9% to 24%.<sup>6</sup>

Additional evidence that the traffic safety benefits of these so-called “zero tolerance” laws are not restricted to young beginning drivers comes from a more recent study. Oregon, which already had a zero BAC restriction on 16–17 year-old drivers, experienced a 40% reduction in single-vehicle nighttime crashes among affected drivers when it extended the zero BAC restriction to all drivers under 21.<sup>50</sup> This suggests that a zero BAC restriction can be effective among older teenagers.

The National Highway System Designation Act of 1995 required all states to enact a zero or 0.02% BAC limit for drivers under 21, or lose a portion of their federal highway funding.<sup>51</sup> As a result, by 1998, all states had enacted a zero tolerance law for drivers under 21. A recent review article concluded that “[z]ero tolerance laws definitely have reduced youth drinking and driving”.<sup>24</sup> The authors reasoned that affected drivers are heavily deterred from drinking and driving because they fear losing their driver’s licenses. Indeed, survey data from several states indicate that there is a high perceived rate of apprehension under the zero tolerance law,<sup>52</sup> and that binge drinkers with such apprehensions are less likely to drink and drive.<sup>8 53</sup> This has translated into reductions in alcohol-related crashes among young people. A comprehensive review covering 16 years of statistics from all 50 states and the District of Columbia found that the presence of a zero tolerance law reduced the odds of an alcohol-positive fatal crash by over 24% for drivers under 21.<sup>54</sup>

Evidence from Canada also demonstrates the traffic safety benefits of zero tolerance laws. For example, an early study of Ontario’s zero BAC restriction for beginning drivers found that there was a 25% reduction in the number of grade 11 and 12 males who reported driving after drinking.<sup>5</sup> A preliminary study of Québec’s GLP, which included a zero BAC restriction, attributed an 8.9% decrease in single-vehicle nighttime crashes to the GLP.<sup>55</sup> Given that such crashes are more likely to involve alcohol, and are often used as a surrogate measure for alcohol-related crashes, it is likely that the zero tolerance law contributed to the decrease.

Again, these reductions have occurred in spite of less-than-optimal enforcement. The process for identifying and substantiating violations, and the penalties for breaching zero tolerance laws, vary greatly among American states.<sup>56</sup> In some states, the excessive paperwork necessary to complete a zero tolerance citation serves as a disincentive to enforcement. Further, the absence of enforcement powers specific to the zero tolerance law may make it difficult for officers to identify violations.<sup>51</sup>

Nevertheless, as indicated, there was still a high perceived apprehension rate, and affected drivers were deterred from breaching the restriction. Thus, improved enforcement powers would only serve to enhance an already effective countermeasure.

The American evidence does suggest, however, that zero tolerance laws should be coupled with appropriate police enforcement powers. For example, enforcement of the zero tolerance law in New Zealand likely benefited from the introduction of compulsory breath testing and a requirement that drivers show their licenses to police officers on request.<sup>54</sup>

To the authors’ knowledge, there has not yet been a study that specifically examined the effects of a zero BAC limit that extended beyond the minimum drinking age in a given jurisdiction. However, as documented above, there is considerable evidence on the effectiveness of zero BAC restrictions within GLPs, and evidence indicating that additional traffic safety benefits occur when those BAC limits are extended to an older age group. Thus, there is every reason to believe that extending the zero BAC limit to Canadian drivers under 21 will have significant beneficial effects. As more provinces and territories move to enact such extended BAC limits, there will be an opportunity to assess their effects more directly.

### The progress of extended BAC laws in Canada

As indicated, the political climate in Canada makes it unlikely that the legal drinking age will be raised. However, the response to GLPs has been positive,<sup>57</sup> and nearly every jurisdiction has a GLP with a zero BAC restriction of some duration (table 1). Nevertheless, traffic crashes remain the leading cause of death for Canadians aged 15–24, and roughly 45% of these crashes are alcohol-related.<sup>58</sup> In response to these statistics and the growing body of research, extended zero BAC limits have become a priority recommendation by grassroots organizations like Mothers Against Drunk Driving Canada,<sup>59</sup> which regularly produces “report cards” to gauge the status of provincial and territorial traffic safety legislation.<sup>60–62</sup> As Voas has explained, nations with federal governments are particularly amenable to these types of ranking initiatives, because states and provinces vie to be the “toughest in the nation” on impaired driving.<sup>63</sup>

In May 2006, Manitoba became the first province to announce its intention to impose a zero BAC limit for the first five years of licensure. The limit, which came into force in December 2006,<sup>64</sup> requires all new drivers to maintain a zero BAC for the first five years of licensure. More recently, Nova Scotia enacted legislation that, when proclaimed in force, will also require new drivers to have a zero BAC during the first five years of licensure (4 years 9 months for those who take an approved driver education program).<sup>65</sup> Prince Edward Island has also expressed its intention to extend its zero BAC limit, indicating that there may now be a trend in this direction.

As a result of these efforts, zero BAC limits for drivers under 21 have gained more widespread support in Canada in 2007. The National Alcohol Strategy Working Group recommended the implementation of such BAC limits in its 2007 report, *Reducing alcohol-related harm in Canada: toward a culture of moderation*.<sup>66</sup> In addition, the Canadian Council of Motor Transport Administrators has established a subcommittee under the Strategy to Reduce Impaired Driving to examine the issue of extended zero BAC limits. These initiatives, among others, will likely keep extended zero BAC limits at the forefront of the national traffic safety agenda in the coming years.

## CONCLUSION

The Canadian experience demonstrates that creative solutions are required to help protect young drivers during a particularly vulnerable period. Canada provides a useful model for other jurisdictions which are committed to a young drinking age but are nevertheless concerned about hazardous drinking patterns and alcohol-related crash rates among youth and young adults. For example, since the New Zealand government has declined calls to reinstate the former drinking age, they may look to the Canadian model of extended zero BAC restrictions as an alternative means of reducing alcohol-related crashes among youth.<sup>67 68</sup>

When faced with the evidence on binge drinking by youth and on their dramatic overrepresentation in alcohol-related crashes, Canada's provincial and territorial governments have taken proactive steps by enacting GLPs and gradually extending their zero BAC limits. Although it will be several years before the effects of the Canadian extended zero BAC restrictions can be measured, the existing research indicates that they will help to protect young drivers and their passengers when they are most at risk.

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