

Driving under the influence of alcohol

Summary

Driving under the influence of alcohol is a threat to road safety. In 2013, the estimated number of road deaths in the Netherlands due to alcohol was between 60 and 135. The legal limit for novice drivers in the Netherlands is a blood alcohol concentration (BAC) of 0.2 g/l and a BAC of 0.5 g/l for all other drivers. Young males and heavy drinkers form the most important risk groups for drink-driving. For years, only the group of relatively light drinkers declined among all drivers under the influence of alcohol in the Netherlands. Of late the group of serious offenders also seems to be declining. This is a positive road safety development as serious alcohol offenders are involved in about two-thirds of all alcohol-related crashes.

Measures like increased enforcement among heavy drinkers and the introduction of an alcolock programme can benefit road safety. In addition visible police controls of all drivers continue to be necessary to maintain the general preventive effect of alcohol controls.

Background and content

According to Article 8 of the Dutch Road Traffic Act it is an offence for a person to drive or to be in charge of a motor vehicle, when he is under such influence of a substance of which he knows or reasonably should know that its use – either in combination with or not in combination with the use of another substance – could diminish driving skills, and that he must therefore be considered unfit to drive. These substances include alcohol, drugs and psychoactive medicines (see also SWOV Fact sheet [The use of drugs and medicines behind the wheel](#)). This fact sheet discusses the use and the consequences of alcohol in traffic and possible measures to reduce this. In the Netherlands, the legal alcohol limit for novice drivers (drivers who have not yet possessed their licence for five years) is a blood alcohol concentration (BAC) of 0.2 g/l and a BAC of 0.5 g/l for other drivers.

How has alcohol consumption among drivers developed over time?

Alcohol consumption among drivers in Dutch traffic has since 1970 been monitored in the research project *Driving and Drinking Behaviour*. The research project consists of random alcohol testing of drivers during weekend nights in autumn.

Figure 1 shows the development of the proportion of drivers under the influence of alcohol during weekend nights since 1970. Between 1970 and 2010, alcohol consumption among drivers on Dutch roads during weekend nights decreased by about 85%. The decrease over the last 40 years is mainly the result of the introduction of a legal alcohol limit of 0.5 g/l in 1974 and the increase in enforcement. Increased enforcement was due to the introduction of electronic breath testing devices in 1984, and the introduction of breath analysis for evidence purposes in 1987. In addition, regional traffic enforcement teams were introduced in 1999, and the Dutch version of the Belgian 'Bob' (designated driver) public information campaign was launched in 2001. Lastly, the legal alcohol limit for novice drivers was lowered to 0.2 g/l on 1 January 2006 and on 1 December 2011 the alcolock programme was introduced as a measure for serious drink-driving offenders. However, the alcolock programme was temporarily stopped in October 2014 and in early March 2015 the Council of State of the Netherlands decided that mandatory participation in the alcolock programme could no longer be imposed on new cases. The main argument was that the programme may have a disproportionate effect in a substantial number of cases. After consultation with the Minister of Infrastructure and the Environment, the Minister of Justice announced in February 2016 that he will not include the alcolock programme in criminal law. The result seems to be that the alcolock programme has come to a definite end in the Netherlands.

The notable decrease in alcohol use in 1974 was caused by drivers estimating the probability of being detected as being very high during the first period following the introduction of the alcohol limit;

therefore the subjective probability of apprehension was very high. After a while, when it became clear that the probability of detection was not nearly as high as they had estimated, the number of offenders rapidly increased again. Even so, their proportion remained significantly smaller than during the period before the alcohol limit was introduced.

In the most recent decade, between 2002 and 2011, the proportion of alcohol offenders in weekend nights decreased by about one third to approximately 2%. In 2013 their proportion had even declined to 1.8%, the lowest proportion so far (WVL, 2014).

For years, the proportion of drivers under the influence of alcohol in the Netherlands only declined in the group of relatively light drinkers. Of late the group of serious offenders also seems to be declining. This is a positive road safety development, because heavy alcohol offenders are involved in about two-thirds of the alcohol-related crashes (WVL, 2014). These are crashes in which at least one of the involved drivers has used alcohol.

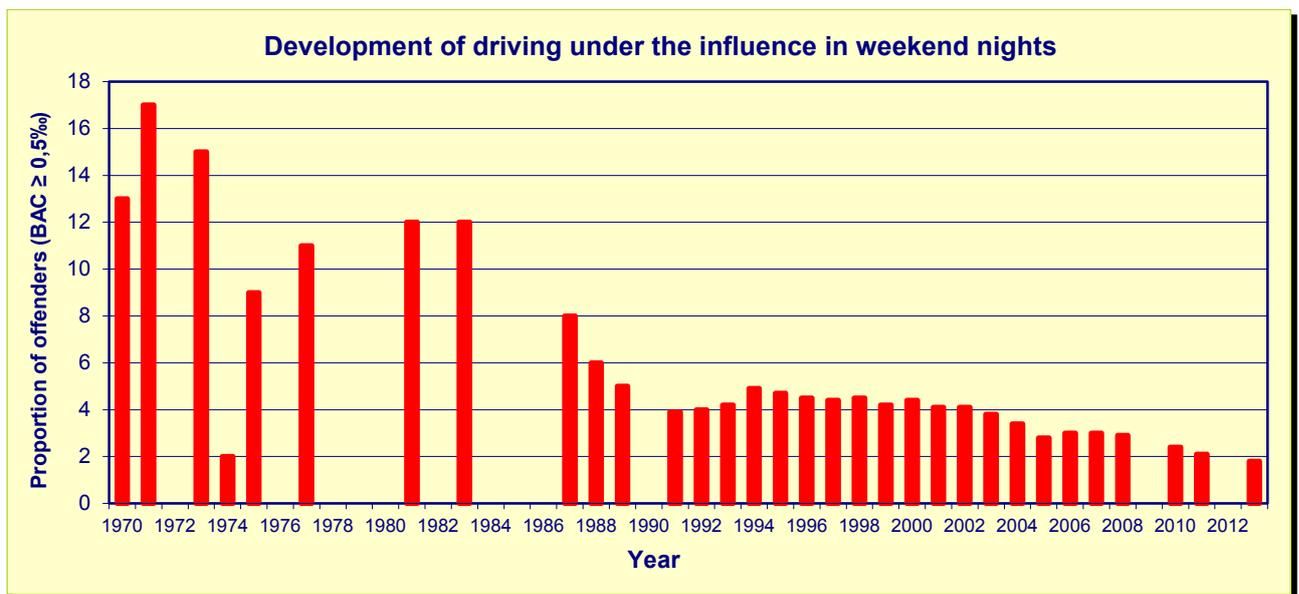


Figure 1. The proportion of alcohol offenders throughout the years. Sources: SWOV (up to 1998); WVL (from 1999).

Combination of alcohol and drugs

Within the framework of the large-scale European research project DRUID (Driving Under the Influence of Drugs, Alcohol and Medicines) a study was carried out in the period 2007-2009. As part of this study SWOV investigated the use of psychoactive substances in traffic in six police regions in the Netherlands (Houwing et al., 2011). The results indicated that, on average for all days and times of the week, 0.24% of the drivers had used a combination of alcohol and drugs. The results of the DRUID study also indicate that the proportion is highest among men younger than 35 during night time hours.

What are the risks of driving under the influence of alcohol?

After consumption, alcohol is absorbed into the bloodstream through the walls of the stomach and small intestines and reaches the brain in about ten minutes. Alcohol has a numbing effect on the brain resulting in a lowering of inhibitions, a reduction in the ability to concentrate and remember, and increased overconfidence of the user.

The consumption of alcohol also affects driving behaviour. Perception decreases and because the driver cannot steer the car as effectively, he begins to swerve. The driver's reaction also becomes slower.

Because drivers under the influence of alcohol also become more indifferent, they will also be less inclined to compensate for their reduced driving skills. In addition, these drivers overestimate their own abilities and underestimate the risks (Steyvers & Brookhuis, 1996).

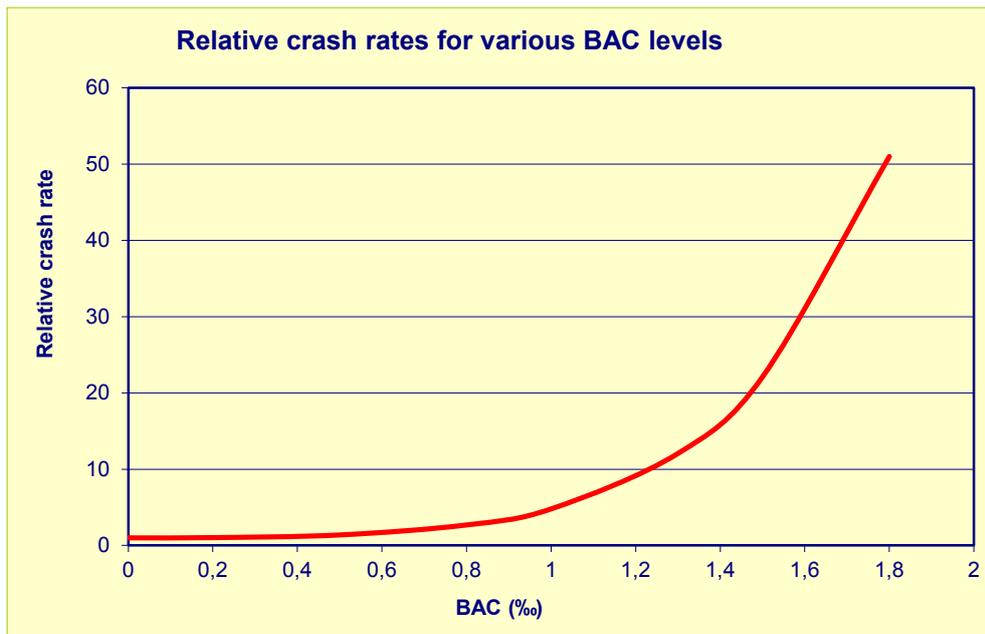


Figure 2. Relative crash rates for various BAC levels (Blomberg et al., 2005).

Figure 2 shows that driving under the influence of alcohol leads to an increased crash rate (Blomberg et al., 2005). The relative crash rate for a certain BAC level is the crash rate compared to that of a sober driver. The risk increases exponentially as the BAC level increases. Blomberg et al. (2005) estimate the risk for drivers with a BAC of 0.5 g/l to be approximately 40% higher. At 1.0 g/l, the risk is almost 4 times higher and at a BAC of 1.5 g/l. it even becomes 20 times higher than that of a sober driver. Cyclists and pedestrians are also subject to such an exponential increase: their risk of being injured in a road traffic crash increases exponentially as the BAC level increases (Olkkonen & Honkanen, 1990)

Combination of alcohol and drugs: an extra high risk

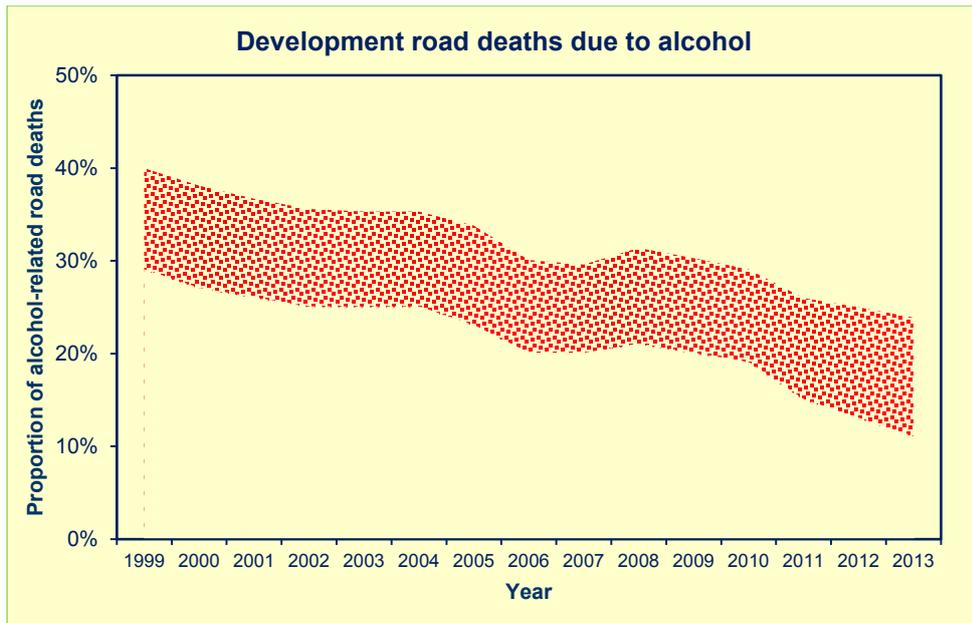
Drivers who combine the use of alcohol and drugs and/or medicines are about twice as likely to be injured in a road crash as a driver who has consumed only alcohol. Mathijssen & Houwing (2005) found that drivers who combine the use of drugs and/or medicines with alcohol and who have a BAC exceeding 0.8 g/l are about a hundred times more likely to be injured in traffic than sober drivers. The DRUID study also estimates the relative risk after the combined use of alcohol and drug to be extremely high (Hels et al., 2011).

How many casualties are due to alcohol-related crashes?

The numbers of deaths and injuries due to alcohol-related crashes are not precisely known. Data is available in the crash registration of the police and in the hospital register. However, both registrations give an underestimate as alcohol testing is not always carried out. In addition, deceased road users are rarely tested for alcohol because it is not considered appropriate from the perspective of criminal law.

SWOV has therefore estimated the *proportion* of alcohol-related road deaths based on the proportions of drivers with a BAC above the limit on weekend nights and the risk data by BAC-class. Figure 3 shows the development of the estimated total proportion of alcohol-related road deaths (all days and all times of day).

The outcome is that in 2013 an estimated 11%-24% of road deaths in the Netherlands is alcohol-related. This is not a very accurate estimate because of the uncertain nature of the underlying data. A more accurate estimate of the number of alcohol-related casualties requires a hospital study in which all seriously injured active road users are tested for alcohol during a certain period. However, such research is currently not foreseen.



Afbeelding 3. *The bandwidth of the estimated proportion of alcohol-related road deaths (Houwing et al., 2014).*

The BAC level not only affects the crash rate, it also has an influence on injury severity. Drivers with more than 1.5 g/l of alcohol in their blood, for example, are about two hundred times more likely to die in a road crash than sober drivers. This is due to the higher risk of being involved in a crash as well as the more severe injury in the event of a crash (Simpson & Mayhew, 1991).

This more severe injury in road crashes is mainly due to the fact that drivers under the influence of alcohol often speed and less frequently use their safety belt. The reduced physical condition of heavier drinkers may be yet another factor (Desapriya et al., 2006).

Which risk groups can be distinguished among drink-drivers?

Research (e.g. Blomberg et al., 2005; Mathijssen & Houwing, 2005) shows that young males and heavy drinkers are more likely to be involved in alcohol-related crashes.

Young males

Although in 2009 only 4% of the total Dutch driving licence holders were young males aged 18-24 (Statistics Netherlands, WVL), they accounted for 23% of the seriously injured drivers who were under the influence of alcohol. The proportion of young women among driving licence holders was also 4%, but no women were found in the random selection of 186 seriously injured drivers, either sober or under the influence (Isalberti et al., 2011). Despite the fact that young drivers consume less alcohol when they drive than older drivers (WVL, 2014), they are over-represented in the group of casualties and drivers involved in alcohol-related crashes (Mathijssen & Houwing, 2005). Due to their lack of experience, young novice drivers not only have a higher crash rate also when they are sober, but after consuming alcohol their crash rate increases faster than that of older, more experienced drivers (Blomberg et al., 2005; Mathijssen, 1999b; Peck et al., 2008; Keall et al., 2004). This can be seen in *Figure 4*.

Houwing et al. (2011a) found that the group of young males (ages 18-34) also counted the highest number of alcohol-drugs users. Whereas the combined use among drivers was 0.24%, it was about three times higher for the young male drivers.

Heavy drinkers

The Dutch hospital study within the DRUID project (Isalberti et al., 2011) shows that about two-thirds of the seriously injured drivers in severe alcohol-related crashes had a BAC exceeding 1.3 g/l. The group of heavy drinkers which at 0.2% can be considered relatively small in Dutch traffic is therefore responsible for the majority of alcohol-related crashes (Houwing et al., 2011a).

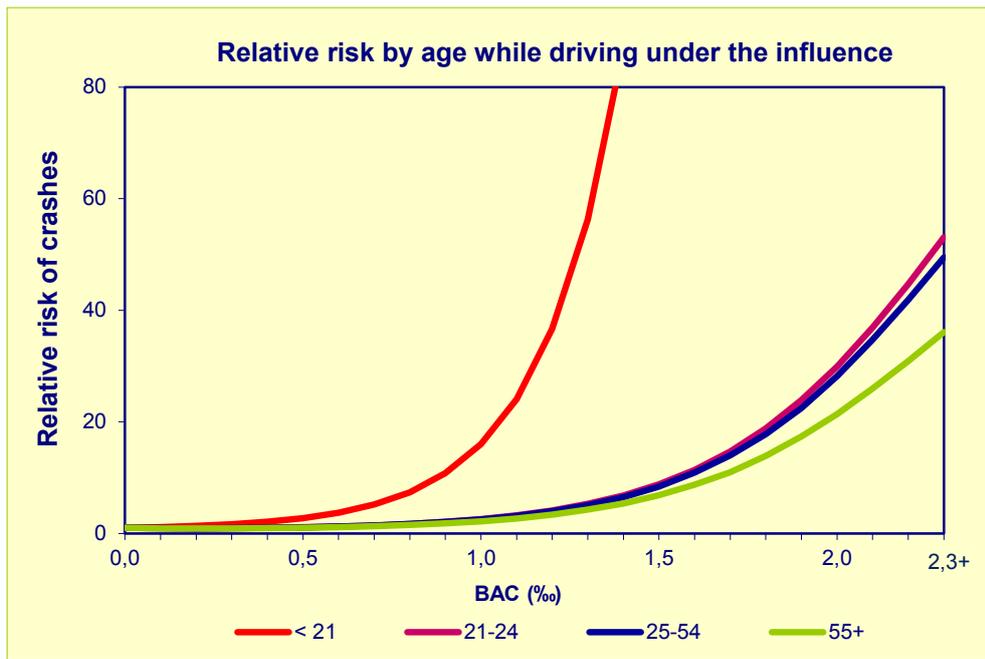


Figure 4. Relative risk for drivers in specific age groups to be involved in a crash at ascending BAC (Peck et al., 2008).

What measures can be taken?

Lower limits

As of 1 January 2006 the legal alcohol limit for novice drivers was reduced to 0.2 g/l. An additional advantage of the measure is that it can contribute to reducing combined alcohol and drug use that is more frequent among young males in particular and which leads to a very high crash rate. Data on the use of alcohol in weekend nights (WVL, 2014) shows that during the period 2006-2013 the use of alcohol among young novice drivers showed a relatively larger decrease than the alcohol use among older drivers.

A general reduction of the legal limit could have an adverse effect on the total number of alcohol-related crashes if it is not accompanied by increased police enforcement. This would be the effect of the real, objective probability of detection for heavy drinkers being much lower as the police would have to process many more offenders with the same capacity (Penttilä et al., 2004).

Public information and education

Campaigns are nearly always carried out in combination with other measures. This is why their direct effect on behaviour associated with drink-driving cannot be proven. However, campaigns can contribute to maintaining desired behaviour which has more or less been forced on people (Schults et al., 2004). Indications of this in the Netherlands were found particularly during the early 1990s. Despite a significant decrease in the enforcement of drink-driving that resulted from a reorganisation of the police, driving under the influence increased only very slightly at that time (Mathijssen, 1999a).

Enforcement

Enforcing legal measures is a major factor in the duration of the effects as well as in their degree of success (Fell & Voas, 2004; Geary & Preusser, 2004). Various studies (e.g. Mathijssen 2001; Erke et al., 2008) showed that enforcement is more effective when supported by publicity. Publicity about intensified enforcement results in a higher subjective probability of being caught and to a more rapid decrease in the number of offenders.

Alcohol controls have a general as well as a specific preventive effect. A general preventive effect ensures that people who do not offend against a rule, will not do so in the future either. A specific preventive effect, on the other hand, is the effect that prevents people who *do* offend from doing so in future. The unpredictability of an alcohol control is important for both types of preventive effect: to give people the feeling (general) that they can unexpectedly be checked and to limit offenders' possibilities

(specific) to avoid the alcohol control. It must be taken into account that nowadays the locations of alcohol controls are known quickly through for instance social media. By setting up part of the controls as mobile controls this issue can be addressed. However, visible controls also remain necessary to maintain the general preventive effect of alcohol controls.

Higher penalties

In comparison with many other European countries, the penalties for drink-driving in the Netherlands are relatively light. Research into the opinions, preferences and behaviour of Dutch drivers indicates that they are against drink-driving and would like to see it punished more severely (SARTRE, 2012). However, it is doubtful whether increased penalties would lead to a substantial reduction in drink-driving. The severity of penalties is found to have less impact than the probability of detection (also see SWOV Fact sheet [Penalties in traffic](#)).

Educational Measure Alcohol and Traffic

The Educational Measure Alcohol and Traffic (EMA) consists of a three-day course imposed on drivers with a relatively high BAC as well as on recidivists. The upper and lower BAC limit have been changed on a number of occasions, also as a result of the introduction and abolishment of the alcohol interlock device. At present the limits are 1.0 - 1.8 g/l for experienced drivers and 0.8 – 1.3 g/l for novice drivers. A study into the effectiveness of the EMA showed an increased knowledge among the participants of drink-driving, but no effect on recidivism (Nägele & Vissers, 2000).

Not only an EMA, but also a LEMA (light EMA) can be imposed.¹ Like the EMA, the LEMA is a course about the risks of alcohol use in the traffic, but it consists of two half-days instead of three days. An interim report on the measurement of recidivism among novice drivers who had followed the LEMA indicated that 12-13% of them were found to drive under the influence again within two years. Although this share was significantly lower than in a similar group of novice drivers who had not taken part in the LEMA, it could not be ruled out that this difference in recidivism was caused by differences in the backgrounds of the participants and the comparison group (Blom, 2014).

Alcolock

An alcohol interlock device or alcolock is an in-vehicle alcohol tester which is connected to the starting mechanism and acts as an ignition interlock. Only after an alcohol test has been successfully passed can the engine be started.

Various assessments have shown that an alcolock is more effective in preventing recidivism than licence suspension. Research in North America and Canada, indicates that for comparable alcohol offences recidivism is two to three times higher among the serious offenders whose licence had been suspended than among offenders who had to drive a car with an alcolock installed (Bax et al., 2001). However, after the alcolock programme had been completed, the participants became recidivists as often as the drivers whose licences had been suspended. A possible extension of the alcolock programme for participants who are not very capable in separating consuming alcohol and driving a car and providing assistance to treat these drivers' alcohol problem could reduce recidivism among drivers (Silverans et al., 2006). An alcolock programme was introduced in the Netherlands on 1 December 2011; the Ministry of Infrastructure and the Environment estimates that this programme will save five or six road deaths per year (SWOV, 2009). However, the programme was temporarily suspended on October 2014 and in early March 2015 the Council of State of the Netherlands decided that mandatory participation in the alcolock programme could no longer be imposed. The main argument was that the programme may have a disproportionate effect in a substantial number of cases. After consultation with the Minister of Infrastructure and the Environment, the Minister of Justice announced in February 2016 that he will not include the alcolock programme in criminal law. The result seems to be that the alcolock programme has come to a definite end in the Netherlands. More information about this topic is available in the SWOV Fact sheet [Alcohol interlock devices](#).

Comprehensive approach to alcohol abuse by youths

Alcohol abuse not only leads to higher risks in traffic, but also to social damages such as damage to health, aggression and disturbance. It could therefore be an option to choose a comprehensive approach to alcohol abuse by young people, part of which being drinking and driving. Houwing et al.

¹ Initially the LEMA was only intended for novice drivers, but since December 2011 it can also be imposed on experienced drivers.

(2015) suggest this can for example be connected to initiatives with a public health perspective, focusing on moderation of alcohol consumption, and to awareness campaigns that highlight the dangers of alcohol. The researchers also see especially cyclists as a target group, since the alcohol use among cyclists is still tolerated in practice.

Conclusion

The proportion of drivers under the influence of alcohol is still decreasing. For a considerable period this drop only occurred among the relatively light alcohol offenders, but in recent years a decrease can also be observed among the heavy alcohol offenders..

The introduction of the alcolock programme in December 2011 may have contributed to the decrease. The Ministry of Infrastructure and the Environment estimated that the programme would save five to six road deaths per year. However, the alcolock programme may no longer be imposed since March 2015.

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