DRINKING AND DRIVING

Alcohol consumption, even in relatively small quantities, increases the risk of road crashes. Drinking diminishes some essential elements of safe driving, such as vision and reflexes, and impairs judgment, which is generally associated with other risky behaviors such as speeding and failure to comply with safety rules (use of seat belts and helmets).

It is important to stress that driving under the influence of alcohol can have negative consequences for everyone on the road, not just drivers. The victims of a driver who has been drinking include the driver's companions and passengers in other vehicles, in addition to other people on the road, especially the most vulnerable (pedestrians, bicyclists, and motorcyclists). These people end up paying the price for the risk taken by a driver who gets behind the wheel of a vehicle while under the influence of alcohol.

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The effects of alcohol

Driving under the influence of alcohol is considered a major risk factor for road traffic crashes. Because of the physiological changes that alcohol consumption produces in the human body, there is a direct correlation between blood alcohol concentration (BAC), the occurrence of crashes, and the severity of the resulting injuries.

Overall, alcohol impairment makes a driver's risk of a fatal crash 17 times higher than for a sober person. Table 1 shows the relationship between alcohol consumption and its effects on human physiology.

The risk of having a fatal crash is 17 times higher for a person driving under the influence of alcohol.

Table 1: *Effects of blood alcohol concentration on the body and its performance*

BLOOD ALCOHOL CONCENTRATION (BAC) (G/DL)	EFFECTS ON THE BODY
0.01-0.05	▶ Increase in heart and breathing rates ▶ Decrease in various central brain functions ▶ Inconsistency in performing tasks ▶ Impaired judgment and loss of inhibition ▶ Mild sense of elation, relaxation, and pleasure
0.06-0.10	▶ Physiological sedation of nearly all systems ▶ Reduced attention and alertness, slower reflexes, impaired coordination, and reduced muscle strength ▶ Reduced capacity to make rational decisions or exercise good judgment ▶ Increased anxiety and depression ▶ Diminished patience
0.11-0.15	▶ Considerably slower reaction time ▶ Impaired balance and movement ▶ Impairment of some visual functions ▶ Slurred speech ▶ Vomiting, especially if this BAC level is reached rapidly
0.16-0.29	▶ Severe sensory impairment, including reduced awareness of external stimuli ▶ Severe motor impairment, including staggering or frequent falls
0.30-0.39	▶ Nonresponsive stupor ▶ Loss of consciousness ▶ Anesthesia comparable to that of surgery ▶ Death (in many cases)
0.40 and more	▶ Unconsciousness ▶ Cessation of breathing ▶ Death, usually due to respiratory failure

Source: Drinking and Driving: A road safety manual for decision-makers and practitioners (PAHO, 2010)

Although people often ask for the equivalence of these BAC levels in terms of doses, glasses, bottles or cans of beer or other drinks, such comparisons are not recommended. Such values cannot be standardized due to the different characteristics of alcoholic beverages and the many variables that influence how alcohol affects different people, and even the same person in different circumstances.

» Determining blood alcohol concentration

The presence of alcohol in the blood is usually determined through analysis of the air exhaled by the lungs. BAC is commonly expressed in grams per deciliter (g/dl), although other values can be used.

In police operations, alcohol levels are normally measured with a breathalyzer using air exhaled through the mouth. The quantity of alcohol is measured in grams per 210 liters of exhaled air (or in milligrams per 210 milliliters of exhaled air). Because of the relationship between BAC and alcohol in breath, the value of the latter can be used to determine BAC.

» The risks of driving under the influence of alcohol

Drivers with a BAC between 0.02 and 0.05 g/dl have at least three times greater risk of dying in a road crash. This risk increases to at least six times greater with a BAC between 0.05 and 0.08 g/dl, and it increases exponentially when BAC exceeds 0.08 g/dl. Studies on the relationship between alcohol and road crashes go back to the 1960s, but it was not until later that research demonstrated that the higher the BAC, the greater the risk of road crashes. Figure 1 shows the estimated relative risk of a road collision for drivers who have been consuming alcohol.

Figure 1: Estimated relative risk of death for driver who have consumed alcohol
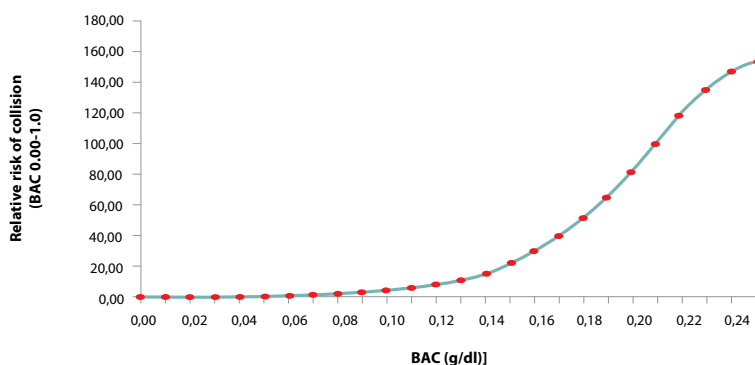
Source: *Drinking and Driving: A road safety manual for decision-makers and practitioners (PAHO, 2010)*

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» Populations at greatest risk due to alcohol consumption

Young adults from 20 to 29 years old are at greater risk (up to three times greater) of suffering the consequences of driving under the influence of alcohol compared to drivers over age 30, at any blood alcohol level. In fact, due to the high risks facing young and novice drivers, many countries enforce blood alcohol limits more strictly in this population group.

It also is important to point out that alcohol consumption is not only a risk factor for drivers of cars and other large vehicles, but also for other road users. Some studies conducted in low- and middle-income countries revealed the presence of alcohol in the blood in 18-90% of pedestrians and 10-28% of motorcyclists injured in road collisions.

Professional drivers are another important group when it comes to drinking and driving. Their behavior can have more serious consequences due to the size and type of vehicles they drive, particularly when they are involved in public transportation.
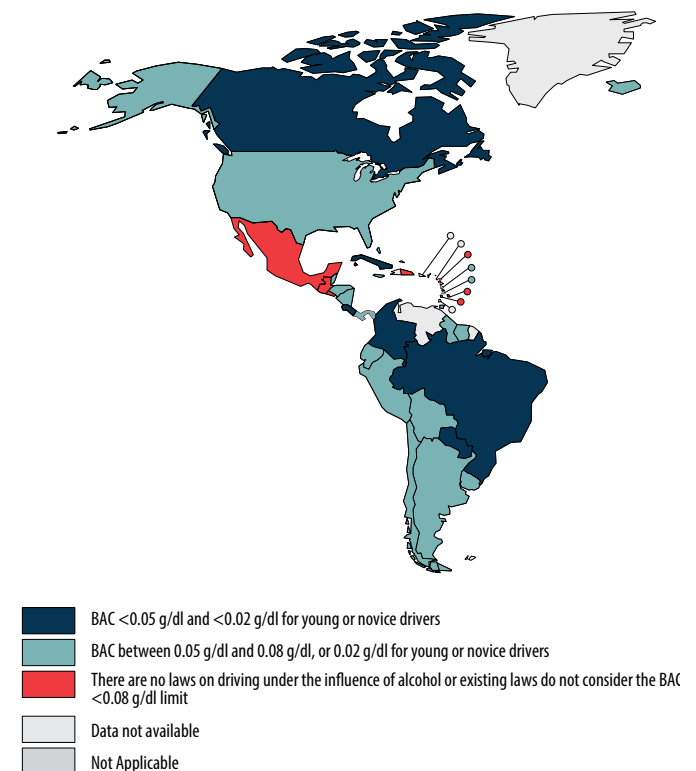
» Drinking and driving legislation

BAC levels permitted for driving a motor vehicle vary according to the legislation in each country, and even between states or provinces in the same country, but they are usually between 0.02 and 0.10 g/dl.

The World Health Organization (WHO) recommends that drinking and driving legislation should use BAC benchmark limits of 0.05 g/dl for the general population and 0.02 g/dl for young or inexperienced drivers. However, only six countries in the Americas follow the WHO recommendation (see figure 2).

> *Laws on drinking and driving should use BAC benchmark limits of 0.05 g/dl for the general population and 0.02 g/dl for young drivers.*

Figure 2: Laws on driving under the influence of alcohol, by country (2013).

- ■ BAC <0.05 g/dl and <0.02 g/dl for young or novice drivers
- ■ BAC between 0.05 g/dl and 0.08 g/dl, or 0.02 g/dl for young or novice drivers
- ■ There are no laws on driving under the influence of alcohol or existing laws do not consider the BAC <0.08 g/dl limit
- □ Data not available
- ■ Not Applicable

Source: Road safety in the Region of the Americas (PAHO, 2016).

Laws on driving under the influence of alcohol must be strictly enforced in order to be fully effective. Of the countries participating in a recent survey on road safety in the Region (Road Safety in the Americas), only four rated their enforcement of drinking and driving laws as "good" (8 or more on a scale of 0-10).

≫ Effectiveness of laws

The basic purpose of road traffic laws is to protect lives. Visible and swift law enforcement is an effective way to reduce alcohol-related road crashes. Experience has shown that when laws are not accompanied by an effective system of enforcement, they fail to have their desired effect. Strict enforcement of blood alcohol limits improves both the effectiveness of the limits and their continued implementation.

Drivers and other road users are often unaware of the risks they run and tend to undervalue the protective effects of legislation. Thus, it is important to understand why people fail to follow these rules, in order to plan and implement appropriate action.

Enforcement is more effective when accompanied by public awareness campaigns that make potential violators believe they are likely to be stopped, leading to a rapid decline in the number of infractions. In addition, random blood alcohol testing and police sobriety checkpoints have proven to be effective ways to significantly reduce alcohol-related traffic collisions.

"Graduated" driver's licenses issued to young and novice drivers for a set period of time allow for progressive stages of monitoring and supervision. Evaluations of these systems reveal significant reductions in traffic crashes and traffic-related deaths, although estimates of their effectiveness vary from 4% to 60%. The objective is to protect novice drivers during the learning stage, helping them gain experience driving without increased risk to them or other road users.

> *When laws are not accompanied by an effective system of enforcement, they fail to have their desired effect.*

Several indicators that can be used to measure compliance with laws on drinking and driving, such as:

▸ Percentage of drivers that die in road crashes who have BACs above the legal limit;

▸ Recorded number of road traffic violations related to driving under the influence of alcohol;

▸ Percentage of drivers caught at sobriety checkpoints with BACs above the legal limit;

▸ Research on driver behavior, for example, in collaboration with the police.

Elements that could be included in a prevention program

Table 2 shows a range of initiatives that could be used to help design and develop programs to prevent drinking and driving. They are categorized according to priorities for the planning or implementation of a prevention program, and each proposal includes an assessment of its cost-effectiveness and difficulty of implementation.

More detailed information on these activities can be found in the Drinking and Driving manual. This manual also contains other relevant information such as explanations of why a drinking and driving program should be developed, how to conduct a situation analysis and select priority measures, how to develop and implement such a program, and how to evaluate it.
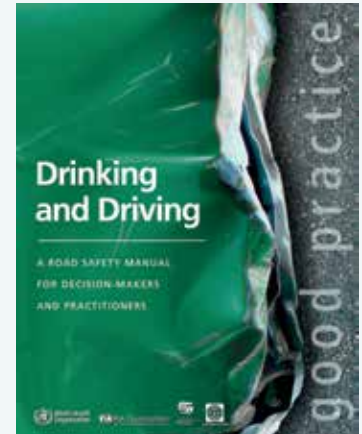
Proposals for implementation of drinking and driving programs

	Element	Description	Effectiveness	Difficulty	Cost
High Priority	Road safety/crash data analysis	Without this, any expenditure of funds and effort could be wasted by underestimating the scale of the problem, or by tackling a problem that is too hard to address in the current circumstances.	High	Low	Low
	Laws on BAC levels in drivers	An enforceable law is a pre-condition for effective enforcement by the police. While some jurisdictions have had success with sobriety testing methods, in general the existence of a specific law defining BAC levels provides the base conditions usually required by police in order to generate the high levels of enforcement required to influence driver behavior.	High	Low if there is political commitment	Low
	Strong enforcement of drink-driving laws	Undertaking sufficient enforcement measures is a key element, for example, sobriety checkpoints and random breath testing to influence drivers' views on the likelihood of apprehension. Experience shows that behavior will not be changed by encouragement or education alone. Enforcement of laws by the police is critical to reinforce public education aimed at preventing drinking and driving in the first place.	High	Low if there is political commitment	Medium
	Strict and swift punishment for those who break drinking and driving laws	Penalties considered serious by the general public and applied swiftly by the authorities can effectively deter individuals from drinking and driving. Examples include fines, driver license suspension, imprisonment, and vehicle sanctions.	High	Low if there is political commitment	Low
	Public information and education	Education should be linked to other elements of the program (enforcement, legal limit, etc.), since it is a supportive element. However, some educational elements are required to commence the process of changing attitudes while behavior is being addressed during the program.	High when combined with enforcement	Medium	Medium to high

	Element	Description	Effectiveness	Difficulty	Cost
	Monitoring and evaluation	If a program is not measured and the desired objectives are not monitored, it will not be possible to determine whether the program was successful. Monitoring will also identify the need for changes to the program during its operation. Monitoring and evaluation data also help reinforce community and political support, and encourage the activities of agency staff involved in project activities.	High	Low	Low
	Lower BAC limits for groups such as young drivers or bus drivers	A lower legal blood alcohol limit should be set––or zero tolerance for specific groups, such as those with responsibilities for passengers or dangerous cargo and high risk groups such as young drivers.	High	Low if there is political commitment	Low
Moderate Priority	Laws prohibiting alcohol sales at certain locations and times	Intended to make access to alcohol more difficult for drivers. An example would be banning the sale of alcohol at roadside establishments.	Medium	Low	Low
	Initiatives to control alcohol access and distribution	Regulations that require licensing alcohol sale and distribution to help address the problem of drinking and driving (e.g. under legal drinking/purchasing age).	Medium	Low	Medium
	Graduated licensing for novice drivers	Graduated licensing programs control the rate and manner in which young drivers gain access to full driving privileges. They may include delayed access to a full license, curfews, and lower BAC limits.	Medium to high	Low	Low if there is political commitment
	Employer programs	These programs aim to use employers' relationships and responsibilities to influence their employees' drinking and driving habits. These programs can be effective in large fleet operations.	Medium	Low	Medium
	Vehicle sanctions	Vehicle sanctions such as vehicle impoundment, license plate impoundment, vehicle registration cancellation and vehicle immobilization have been used effectively in reducing repeat drinking and driving. In order for a program to be effective, countries must have a good vehicle registration system.	Medium	Low	Medium if there is political commitment
Low Priority	"Designated driver" and ride service programs	These strategies aim to provide safe transport following a drinking event. Designated driver programs encourage one person in a group to abstain from drinking and provide safe transport for the others. Ride service programs provide transportation to intoxicated people who would otherwise drive.	Low	Low	Low
	Treatment for repeat offenders	Rehabilitation treatment programs are among the measures to counter drinking and driving in many countries. The programs are diverse and range in effectiveness, although few have been well studied. For treatment programs to be seriously considered, countries must have sufficient information on repeat drinking and driving offenders.	Low to medium	Medium	Low to medium
	School education programs	Education about the dangers of drinking and driving can be introduced in schools. This can include visits to schools by representatives of the health sector or traffic police, particularly if specific materials are not available.	Low	Low	Low

Source: *Drinking and Driving: A road safety manual for decision-makers and practitioners (PAHO/WHO)*

» Related documents

- Drinking and Driving: A safety manual for decision-makers and practitioners (PAHO, 2010).
- Road Safety in the Americas (PAHO, 2016).
- Global status report on road safety 2015 (WHO, 2015).

DRINKING AND DRIVING

Pan American Health Organization

World Health Organization
REGIONAL OFFICE FOR THE Americas