



ALCOHOL AND HEALTH

# ALCOHOL AND PHYSICAL ACTIVITY



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# INTRODUCTION

Sports and alcohol are so closely connected in our culture that it is hard to think of one without the other. Practically every team in every sport is sponsored by an alcoholic beverage, and the drinking that accompanies sports even has its own vocabulary: the *19th hole* in golf, the *third half-time* in football and those *little pick-me-ups* on ski hills and snowmobile trails.

The issue actually concerns a lot of people: one in five Quebecers participates in a sport that involves training or competing at a certain level of physical activity or organization.<sup>1,2</sup> While many people enjoy a variety of sports, most of our physically active compatriots seem to prefer golf, ice hockey and soccer.<sup>3</sup>

Athletically inclined Quebecers commonly consider health and physical fitness to be a very important benefit of playing sports. Young people 15 to 19 consider it the most important benefit, while 60% of people 20 to 54 and 54% of those 55 and older deem it a very important benefit, second only to relaxation and enjoyment. Health is thus clearly important to those who play sports, and most (64%) of those who do think of themselves as being in excellent or very good health.<sup>4</sup>

At the same time, drinking is very much a part of life in Quebec. More than eight out of ten people aged 15 or older drink occasionally or regularly. They drink now and then, at specific times, notably on sports-related occasions. By now, we are well aware of the impact of alcohol on the human body. But what about the effects and particular impact of drinking on people who play sports? How does alcohol affect athletic performance, recovery and healing? Are sports and alcohol a good mix?

This report takes a simple and concise approach to the subject. It looks first at the drinking habits of people who play sports, then reviews the salient points of explanations for the connection between sports and alcohol. It then attempts to explain why people who play sports may be particularly affected by drinking, mainly because of the impact of alcohol on performance and recovery. Finally, it contains recommendations regarding drinking before, during and following physical activity

<sup>1</sup> The 2010 Statistics Canada General Social Survey determined whether respondents participated in sports by asking the following question: "Did you regularly participate in any sports during the last 12 months?" According to Statistics Canada, "regularly" meant at least once a week during the season or for a certain period of the year.

<sup>2</sup> Statistics Canada data on sports participation cannot be broken down by province. Only data for Canada as a whole are available.

<sup>3</sup> <http://www5.statcan.gc.ca/cansim/a26?id=1130001&pattern=&p2=1&stByVal=1&p1=1&tabMode=dataTable&csid=&retrLang=eng&lang=eng>

<sup>4</sup> [http://publications.gc.ca/collections/collection\\_2013/pc-ch/CH24-1-2012-fra.pdf](http://publications.gc.ca/collections/collection_2013/pc-ch/CH24-1-2012-fra.pdf)

<sup>5</sup> [http://publications.gc.ca/collections/collection\\_2013/pc-ch/CH24-1-2012-fra.pdf](http://publications.gc.ca/collections/collection_2013/pc-ch/CH24-1-2012-fra.pdf) *Op. cit.*

# DRINKING HABITS OF PEOPLE WHO PLAY SPORTS

There is very little accurate data on the drinking habits of adults in the general population who participate in sports.

However, sports publications and literature commonly report that people who play sports drink a lot, and are more likely to drink excessively than those who do not play sports. In Ireland, about 1,000 men who were members of a sports club participated in a study on drinking habits in amateur sports. The study showed that more than 50% of the sportsmen drank excessively at least once a week. That compares to 40% for all Irish men.<sup>5</sup> A study of university students in New Zealand showed that problem drinking was far more common among elite athletes at both the regional and international level than

among other students. In that same study, athletes also had higher scores than non-athletes when it came to the negative impacts of drinking.<sup>6</sup> Another study published in 2014 reported that American college students who played sports drank more frequently, were more likely to drink to get drunk, and drank excessively more often than students who did not play sports.<sup>7</sup> In yet another example, J.A. Ford's 2007 study of college students showed that more than half (52.4%) of those who were athletes reported having drunk excessively during the last two weeks, compared to 42.6% of the non-athletes.<sup>8</sup> Similar results were obtained in France, where, although student athletes drank less frequently than non-athlete students, they did drink excessively more frequently.<sup>9</sup>



<sup>5</sup> O'Farrell, A.M., Allwright, S.P., Kenny, S.C., Roddy, G., and Eldin, N. (2010).

<sup>6</sup> O'BRIEN, K.S., Blackie, J.M., et Hunter, J.A. (2005).

<sup>7</sup> Barnes, M.J. (2014).

<sup>8</sup> Ford, J.A. (2007).

<sup>9</sup> Lorente, F. O., Peretti-Watel, P., Griffet, J., & Grélot, L. (2003).



Other research has shown that both the strength and the direction of the link between sports and drinking vary according to the intensity with which young people play a sport. Thus, moderate physical activity is associated with moderate drinking, while no activity or intense activity is associated with abusive drinking and alcohol dependence.<sup>10</sup> Such results correspond to those of French researchers who studied doping in sports. According to the latter, it is not certain that playing sports in general is associated with a particular vulnerability to substance use, including alcohol. Instead, they believe there is “a subgroup of subjects playing certain types of sports intensely, who consume doping and other substances in a hedonistic way, and are not concerned about risks to their health.”<sup>11</sup>

In 2014, the Canadian Centre on Substance Abuse commissioned a systematic review to examine the relationship between sport participation and substance use among youth aged 10 to 24. Among the key findings: “Sport participation appears to be associated with increased alcohol use and heavy drinking throughout adolescence and early adulthood.”

The studies included in the review also indicated that the relationship between sport and alcohol varies according to gender and socio-economic status, although the evidence is not always consistent.<sup>12</sup>

Paradoxically, in 2012, a Swedish study showed that women 19 to 30 and men over 31 who walked regularly outdoors or participated in sports were significantly less likely to drink excessively. The authors of this study believe the results show that, in Sweden, excessive drinking does not go hand-in-hand with a healthy lifestyle.<sup>13</sup>

All this data raises an issue: How can it be that participation in sports, which is generally considered to support behaviours that promote good health, seems for some to be a crucible for excessive drinking?

The handful of studies that have focused on the source of this association lead us to a three-pronged answer involving psychological, cultural and economic factors.

<sup>10</sup> Choquet, M., and Hassler, C. (1997).

<sup>11</sup> Franques, P., M. Auriacombe, et J. Tignol (2001).

<sup>12</sup> <http://www.ccsa.ca/Resource%20Library/CCSA-Sport-Substance-Abuse-Findings-Report-2014-en.pdf>

<sup>13</sup> Andersson, A., Andersson, C., Holmgren, K., Mårdby, A.C., and Hensing, G. (2012).



## PSYCHOLOGICAL FACTORS

Cognitive psychology suggests a cause-and-effect relationship between alcohol and sports because of the motives behind drinking.<sup>14</sup> According to this approach, athletes under pressure to perform in competitive events would drink alcohol in order to relieve stress. In recent years, major sports stars have spoken openly about the pressure they feel from sponsors and fans. Athletes might therefore use alcohol to reduce the anxiety created by the intense pressure to perform.

While this explanation may account for the behaviour of athletes who play competitive sports on a very intense level, it does not really apply to the majority of people who play sports, and surely does not explain the behaviour of Sunday warriors, who are more likely just looking for thrills.

According to the temperament model of behaviour, some people are thrill-seekers and are therefore more inclined than others to seek out a variety of new and extreme sensations, as well as take all kinds of risks in order to experience those sensations. That trait would be both a precipitating factor in the choice of sports (high-adrenaline), and a vulnerability factor with regard to alcohol dependence. The authors of one study even proposed that athletes and drug addicts had more in common with each other than with controls from the general population who had no substance dependence and did not participate in high-adrenaline sports.<sup>15</sup> In other words, a single personality trait could help explain – in the same person – behaviours as different as participation in extreme sports and the use of addictive substances, such as alcohol.<sup>16</sup> As paradoxical as it may seem, the trait that could motivate a person to do ultra marathons could also be responsible for a propensity to drink abusively.

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<sup>14</sup> Martens, M.P., Cox, R.H., and Beck, N.C. (2003).

<sup>15</sup> Piquemal, E., Franques, P., Auriacombe, M., Grabot, D., and Tignol, J. (2001).

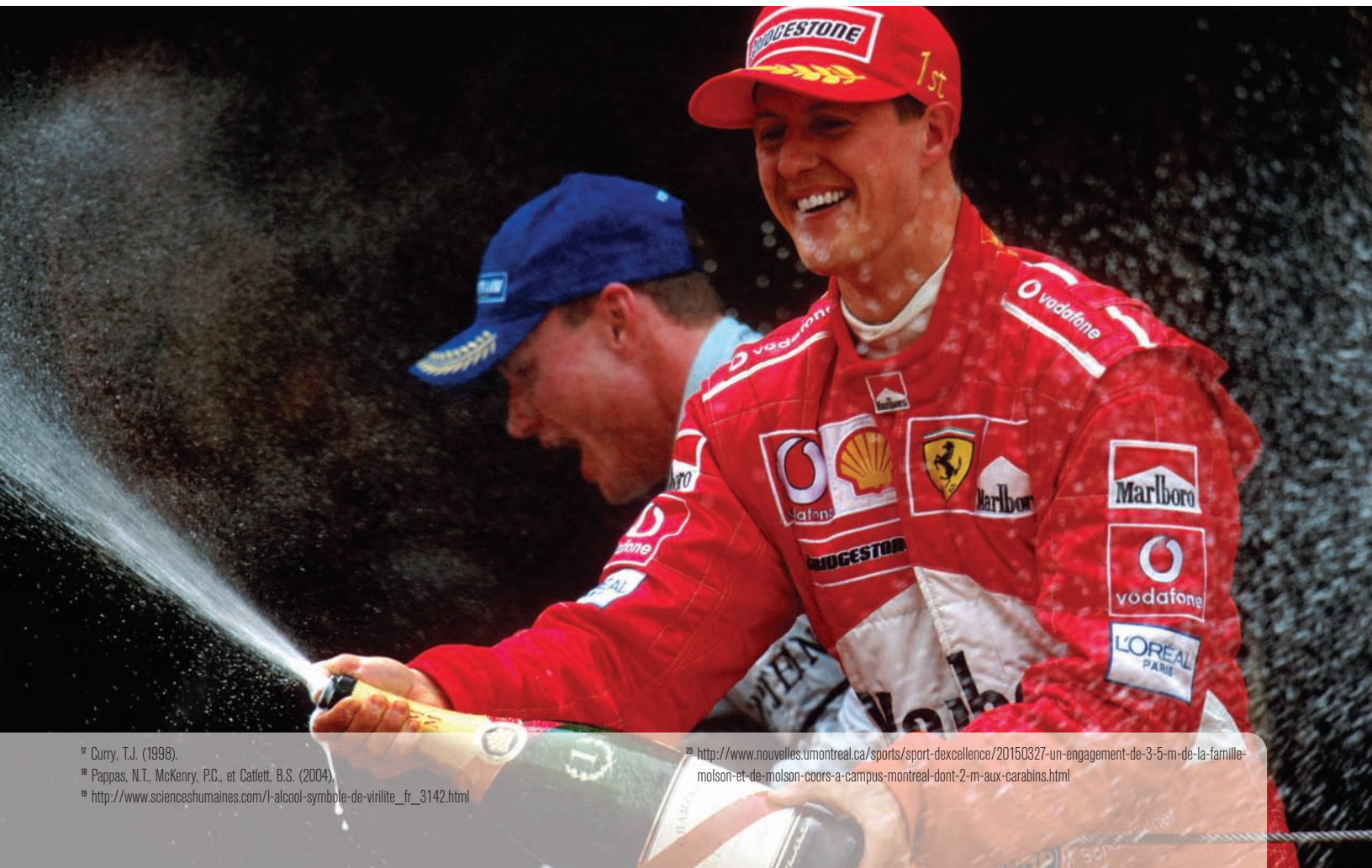
<sup>16</sup> Franques, P., M. Auriacombe, et J. Tignol (2001).

## CULTURAL FACTORS

Sociologists tend to take a cultural approach in explaining the link between alcohol and sports.<sup>17,18</sup> In their studies, researchers have notably examined the hyper-masculine environments surrounding many men's teams in such sports as hockey, football and baseball. In these sports, they say, demonstrations of virility and power are encouraged by masculine behaviour under the pretext of promoting cohesion and team spirit. Of course, getting drunk has long been "men's business." It is important to remember that drinking in general – and excessive drinking, in particular – is a privilege that men have traditionally denied to women. Even if this is no longer actually the case, the symbolism remains. Men consider drinking and their own ability to control it a strong symbol of virility.<sup>19</sup>

## ECONOMIC FACTORS

Finally, the impression that alcohol and sports are inseparable could be linked to a long tradition of sports sponsorship by the alcoholic beverage industry, here and elsewhere. In Quebec, the Société des alcools du Québec and major breweries sponsor many key sports events, such as the Rogers Cup (tennis) and the Canadian Open (golf). The Montreal Canadiens hockey team is affiliated with Molson; Budweiser is a partner of the Montreal Impact soccer team. The Molson family and Molson Coors have committed more than \$2 million to the Université de Montréal's Carabins Excellence in Sport Program.<sup>20</sup> At the same time, sports championships are generally accompanied by alcohol. Whether it's the Stanley Cup, the Tour de France or a Formula 1 race, athletes celebrate their victories with champagne, beer and other alcoholic beverages. And the fans up in the stands do likewise.



<sup>17</sup> Curry, T.J. (1998).

<sup>18</sup> Pappas, N.T., McKenry, P.C., et Catlett, B.S. (2004).

<sup>19</sup> [http://www.scienceshumaines.com/l-alcool-symbole-de-virilite\\_fr\\_3142.html](http://www.scienceshumaines.com/l-alcool-symbole-de-virilite_fr_3142.html)

<sup>20</sup> <http://www.nouvelles.umontreal.ca/sports/sport-dexcellence/20150327-un-engagement-de-3-5-m-de-la-famille-molson-et-de-molson-coors-a-campus-montreal-dont-2-m-aux-carabins.html>



# ALCOHOL AND ATHLETE HEALTH

As we have seen above, alcohol benefits from a strong association with sports on a number of levels. And yet, Canadian data showing that most people participate in sports because of the health and well-being benefits makes us wonder: From a health perspective, is the alcohol-sports connection deserved – or even tenable?

Like all drinkers, athletes who drink abusively expose themselves to a variety of negative impacts on their short- and long-term health and well-being. And some of the impacts and consequences of drinking can be particularly harmful to athletes, or at least to those who want to get a maximum return on their physical effort.

## ALCOHOL AND SPORTS PERFORMANCE

Although the practise is hardly widespread, some people drink before and sometimes even while participating in their sport. A game of hockey is often just an excuse for “the guys” to get together and toss back a few, and more than a few skiers stay

a little too long in the chalet bar before heading back to the slopes. There is little doubt that, in such situations, alcohol can have a particularly deleterious impact. We know that alcohol affects metabolic function, thermoregulatory function, and psychomotor skills. We also know that people who engage in physical activity under the influence of alcohol have less endurance, are more likely to hurt themselves, and are at greater risk for serious injury.



- **Metabolizing carbohydrates**

Carbohydrates are the primary source of energy for all activity of sustained intensity. Generally speaking, under good conditions, athletes can continue intense activity, such as cycling, running, hiking, skiing and playing hockey, thanks to their stored glycogen. The more intense and the shorter the activity, the more the body uses up its glycogen reserves. Conversely, the longer the duration and the lower the intensity, the more the body relies on its fat reserves. Unfortunately, glycogen reserves are limited and once they are depleted, the athlete will feel fatigue and be at risk for hypoglycemia. The data show that drinking can exacerbate this effect, since even small amounts of alcohol have an impact on carbohydrate metabolism in the liver and skeletal muscles.<sup>21</sup> As a result, drinking alcohol promotes faster depletion of glucose reserves, thus reducing endurance and performance in activities that depend on those reserves.

- **Thermoregulatory function**

Drinking before or during physical activity also affects performance because of alcohol's impact on thermoregulatory function. Studies have shown that when large doses of alcohol are administered before cold-weather exercise, peripheral vasodilation increases and the body's internal temperature drops notably.<sup>22</sup> Combined with the drop in blood sugar that is also observed under such conditions, this inevitably impairs performance. So people who are trying to give their best should be aware that a "little pick-me-up" is anything but.

The impact is just as bad when the weather is hot. The American College of Sports Medicine notes that, because of its diuretic properties, alcohol promotes dehydration; when consumed during physical activity, it can therefore negatively affect performance, and can even be dangerous, especially during prolonged activity in the heat.<sup>23</sup>



<sup>21</sup> <http://www.coach.ca/training-diet-carbohydrate-go-food-p154687&language=en>

<sup>22</sup> Shirreffs, S.M., and Maughan, R.J. (2006).

<sup>23</sup> American College of Sports Medicine (2007).

## • More injuries

The greatest danger of drinking before or during a sports activity is the risk of injury and serious injury. Engaging in physical activity under the influence of alcohol increases the risk and severity of injuries because of alcohol's impact on psychomotor skills – reaction time, for example – and on behaviour.

As blood-alcohol level increases, the impact of the alcohol extends to the motor and sensory centres of the brain. With small amounts (0.02-0.05 g/100 ml), it is still possible to control balance and execute precise actions, but reaction time is slower and hand-eye coordination is affected. With moderate amounts, (0.06-0.10 g/100 ml), the impact is amplified further, while tracking, visual search, recognition and response skills are impaired.<sup>24, 25</sup> Clearly, participating in a sport in such a state increases the risk of accident and injury.



In the case of motorized sports, drinking not only increases the risk of accident, it is illegal. Driving a snowmobile or ATV with a blood-alcohol content over 0.08 (or with any amount of alcohol in the blood, if you are under 22) leads to immediate suspension of your driver's license, and a charge of impaired driving under the Criminal Code and the Highway Safety Code. Note that anyone found guilty of driving a snowmobile, a boat or any other motorized vehicle while impaired is stripped of their driving privileges, period, including cars and trucks, for at least one year.

Furthermore, because of the disinhibiting effects of alcohol, people who engage in physical activity with an elevated blood-alcohol content are more tempted to behave dangerously. They will tend to go faster, further and higher than their skills actually allow, and are thus at greater risk for injury and serious injury.

Finally, when people start getting drunk, their language, thoughts and senses are affected. It takes clear thinking and good communication to resolve the little skirmishes and quarrels that can arise during competitive sports. Thus, when cognitive and verbal skills are diminished, the risk of violent and aggressive behaviour increases, along with the risk of injury.<sup>26</sup>

<sup>24</sup> American College of Sports Medicine. (2007).

<sup>25</sup> Suter, P.M., and Schutz, Y. (2008).

<sup>26</sup> Suter, P. M., & Schutz, Y. (2008).

# ALCOHOL AND RECOVERY

Research data and common observation tell us that, when it comes to sports and alcohol, people generally tend not to do their drinking before or during physical activity. But they do drink when they're done. A US study published in 2014<sup>27</sup> showed that drinking before or during training and competing is extremely rare among American college athletes, but it is common practice afterwards. More than half the respondents in the study (55.8%) said they drank after working out. That makes it all the more relevant to examine how drinking affects recovery. After all, recovery is as important as training in the quest for ultimate athletic performance.

## METABOLIC RECOVERY

When people exercise or play a sport intensely for a sustained period of time, they tend to become dehydrated and deplete the glycogen (sugar) reserves stored in the liver (hepatic glycogen) and the muscles (muscular glycogen). After the workout, replenishing those water and sugar reserves is critical.

It has long been known that the liver – that organ so essential to survival – is strongly affected by alcohol. Among other things, the liver is very involved in eliminating toxins, and ethanol, which is found in all alcoholic beverages, is highly toxic. The liver is responsible for breaking down whatever alcohol is ingested, so that the ethanol can be expelled from the body. This is why increased alcohol consumption is linked to cirrhosis of the liver, which, by the way, can turn into cancer. The liver is also the organ that takes everything a person eats and drinks and transforms it into energy in order to extract the nutrients and help the body use carbohydrates (sugars) more efficiently. It is therefore easy to understand how drinking more alcohol than the liver can process can only cause short-term problems and sometimes even irreparable damage.

Strangely, drinking alcohol does not appear to affect glycogen resynthesis, but researchers have noted that, although there is no direct impact, there may well be an indirect link, given that, under the influence of alcohol, athletes may forget or neglect to eat carbohydrate-rich foods, which are absolutely essential for resynthesizing glucose after a session of intense physical activity.



<sup>27</sup> [http://www.ncaa.org/sites/default/files/Substance%20Use%20Final%20Report\\_FINAL.pdf](http://www.ncaa.org/sites/default/files/Substance%20Use%20Final%20Report_FINAL.pdf)



As for hydration, a recent study of the effects of alcohol on rehydration following a dehydrating activity has shown that small and moderate amounts of alcohol (0.24 to 0.49 g of alcohol/kg of body weight) do not promote urination. However, larger amounts (0.92 g of alcohol/kg of body weight) had a significant impact on urinary output and restoring blood volume, i.e. on the time necessary to make up for the lack of water.<sup>28</sup> In other words, someone who drinks more than moderately following physical activity will take longer to rehydrate and be likely to experience the fatigue, muscle cramps, headaches and other symptoms of dehydration more noticeably.

What's more, dehydration that exceeds 2% to 5% of body weight affects performance significantly, because of the negative impact on blood volume and flow, thermoregulation (heat dissipation) and glycogen use.<sup>29</sup>

Finally, a study of a small sample of athletes showed that drinking large quantities of alcohol after exercise (about 12 standard drinks) interferes with protein synthesis, i.e. the development of muscle mass, even when protein is eaten at the same time.<sup>30</sup>

<sup>28</sup> Barnes, M.J. (2014).

<sup>29</sup> Jeukendrup, A., and Gleeson, M. (2010).

<sup>30</sup> Parr, E.B., Camera, D.M., Areta, J.L., Burke, L.M., Phillips, S.M., Hawley, J.A., and Coffey, V.G. (2014).

## WELL-BEING: SLEEP AND HANGOVERS

Athletes who want an optimum recovery after their effort have two more reasons to keep their drinking moderate: ensuring a good sleep and avoiding a hangover.

While alcohol generally helps people fall asleep and stay asleep for the first few hours, it is disruptive the rest of the night, causing fragmented sleep, waking during the night and sometimes even premature waking in the morning and the inability to fall asleep again. This is significant for athletes, for whom the quantity and quality of sleep has a direct impact on their energy level, performance and recovery. Sleep also has an indirect influence on performance, reducing the risk of over-training and under-recovery, enhancing resistance to illness and improving recovery from injury.<sup>31</sup>

Excessive drinking affects not only an athlete's sleep, but also the person's overall condition the next day. Indirectly, alcohol can impact performance because of the general discomfort people feel when suffering from a hangover. In addition to fatigue, lethargy, distress and overwhelming thirst, other equally common symptoms reported by people who have "tied one on" the night before include headaches, muscle pain and cramps, and gastro-intestinal disorders, such as a loss of appetite, stomachache, nausea, vomiting and diarrhea. Occasionally, hangovers are also accompanied by increased activity of the sympathetic nervous system, hypersensitivity to sound and light, dizziness, impaired attention, concentration and short-term memory, significant visual-spatial problems, impaired psychomotor skills and a noticeable feelings of anxiety, depression and irritability. In short, not the kind of things you would associate with good health and sports performance.



<sup>31</sup> Samuels, C.H., and Alexander, B.N. (2013).



## CONCLUSION

Exercise and alcohol are not always a good match, but alcohol clearly benefits from a strong association with sports in our culture, and current scientific data prove it.

Nonetheless, it is important to remember that drinking alcohol immediately before or during a game, event or intense workout reduces endurance and can increase the risk of injury. Drinking afterwards prevents the body from recovering as well as it might, by affecting various metabolic processes, sleep and general well-being.

While optimal performance may not be a major concern for the average amateur athlete, health and physical fitness should still be goals as important as the pleasure of participating in the activity itself.

To help Quebecers achieve that objective, Éduc'alcool recommends the following for people who enjoy sports and physical activity:

- Do not drink alcohol before or during the activity.
- Afterwards, drink water or a sports drink and eat a meal rich in protein and carbohydrates.
- Do not exceed the low-risk drinking guidelines: two drinks max for women and three drinks max for men.

Because for athletes, as for everyone else, moderation is always in good taste.

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An explanation of what happens to alcohol as it passes through the body and the effects it produces.



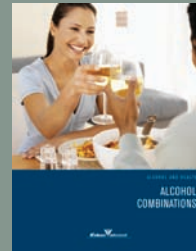
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A review of the physiological and psychological effects of abusing drinking. The consequences of both chronic and occasional excessive drinking are highlighted.



## THE EFFECTS OF MODERATE AND REGULAR ALCOHOL CONSUMPTION

A review of the research on how moderate, regular alcohol consumption affects human health.



## ALCOHOL COMBINATIONS

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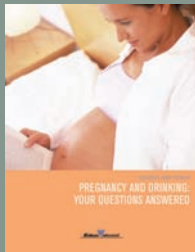
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## ALCOHOL AND WOMEN

A report on women and drinking that explains why women are more vulnerable than men – both physiologically and socially – to the effects of alcohol.

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Moderation is always in good taste.

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