

## The ABCs of BACs

### Drinking and Driving

“I’ve only had a few.” “I feel fine to drive.” “I’m only going down the road.” “I’ll take the back roads.”

These justifications may make sense to someone who is impaired, but the reality is very different and very dangerous. Every day in this country, 4 people are killed and 175 are injured in impaired driving crashes. How many of those impaired drivers used those excuses to justify getting behind the wheel impaired?

Alcohol affects judgment, hand-eye coordination, ability to focus, ability to see and think clearly, ability to recognize potentially dangerous or hazardous road conditions or situations. It impairs every skill you need to drive, not to mention your ability to judge just how impaired you actually are.

Drivers with even a little alcohol in their systems are more likely to be involved in a crash causing death than a sober driver.

Age is a factor too. Young drivers are at increased risks for a crash. A 35-year-old man driving with an alcohol limit of .08 and .099 is four times more likely to die in a crash than if they were sober, whereas a 19-year-old man driving with the same alcohol level is 20 times more likely to die in a crash. The higher risk of crash among young drinking drivers is the reason provinces and territories have .00% BAC requirements for young drivers until a certain age or until they have completed the province or territories’ graduated licencing program.

## What Is Blood Alcohol Concentration?

Your blood alcohol concentration, or BAC, is the amount of alcohol in your blood. For example, if a person's BAC is .05%, that means they have 50 milligrams of alcohol in 100 millilitres of blood. Each drink you have within a certain timeframe increases your BAC.

Alcohol moves through your bloodstream to your whole body. Your liver breaks down about 90% of the alcohol, with the remainder passing out of your body unchanged. This process takes about two hours for one standard drink. If you keep drinking during this time, the alcohol stays in your system until your liver is able to process it. So your BAC can rise quickly as you continue to drink. Your BAC will start to drop once you stop drinking, but it takes longer to fall than it does to rise.

## Understanding the Effects of Alcohol On Driving

Alcohol decreases a person's ability to drive a motor vehicle safely. The more you drink, the greater the effect. The amount of alcohol required to become impaired differs according to how fast you drink, your weight, your gender, and how much food you have in your stomach. Because of these variables, the safest choice is always not to drink and drive.

Blood Alcohol Concentration	Typical Effects	Predictable Effects on Driving
.02	<ul style="list-style-type: none"><li>• Some loss of judgment</li><li>• Relaxation</li><li>• Slight body warmth</li><li>• Altered mood</li></ul>	<ul style="list-style-type: none"><li>• Decline in visual functions (rapid tracking of a moving target)</li><li>• Decline in ability to perform two tasks at the same time (divided attention)</li></ul>
.05	<ul style="list-style-type: none"><li>• Exaggerated behavior</li><li>• May have loss of small- muscle control (e.g., focusing your eyes)</li><li>• Impaired judgment</li><li>• Usually good feeling</li><li>• Lowered alertness</li><li>• Release of inhibition</li></ul>	<ul style="list-style-type: none"><li>• Reduced coordination</li><li>• Reduced ability to track moving objects</li><li>• Difficulty steering</li><li>• Reduced response to emergency driving situations</li></ul>
.08	<ul style="list-style-type: none"><li>• Muscle coordination becomes poor (e.g., balance, speech, vision, reaction)</li></ul>	<ul style="list-style-type: none"><li>• Concentration</li><li>• Short-term memory loss</li></ul>

	<ul style="list-style-type: none"> <li>time, and hearing)</li> <li>• Harder to detect danger</li> <li>• Judgment, self-control, reasoning, and memory are impaired</li> </ul>	<ul style="list-style-type: none"> <li>• Speed control</li> <li>• Reduced information processing capability (e.g., signal detection, visual search)</li> <li>• Impaired perception</li> </ul>
.10	<ul style="list-style-type: none"> <li>• Clear deterioration of reaction time and control</li> <li>• Slurred speech, poor coordination, and slowed thinking</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced ability to maintain lane position and brake appropriately</li> </ul>
.15	<ul style="list-style-type: none"> <li>• Far less muscle control than normal</li> <li>• Vomiting may occur (unless this level is reached slowly or a person has developed a tolerance for alcohol)</li> <li>• Major loss of balance</li> </ul>	<ul style="list-style-type: none"> <li>• Substantial impairment in vehicle control, attention to driving task, and visual and auditory information processing</li> </ul>

*Information in this table shows the BAC level at which the effect usually is first observed, and has been gathered from a variety of sources including the National Highway Traffic Safety Administration, the National Institute on Alcohol Abuse and Alcoholism, the American Medical Association, the National Commission Against Drunk Driving, and www.webMD.com.*

## Legal BAC Limits

In Canada, the **Criminal Code BAC limit is .08%**.

It is important to realize, though, that even small amounts of alcohol can impair driving ability.

That is why just about every province and territory in Canada has **administrative laws for drivers whose BACs are .05% and over**. Drivers at these levels do not face criminal impaired driving charges, but they are subject to licence suspensions ranging from 24 hours to 7 days, depending on the province or territory. Provincial administrative licence suspension programs also include escalating suspensions for repeat infractions, vehicle impoundments, education and remedial program requirements and alcohol ignition interlocks.

*\*Note, Saskatchewan's administrative BAC limit is .04%.*

Mixing alcohol and driving is particularly dangerous for young people who lack both drinking and driving experience. Traffic crashes

are the single largest cause of death among 15 to 24 year olds and approximately 50% of these deaths are alcohol-related. Most provinces have a **.00% BAC requirement for young and novice drivers** until they reach a certain age or have completed the province or territories graduated licencing program.

## How Do Police Test For BACs?

Police use breathalyzer devices to measure the amount of alcohol in your breath. (As blood flows through the body, it releases alcohol into the lungs in proportion to its concentration in the blood.)

The roadside screening breathalyser police use rates your BAC in one of three categories: Pass (under .05%), Warn (.05% to .08%) or Fail (.08% and higher). Drivers in the warn range can face immediate roadside suspensions and other sanctions under the provincial/territorial administrative programs. Drivers in the fail range may be required to go to a police station to be tested on a more sophisticated breath testing device which provides an actual BAC level reading.

## Standard Drinks

When trying to estimate BACs, they are often calculated according to “standard” drinks or servings over a period of time. A “standard” drink or serving contains 13.5 grams of alcohol.

Wine, beer and spirits have different concentrations of alcohol. Most beers contain 5% alcohol; wines are about 12 to 13% alcohol; and spirits can be 40% alcohol or more. Alcohol concentrations can also vary among brands and types of drinks.

**The following is a guideline for how much beer, wine or spirits equal a standard drink:**

341 ml (12 oz.) bottle of beer →  
148 ml (5 oz.) glass of wine → = 13.5 grams of alcohol  
44 ml (1.5 oz.) shot of spirits →

**Note:** Larger servings of alcohol or products with high alcohol content will exceed the 13.5 grams. For example, a large wine glass will hold more than the standard amount of alcohol, as does a pint of beer versus a bottle. Likewise, a beer with a higher-than-average alcohol content will exceed the standard drink definition.

## **Factors That Affect BACs**

A number of factors affect how quickly your BAC rises and drops. Body type, weight and food intake at the time of drinking can all impact your BAC.

Body type, for example, affects the amount of blood you have. If you are lighter, you have less blood and your BAC will be higher than a heavier person who drinks the same amount. Also, muscle tissue contains more blood while fatty tissue contains more water. So if you have a lot of body fat and you drink as much alcohol as someone of the same sex who is muscular, your BAC will be higher. There is less blood for the alcohol to mix with so the ratio of alcohol to blood is higher.

Since women tend to be smaller than men and have more fatty tissue, a woman who drinks as much alcohol as a man usually has a higher BAC.

## **Myths About Sobering Up**

There are as many myths about how to sober up quickly as there are drinks to choose from. Think you can sober up more quickly by drinking coffee or water, jogging, taking a shower, or taking a nap? Think again!

**The only thing that will sober you up and lower your BAC limit is time.**

If you are over the legal limit, it will take about six hours for your body to get rid of all the alcohol.

## Calculating Your BAC

Some people think if they only have a drink an hour, they'll stay under the legal limit. This only works for a couple of hours. After that, the alcohol is simply building up in your system and your BAC will continue to rise with each drink.

The following charts provides a general idea of how many drinks it takes to get to the .05% and .08% BAC levels, based on weight, standard drinks and a metabolism rate of a .015% decrease in BAC per hour.

But remember, alcohol affects everyone differently and there are many factors that contribute to your BAC level.

Also remember, no chart or BAC estimate will take the place of a police breathalyser. If you think you're near the .05% limit, don't drive. If you're pulled over and caught at .05% or over, the breathalyser results will always trump any informal BAC calculations you do online, at a bar or even with a personal breathalyser device.

For the vast majority of people drinking socially – having a glass of wine or two with dinner or a beer or two after work – you will not reach the .05% level. If you are going to be drinking more than that, plan alternate transportation home. The safest way, as always, is to separate drinking from driving entirely.

## BACs (%) for Males in Relation to Time, Weight<sup>1</sup> and Standard Canadian Drinks<sup>2</sup>

Standard Drinks <sup>3</sup>	2 hours						3 hours						4 hours					
	165 lbs.	180 lbs.	195 lbs.	210 lbs.	225 lbs.	240 lbs.	165 lbs.	180 lbs.	195 lbs.	210 lbs.	225 lbs.	240 lbs.	165 lbs.	180 lbs.	195 lbs.	210 lbs.	225 lbs.	240 lbs.
2	.020	.016	.012	.009	.007	.004	.005	.001	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
3	.045	.039	.034	.029	.025	.022	.030	.024	.019	.014	.010	.007	.015	.009	.004	.000	.000	.000
4	.070	.062	.055	.049	.043	.039	.055	.047	.040	.034	.028	.024	.040	.032	.025	.019	.013	.009
5	.095	.085	.076	.068	.062	.056	.080	.070	.061	.053	.047	.041	.065	.055	.046	.038	.032	.026
6	.120	.108	.097	.088	.080	.073	.105	.093	.082	.073	.065	.058	.090	.078	.067	.058	.050	.043
7	.145	.130	.118	.108	.098	.090	.130	.115	.103	.093	.083	.075	.115	.100	.088	.078	.068	.060
8	.170	.153	.139	.127	.117	.108	.155	.138	.124	.112	.102	.093	.140	.123	.109	.097	.087	.078

  Provincial infraction<sup>4</sup>

  Criminal offence<sup>5</sup>

<sup>1</sup> The BACs in this chart are based on lean body weight. It must be noted that a 200-pound man who is 30 pounds overweight would have a higher BAC than a lean 200-pound man who drank the same amount of alcohol.

<sup>2</sup> The BAC levels at which provincial and federal sanctions will actually be imposed are significantly higher than the shading in the chart indicates. First, the chart reflects the BAC that would be obtained in sampling a driver's blood when initially stopped by the police. In contrast, the provincial and federal sanctions are based on readings from breath-testing machines and the ratio that these machines use to convert a driver's breath/alcohol concentration into a BAC underestimates his or her actual BAC by approximately 10%. Second, in terms of the criminal offence, two evidentiary samples must be taken at least 15 minutes apart, and only the lowest reading is admissible. Third, the evidentiary BAC readings are invariably rounded down. For example, a driver with an evidentiary BAC of .086% is treated as having a BAC of .08% and thus would not be charged. Fourth, given the time it takes to process impaired driving suspects, their evidentiary BAC will often be considerably lower than their BACs at the time of driving. Finally, approximately 75% of officers in a national police study reported that they will not lay a criminal charge unless a suspect's evidentiary BAC readings exceed .10%.

For the methodology underlying the chart see R. Solomon & E. Chamberlain, "Calculating BACs for Dummies: The Real-World Significance of Canada's 0.08% Criminal BAC Limit for Driving" (2003) 8(2) Canadian Criminal Law Review 219 at 231.

<sup>3</sup> In Canada, a "standard drink" is based on a 12-imperial ounce beer containing 5% alcohol by volume, a 5-imperial ounce glass of wine containing 12% alcohol by volume or a 1½-imperial ounce serving of liquor containing 40% alcohol by volume. These drinks each contain 13.46 grams of pure alcohol.

<sup>4</sup> A short-term administrative licence suspension may be imposed on drivers who have: a BAC ≥ .05% in AB, BC, MB, NB, NL, NS, NT, ON and PE; and a BAC ≥ .04% in SK. Suspensions may also be imposed on drivers who are reasonably suspected of being adversely affected by alcohol (typically based on having a BAC ≥ .05%) in NU and YK. QC has no comparable provision. It should be noted, as well, that all the provinces and territories other than NU, AB and YK impose licence suspensions of 3 months or 90 days on drivers who have a BAC ≥ .08%. NU has no comparable provision and the licence suspension in AB remains in place until the disposition of the related criminal charge. The licence suspension in YK is the shorter of 90 days or until the accused is convicted of the related criminal charge.

<sup>5</sup> The *Criminal Code*, R.S.C. 1985, c. C-46, s. 253(1)(b) prohibits driving or having care or control of a motor vehicle with a BAC in excess of .08%.

\* In addition to gender and weight, the BACs of individuals will be affected by how quickly they drink, whether they have eaten and the rate at which their bodies metabolize alcohol.

## BACs (%) for Females in Relation to Time, Weight<sup>1</sup> and Standard Canadian Drinks<sup>2</sup>

Standard Drinks <sup>3</sup>	2 hours							3 hours							4 hours							
	100 lbs.	115 lbs.	130 lbs.	145 lbs.	160 lbs.	175 lbs.	190 lbs.	100 lbs.	115 lbs.	130 lbs.	145 lbs.	160 lbs.	175 lbs.	190 lbs.	100 lbs.	115 lbs.	130 lbs.	145 lbs.	160 lbs.	175 lbs.	190 lbs.	
1	.019	.013	.008	.004	.001	.000	.000	.004	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
2	.068	.055	.045	.037	.031	.026	.021	.053	.040	.030	.022	.016	.011	.006	.038	.025	.015	.007	.001	.000	.000	.000
3	.117	.097	.083	.071	.062	.054	.047	.102	.082	.068	.056	.047	.039	.032	.087	.067	.053	.041	.032	.024	.017	.017
4	.165	.140	.120	.105	.092	.082	.073	.150	.125	.105	.090	.077	.067	.058	.135	.110	.090	.075	.062	.052	.043	.043
5	.214	.182	.158	.138	.123	.110	.099	.199	.167	.143	.123	.108	.095	.084	.184	.152	.128	.108	.093	.080	.069	.069
6	.263	.225	.195	.172	.153	.137	.124	.248	.210	.180	.157	.138	.122	.109	.233	.195	.165	.142	.123	.107	.094	.094
7	.312	.267	.233	.206	.184	.165	.150	.297	.252	.218	.191	.169	.150	.135	.282	.237	.203	.176	.154	.135	.120	.120

  Provincial infraction<sup>4</sup>

  Criminal offence<sup>5</sup>

<sup>1</sup> The BACs in this chart are based on lean body weight. It must be noted that a 175-pound woman who is 30 pounds overweight would have a higher BAC than a lean 175-pound woman who drank the same amount of alcohol.

<sup>2</sup> The BAC levels at which provincial and federal sanctions will actually be imposed are significantly higher than the shading in the chart indicates. First, the chart reflects the BAC that would be obtained in sampling a driver's blood when initially stopped by the police. In contrast, the provincial and federal sanctions are based on readings from breath-testing machines and the ratio that these machines use to convert a driver's breath/alcohol concentration into a BAC underestimates his or her actual BAC by approximately 10%. Second, in terms of the criminal offence, two evidentiary samples must be taken at least 15 minutes apart, and only the lowest reading is admissible. Third, the evidentiary BAC readings are invariably rounded down. For example, a driver with an evidentiary BAC of .086% is treated as having a BAC of .08% and thus would not be charged. Fourth, given the time it takes to process impaired driving suspects, their evidentiary BAC will often be considerably lower than their BACs at the time of driving. Finally, approximately 75% of officers in a national police study reported that they will not lay a criminal charge unless a suspect's evidentiary BAC readings exceed .10%.

For the methodology underlying the chart see R. Solomon & E. Chamberlain, "Calculating BACs for Dummies: The Real-World Significance of Canada's 0.08% Criminal BAC Limit for Driving" (2003) 8(2) Canadian Criminal Law Review 219 at 231.

<sup>3</sup> In Canada, a "standard drink" is based on a 12-imperial ounce beer containing 5% alcohol by volume, a 5-imperial ounce glass of wine containing 12% alcohol by volume or a 1 ½-imperial ounce serving of liquor containing 40% alcohol by volume. These drinks each contain 13.46 grams of pure alcohol.

<sup>4</sup> A short-term administrative licence suspension may be imposed on drivers who have: a BAC ≥ .05% in AB, BC, MB, NB, NL, NS, NT, ON and PE; and a BAC ≥ .04% in SK. Suspensions may also be imposed on drivers who are reasonably suspected of being adversely affected by alcohol (typically based on having a BAC ≥ .05%) in NU and YK. QC has no comparable provision. It should be noted, as well, that all the provinces and territories other than NU, AB and YK impose licence suspensions of 3 months or 90 days on drivers who have a BAC ≥ .08%. NU has no comparable provision and the licence suspension in AB remains in place until the disposition of the related criminal charge. The licence suspension in YK is the shorter of 90 days or until the accused is convicted of the related criminal charge.

<sup>5</sup> The *Criminal Code*, R.S.C. 1985, c. C-46, s. 253(1)(b) prohibits driving or having care or control of a motor vehicle with a BAC in excess of .08%.

\* In addition to gender and weight, the BACs of individuals will be affected by how quickly they drink, whether they have eaten and the rate at which their bodies metabolize alcohol.