

Special article

Motor vehicle driving after alcoholic beverages consumption according to data from Vigitel-SP survey, 2012/2013, 2014 and 2020 editions

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Drinking and driving are two of the most important risk factors in traffic accidents. The severity of the injuries these kind of event causes is a consequence of the physiological changes caused by alcohol consumption in relation to the blood alcohol content (BAC), which is expressed in grams per each 100 milliliters of blood (g/100 mL).¹

The breath that is exhaled through the mouth is a recurring measurement in traffic inspection operations. It is obtained by the breathalyzer, which shows the amount of alcohol per each 210 mL of expelled air. The relation between alcohol concentration in blood and breath is used to convert the result of that relation into BAC rates, thus indicating the level of alcohol intoxication.¹

Relaxation and the feeling of well-being resulting from alcoholic beverages intake are the main reasons for their use, when consumption is responsibly carried out. The World Health Organization (WHO), however, has established the use of alcohol as harmful, with social and health consequences, both for the consumer as for those close to them, as well as for society in general. And also, when the consumption pattern is associated with a higher risk of health damage.²

Nonetheless, according to WHO, even in small quantities alcohol intake can be harmful when it causes cognitive and behavior changes. Therefore, individuals with low BAC may show signs and symptoms of alcohol intoxication that conflict with the act of driving.³ In consequence, driving under the influence of alcohol is one of the main causes of traffic accidents in the world, since its usage impairs the reaction time and affects the conditions for performing a series of motor tasks that are essential for driving vehicles.²

Drunk drivers have a much higher risk of being involved in accidents than non-drunk drivers, and the risk increases considerably according to the alcohol concentration in the blood, as shown in [Table 1](#).

Table 1. Blood alcohol content (BAC) and performance

BAC (g/100 mL)	EFFECTS ON THE BODY
0.01 - 0.05	<ul style="list-style-type: none"> • Elevated heart and respiratory rates • Decreased functions of several nerve centers • Inconsistent behavior when performing tasks • Decreased power of judgment, and lack of inhibition • Mild sense of euphoria, relaxation and enjoyment
0.06 - 0.10	<ul style="list-style-type: none"> • Physiological numbness of almost all systems • Decreased attention and vigilance; slower reflexes; coordination issues; reduced muscle strength • Lower ability to make rational or discerning decisions • Increasing feelings of anxiety and depression • Decreased patience
0.10 - 0.15	<ul style="list-style-type: none"> • Considerably slower reflexes • Balance and movement issues • Change of some visual functions • Slurred speech • Vomiting, especially if this BAC level is quickly reached
0.16 - 0.29	<ul style="list-style-type: none"> • Severe sensory disorders, including reduced awareness of external stimuli • Severe changes in motor coordination, with a tendency to frequent stumbling and falling
0.30 - 0.39	<ul style="list-style-type: none"> • Deep lethargy • Loss of consciousness • Sedation state compared to surgical anesthesia • Death (in many cases)
From 0.40	<ul style="list-style-type: none"> • Unconsciousness • Respiratory arrest • Death, usually caused by respiratory failure

Source: WHO (2007).³

As for motorcyclists, it is estimated that a BAC rate above 0.05 g/100 ml increases the risk of an accident up to 40 times, when compared to a zero BAC rate.³

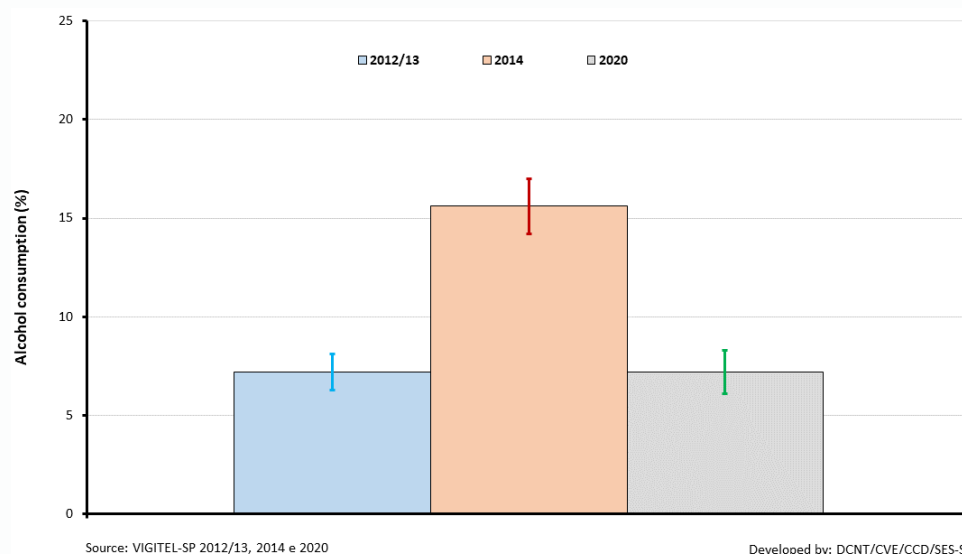
The publication of The Global Burden of Disease (GBD) in 2016 considered there was no safe limit for alcohol consumption, which increases the risk of health damage, the higher the intake amount. WHO's stance is that any amount of alcohol use is associated with some risk; as for example, alcohol addition, breast cancer (a linear relationship in women) or trauma. While individual risk may be low, in terms of population, there are no risk-free consumption levels for alcohol from a public health perspective.⁴

The Surveillance of Risk and Protection Factors for Chronic Diseases by Telephone (Vigitel) survey is the system which estimates the frequency and sociodemographic distribution of risk and protection factors for chronic non-communicable diseases in all

Brazilian capitals and the Federal District. In order to improve surveillance actions to control chronic non-communicable diseases in the State of São Paulo, the Health Department-with technical-scientific support from the Health and Nutrition Epidemiological Research Center, of the School of Public Health, in the University of São Paulo (Nupens/FSP-USP), has begun expanding the system to all of São Paulo State territory. Named as Vigitel-SP, it assesses many risk factors, including the ones associated to alcoholic beverages consumption and driving motor vehicles. In almost a decade three survey editions were published, in 2012/2013, 2014 and 2020.⁷

In the adult population in the State of São Paulo, an increase in the percentage of individuals who had consumed alcoholic beverage and driven motor vehicle in the same occasion was noted between the years 2012/2013 (7.2% - 95% CI 0.9%) and 2014 (15.6% – 95% CI 1.4%), with a decrease in 2020 (7,2% IC 95% 1,1%), as shown in Figure 1.

Figure 1. Percentage of individuals who reported driving motor vehicles after consuming any amount of alcoholic beverage, in the adult population of the State of São Paulo, in the years 2012/2013, 2014 and 2020.



Federal Law No. 11,705, often referred to as Dry Law, established in 2008 a new blood alcohol content limit for drivers, from 0.6 g/L to 0, with a tolerance of 0.2 g/L. Drivers who were caught with blood alcohol concentration >0.2 g (or 0.02 BAC) payed a fine and had their license to drive suspended for one year. Those who showed BAC level >0.06 were to be arrested, serving 6 months to 3 years of detention.⁸ This initiative has significantly reduced the rates of injuries and fatalities in São Paulo traffic – both state and city.

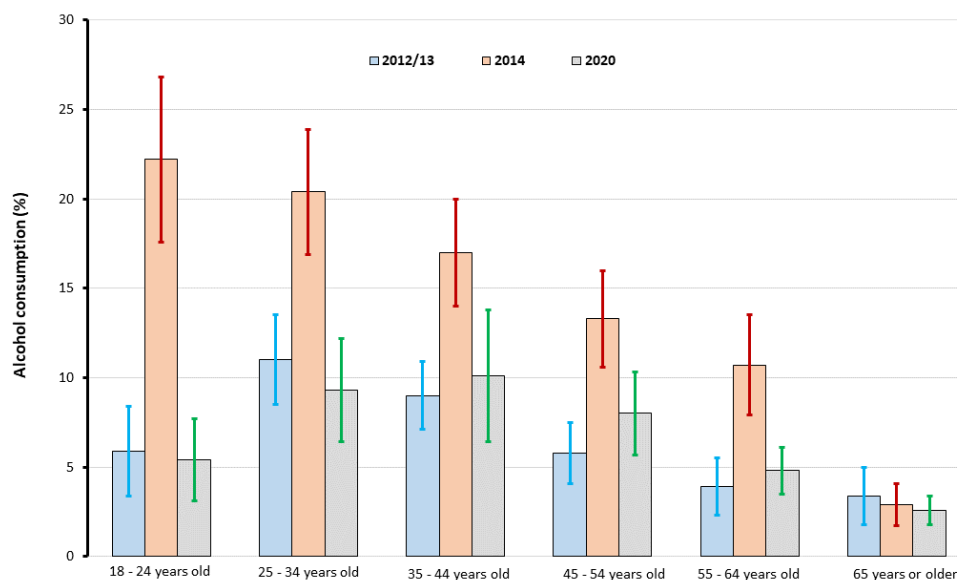
In December, 2012 Federal Law No. 12,760 was enacted, regarding an amendment in the Brazilian National Traffic Code (CTB). In addition to increasing the amount of the

administrative fine, it extended the possibilities of evidence of driving under the influence of alcohol or any psychoactive substance.⁹

The indicator evaluating vehicle driving after consuming any amount of alcoholic beverage showed a high prevalence in 2014, and decreased in 2020, when Federal Law No. 13,546/2017 was enacted. Named as New Dry Law, amongst other measures it altered Law No. 9.503/1997, to provide for crimes committed while driving motor vehicles. This new ordinance promoted three amendments in CTB for drivers who kill or injure people in traffic after consuming alcoholic beverages or other psychoactive drugs. In case of involuntary manslaughter, with no intention of killing, imprisonment was extended to 5 to 8 years of detention.¹⁰

In the analysis by period, the year of 2014 showed a predominance of consumers of any amount of alcoholic beverage who drove motor vehicles in the age group from 18 to 64 years old. In the 2012/2013 and 2020 periods, this age ranged from 18 to 54 years old, as shown in Figure 2.

Figure 2. Percentage of individuals by age who reported driving motor vehicles after consuming any amount of alcoholic beverage, in the adult population of the State of São Paulo, in the years 2012/2013, 2014 and 2020.



Source: VIGITEL-SP 2012/13, 2014 e 2020

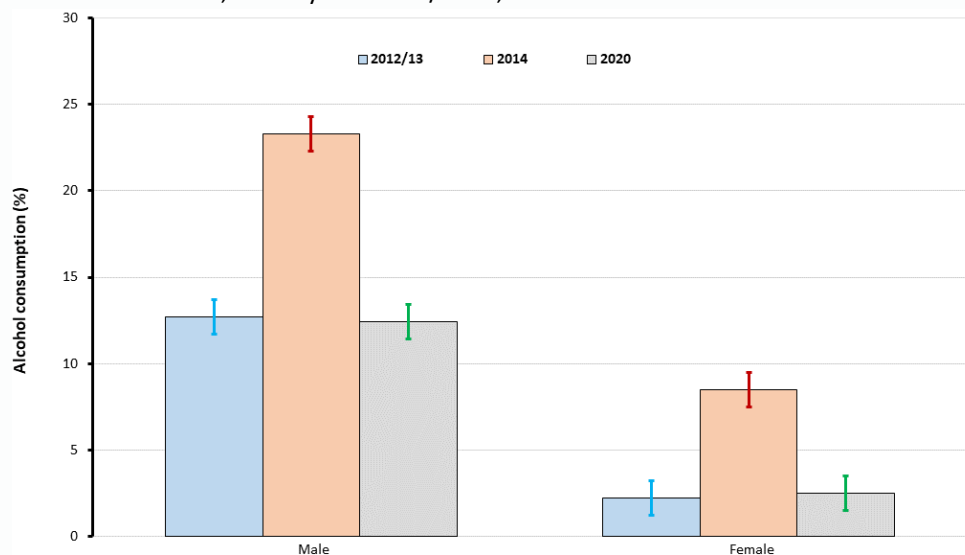
Developed by: DCNT/CVE/CCD/SES-SP

Among motor vehicle drivers after consuming any amount of alcoholic beverage in the adult population studied, males showed a predominance in the three surveyed years: 2012-2013, 2014 and 2020, 12.7%, 23.3% and 12.4% respectively; among females, this rate was 2.2%, 8.55% and 2.5% (Figure 3).

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Figure 3. Percentage of individuals by gender who reported driving motor vehicles after consuming any amount of alcoholic beverage, in the adult population of the State of São Paulo, in the years 2012/2013, 2014 and 2020.



Source: VIGITEL-SP 2012/13, 2014 e 2020

Developed by: DCNT/CVE/CCD/SES-SP

In recent decades, women have increasingly played roles previously reserved for men. As a consequence, there have been changes in behavior patterns in many areas. Increased alcohol consumption among the female population is a remarked global trend, though with lower rates than among men. Women, however, are biologically more sensible to the effects of this substance; they are more likely to develop problems related to its consumption, even at lower levels.²

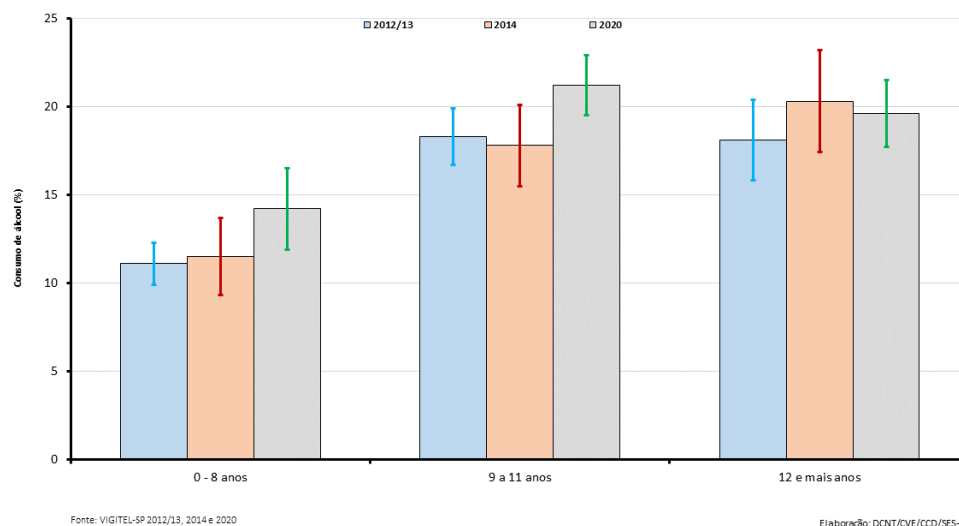
The individuals who reported driving after consuming any amount of alcoholic beverages were predominantly between 9 and 11 years old, having 12 or more years of schooling, in all three survey periods.

The Vigitel-Brazil 2021 edition, as mentioned, which presents data from Brazilian capitals and the Federal District, showed that 5.3% of respondents drove a motor vehicle after consuming any amount of alcohol. This rate was also higher in males (9.7%) than in females (1.6%), predominantly between 25 and 54 years old, with a tendency to increase according to schooling level.¹¹

The driver who rides under the effect of alcohol may be checked by breathalyzer testing, laboratorial blood exams, clinical examination or the ascertainment by traffic authority, through signs that suggest altered psychomotor ability such as appearance, attitude, orientation, memory, and motor and verbal abilities. Administrative infringement

happens if the driver presents any alcohol concentration per liter of blood corresponding to a measurement equal to or greater than 0.05 mg per liter of expired alveolar air, or signs of psychomotor change.¹²

Figure 4. Percentage of individuals by years of schooling who reported driving motor vehicles after consuming any amount of alcoholic beverage, in the adult population of the State of São Paulo, in the years 2012/2013, 2014 and 2020.



Driving a vehicle demands complex actions in response to a continuously changing environment. In order to drive safely, the driver must be able to promptly perform a continuous series of complex muscle movements, with great precision, whatever the conditions of weather and roads. Any situation contributing to a change in perception, judgment, vigilance, and ability to perform requisite actions to control a vehicle will impair a driver's skill, making vehicle driving insecure.¹³

In both Brazil and the world, traffic accidents are considered a health, safety and economic issue, and the use of alcohol is a risk factor for violent, non-intentional death, since it impairs the requisite cognitive and psychomotor skills for safely driving motor vehicles. Therefore, there is no safe alcohol consumption, and it is the driver's responsibility to mind the harm its use can cause, and not to drive after drinking.

Harmful alcohol consumption demands public policies actions that may reduce its impact, not only in the specific traffic scenario, but also in other contexts, including advertising, sales and consumption.

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