

DRIVING WHILE TIRED

What are the risks?

Fatigue, including 'drowsy driving', is a contributing factor in between 16-20% of all road crashes in Victoria¹. After being awake for 17 hours, driving performance is consistent with that of a driver with a BAC (Blood Alcohol Concentration) of 0.05, and the risk of crashing doubles. After being awake for 21 hours, driving performance is equivalent to having a BAC of 0.15, with seven times the crash risk.

Fatigue-related crashes often involve vehicles running off the road or crossing the centre line. As sleeping drivers do not react or apply the brakes, the outcomes of these types of crashes are severe, especially at high speeds.

Because of lifestyle factors which influence getting enough sleep, young people, parents of infants, commercial drivers and shift workers are at increased risk of fatigue-related crashes³.

Impairment⁴

When we are drowsy, we are still awake but we are less alert. Drowsiness is associated with:

- Shortened attention span
- Slower reaction time
- Poor concentration
- Reduced awareness of the environment and situation
- Daydreaming or mental wondering
- Making errors.

Drowsiness when driving is associated with:

- Trouble remembering the last few kilometres driven
- Missing exits or street signs
- Difficulty maintaining the vehicle's position in the lane
- Inability to maintain a consistent speed
- Tailgating.

Science of sleep

Falling asleep is a neurochemical process that can't be consciously controlled. Sleepiness and alertness are mainly determined by the human body's circadian rhythms and sleep homeostasis.

Circadian rhythms are controlled by a biological clock inside our brain. The clock responds to light cues by increasing the production of melatonin (a hormone) at nighttime, then switching it off when it senses light.

Sleep homeostasis is the body's urge to sleep. With each hour of being awake, the desire for sleep builds, and the pressure to sleep increases dramatically after being awake for 16 hours⁵.

Sleep scientists recommend the following good sleep practices⁶:

- Maintain a regular bedtime and wake time.
- If you cannot fall asleep, do not stay in bed. Try getting out of bed and reading a book or having a light snack. This avoids creating an association between the bed and being unable to fall asleep.
- Allow time to wind down before bed and avoid activities that demand high levels of concentration shortly before bed.
- Avoid coffee, alcohol and nicotine in the hours leading up to bedtime. These substances are all stimulants and can disrupt the body's natural sleep rhythm.
- Do not exercise too close to bedtime.
- As the circadian system is particularly sensitive to light, devices such as iPhones and iPads should be avoided prior to bedtime.
- Ensure the bed and bedroom are conducive to sleep, including dim lighting, a moderate temperature and limited noise.

What works

Sleep is the only real solution to feeling tired. The following recommendations will help you to avoid driving while tired.

- Get a good night's sleep. For most adults, this means seven-to-nine hours.
- If you are feeling drowsy while driving, stop and take a powernap. Even short naps have been shown to temporarily increase alertness⁷.
- Schedule driving at times when you are not normally asleep.
- On long trips, share the driving and take regular breaks.
- Avoid beginning long trips after a full day's work.
- Be aware that some medicines cause drowsiness.
- Avoid alcohol before driving, as even low levels of blood alcohol are associated with drowsiness.

Turning up the music, opening windows or turning on the air conditioning while driving do not decrease your body's drive for sleep, and are not recommended. The only remedy is sleep.

Vehicle technology and road infrastructure can help prevent fatigue-related crashes, or reduce the severity if a crash does occur.

How can technology help?

- Lane Keep Assist either alerts drivers that they're drifting, or gently guides the vehicle back within the lane, reducing the risk of head-on and single vehicle crashes⁸.
- Safety infrastructure such as roadside or centreline barriers can prevent severe injury outcomes when drivers run off-road⁹.

What might the future look like?

- Cars that monitor and alert drivers to drowsiness by scanning the eyes and eyelids to detect eye movement, blinking and eye closure.
- Police devices that use eye scanning or saliva samples to detect fatigue-impaired drivers.

¹ <http://www.tac.vic.gov.au/road-safety/tac-campaigns/fatigue>

² <http://www.tac.vic.gov.au/road-safety/statistics/summaries/fatigue-statistics>

³ SWOV (2012). *Fatigue in traffic: causes and effects*. SWOV Fact sheet, August 2012. SWOV, Leidschendam

⁴ <http://drowsydriving.org/about/warning-signs/>, <http://healthysleep.med.harvard.edu> and <http://www.sleephealthfoundation.org.au>

⁵ Van Dongen HPA, Maislin G, Mullington JM, Dinges DF. (2003). The cumulative cost of additional wakefulness: Dose-response effects on neurobehavioral functions and sleep physiology from chronic sleep restriction and total sleep deprivation. *Sleep*, 26, 117-26

⁶ <http://healthysleep.med.harvard.edu> and <http://www.sleephealthfoundation.org.au>

⁷ Ficca G, Axelsson J, Mollicone DJ, Muto V, Vitiello MV. (2010). Naps, cognition and performance. *Sleep Med Rev.*, 14, 249-58.

⁸ Sternlund, S., Strandroth, J., Rizzi, M., Lie, A., & Tingvall, C. (2017). The effectiveness of lane departure warning systems—A reduction in real-world passenger car injury crashes. *Traffic Injury Prevention*, 18, 225-229.

⁹ Carlson, A. (2009). *Evaluation of 2+1 Roads with Cable Barrier: Final Report*. Swedish Road Administration. VTI Report 636A.

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