

RECOMMENDATIONS REGARDING DRIVING AND PSYCHOACTIVE SUBSTANCES

IBERO-AMERICAN ROAD SAFETY PROGRAMME/OISEVI

These recommendations were approved at the 8th General Assembly of the Ibero-American Road Safety Observatory (OISEVI), held in Madrid on 6-8 May 2019.

Contents

1. Background.....	3
1.1. Scale of the problem.....	3
1.2. Effects of drugs.....	4
1.3. Risk of suffering a road accident.....	5
2. Regulations.....	7
2.1. Zero tolerance.....	7
2.2. Distinction between presence and influence.....	8
2.3. Mandatory requirement to undergo tests.....	9
2.4. Consumption of medicines.....	9
3. Vigilance.....	10
3.1. Tests for drugs in oral fluid.....	10
3.2. Tests for drugs in blood.....	11
3.3. Nested drugs tests performed selectively.....	11
3.4. Successive drugs tests after a collision.....	11
3.5. Nested drugs tests of those committing violations.....	12
4. Technical aspects.....	13
5. Information systems.....	14
5.1. Studies into prevalence of consumption.....	14
5.2. Definition of drug consumption-related road accident.....	14
5.3. Information on accidents related to the consumption of alcohol and/or drugs.....	15
5.4. Information from autopsies and hospitals.....	15
6. Other recommendations.....	16
6.1. Educational and awareness-raising measures.....	16
6.2. Education.....	16
6.3. Research and development.....	17
REFERENCES.....	18

1. Background

Alcohol, in particular in high concentrations, must remain the main focus for vigilance and measures to prevent the consumption of drugs. However, the consumption of other drugs and psychotropic medication among drivers is a problem which must be addressed, although it entails many more difficulties than the control of alcohol consumption.

Both illegal and legal drugs alter the driver's psychological and physical state, impairing their driving. The use of multiple drugs simultaneously, or in combination with alcohol, further increases the risk of a road accident.

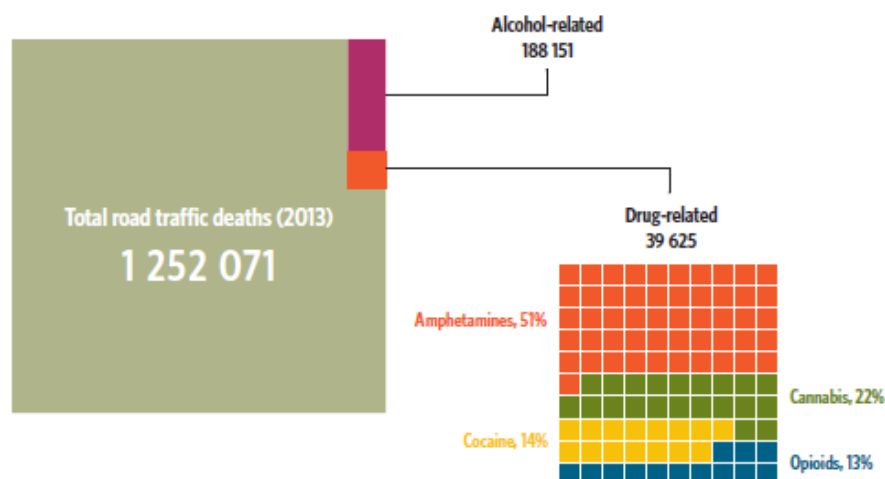
The general purpose of these recommendations is to identify best practices to guide the development of effective policies that will reduce the number of drugs-related traffic victims. They serve as the starting point to facilitate the selection of measures in public policy decision-making, distinguishing between those which concern regulatory provisions, vigilance, information management, and other aspects.

The term "psychoactive drug" is used here to refer both to illegal and to legal substances, excluding alcohol. Given the scale of the topic, this report focuses mainly on illegal drugs and new psychoactive substances, while nonetheless making reference to legal medication, such as prescription medicines.

1.1. Scale of the problem

In 2013 it was estimated that illegal drug use was responsible for more than 39,600 traffic deaths worldwide (WHO, 2016b). It was estimated that amphetamine consumption caused around half of these deaths, while cannabis was responsible for a fifth.

Proportion of drug-related road traffic deaths



One of the main difficulties in this field is the different diversity of drugs which exist on the market, which trigger different effects depending on the doses, the characteristics of the individual consuming them, or the type of substance.

The European DRUID project: "Driving Under the Influence of Drugs, Alcohol and Medicines" has calculated that on average:

- 3.48% of drivers in the European Union drive with alcohol (> 0.1 g/l) in their blood,
- 1.9% with illegal drugs,
- 1.4% with (a limited list) of medicines,
- 0.37% with a combination of alcohol and drugs, and
- 0.39% with different classes of drug.

Of the drugs analysed, cannabis is the most common, after alcohol, although benzodiazepines are on occasion even more frequent than cannabis, when samples of these drugs have been analysed. Statistically, the use of amphetamines, cannabis, benzodiazepines, heroin and cocaine is associated with a greater risk of being involved in and/or responsible for an accident, and in many cases this risk increases when the drug is combined with another psychoactive substance, such as alcohol.

1.2. Effects of drugs

The consumption of psychoactive drugs before driving has a negative impact on a person's ability to drive, by undermining their normal cognitive behaviour and psychomotor function.

Psychoactive drugs affect important aspects when driving: reaction times, vehicle control, risk perception and self-perception (SWOV, 2015). These changes worsen when multiple psychoactive drugs are combined, or they are used in combination with alcohol.

The effects of psychoactive drugs are complex and varied:

- Some psychoactive drugs (**stimulants**) give a false sense of security, instilling the driver with a high level of confidence in their driving ability. They are also associated with driving too fast (speeding), taking unnecessary risks (jumping traffic lights, switching lane, etc.) and poor reaction times. Some drivers believe that taking psychoactive drugs makes them better drivers, despite the fact that there is little scientific evidence in support of this belief.
- Other types of medication, such as **benzodiazepines** and drugs such as **opioids**, cause drowsiness (they are known as nervous system depressants).
- Chronic drug takers may (falsely) feel that drugs have a very slight effect on their driving ability (EMCDDA, 2012).

There is a growing number of new psychoactive substances currently available which aim to imitate the effects of established illegal drugs, such as cannabis and MDMA. They may have serious effects on health, since some are considerably more toxic than other illegal drugs, leading to poisoning and death (EMCDDA, 2016). Little is known as to how prevalent the consumption of these new psychoactive substances is, since further research is required.

The following table sets out the forms in which drugs affect brain function (WHO, 2016):

Class of drug	Drugs	Drug impairment						
		Drowsiness	Cognitive functions	Motor functions	Mood	Lateral control of the vehicle	Reaction time	Balance
Illegal drugs	Cannabis	X	X	X	X	X	X	X
	Cocaine	-	X	X	X	-	-	-
	Amphetamines	-	X	X	X	-	X	X
	MDMA(a)	-	X	-	X	-	-	X
	Hallucinogens	-	X	X	X	-	X	X
Prescription drugs	Benzodiazepines	X	X	X	-	X	-	X
	Opioids	X	X	X	X	X	-	X
	Other depressants	X	X	X	X	X	-	X
New psychoactive substances	Synthetic cannabinoids	X	X	X	X	X	X	X
	Synthetic cathinones	-	X	X	X	-	-	-

X: Affects, -: Does not affect Source: (NHTSA, 2014)

1.3. Risk of suffering a road accident

Drivers who have consumed drugs also tend to have a greater risk of involvement in serious accidents. Numerous studies have examined the impact of drug consumption among drivers injured or killed in car accidents. Cannabis is the substance most commonly found, followed by benzodiazepines. Estimates vary widely, and depend on the type of accident and case selection. Nonetheless, the evidence clearly demonstrates that drugs other than alcohol are not infrequent among drivers involved in serious traffic accidents.

However, the key problem is not the frequency with which drugs are detected among drivers, but the extent to which consumption of a particular psychoactive substance contributed to the crash. Analytical epidemiological studies aim to determine the extent to which medicines are disproportionately represented among drivers involved in traffic accidents, and to quantify the crash risk associated with the use of various types of medicine. Three approaches have been employed to estimate the risk of accident: case studies and controls, studies of responsibility/blame for the crash, and pharmacoepidemiological studies. These studies face

numerous methodological obstacles, and the differences in their findings may in part be attributed to a variety of factors, such as approach (case-control, analysis of responsibility); seriousness of the crash (e.g. injury, fatality); fluid used for the tests (e.g. urine, blood); and sample size. Despite these challenges, though, the general weight of evidence reveals a greater risk of involvement in collisions among drivers consuming various types of substance, furthermore revealing that:

- The scale of the risks of collision associated with drug consumption is generally lower than those associated with alcohol consumption, in particular those with higher levels of alcohol in their blood.
- The impairment in driving caused by these substances reveals greater risks when combined with alcohol, even in small quantities. (OECD / ITF, 2010).

The following table summarises the estimations of risk associated with alcohol and other drugs, according to the results of the DRUID project.

TABLE 11

Typical odds ratios for injury or death as a result of a car crash while under the influence of alcohol, medicinal or recreational drugs, based on meta-analyses and DRUID case-control studies

	Odds ratio (95 % CI)	Reference
Alcohol 0–0.49 g/l	1.18 (0.81–1.73)	Hels et al. (2011)
Alcohol 0.5–0.79 g/l	3.64 (2.31–5.72)	Hels et al. (2011)
Alcohol 0.8–1.2 g/l	13.35 (8.15–21.88)	Hels et al. (2011)
Alcohol ≥ 1.2 g/l	62.79 (44.51–88.58)	Hels et al. (2011)
Amphetamines	6.19 (3.46–11.06)	Elvik (2013) (†)
Antidepressants	1.32 (1.08–1.70)	Elvik (2013) (†)
Antihistamines	1.12 (1.02–1.22)	Elvik (2013) (†)
Benzodiazepines	1.59 (1.10–2.31)	Dassanayake et al. (2011)
Cannabis	1.92 (1.35–2.73)	Asbridge et al. (2012)
Cocaine	1.66 (0.91–3.02)	Elvik (2013) (†)
Opioids	1.89 (1.47–2.43)	Elvik (2013) (†)

(†) As odds ratios are given for different crashes, we give the odds ratio for injury crashes here.
 NB: Significantly increased odds ratios are shown in bold.

2. Regulations

The most direct way of addressing the issue of driving with psychoactive drugs is through legislation and appropriate application of the law. A total of 159 countries around the world have national legislation prohibiting the use of drugs, although most of these laws do not define what is considered a "drug", nor do they specify a threshold (WHO, 2015).

Efforts to effectively address drug consumption typically involve a combination of legislative initiatives, vigilance and prevention activities. To date, the nature of these efforts has been based on the considerable experience of measures applied to tackle the issue of drink-driving. Much has been learned over the last 30 years as to effective ways of reducing alcohol consumption and driving, and these lessons are steering the development and implementation of measures to control the problem of drug consumption behind the wheel.

Despite the clear parallels between driving under the effects of alcohol and of drugs, there are numerous differences which must be taken into account in adapting these measures. For example, the term "drugs" covers a wide variety of substances. Some are illegal, but are widely used for their euphoria-inducing effects (such as cannabis, cocaine); others are prescribed for medical purposes (such as benzodiazepines). Meanwhile, some prescription medicines are used inappropriately (for example an incorrect dose or in combination with alcohol), or by people to whom they were not prescribed. Each of these situations involves different behaviours, motivations and subgroups within the population. Any approach must take these varying situations into account.

2.1. Zero tolerance

There is considerable regulatory experience in addressing alcohol consumption when driving. According to the links established between blood alcohol concentration (BAC), impairment and risk of accident, the regulations specify that drivers have committed a violation or offence if their BAC is above a specified value. Such laws based on a figure (maximum permitted level) remove the need to demonstrate that the driver was negatively affected by the consumption of alcohol.

It is harder to adapt alcohol regulations to the situation of driving under the effect of drugs. While research over the last fifty years clearly establishes the relationship between alcohol, impaired driving and risk of accident, no similar evidence is available for all the psychoactive substances that could potentially be detrimental.

The alternative employed by various countries is to establish a drugs limit of zero. These so-called "zero tolerance" laws specify that any detectable amount of certain substances found in a driver's body will be considered a violation. Various countries¹ have zero tolerance laws for drugs. One additional advantage of this type of law is that it serves to reinforce existing regulations to combat the possession and/or use of illegal substances.

¹ Example: France, Cyprus, Italy, Finland, Czech Republic, Spain, United Kingdom, state of Victoria in Australia

Although zero tolerance laws for illegal substances may be quick and politically acceptable, this is not the case for medicines. Setting a zero tolerance standard for all psychoactive medicines would affect a great many drivers. While it must be acknowledged that many psychoactive pharmaceutical products may impair the driver's ability, in particular at the start of treatment, or after a change of dose, if taken responsibly under medical prescription and for a therapeutic purpose (as recommended in the technical specifications/product inserts), the risk/benefit balance may be favourable.

In any event, zero tolerance drugs policies are recommended, taking into account the difficulty in determining certain specific substances, and in setting limits. A system of zero tolerance for illegal psychoactive drugs employing the lower limit of quantification must take into account passive or accidental exposure. This model establishes legal limits with a concentration of the substance set at the laboratory limit of detection (LOD) or the lower limit of quantification (LLOQ): Any driver with a detectable quantity of a relevant psychoactive substance is deemed to have broken the law. The limit set for the LLOQ approach is typically higher than the LOD.

2.2. Distinction between presence and influence

According to the zero tolerance approach, any driver in whom any of the drugs covered by the traffic regulations is detected, may be penalised. However, in certain circumstances it may not be sufficient to detect the presence of drugs, but also to demonstrate that the driver was under their influence. In some countries, corroboration of influence is essential in order to bring criminal action against the driver.

The current state of scientific knowledge does not serve to demonstrate the influence on psycho-physical aptitude and capacity to drive a vehicle affecting an individual with a certain concentration level of the drug in oral fluid, among other reasons because of the different toxicokinetic effect of each drug, and because it has not (at least for most of the substances studied) been possible to establish a correlation between the levels of concentration in oral fluid and blood.

Given all the above, the recommendation is to determine the influence that such drugs are causing on the physical and/or mental faculties of the driver, to be understood as those factors triggering anomalous or risky driving, causing an accident, leading the individual to reveal a type of sign the intensity of which can be evaluated by a law enforcement officer who, acting in a judicial police role and relying on the results of the evidence and a formal record of signs, decides whether or not the person was under the influence of the drugs.

This means that in order to accredit influence, it will be essential to identify the external signs seen in the driver, revealing the importance of drawing up a formal record of signs, and justifying specific training which would be necessary and essential for law enforcement officers.

2.3. Mandatory requirement to undergo tests

One important aspect to take into account within the regulatory context is the obligation on the part of motor vehicle drivers, along with any other person involved in a road accident, to undergo alcohol and drugs tests administered by law enforcement officers.

This mandatory condition must cover different types of test: preventive, following an accident and following a violation.

2.4. Consumption of medicines

The problems derived from the use of medicines among drivers must be addressed by providing doctors and patients with appropriate information, but not by defining thresholds.

In those cases where the consumption of this type of substance has been prescribed by a doctor, then that physician will inform the patient whether the prescribed dose could affect driving ability or not. In such cases, as the doctor knows exactly which active ingredient is contained in the medication prescribed, they are in a position to decide whether the stated dose does or does not affect the patient's ability to drive. Meanwhile, if these substances are not consumed under a medical prescription, the person ingesting them has no prior medical evaluation of the extent of their effects.

When psychoactive medicines are prescribed, whether for the treatment of pain, insomnia or as antidepressants, the dose prescribed must be high enough to have the desired therapeutic effect, but without undermining the ability to drive, which could seriously affect the patient's quality of life.

3. Vigilance

Legislation and penalties can only be effective when they are effectively enforced. In fact, the main factor serving as a general deterrent in the case of driving after consuming drugs is the perceived risk of being stopped (EMCDDA, 2012). Among the general driving population, only 11% believe that on a given trip the likelihood of the police performing a drugs test is great or very great (Acherman Stürmer, Y. 2016). It is therefore vital that vigilance in itself be conducted appropriately and visibly.

In Spain, vigilance with regard to drugs takes place in two stages. The first is highway detection. Drivers suspected of driving under the influence of psychoactive drugs are stopped and evaluated by the police, using equipment which provides evidence of drugs in oral fluid. If the result is positive, a second sample will be taken from the driver for analysis of evidence in oral fluid, or the individual may be taken to a hospital to provide a blood sample.

It may prove difficult to detect psychoactive drugs in drivers. Unlike alcohol, detection and measurement of psychoactive substances is more complex, costly, and takes longer (minutes rather than seconds). Long stops and checks may prove costly. Subjects are therefore normally selected (rather than chosen at random), and on the basis that if a driver has already given a positive result for alcohol, a drugs detection test may not be performed on them.

It is important that the technology and protocols employed in applying the regulations be fully proven prior to complete implementation. It is advisable to work on technical standards to help standardise the technology used in the selection and the test. Application varies among and within countries, and depends to a great extent on human and financial resources, as well as the capacities and authorities of police forces.

Highway checkpoint location is another factor typically used to maximise effectiveness, while the ability of the police to identify possible drug users is likewise important.

3.1. Tests for drugs in oral fluid

It would be helpful to find a method of detecting recent drug consumption, as in the case of alcohol (detected in exhaled air), with a method that is practical (convenient for the subject) and non-invasive.

Most drugs can be detected through oral fluid. The oral fluid test is easy to perform, is not invasive, and is quick. It can furthermore be performed roadside by law enforcement officers, making it the optimal test to preselect those drivers most likely to have consumed drugs.

In Spain, indicative tests (the first test performed on the driver once to obtain an indication of consumption) are performed with a sample of oral fluid, while confirmation of the consumption of drugs (after an initial positive indicative test) is performed by means of a laboratory analysis of a sample of oral fluid or blood.

3.2. Tests for drugs in blood

Tests to identify drug consumption by means of blood samples require the driver/citizen to be taken to a hospital where the sample can be taken. This often involves a considerable time elapsing from the moment of detection and the sample being taken. Meanwhile, in the great majority of cases this sample cannot be analysed at the hospital itself, because of the specificities required by the detection technique, which means that the sample must then be transferred to an external laboratory.

All these difficulties mean that in the case of Spain, blood samples to determine drug consumption are taken only in the following cases:

- Salivation impossible. Either because the subject is unconscious (because of an accident) or because of clinical/manifest inability to salivate.
- The citizen does not agree with the positive result of the indicative test and wishes to compare the results obtained from the sample of oral fluid analysed in the laboratory, with a blood sample.

3.3. Nested drugs tests performed selectively

From the perspective of road safety, the application of the legal limits for the use of drugs in traffic situations must focus in particular on higher-risk groups, such as cases of multiple consumption and young drivers.

In Spain, an alcohol test is first performed, in general and on grounds of effectiveness. If the result is positive, no drugs test is conducted. If negative, and where suspicions may exist, a drugs test is performed. This is known as a "nested approach".

3.4. Successive drugs tests after a collision

Blood alcohol and drugs tests performed on drivers involved in a traffic accident with victims not only result in effective legal enforcement, but also a sense of trust among the general population that this risk factor is subject to proper vigilance.

The recommendation is to conduct a blood alcohol test on all motor vehicle drivers, cyclists and pedestrians involved in a traffic accident with victims.

If it is not possible to perform the test systematically, other methods should be applied to allow adjustment of the official figures of fatalities and serious injuries in traffic accidents connected with the consumption of drugs. The volume of information which may be gathered as part of the subsequent accident investigation varies from one country to another.

3.5. Nested drugs tests of those committing violations

In general, there is a greater likelihood of drug consumption among those drivers who have committed a prior traffic violation. It is therefore advisable to conduct selective drugs tests on those perpetrators who have been notified on the road that they have committed some prior violation.

4. Technical aspects

There are no international regulations in this regard, and at present each country is adopting whichever procedures are best suited to its needs. The recommendations detailed below are based on the experience of Spain, where tests (indicative and evidential) are performed with oral fluid, blood being used only in those cases where the citizen is unconscious, cannot salivate, or does not agree with the indicative result of the test and demands a comparative test.

In order to convey a clear message to society, it is important that both scientists and public authorities define as uniform a procedure as possible, detailing the substances and cut-off points that will be tested, as well as defining those cases in which the subject is under the influence of psychoactive substances. As we have already seen, it is difficult to implement a threshold equivalent to the blood alcohol concentration for other psychoactive substances, because of the differing pharmacological natures of the range of substances, the limitations of experimental and epidemiological research intended to determine any cut-off level, the ethical considerations involved in their application, and the matter of combining or separating control of drug abuse and road safety measures (ESTC, 2017). No threshold equivalent to BAC for alcohol consumption can at present be established for psychoactive drugs, because of the limitations referred to above.

The substances to be analysed must be selected by each country, taking into account those that are more commonly consumed among the population. A distinction is made among three main types of psychoactive substance (WHO, 2016):

- Illegal drugs (such as cocaine, heroin, methamphetamine, cannabis) are under international control, and produced and consumed mainly for non-medical purposes.
- Medicines (such as antidepressants, benzodiazepines, opioid painkillers) for the treatment of medical conditions.
- New psychoactive substances (such as synthetic cannabinoids, synthetic cathinones), which are synthesised and consumed for non-medical purposes in the expectation of the effects of known illegal drugs.

The substances identified in the UN Single Convention on Narcotic Drugs of 30 March 1961 and the Vienna Convention on Psychotropic Substances of 21 February 1971, provide a clear reference to define the drugs to be tested.

Notwithstanding these lists, it is advisable to consider any substance which could, once inside the body, modify one or more of the driver's psycho-physical conditions, exerting an influence that could jeopardise road safety, even if they are not specifically narcotic or psychotropic substances included on these lists.

5. Information systems

5.1. Studies into prevalence of consumption

Epidemiological studies as to drugs and driving examine the prevalence of drug consumption among different groups of drivers. These studies include roadside tests or surveys, prevalence studies in subsets of drivers, accident risk studies, analysis of responsibility, interview surveys and pharmacoepidemiological studies. Legislation, data protection, data availability and funding may affect the choice of survey type. Roadside tests or surveys are more directly representative of the general driver population.

In epidemiological research, the appropriate study design may be difficult to implement because of the limitations of the methodology, and there may be risk factors associated with the use of drugs that do not arise from the study findings. Furthermore, epidemiological studies are not always easy to compare. If, for example, the data are drawn from different populations, the researchers use different types of sample or detection techniques, or samples are analysed for different psychoactive substances (EMCDDA, 2014).

It is worth highlighting in this section some of the conclusions of the DRUID project (Hargutt et al., 2011), from the perspective of traffic safety, in particular taking into account the prevalence rates and risks observed:

- Alcohol, in particular in high concentrations, must remain the number one priority in drug control.
- The combination of alcohol and drugs or medicines would seem to be an issue requiring a more intense focus, as it entails very high traffic risks.
- The problems of the use of medicines among drivers must be addressed by providing doctors and patients with relevant information, rather than defining usage thresholds.
- Further research is needed to evaluate the likely risks of amphetamines in actual traffic, and mediating factors. Up until now, studies into the impact of these substances have varied depending on the research design.

5.2. Definition of drug consumption-related road accident

To evaluate the presence of drugs in traffic accidents with fatalities, an international definition is needed of what a drug consumption-related road accident is, no such definition having yet been achieved.

This demands a cautious approach in comparing the prevalence of drugs in fatal accidents among different countries.

The recommendation is to standardise the definition of drug consumption-related fatality.

5.3. Information on accidents related to the consumption of alcohol and/or drugs

A systematic approach is advisable in terms of conducting a drugs test after a traffic accident and registering the results for statistical analysis, in order to evaluate the efficacy of measures to combat drug use when driving.

Complete results as to drugs tests would serve to compare the incidence of inappropriate behaviours regarding drugs among different groups of drivers, thereby contributing to better decision-making.

5.4. Information from autopsies and hospitals

Drugs tests can only be performed at the roadside if the victim is conscious and fully capable in order to conduct the procedure. However, information as to possible consumption among those who are killed or seriously injured must be drawn from other sources.

It is important to define the operational protocol for hospitals with regard to immediately taking and analysing a blood sample in the case of those with serious injuries suffered in a road accident. And it is likewise desirable to establish channels of communication so that information concerning consumption of drugs derived from the results of autopsies on traffic accident fatalities can be transferred to the body responsible for analysing the prevalence of alcohol consumption in traffic accidents.

6. Other recommendations

6.1. Educational and awareness-raising measures

There are studies demonstrating that vigilance intervention is more effective if supported by an advertising or awareness campaign. Such campaigns convey the message that anyone could be subjected to a test, thereby underpinning vigilance actions.

6.2. Education

As with other risk factors, educational measures should be addressed on a preventive basis, through educational and awareness-raising campaigns.

It would be beneficial to approach such measures by providing information first about the ban on drug consumption when driving, and furthermore about the specific effects that drugs may have on individuals and their ability to drive, since some users falsely believe that their driving performance improves after consuming certain substances.

Different messages are typically devised according to the target group: general public, people with addiction problems, young people, primary school teachers, doctors and other professionals. It is also important that those reaching decisions as to road policy, legislators and judges, are aware of the key implications derived from driving under the influence of psychoactive drugs.

Social disapproval is believed to have an important impact on the prevalence of driving under the effects of drugs (EMCDAA, 2012). Ensuring that the general population are aware of the dangers of driving and the effects of drugs could therefore help to reduce prevalence, as has been seen with drinking. Vigilance on public roads may serve to educate the public, while at the same time acting as a deterrent.

Given the prevalence of drug consumption among young people, and the fact that youngsters are more likely to suffer an accident, many drug-driving campaigns target this segment of the population. Young people could also be educated in this matter as part of the process of obtaining any type of driving licence.

In particular, health professionals need to help patients understand the effects that prescribed medicines or drugs could have on their driving. For example, useful information is provided in package inserts/packaging/technical specifications of medicines as to the effects they may have on driving.

Companies also play an important role in alcohol or drug training, which is of particular significance in the case of companies responsible for goods or passenger transport by road.

6.3. Research and development

As has been seen over the course of this document, continued research is needed in this field.

An understanding of the role of drugs in road accidents demands evidence of two complementary approaches to research: experimental and epidemiological research. The role of experimentation is to document the nature and scope of the impairment caused by specific doses of drug. The role of epidemiological studies is to determine the extent to which drugs contribute to traffic accidents.

Research addressing this matter requires support. One of the problems we find on occasion is the difficulty in comparing studies. To obtain more compatible methodologies, in 2006-07 a committee of international experts, including representatives from the ECDMMA, and the National Institute on Drug Abuse drew up guidelines for future research into drugs and driving (Walsh et al., 2008). According to these guidelines, comparisons of such studies should take into account the different research designs, biological matrices analysed, cut-off levels, etc.

REFERENCES

- European Monitoring Centre for Drugs and Drug Addiction (2014), "Drug use, impaired driving and traffic accidents"
- Walsh, J. M., Verstraete, A. G. Huestis, M. A. and Morland, J. (2008), 'Guidelines for research on drugged driving', *Addiction* 103, 1258–1268.
- SWOV (2015). The use of drugs and medicines behind the wheel. SWOV Fact sheet, July 2015, The Hague.
- EMCDDA 2012, Driving Under the Influence of Drugs, Alcohol and Medicines in Europe: Findings from the DRUID Project, p23.
- EMCDDA 2016, European Drug Report: Trends and Developments, p12
- Hargutt, V., Kruger, H. -P. and Knoche, A. (2011), 'Driving under the influence of alcohol, illicit drugs and medicines. Risk estimations from different methodological approaches', DRUID Deliverable 1.3.1., Bundesanstalt für Strassenwesen, Bergisch-Gladbach.
- EMCDDA 2012, Driving Under the Influence of Drugs, Alcohol and Medicines in Europe: Findings from the DRUID Project, p42.
- Achermann Stürmer, Y. (2016). Driving under the influence of alcohol and drugs. ESRA thematic report no. 2. ESRA project (European Survey of Road users' safety Attitude). Bern, Switzerland: Swiss Council for Accident Prevention, p25.
- ETSC (2017). PREVENTING DRUG DRIVING IN EUROPE Policy measures for national and EU action
- OECD/ITF (2010) Drugs and Driving: Detection and Deterrence ISBN: 978-92-82-10275-6
- WHO (2015). Global status report on road safety 2015. Geneva: World Health Organization; 2015.
- WHO (2016). Drug use and road safety: a policy brief. Geneva, Switzerland, World Health Organization, 2016.
- WHO (2016b) Global health estimates. Geneva, Switzerland, World Health Organization; 2016.
- NHTSA (2014) Couper FJ, Logan BK. Drugs and human performance fact sheets. Washington (DC): National Highway Traffic Safety Administration; 2014 (Report No. DOT HS 809 725).
- EMCDDA (2018), European Monitoring Centre for Drugs and Drug Addiction, and Canadian Centre on Substance Use and Addiction (2018), Cannabis and driving: questions and answers for policymaking, Publications Office of the European Union, Luxembourg.