Questions about drink driving

CONSUMERS and winemakers often ask questions about how their driving is affected when they drink a glass or two of wine. Why isn't it safe to drink and drive? Like most countries, Australia has strict laws about drinking alcohol and driving. Across all states and territories, the legal limit for fully licensed drivers has been set at 0.05 blood alcohol concentration (BAC), which equates to 0.05g of alcohol in a person's body for every 100mL of blood. This is the level above which the risk of being involved in a crash increases significantly. When behind the wheel of a vehicle, drivers need total concentration, good coordination, rapid reflexes and the ability to make correct judgments and decisions.

What happens in the brain when you drink?

After one or two 10g standard drinks per hour (or when the BAC is between 0.01 and 0.05) the cerebral cortex of the brain is affected by alcohol. A person in normal health may experience a sense of relaxation, well-being and perhaps a loss of inhibition. There is usually no loss of coordination, although perception and the processing of visual information may be impaired (Breitmeier et al. 2007).

The literature suggests that cognitive processes are affected and impaired by alcohol at a lower BAC than motor function. Cognitive processes are the basic mental abilities we use to think, study, and learn. Motor function is the muscular activity and movement directly proceeding from mental processes. Alcohol interferes with the messages from the brain to the muscles, and impairs motor function. Observable cognitive and motor impairment following alcohol consumption generally only occur at 0.03 BAC and above (Moskowitz et al. 2000).

The following table summarises the typical effects that may be observed within a certain blood alcohol concentration range. Effects are, however, are also influenced by age, gender, genetic, subjective and task factors, which means that the impairment of an individual after drinking alcohol may be unpredictable.

Typical effects on driving that may be observed within a certain BAC range (AWRI publication #1234).

BAC level	Effects from drinking alcohol on driving
0.02 to 0.05	The cerebral cortex is affected, and the ability to detect and process auditory and visual information may be impaired, as well as eye-hand coordination and ability to carry out diverse tasks. For driving a vehicle, this translates to: • Reduced ability to see or locate moving lights correctly • Reduced ability to judge distances • Increased tendency to take risks • Decreased ability to respond to several stimuli
0.05	Twice as likely to have an accident than before drinking
0.05 to 0.08	The cerebral cortex and forebrain are affected. Perception of movement, ability to visually follow a moving object, capacity for recall and muscle coordination may also be impaired. In addition, reaction time may be increased and mistakes are more likely. For driving a vehicle, this translates to: • Further reduction in ability to judge distances • Impaired sensitivity to red lights • Slower reactions • Shorter concentration span
0.08	Five times more likely to have an accident than before drinking
0.08 to 0.12	The cerebral cortex, forebrain and cerebellum are all affected. Balance and coordination may be impaired along with auditory and visual attention including colour perception; reaction time and reflexes may be further slowed and behaviour and emotions exaggerated and unstable. For driving a vehicle, this translates to: • Overestimation of abilities • A feeling of euphoria • Reckless driving • Impaired peripheral vision (resulting in accidents due to hitting vehicles while passing) • Impaired perception of obstacles
0.12	Ten times more likely to have an accident than before drinking
0.12 onwards	Gradually more parts of the brain become affected, causing confusion, disorientation and sleepiness. Unconsciousness and memory loss can be experienced. Risk of death increases progressively as BAC increases over 0.30, as breathing slows and becomes increasingly irregular, but death generally only occurs when BAC is over 0.40.

How much wine can I consume before I am over 0.05 BAC?

A man's BAC will generally increase by 0.01 to 0.02 for each 10g standard drink and generally decreases by 0.01 per hour. The University of Adelaide's Centre for Automotive Safety Research (CASR) recommends that to remain under the legal limit of 0.05, a man should consume no more than two 10g standard drinks in the first hour and one each hour following. A woman's BAC, however, will generally increase by 0.02 to 0.03 for each standard drink and generally decrease by 0.0075 per hour. To remain under the legal limit of 0.05, a woman should consume no more than one 10g standard drink in the first hour and one each hour following. These are conservative estimates designed to minimise the risk of exceeding the legal limit. The consumption of wine with a meal, however, will significantly slow the absorption of alcohol from the gastrointestinal tract. The maximum BAC recorded will, therefore, be lower than when alcohol is consumed on an empty stomach. In addition, on a full stomach BAC will be recorded for a longer period of time.

The AWRI recommends that wine consumers should not drink and drive. For further information please refer to the following websites:

casr.adelaide.edu.au
www.atsb.gov.au
www.drinkwise.org.au

References

AWRI publication #1234 Stockley, C.S., Saunders, J.B. (2010). The biology of intoxication. In: Fox, A., MacAvoy, M. (eds.) Expressions of Drunkenness (Four Hundred Rabbits). Routledge, New York: 13–52.

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