# SWOV Fact sheet

## The use of drugs and medicines behind the wheel

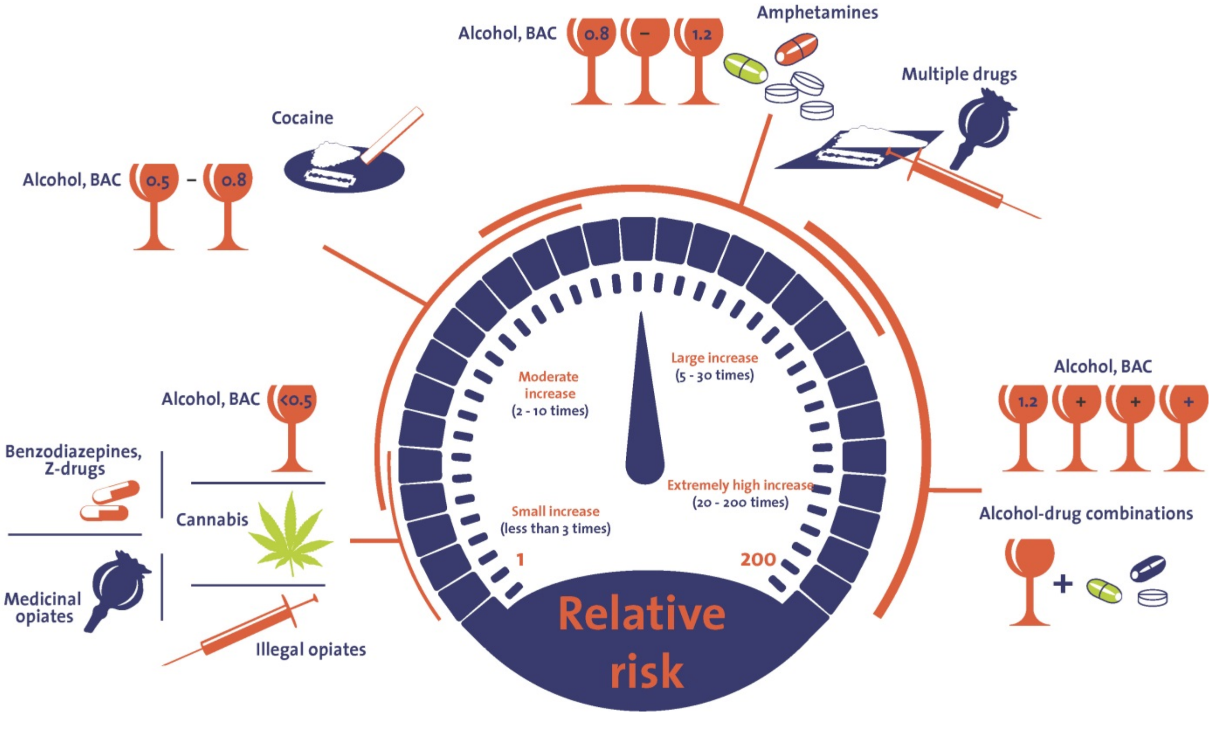

**Summary**

*Research shows that about 4% of drivers in Europe participate in traffic after having taken drugs and/or medicines. With 3.4% this share was lower in the Netherlands; traces of drugs were found in approximately 2.8% of the car drivers and traces of drugs were found in 0.6%. Substance use is highest among young male drivers. Alcohol and cannabis (hashish and weed) are used by far the most in Dutch traffic, followed by cocaine and benzodiazepines (sleeping pills and tranquilizers). The exact number of road traffic casualties due to drug use in traffic is unknown. A hospital study indicates that approximately 10% of the seriously injured drivers tested positive for drugs.*

*Police enforcement of drug use in traffic will benefit when legal limit are set for drug use in traffic. Such limits will be introduced in the Netherlands on 1 July 2016. The new limits for each individual drug are based on the relationship with behaviour, i.e. impairment of the ability to drive. The new legislation uses the zero limit for 'combined use of substances'. As the use of alcohol leads to a greater number of traffic casualties, it is important that the enforcement on drugs use in traffic is not at the expense of the enforcement on alcohol.*


**How dangerous is the use of drugs and medicines in traffic?**

Drug use leads to higher risks in traffic. This is even more so the case for the combined use of multiple drugs and for drug-alcohol combinations. In addition, the use of only amphetamines makes the likelihood of serious or fatal injury in a crash 5 to 30 times greater, the use of cocaine leads to a 2 to 10 times higher risk of serious or fatal injury, and the use of cannabis and illegal opiates makes the risk about 1 to 3 times greater (Hels et al., 2011). These are all 'relative risk data' (see image) compared to the risk of serious or fatal injury without the use of drugs or alcohol.



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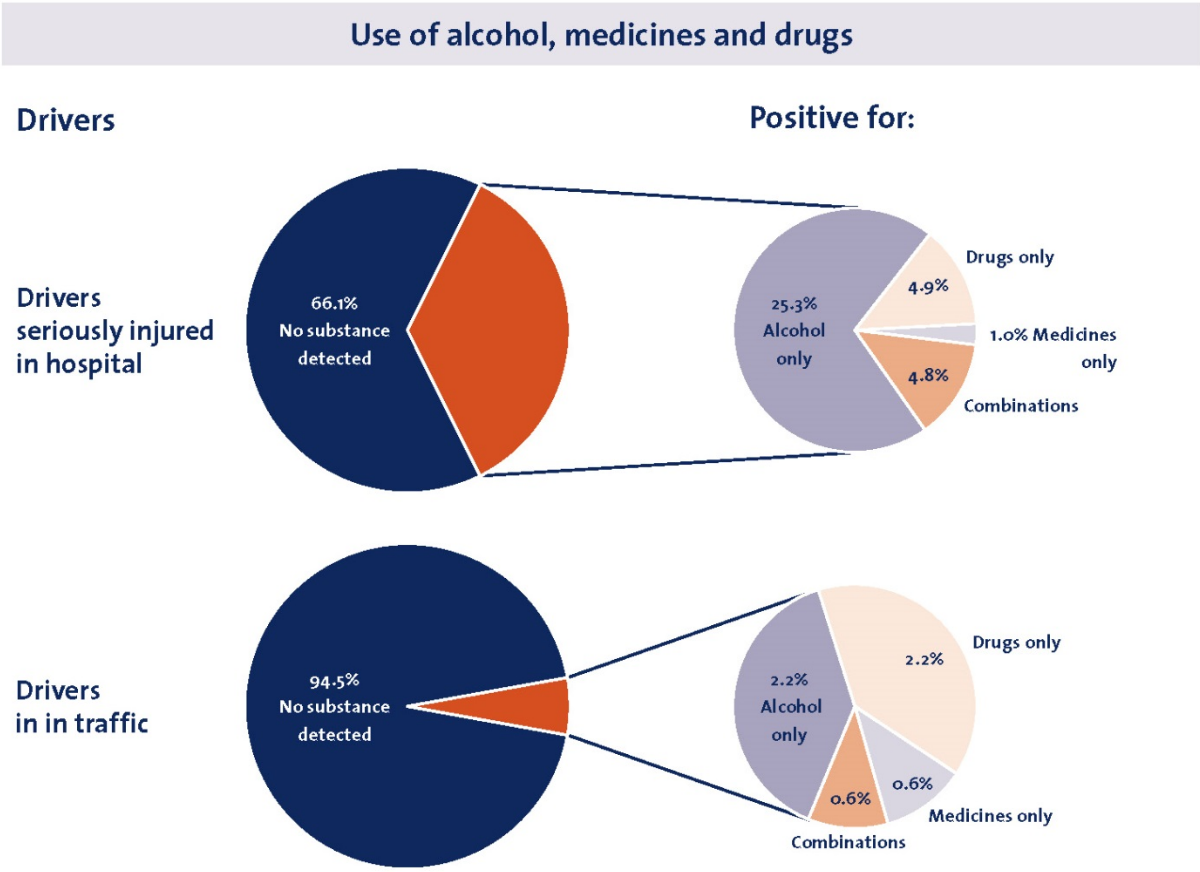
**How many casualties are related to drug use  in traffic?**
The precise number of casualties due to drug use in traffic is unknown.

Approximately 1 in every 10 seriously injured drivers is estimated to have used drugs; about half of these casualties have also used alcohol. This is data from the DRUID study and are from the period 2007-2009 (Isalberti et al., 2011). In this study, three hospitals in the Netherlands tested the blood of seriously injured drivers for alcohol, medicines and drugs. More recent data is not available.

The figure below shows the shares of seriously injured drivers who were tested (positive) for the use of drugs and medicines  (upper part of the figure; data 2007-2009, the Netherlands).




The lower part of the figure answers the following question:

**How many drivers are under the influence of drugs or medicines?**
In Europe, drugs and/or medicines were found in approximately 4% of the drivers (Houwing et al., 2011). With 3.4% the share was lower in the Netherlands: traces of drugs were found in about 2.8% of the drivers and 0.6% had traces of medicines in their body (see previous figure; period 2007-2009; Houwing et al., 2011). However, this share does not yet include the use of the party drug GHB and of SSRIs (medicines mainly used as antidepressant). The DRUID project did not measure how frequently these substances were found in drivers. An estimated 1.2% of all drivers participate in Dutch traffic under the influence of  medicines that affect the ability to drive a car (Houwing & Hagenzieker, 2013).

The table below provides the more detailed data on which the above pie charts are based:  the data of the individual psychoactive substances and their 95% conficence intervals (Isalberti et al., 2011; Houwing et al., 2011).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## Drivers having used psychoactive substances

| Which group? | Which substance? | Share of seriously injured drivers | Share of drivers in traffic |
|---|---|---|---|
| Nothing | No substance detected | 66.1% (59.0 - 72.5) | 94.5% (93.81 - 95.10) |
| Alcohol only | Alcohol > 0.1 g/l | 25.3% (19.6 - 32.0) | 2.2% (1.78 - 2.60) |
| One drug only | Cannabis | 0.5% (0.0 - 2.9) | 1.7% (1.34 - 2.07) |
| | Cocaine | 1.1% (0.3 - 3.9) | 0.3% (0.18 - 0.50) |
| | Amphetamines | 1.1% (0.3 - 3.9) | 0.2% (0.10 - 0.36) |
| | GHB | 2.2% (--) | -- (--) |
| | Illegal opiates (e.g. heroin) | -- (0.0% - 2.0%) | 0.01% (0.00 - 0.09) |
| One medicine only | Benzodiazepines | -- (0.0% - 2.0%) | 0.4% (0.25 - 0.62) |
| | Medicinal opiates<br>(e.g. morphine and codeine) | 0.5% (0.0 - 2.9) | 0.2% (0.08 - 0.32) |
| | Z-drugs<br>(e.g. zolpidem and zopiclon) | 0.5% (0.0 - 2.9) | 0.04% (0.01 - 0.15) |
| Combinations | Drug-drug combinations | 0.5% (0.0 - 2.9) | 0.4% (0.22 - 0.56) |
| | Alcohol-drug combinations | 4.3% (2.2 - 8.3) | 0.2% (0.13 - 0.42) |

Drug use is highest among young male drivers (18-24 years-old). A total of 8.1% in this group tested positive for the use of one or more type of drug (Houwing et al., 2011). It should be noted that traces of drugs can also be detected if the drugs were taken some time earlier, and therefore this does not necessarily mean that the user actually participates in traffic under the influence of drugs. It turns out that alcohol and cannabis are found in traffic by far the most, followed by cocaine and benzodiazepines (sleeping pills and tranquilizers, anti-anxiety medication).

**What is the effect of drugs and medicines on the ability to drive?**
Driving simulator research shows that the effect of drugs and medicines on driving ability varies by type of drug and even within one type of drug there are differences in the effects (Berghaus et al., 2011; Ramaekers et al., 2011). The table summarizes the possible effects of the various drug types.

## Negative effect on driving skills

| Which substance? | Effect on driver | Negative effect on ability to drive |
|---|---|---|
| Cannabis  | 'High', 'stoned', feeling of:<br>• euphoria<br>• relaxation<br>• drowsiness | Worse performance in complex driving tasks:<br>↘ reaction<br>↘ coordination<br>↘ memory |
| Stimulants:<br>Amphetamines<br>Ecstasy<br>Cocaine  | Feeling of:<br>• energy<br>• alertness | Overconfidence:<br>↗ speed<br>↗ aggressive driving<br>↗ risk-taking<br>↘ vehicle control |
| Medicines:<br>Benzodiazepines<br>SSRIs<br>Codeine/morphine  | Feeling of:<br>• sleepiness<br>• absent-mindedness<br>• agitation | Worse performance in driving tasks:<br>↘ coordination<br>↘ assessment<br>↘ reaction<br>↘ vehicle control |


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Cannabis makes users 'high' or 'stoned' which leads to reduced skills on complex driving tasks that require dividing the attention between different aspects of the task. However, cannabis users seem aware of the reduced skills and try to correct for this. The adverse effects may therefore be smaller than expected. However, cannabis used in combination with alcohol leads to a further reduction of skills, because the adverse effects of both substances reinforce each other (Steyvers & Brookhuis, 1996; Bosker et al., 2012).

Stimulant drugs can cause overconfidence, whereas at the same time the control of the vehicle lessens (Ramaekers, 2011; Shinar, 2006).

Medicines can also affect the ability to drive. Medicine use in the Netherlands is below the European average. This is possibly the result of the strict policy in the Netherlands regarding the prescription of medicines (Houwing & Hagenzieker, 2013).

In the Netherlands, the medicines found to be used by drivers are mainly benzodiazepines (sleeping pills and tranquilizers, anti-anxiety medication) and SSRIs (antidepressants). The numbing effect of these drugs on the brain affects the ability to drive (Houwing & Hagenzieker, 2013). As the adverse effects of benzodiazepines in combination with alcohol are extra strong, the use of this combination is discouraged (e.g. Steyvers & Brookhuis, 1996; Shinar, 2006).

**Which measures can be taken and what are the effects?**

The present measures against driving under the influence mainly focus on alcohol and hardly on the use of drugs and medicines. Yet, there are measures that could push back the use of drugs and medicines that affect driving skills in traffic:

- Introduction of limits and enforcement of these limits
- Increasing knowledge and risk awareness of drug use in traffic
- Providing information about medicines that affect the ability to drive

The precise effects of the above measures are still unknown. This is due to the fact that there is still too little data are available to evaluate these measures. For example, when the use of psychoactive substances among drivers and among seriously injured road users in hospitals were to be monitored, it will be easier in the future to measure the effects of measures against drug use.

*Introduction of limits and enforcement of these limits*

From 1 July 2016, legal limits for drug use in traffic will be operational in the Netherlands. The new legislation is based on behaviour-related limits for the use of a single drug (single use) and zero limits for combination use. Behaviour-related limits are limits above which psychoactive substances affect the ability to drive. In the Netherlands the limit values have been set in such a way that their effect on the ability to drive is similar to the 0.5 g/l limit for alcohol (Staatscourant, 2011).

From a road safety point of view, enforcement of the legal limits for drug use in traffic should particularly focus on the groups with the highest risk, such as the users of combinations of drugs and the young male drivers.

There are no known evaluations of the road safety effects of drug legislation and enforcement. Legislation and enforcement regarding the use of drugs in traffic is expected to have a specific effect as well as a general preventive effect. However, it is important to keep in mind that there are far fewer traffic casualties due to drug and medicine use than as a result of alcohol use. When the enforcement on drugs in traffic were to be at the expense of enforcement on drinking and driving, this would have a negative road safety effect (Veisten et al., 2011).

Most drugs can be detected using saliva testers. These testers, however, cannot detect all types of drugs. For technical reasons, for example, the detection of GHB is not possible. In addition, a saliva test is rather time-consuming and it is very expensive to use it on just any driver. Therefore a preselection, for example on the basis of external characteristics and behaviours, will probably be necessary from the point of view of cost-effectiveness.

*Increasing knowledge and risk awareness of drug use in traffic*

To support and perpetuate the effects of legislation and enforcement, users should be made more aware of the hazards involved in the use of drugs in traffic. Prevention programmes can play a role in

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strengthening the social norm that driving under the influence of drugs is not acceptable (Holmes et al., 2014; Heissing et al., 2011). In addition, the deterrent effect of legislation must be increased by public information when the law is introduced to make road users familiar with the legislation on driving under the influence of drugs.

*Providing information about medicines that affect the ability to drive*
Measures against the adverse effects of medicines in traffic focus mainly on providing information. Different forms of communication can be used to warn drivers of the potential risk of the use of drugs in traffic, such as a warning labels on the package of medicines, information leaflets inside the package, brochures and information campaigns in the media. Also national Government campaigns to raise awareness of the risks of participation in traffic among users of psychoactive medicines. In the Netherlands such campaigns are held with some regularity.

Another form of communication is doctors and pharmacists providing information to individual patients. During a consultation, the doctor should inform the patient step by step about the risks and side effects of the prescription medicines and about possible alternatives. In addition, the doctor is to record all information that is relevant to determine whether the patient is fit to drive (Monteiro, 2014).

For both forms of information it is important that the medicines are classified in a uniform manner according to their possible effect on the ability to drive. Such a uniform classification system has been worked out within  DRUID (De Gier et al., 2009). However, this new classification system has not yet been put into use.

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