




A policy brief

# Drug use and road safety



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Organization



# Psychoactive substance use affects the functioning of the brain and leads to impaired driving

Drug use and road safety: a policy brief.

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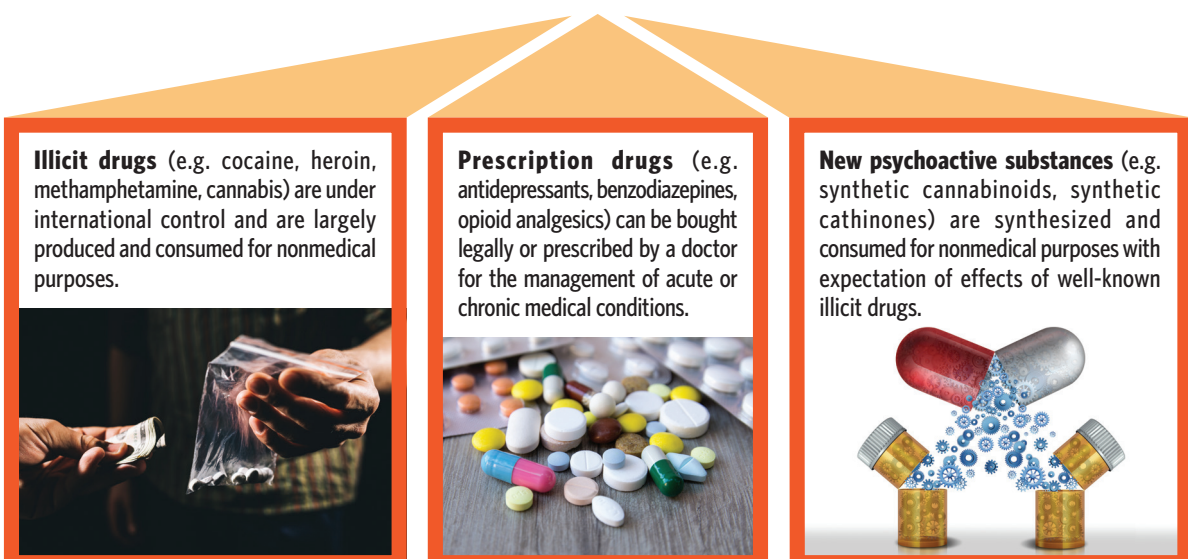
# A growing concern

There is growing concern around the world about drug use and road safety. Drinking alcohol and driving is a well studied risk factor for road traffic crashes, injuries and deaths but drug-induced impairment of driving is causing increasing concern in many countries around the world. For many years there have been several gaps in our knowledge, particularly about the global extent of the problem, the relationship between drug concentrations and crash risk, appropriate threshold limits in blood, legislation and enforcement of effective measures to prevent drug-driving. However, these knowledge gaps are progressively being filled by a growing body of evidence on drug use and road safety, including effective ways to reduce drug-induced road traffic crashes and injuries (1-8).

For the purpose of this document the term “drug” is used as an equivalent of “psychoactive drug”, which refers to a substance that has the ability to affect mental processes such as an individual’s consciousness, mood or thinking. The term “drug” in this document does not include alcohol and nicotine which are covered by the term “psychoactive substance”.

The purpose of the document is to provide up-to-date information on drug use and road safety to support informed decisions on road safety and drug policies in WHO Member States. This document focuses on drug-driving and not on drink-driving. Drawing on the growth in knowledge in this area over recent decades, the document describes the impact of drug use on road safety and suggests what can be done to reduce drug-related crashes, injuries and deaths on the roads. Three categories of psychoactive drug are relevant to the risk of road traffic injury (Figure 1).

**Figure 1**  
Psychoactive drugs relevant to road traffic injury risk



# How do psychoactive drugs impair driving?

Psychoactive drugs affect the functioning of the brain and may lead to impaired driving (e.g. by delaying reaction time and information processing, reducing perceptual-motor coordination and motor performance,

as well as attention, road tracking and vehicle control). The ways in which different drugs affect brain functioning are summarized in Table 1.

**Table 1**  
Ways in which different drugs affect brain functioning

Drug class	Drug	Impairment						
		Drowsiness	Cognitive functions	Motor functions	Mood	Lateral vehicle control	Time estimation	Balance
Illicit drugs	Cannabis	●	●	●	●	●	●	●
	Cocaine	—	●	●	●	—	—	—
	Amphetamines	—	●	●	●	—	●	●
	MDMA <sup>a</sup>	—	●	—	●	—	—	●
	Hallucinogens	—	●	●	●	—	●	●
Prescription drugs	Benzodiazepines	●	●	●	—	●	—	●
	Opioids	●	●	●	●	●	—	●
	Other depressants	●	●	●	●	●	—	●
New psychoactive substances	Synthetic cannabinoids	●	●	●	●	●	●	●
	Synthetic cathinones	—	●	●	●	—	—	—

Source: Based upon reference (9).

●: the drug has an impairment effect.

—: the drug has no impairment effect.

<sup>a</sup> Methylendioxyamphetamine.

The risk of getting involved in a road traffic crash is increased to varying degrees depending on the psychoactive drug used (Table 2). For example, the risk of a fatal

crash occurring among those who have used amphetamines is about five times higher than among persons who have not used them.

**Table 2**  
Summary estimates of relative risk of road traffic crash associated with the use of various drugs

Drug	Crash severity	Best estimate of relative risk adjusted for publication bias	95% confidence interval
Amphetamine	Fatal	<b>5.17</b>	(2.56, 10.42)
	Injury	<b>6.19</b>	(3.46, 11.06)
	Property damage	<b>8.67</b>	(3.23, 23.32)
Analgesics	Injury	1.02	(0.89, 1.16)
Anti-asthmatics	Injury	<b>1.31</b>	(1.07, 1.59)
Anti-depressives	Injury	<b>1.35</b>	(1.11, 1.65)
	Property damage	1.28	(0.90, 1.80)
Anti-histamines	Injury	<b>1.12</b>	(1.02, 1.22)
Benzodiazepines	Fatal	<b>2.30</b>	(1.59, 3.32)
	Injury	<b>1.17</b>	(1.08, 1.28)
	Property damage	<b>1.35</b>	(1.04, 1.76)
Cannabis	Fatal	1.26	(0.88, 1.81)
	Injury	1.10	(0.88, 1.39)
	Property damage	<b>1.26</b>	(1.10, 1.44)
Cocaine	Fatal	<b>2.96</b>	(1.18, 7.38)
	Injury	1.66	(0.91, 3.02)
	Property damage	1.44	(0.93, 2.23)
Opiates	Fatal	<b>1.68</b>	(1.01, 2.81)
	Injury	<b>1.91</b>	(1.48, 2.45)
	Property damage	<b>4.76</b>	(2.10, 10.80)
Penicillin	Injury	1.12	(0.91, 1.39)
Zopiclone	Fatal	2.60	(0.89, 7.56)
	Injury	1.42	(0.87, 2.31)
	Property damage	<b>4.00</b>	(1.31, 12.21)

Source: Based upon reference (6).

Notes: Estimates shown in bold are statistically significant at the 5% level.

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# Epidemiology of drug use and road traffic injuries

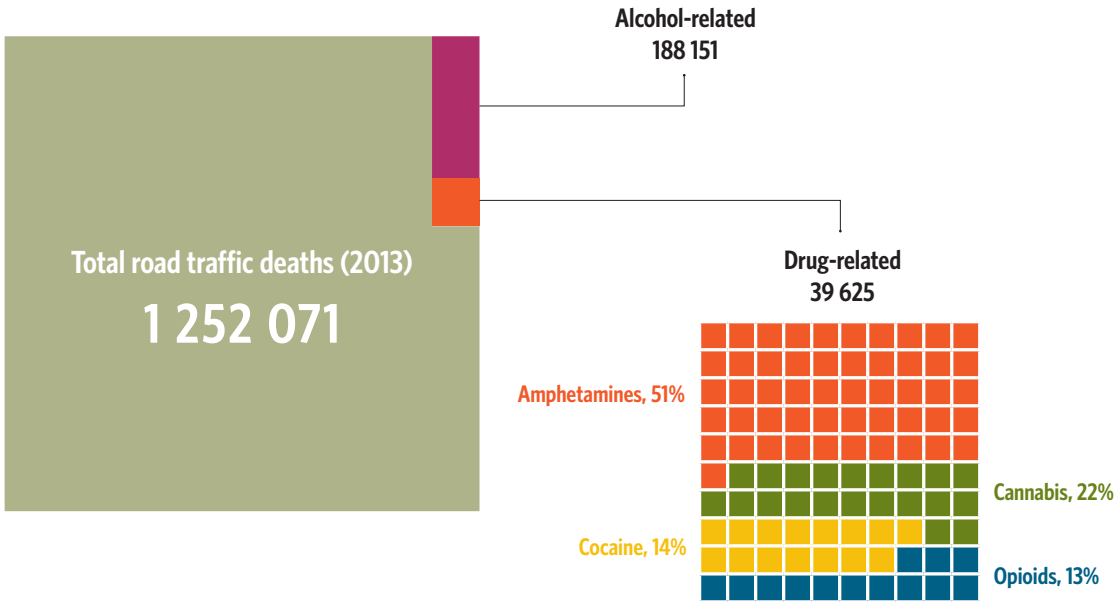
Surveys and laboratory tests from various countries show that psychoactive drug use is reported frequently by drivers or detected in the biological fluids of injured or killed drivers. For instance:

- Roadside surveys show that the prevalence of any psychoactive drug among drivers ranges from 3.9% to 20.0% (10, 11).
- Population surveys show that self-reported driving after using psychoactive drugs (mostly cannabis) varies in different countries between 3.8% and 29.9% (12, 13).
- Prevalence of drug use (such as amphetamines, benzodiazepines, cannabis

and cocaine) among fatally injured persons in a road traffic crash ranges from 8.8% to 33.5% (10, 14).

In 2013, illicit drug use was estimated to be responsible for just over 39 600 road traffic deaths worldwide (15). Amphetamine use was estimated to cause around half of these deaths while cannabis was estimated to cause one fifth of them (Figure 2). Although there were more deaths due to drink-driving worldwide in the same year (just over 188 000), the risk of death from drug-driving remains high.

**Figure 2**  
Proportion of drug-related road traffic deaths



# Prevention and early interventions

Measures that need to be in place and implemented in a comprehensive manner cover five essential areas: legislation, testing, enforcement, awareness-raising, and counselling and treatment.

## Establishing drug-driving laws and regulations

The type of legal framework varies according to the social, legal and economic characteristics of a particular jurisdiction, as well as the historical context of the development of laws designed to improve road user safety.

- **Zero tolerance laws** make it unlawful to drive with any amount of specified drugs in the body.
- **Impairment laws** make it unlawful to drive when the ability to drive has become impaired following drug use, often

described as being “under the influence” or in similar terms.

- **Per se laws** make it unlawful to drive with amounts of specified drugs that exceed the maximum set concentration. The specific link between drug concentration, impairment and the risk of a crash still needs more research. To date, a few countries, including the United Kingdom, have adopted per se laws (Box 1).

A total of 159 countries around the world have national legislation prohibiting drug-driving but most of these laws do not define what is considered to be a “drug”, nor do they specify a threshold (7). It will be difficult to enforce drug-driving laws in countries that have neither defined what is considered to be a “drug” nor specified a threshold.

## Box 1

### Drug-driving legislation in the United Kingdom

In 2012, the government of the United Kingdom announced a new offence in relation to driving with specific controlled drugs in the body above the limit specified in regulations. The Crime and Courts Act inserted a new section 5A in the Road Traffic Act 1988 (16,17). Thus, on 2 March 2015, new regulations came into force in England and Wales, addressing eight general prescription drugs and eight illicit drugs. Regulations on amphetamines came into force on 14 April 2015.

#### EXCERPTS FROM ROAD TRAFFIC ACT 1988

##### Section 4. Driving, or being in charge, when under influence of drink or drugs.

(1) A person who, when driving or attempting to drive a mechanically propelled vehicle on a road or other public place, is unfit to drive through drink or drugs is guilty of an offence.

(2) Without prejudice to subsection (1) above, a person who, when in charge of a mechanically propelled vehicle which is on a road or other public place, is unfit to drive through drink or drugs is guilty of an offence.

(...)

##### Section 5A. Driving or being in charge of a motor vehicle with concentration of specified controlled drug above specified limit

(1) This section applies where a person ("D")—  
(a) drives or attempts to drive a motor vehicle on a road or other public place, or  
(b) is in charge of a motor vehicle on a road or other public place, and there is in D's body a specified controlled drug.

(2) D is guilty of an offence if the proportion of the drug in D's blood or urine exceeds the specified limit for that drug.

(...)

##### Specified controlled drugs and specified limits in England and Wales based on the Drug-Driving (specified limits) (England and Wales) Regulations 2014 and the Drug-Driving (specified limits) (England and Wales) Amendments regulations 2015

Controlled drug	Limit (microgrammes per litre of blood)
Amphetamine	250
Benzoylcegonine	50
Clonazepam	50
Cocaine	10
Delta-9-Tetrahydrocannabinol	2
Diazepam	550
Flunitrazepam	300
Ketamine	20
Lorazepam	100
Lysergic Acid Diethylamide	1
Methadone	500
Methylamphetamine	10
Methylenedioxymethamphetamine	10
6-Monoacetylmorphine	5
Morphine	80
Oxazepam	300
Temazepam	1000



Department for Transport, United Kingdom. © Crown



## Testing for drug use

Testing for the presence of a drug in the body fluid ascertains whether a particular drug is present and, in some cases, at what concentration. An important factor is whether the legal framework allows random testing or requires a suspicion of drug impairment before a drug test can be administered. Oral fluid sampling is relatively non-invasive, and can be carried out anywhere and without requiring medical or specialist qualifications.

Testing and/or detecting drugs can be done at the roadside (Box 2) and in hospital emergency rooms or other settings to determine the extent of drug use among drivers and other road users. It is important to detect and monitor the trend in the use

of drugs among drivers and other road users continuously to determine the scale of the problem and to develop appropriate measures. Where a threshold concentration has been specified in legislation, in order for the legislation to work, enforcement officers must be trained to collect samples of bodily fluid for testing. For drugs that as yet have no set threshold, enforcement officers must be trained to recognize clinical signs and symptoms of drug use, assess impairment, and take samples to determine the type and concentration of substance present. The type and concentration of substance present can also be tested on injured persons attending hospitals or emergency rooms.

### Box 2

#### Roadside drug-use testing in Australia

Australia has a national road safety strategy. However, each of the six states and two territories of Australia is responsible for road safety policy, legislation and enforcement within its jurisdiction (18–20). Each of the eight jurisdictions in Australia has a roadside drug-testing programme. The State of Victoria was the first jurisdiction to introduce random roadside drug-testing just over a decade ago, with the other jurisdictions progressively introducing similar programmes over the following seven years.

The roadside testing process for illicit drugs in Victoria involves a five-step process:

**Step 1:** Vehicle intercept

**Step 2:** Roadside preliminary oral fluid sample

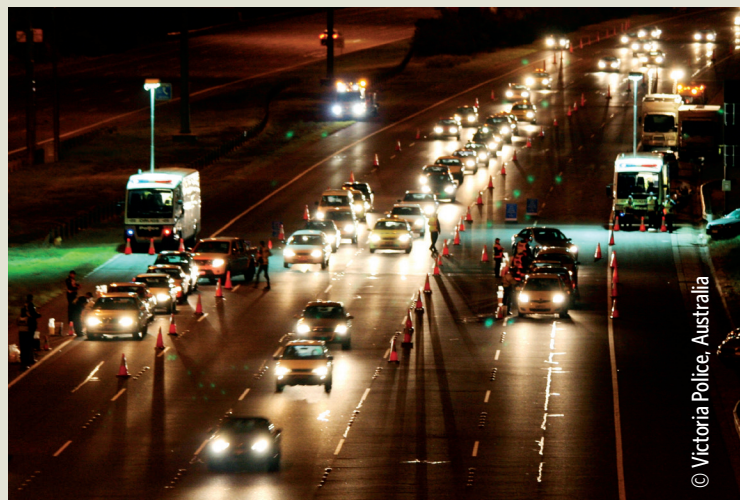
**Step 3:** Second oral fluid sample screening

**Step 4:** Laboratory confirmation analysis

**Step 5:** Prosecution if the person has a previous offence

If there is no previous offence and the sample is positive, the case is dealt with by a penalty notice issued by the police with a fine and suspension of the driving licence.

Different devices may be used for the roadside preliminary test. They give positive or negative readings in three minutes. Over 300 000 tests were conducted in Victoria between 2005 and 2014. The prevalence of positive test results went down between 2005 and 2010 but has begun to rise again. Methamphetamine accounted for 85% of positive drug tests, cannabis for 32%, and 22% of tests were positive for more than one drug.



## Enforcing drug-driving laws

It is critical that a drug-driving law is visibly and regularly enforced. In addition, appropriate penalties should be imposed to support compliance with the requirements of

the law (Box 3). Without visible enforcement and swift penalties, a drug-driving law has little chance of changing behaviour.

### Box 3

#### Enforcing drug-driving laws in Spain

Spanish drug-driving laws have a dual approach: drug driving is considered as both an administrative infringement (Law 6/2014) (21) and a criminal offence (Organic Law 5/2010) (22). Drug-driving as an administrative infringement is based on a zero tolerance system where the person driving with any amount of drugs (except prescribed medicines for therapeutic purposes) is punished by a fine (1000 Euros) and demerit points (6 points) (Law 6/2014). Drug-driving as a criminal offence is based on the impairment of the driver due to drugs as shown by impairment signs, where the law punishes the person driving under the influence of drugs by imprisonment (3–6 months), or a fine, or community service (31–90 days) and by driving disqualification (for 1–4 years) (Organic Law 5/2010). The penalties imposed for drug-driving are either those prescribed for the administrative infringement or those relating to the criminal offence; the penalties relating to both laws cannot be simultaneously applied for the same infraction.

If stopped randomly at a checkpoint, or if involved in a road traffic crash or if committing another (road traffic) infraction, drivers are subjected to a drug test and are obliged to provide a saliva sample. The drivers are first submitted to a roadside screening test for drugs using oral fluid. If the result is positive, a second mandatory evidential oral fluid sample is sent to a toxicology laboratory. The driver has the right to request a blood sample. Surveys conducted among drivers subjected to roadside drug screening in Spain shows a decrease in prevalence of psychoactive drugs from 6.9% in 2008 to 4.9% in 2013 (23).



## Raising awareness of drug-driving

Raising awareness of drug-driving and its impact on road safety – including deaths, injuries, property damage and harm to other road users – among the general public

and policy-makers can reduce drug-driving and create a climate in which legislation and enforcement will be supported (Boxes 4 and 5).

### Box 4

#### The United Kingdom's THINK! drug-driving campaign

A new drug-driving law came into force on 2 March 2015 in England and Wales. The law makes it an offence to drive with any of the 17 controlled drugs above a specified level in the blood. A THINK! drug-driving campaign was designed to inform road users and promote adherence to the new law (24).

The specific objective of the campaign was to raise awareness of the new law among all adults and to challenge and deter young male drivers between 17 and 34 years of age from driving under the influence of drugs. The messages developed focused on the legal consequences of drug-driving, both illicit drugs and medical drugs, and invited audiences to get more information from health-care professionals. The campaign included a variety of promotional materials and activities aimed at reaching out to the target audience in as many ways as possible. Among these there were a website, television and radio adverts, printed materials as well as pre-campaign activities with health-care professionals and police to ensure that they were aware and prepared before messages were communicated to the general public. The campaign attracted the attention of news media which contributed to giving visibility to the topic. The campaign materials were disseminated for six weeks.

Evaluation of the media campaign targeting 17-34-year-old males found that campaign recognition was good: 52% of the target audience recognised at least one of the advertisements and 26% agreed they had "seen or heard anything recently about changes to drug-driving legislation". Awareness of the personal consequences of drug-driving also increased significantly from 45% before the campaign to 51% after it.



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### Box 5

#### Teen drugged driving: an activity guide for parents, coalitions and community groups

The *Teen drugged driving toolkit*, released in 2011 in the USA, was created to provide coalitions, prevention groups and parent organizations with (25):

- facts on the danger and extent of teen and young adult drug-driving;
- activities for effective prevention; and
- resources to further assist in prevention activities.

Evidence shows that, because teens are the least experienced drivers as a group, they have a higher risk of being involved in a road traffic crash compared with more experienced drivers. When this lack of experience is combined with the use of marijuana or other substances – which alter perception, cognition, reaction time and other faculties – the results can be tragic. The included activities were designed to raise awareness about drug-driving, to give parents and community leaders tips and advice on identifying the risks of drug-driving, to encourage local media to raise awareness of the dangers of drug-driving, and to educate parents and teens about the issue. The first activity consisted of a programme guide to host a drug-driving prevention night (including discussion guide and media pitch materials). The second activity was the development of guidelines for a drug-driving poster contest (including promotional language, discussion guide and sample teen posters). This toolkit has been distributed to more than 600 Drug-Free Community programmes in all 50 states of the USA, and has been utilized by youth-serving non-profit organizations – including Students Against Destructive Decisions (SADD) and National Organizations for Youth Safety (NOYS).

## Counselling and treatment

It is important not only to enforce drug-driving laws but also to counsel and, when appropriate, treat drivers found to be

impaired by drugs – especially those who are repeat offenders or those with drug-use disorders (Box 6).

### Box 6

#### Treatment of drug-impaired drivers in Sweden

The Swedish programme *Samverkan mot alkohol och droger i trafiken* (SMADIT) (United action against alcohol and drugs on the roads) is a cooperative effort of several authorities: the Swedish Transport Administration, the Swedish Police, the Swedish Coast Guard, Swedish Customs, local authorities, county councils, the Swedish Transport Agency, the Prison and Probation Service, and the county administrative boards. People reported for drink-driving and/or drug-driving on the road or at sea are offered professional help promptly. The aim is to reduce impaired driving and offer options for alcohol- and drug-impaired drivers to handle their problems. All local authorities in Sweden work according to SMADIT although the programme is applied in different ways in different parts of the country.

In Örebro county, in the southern central part of Sweden, SMADIT is being applied and persons caught by police under suspicion of drink-driving, drug-driving, minor narcotics offences or doping crime are offered a motivational interview with staff of the Addiction Centre as well as further support from the centre, the social services or the probation services. An evaluation of SMADIT-Örebro sought to determine if accepting further support had any impact on recidivism in drink- and drug-driving and other crimes (26). The methods comprised a retrospective register study of 840 individuals and a prospective interview study of 172 persons who experienced SMADIT-Örebro. Data were collected during 2013–2015. According to preliminary results of the register study, it could not be shown that undergoing the SMADIT-Örebro programme resulted in fewer offences due to driving under the influence. However, qualitative data suggest many participants felt positively about the programme and indicated that it may motivate them to receive help and change their behaviour with regard to substance use.

### Box 7

#### Public health sector role

- Support and provide preventive interventions, counselling and, when appropriate, treatment for drivers found to be impaired by drugs – especially those who are repeat offenders or who have drug-use disorders. Applied programmes should be evaluated regularly for their effectiveness on traffic safety.
- In close cooperation with the road safety sector, participate in activities to raise awareness about drug-driving injury and other health risks, as well as evidence-based preventive interventions on drug use and road safety addressing the general public, policy-makers, drivers (especially young drivers), people using drugs, patients and health-care professionals.
- Conduct research and disseminate information on, for instance, the prevalence of drug use among drivers and the effectiveness of implemented measures.
- Provide guidance on the use and effects of prescription drugs on fitness to drive. For instance, risk communication can be based on a graded warning system with pictograms for medicines that impair driving. Key actors to provide this information to the patients are prescribing physicians and dispensing pharmacists.
- Ensure multisectoral collaboration with involvement of law enforcement officers and legislators. Recommendations for national activities regarding enforcement, education or campaigns should take into account country-specific characteristics of the problem.

# Suggestions for the future

Countries are at different stages of establishing and enforcing drug-driving laws. Reasonable progress is being made on drug-driving research, legislation and enforcement to support countries in this area. Available information shows that the use of psychoactive drugs increases risks for road traffic crashes and injuries. In summary, priorities and options for further action include:

- **Determining prevalence of drivers' drug use and drug-impaired driving, as well as the number of drug-impaired road traffic injuries and deaths.** Additional data collection and research in this area are needed, particularly in low- and middle-income countries. To clarify the magnitude of the risk of traffic injuries and crashes, studies are needed in order to generate and effectively communicate information on the prevalence of drug use and impaired driving among drivers in these countries.
- **Developing and establishing thresholds drug-driving laws and regulations.** For “per se laws” it is critical to determine appropriate drug thresholds in blood and/or saliva. For many drugs the specific relationship between concentration, impairment and the risk of a crash still needs more research. Ideally, an international working group could be constituted to review experiences in different countries and provide guidance on priorities for international collaboration in this area.
- **Integrating drug-driving policies with drug policy frameworks oriented to public health.** Drug-driving laws and programmes should be integrated into the overall drug policy frameworks. A similar approach has been used in drink-driving laws, which have been integrated into overall alcohol policies. Successful implementation of integrated policies and programmes requires effective multisectoral collaboration with the involvement of different sectors such as transport, police, health, drug control and education. Box 7 outlines the role of the public health sector.

## REFERENCES

1. Peden M, Scurfield R, Sleet D, Mohan D, Hyder AA, Jarawan E, et al., editors. World report on road traffic injury prevention. Geneva: World Health Organization; 2004.
2. Neuroscience of psychoactive substance use and dependence. Geneva: World Health Organization; 2004.
3. Vester JC, Pandi-Perumal SR, Ramaekers JG, de Gier JJ, editors. Drugs, driving and traffic safety. Basel: Birkhäuser; 2009.
4. Schulze H, Schumacher M, Urmeew R, Auerbach K. Final report: work performed, main results and recommendations. Bergisch Gladbach: Bundesanstalt für Straßenwesen (Federal Highway Research Institute); 2012 (Project No: TREN-05-FP6TR-S07.61320-518404-DRUID).
5. Bernhoft IM, Hels T, Lyckegaard A, Houwing S, Verstraete G. Prevalence and risk of injury in Europe by driving with alcohol, illicit drugs and medicines. *Procedia Soc Behav Sci.* 2012; 48:2907-16.
6. Elvik R. Risk of road accident associated with the use of drugs: a systematic review and meta-analysis of evidence from epidemiological studies. *Accid Anal Prev.* 2013;60:254-67.
7. Global status report on road safety 2015. Geneva: World Health Organization; 2015.
8. The health and social effects of nonmedical cannabis use. Geneva: World Health Organization; 2016.
9. Couper FJ, Logan BK. Drugs and human performance fact sheets. Washington (DC): National Highway Traffic Safety Administration; 2014 (Report No. DOT HS 809 725).
10. Houwing S, Hagenzieker M, Mathijssen R, Bernhoft IM, Hels T, Janstrup K, et al. Prevalence of alcohol and other psychoactive substances in drivers in general traffic. 2011 [DRUID (Driving under the Influence of Drugs, Alcohol and Medicines, Deliverable 2.2.3)] ([www.druid-project.eu](http://www.druid-project.eu), accessed 4 April 2016).
11. Berning A, Compton R, Wochinger K. Results of the 2013–2014 national roadside survey of alcohol and drug use by drivers. Washington (DC): National Highway Traffic Safety Administration; 2015 (Traffic Safety Facts Research Note. Report No. DOT HS 812 118).
12. Results from the 2013 National Survey on Drug Use and Health: Summary of National Findings. NSDUH Series H-48, HHS Publication No. (SMA) 14-4863. Rockville (MD): Substance Abuse and Mental Health Services Administration; 2014.
13. Mallick J, Johnston J, Goren N, Kennedy V. Drugs and driving in Australia: a survey of community attitudes, experience and understanding. Melbourne: Australian Drug Foundation; 2007.
14. Beasley E, Beirness D. Drug use by fatally injured drivers in Canada (2000–2008). Ottawa: Canadian Centre on Substance Abuse; 2011.
15. Global health estimates. Geneva, World Health Organization; 2016.
16. Road Traffic Act 1988, Sections 4, 5A. Norwich, The Stationery Office Limited ([http://www.legislation.gov.uk/ukpga/1988/52/pdfs/ukpga\\_19880052\\_en.pdf](http://www.legislation.gov.uk/ukpga/1988/52/pdfs/ukpga_19880052_en.pdf), accessed 4 April 2016).
17. Driving or being in charge of a motor vehicle with concentration of specified controlled drug above specified limit. Update (2013) to section 5A of United Kingdom Road Traffic Act 1988 (<http://www.legislation.gov.uk/ukpga/2013/22/section/56/prospective#section-56-1>, accessed 6 April 2016).
18. Boorman M, Papafotiou K. The Victorian legislative framework for testing drivers for impairment caused by drugs other than alcohol: an evaluation of the characteristics of drivers detected from 2000 to 2005. *Traffic Inj Prev.* 2007; 8(3):217-23.
19. Boorman M, Owens K. The Victorian legislative framework for the random testing drivers at the roadside for the presence of illicit drugs: an evaluation of the characteristics of drivers detected from 2004 to 2006. *Traffic Inj Prev.* 2009; 10(1):16-22.
20. Boorman M. The drug driving enforcement framework in Victoria. Seventh Australasian Drug and Alcohol Strategy Conference, Brisbane, Australia, 17-20 March 2015 (<http://event.icebergevents.com.au/uploads/contentFiles/files/2015-ADASC/Martin%20Boorman.pdf>, accessed 3 April 2015).
21. Ley 6/2014, de 7 de abril, por la que se modifica el texto articulado de la Ley sobre Tráfico, Circulación de Vehículos a Motor y Seguridad Vial, aprobado por el Real Decreto Legislativo 339/1990, de 2 de marzo [Act 6/2014 (7 April) amending the text of the Motor Vehicle Traffic and Road Safety Act, approved by Royal Legislative Decree 339/1990 (2 March)] ([https://www.boe.es/diario\\_boe/txt.php?id=BOE-A-2014-3715](https://www.boe.es/diario_boe/txt.php?id=BOE-A-2014-3715), accessed 5 April 2016).
22. Ley Orgánica 5/2010, de 22 de junio, por la que se modifica la Ley Orgánica 10/1995, de 23 de noviembre, del Código Penal [Institutional Act 5/2010 (22 June) amending Criminal Code Institutional Act 10/1995 (23 November)] ([http://noticias.juridicas.com/base\\_datos/Penal/lo5-2010.html](http://noticias.juridicas.com/base_datos/Penal/lo5-2010.html), accessed 5 April 2016).
23. Fierro I, González-Luque JC, Seguí-Gómez M, Álvarez FJ. Alcohol and drug use by Spanish drivers: comparison of two cross-sectional roadside surveys (2008–9/2013). *Int J Drug Policy.* 2015;26(8):794-7. doi:10.1016/j.drugpo.2015.04.021.
24. Drug driving campaign activity 2015. London: Department for Transport; 2015 (<https://www.gov.uk/government/publications/think-drug-driving/drug-driving-campaign-activity-2015>, accessed 5 April 2016).
25. Teen drugged driving: parent, coalition and community group activity guide. Executive Office of the President of the United States of America, 2015 ([https://www.whitehouse.gov/sites/default/files/ondcp/issues-content/drugged\\_driving\\_toolkit.pdf](https://www.whitehouse.gov/sites/default/files/ondcp/issues-content/drugged_driving_toolkit.pdf), accessed 5 April 2016).
26. Kjellin L, Wadefjord A, Göthlin A (2015). En möjlighet att få hjälp. En studie av Samverkan mot alkohol och droger i trafiken (SMADIT) i Örebro län. Rapport 2015-11-03 (<http://fudinfo.trafikverket.se/fudinfoexternwebb/pages/PublikationVisa.aspx?PublikationId=2862>, accessed 4 April 2016).



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