



# Appendices and acronyms

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<b>Appendix 1: Factors that impact blood alcohol concentration (BAC)</b> .....	139
<b>Appendix 2: Hand-held breath-testing devices</b> .....	141
<b>Appendix 3: Safe vehicle interception</b> .....	142
<b>Appendix 4: Different types of publicity campaigns</b> .	146
<b>References</b> .....	148
<b>Acronyms</b> .....	149

## Appendix 1: Factors that impact blood alcohol concentration (BAC)

- **The amount of alcohol consumed** – the more alcohol consumed, the more ends up in the bloodstream.
- **The rate at which the alcohol is consumed** – the liver, responsible for breaking down alcohol, can process approximately the amount of alcohol in one standard drink each hour<sup>1</sup>.
- **The amount of food already in the stomach** – if there is food in the stomach it takes the alcohol longer to reach the small intestine and thus longer to enter the bloodstream.
- **The type of alcohol beverage consumed** – some drinks interact with the valves in the stomach to affect how quickly alcohol is able to enter the small intestine.
- **Gender** – women will typically reach a higher BAC than men who have consumed equivalent amounts of alcohol. This is partly because women produce less of the stomach enzyme that breaks down alcohol.
- **Body weight and body type** – BAC is a function of the amount of alcohol divided by the amount of water in the body. In a larger body, which will contain more water, the alcohol is less concentrated. Also, fatty tissue does not absorb much alcohol. As such, the larger the body-fat percentage the more concentrated the alcohol will be in the rest of the body. This is another reason why women, who tend to have a higher percentage body fat than men, will reach a higher BAC than a male of equivalent weight who has consumed the same amount of alcohol.
- **Liver health** – the liver is responsible for breaking down alcohol, and so impairment of the liver function will hamper this process.
- **Medication** – some medications can slow the elimination of alcohol from the body.
- **Genetics** – genetic factors play a role in determining the body's ability to break down alcohol. For example, some people of Asian descent have difficulty metabolizing alcohol because of differing activity levels in some liver enzymes.
- **Tolerance** – after a period of prolonged or heavy use, the effects of alcohol on the body are reduced because of increased ability to metabolize alcohol, and a reduction in the body's sensitivity to alcohol.

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<sup>1</sup> A standard drink contains between 8–14 grams of alcohol depending upon the definition adopted by the relevant government (ICAP 1998).

## ALCOHOL IMPAIRMENT CHART

NEVER DRINK AND DRIVE	# of Drinks	APPROXIMATE BLOOD ALCOHOL PERCENTAGE									
		Body Weight in Pounds/Kilograms									
		90	100	120	140	160	180	200	220		240
	0	.00	.00	.00	.00	.00	.00	.00	.00	.00	ONLY SAFE DRIVING LIMIT
	1	.05	.05	.04	.03	.03	.03	.02	.02	.02	Impairment Begins
	2	.10	.09	.08	.07	.06	.05	.05	.04	.04	Driving Skills Affected
	3	.15	.14	.11	.10	.09	.08	.07	.06	.06	Possible Criminal Penalties
	4	.20	.18	.15	.13	.11	.10	.09	.08	.08	
	5	.25	.23	.19	.16	.14	.13	.11	.10	.09	
	6	.30	.27	.23	.19	.17	.15	.14	.12	.11	Legally Intoxicated
	7	.35	.32	.27	.23	.20	.18	.16	.14	.13	Criminal Penalties
	8	.40	.36	.30	.26	.23	.20	.18	.17	.15	
	9	.45	.41	.34	.29	.26	.23	.20	.19	.17	
	10	.51	.45	.38	.32	.28	.25	.23	.21	.19	

Your body can get rid of one drink per hour. Each 1½ oz. of 80 proof liquor, 12 oz. of beer or 5 oz. of table wine = 1 drink. (Each 45 ml of liquor (40% alcohol by volume), 360 ml of beer or 150 ml of table wine = 1 drink.)

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	0	.00	.00	.00	.00	.00	.00	.00	.00	.00	ONLY SAFE DRIVING LIMIT
	1	.04	.03	.03	.02	.02	.02	.02	.02	.02	Impairment Begins
	2	.08	.06	.05	.05	.04	.04	.03	.03	.03	
	3	.11	.09	.08	.07	.06	.06	.05	.05	.05	Driving Skills Affected
	4	.15	.12	.11	.09	.08	.08	.07	.06	.06	Possible Criminal Penalties
	5	.19	.16	.13	.12	.11	.09	.09	.08	.08	
	6	.23	.19	.16	.14	.13	.11	.10	.09	.09	
	7	.26	.22	.19	.16	.15	.13	.12	.11	.11	Legally Intoxicated
	8	.30	.25	.21	.19	.17	.15	.14	.13	.13	Criminal Penalties
	9	.34	.28	.24	.21	.19	.17	.15	.14	.14	
	10	.38	.31	.27	.23	.21	.19	.17	.17	.16	

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Source: adapted from *Journal of Studies on Alcohol*, Vol. 42, No. 7, 1981

## Appendix 2: Hand-held breath-testing devices

The following table presents a brief overview of a selection of hand-held breath-testing devices and evidential breath-testing instruments.

Technology type	Functionality	Typical application
Chemical reaction (tube and bag)	Low level accuracy, low level specificity, low level training, manual operation, subjective determination of result.	Roadside alcohol screening, presence of alcohol only, low volume use.
Basic hand-held electrochemical reaction (fuel cell) unit	Medium level accuracy, medium level specificity, moderate training, manual sample collection, objective electronic result display.	Roadside alcohol screening, indication of alcohol level, high volume use.
Hand held electrochemical reaction (fuel cell) unit with printer interface.	Medium level accuracy, medium level specificity, moderate training, manual sample collection, objective electronic result display with hard-copy result printing.	Roadside alcohol screening, indication of alcohol level, high volume use.
Hand held electrochemical reaction (fuel cell) unit with data storage printer interface.	Medium level accuracy, medium level specificity, moderate training, automatic sample collection, objective electronic result display with hard-copy result printing, downloadable data storage.	Roadside alcohol screening, indication of alcohol level, high volume use.
Desktop evidential standard, infrared energy absorption (IR) analyser.	High level accuracy, medium to high level specificity, high level training, fixed place of operation, automatic sample collection, objective electronic result display with hard-copy printing, downloadable data storage.	Evidential standard breath alcohol analysis. Fixed location use only.
Desktop/portable evidential standard infrared energy absorption (IR) analyser.	High level accuracy, medium to high level specificity, high level training, automatic sample collection, fixed/mobile place of operation, objective electronic result display with hard-copy result printing, downloadable data storage.	Evidential standard breath alcohol analysis. Fixed location or mobile use.
Desktop/portable evidential standard dual sensor (infrared energy absorption (IR) at multiple wave lengths) analyser.	High level accuracy, very high level specificity, high level training, automatic sample collection, fixed/mobile place of operation, objective electronic result display with hard-copy result printing, downloadable data storage.	Evidential standard breath alcohol analysis. Fixed location or mobile use.
Desktop/portable evidential standard IR and EC dual sensor (infrared energy absorption and electrochemical reaction) analyser.	High level accuracy, very high level specificity, high level training, automatic sample collection, fixed/mobile place of operation, objective electronic result display with hard-copy result printing, downloadable data storage.	Evidential standard breath alcohol analysis. Fixed location or mobile use.

## Appendix 3: Safe vehicle interception

The process of intercepting moving vehicles and interviewing drivers is a regular part of the traffic officer's duties, therefore a precise and methodical approach must be adopted. The presumption that a motorist, especially a drink-driving one, will stop when directed by police to do so, or that an intercepted motorist will maintain a cooperative demeanour, no longer exists. However, police must always be courteous and polite and maintain a high degree of skill and professionalism. The following is a guide only to safe vehicle interception, as each interception requires planning and an ongoing risk assessment.

### Preparing to intercept

Generally police intercept because of a traffic offence, or because the driver or occupants are wanted or suspicious. The suspect must therefore be stopped or apprehended as safely and quickly as possible without endangering the safety of those persons, other motorists or the police. Traffic police must remain aware of any risks that could be present – always consider: “what if?”.

- Police and not the motorist must choose the interception point (consider safety at the time and particularly safety after the stop, especially on a busy road or expressway).
- In busy areas use clear zones, bus stops, loading zones (remember double parking is dangerous to everyone).
- Make sure there are no side streets in the vicinity of the interception point where the vehicle can suddenly turn and evade police.
- At night, try to select well-lit areas with a high degree of safety and security.
- Avoid areas where large crowds gather e.g. outside drinking venues or nightclubs – spectators can sometimes complicate a situation.

### Signalling the intercept

Once a decision is made to intercept:

- take up a safe position behind the vehicle – the distance will depend upon the particular circumstances but it should not be less than three car lengths;
- move to a position where the driver can see the police vehicle in the rear vision mirror;
- activate the police lights, flash your headlights and/or sound the siren with a short burst to draw attention;
- indicate for the driver to pull over;
- If the driver pulls over in an unsafe location, use the PA system on the police vehicle to direct the driver to a more suitable location.

Be conscious of weather conditions and be aware that the driver may refuse to pull over intentionally or may not hear or know of police presence because of drunkenness, deafness, inattention, loud music etc. Treat every interception with caution as you do not know who you are stopping – the motorist may be a wanted person, or just a nervous citizen. It is important to notify the communications centre of your location and record the vehicle registration number before the interception.

A step-by-step account of safe vehicle-intercept procedures is presented below:

1. Stop the police vehicle one car-length behind, and a half-car width to the left of the other vehicle and in a suitable position to read the rear number plate of the suspect vehicle. This position provides a safety corridor which offers protection to your colleague or yourself from other traffic when interviewing the driver.
2. Activate and leave your police emergency lights and hazard lights on.
3. The police observer, i.e. the passenger, will step out of the police car and watch the suspect vehicle and its occupants. The police observer should approach and stand near the rear passenger side of the suspect vehicle. From here he can watch the driver of the vehicle, any occupants, and also his/her partner.
4. On approaching the suspect vehicle, be alert – watch the occupants, especially their hands. Check the boot, check the seats for objects – baseball bats, iron bars or weapons.
5. When the cover officer (police observer) is satisfied that the motorist will not drive off, he signals the driver of the police car, who should move quickly into the safety corridor. An approach is then made to the driver with the usual greeting. The driver should be asked to turn the ignition off and then the conversation can continue. If the driver is a criminal suspect or a drink-driver, the keys must be taken from the ignition.
6. Always consider the safety factors – be very vigilant with your observations; watch that the door is not pushed open quickly, endangering yourself; always check that there are keys in the ignition (not a stolen car). Is the driver unusually nervous? What are the passengers doing? Keep alert to any unusual hand movements. While there is no need to over-react or be nervous yourself, it is far better to be observant and pick up on early indications of any potential danger rather than be injured or placed in jeopardy because you considered the interception as routine. Your safety is paramount.
7. It is desirable to allow the suspect to remain in the vehicle. This reduces the chance of attack against you. However, if the driver gets out of the vehicle he/she should be asked to move to the footpath or the side of the road as soon as possible. While the driver is doing this, visually check for any danger signals or weapons. Your police vehicle, if positioned correctly, will afford you protection against approaching traffic. You may want the driver to alight from the vehicle. This should always be done in a controlled way for the safety of both the police and the driver. Always take a firm hold of the driver's door as it is opened and ask the driver politely to step outside the vehicle.

8. The engine of the police vehicle should be left running and at night the headlights of the police vehicle should be left on. Always leave your blue light operating to warn other motorists of your presence.
9. Never stand between the police vehicle and the suspect vehicle – in case of a collision from passing traffic or the offending driver reversing into you or the police vehicle.
10. Be careful that you are not injured by the erratic movements of a confused or dangerous driver if they alight from their car.
11. When your enquiries are completed, both members should return to the police vehicle with one member keeping the suspect under observation at all times.
12. Do not relax your caution until the other car has been permitted to drive off. After the check is complete notify the communications centre that you are clear.
13. Wait for the intercepted vehicle to move off first then you move off in consideration of other moving traffic

If you are by yourself in a police vehicle, follow the above process but consider calling for a back-up unit (it is better to call too early, or when not required, than not being able to call at all) and do not advertise or advise the suspect that you are alone, especially at night.

In all cases the police officer must take the initiative and be in control of the situation. You may need to give firm directions, but you should always remain courteous and respectful. The police officer has the advantage of skill, knowledge and a professional attitude to ensure that the situation remains calm. This makes it less traumatic for the driver, easier to handle for the police officer and a less dangerous situation overall. The use of courteous expressions has the following advantages:

- if the driver is nervous, it puts them at ease;
- if the driver is aggressive, your courteous approach can be verbally disarming and change the tone of the conversation;
- if they continue to be aggressive then you are maintaining your professionalism, and because of your attitude and actions you can think clearly.

### **Failure to stop when requested by police**

When a driver fails to stop following a police direction or persistent police directions, you must assume that the driver does not want to or does not intend to stop. You must assume that because he/she has decided not to stop (and like any other person escaping) that they are dangerous. Remember – an offender's vehicle is their most effective weapon.

- Notify the communications centre and request back-up.
- Make sure that you have recorded the registration number and description of the vehicle and driver/passengers.
- Never move alongside the vehicle in this situation because:
  - if they are armed, your vehicle and yourself then become targets;
  - the offender may suddenly turn or crash into your vehicle;

- ▷ the offender may turn into a side street, gaining an escape advantage;
- ▷ it is a potentially dangerous manoeuvre for a number of other reasons e.g. in some countries it is common for the offending driver to force the police vehicle onto the wrong side of the road, thereby exposing it to oncoming traffic and the dangers of a head-on collision. Even on an expressway, the offender can nudge the police vehicle, putting it off balance and making it hard to control.
- Decide on a plan to resolve the situation. This may include continuing to follow the vehicle. Call in more resources or abandon the interception – whatever is the most practical in consideration of the law, police policy and all safety factors.
- Remember, emergency provisions allow the police to do a number of lawful actions – they do not include driving in a dangerous manner, at a dangerous speed, or reckless driving.

The most important aspect of any interception is the safety of the police officer, the safety of the citizens and the safety of the offenders or suspect. Always plan ahead and expect the unexpected.

## Appendix 4: Different types of publicity campaigns

### Information campaigns

Information campaigns are used when there has been a change in the law or road rules affecting road users and there is a need to ensure the public have been informed of the new rules. A good example is where the rules for the maximum allowable blood alcohol level for drivers is changed.

Additionally, campaigns of this type can be undertaken when target-group research has identified that road users are ignorant of the rules, or people use their ignorance as one of the excuses for not changing their behaviour. For example, some drunk drivers use the excuse that they didn't know it was illegal, or that they were not told it was illegal.

Information campaigns should be designed to reach a very wide audience. The content must be factual and explanatory. There is rarely a need to use persuasive or emotional images or language in campaigns of this type. Distribution of follow-up information, such as explanatory leaflets, can be an important component. These should be widely available at transport registry offices, police stations, petrol stations, roadside restaurants and other areas where the public can easily access the information.

### Persuasive behaviour-change campaigns

Campaigns designed to persuade road users to amend their behaviour, or to consider new attitudes to their use of the road, are *the core of road safety publicity*. Although a considerable amount of research is still being conducted on the psychological “linkage” between knowledge, attitudes and behaviour, some people would advocate that information (or knowledge) helps to determine and shape attitudes; and that attitudes (among a number of other key factors) are important determinants of behaviour.

Such a “behavioural” model is a good starting point for trying to influence behaviour, although other factors such as “perceived control” (1), habit (2) and even culture and social factors (3) are likely to play a key role. Behaviour change campaigns must be undertaken with the support of other initiatives, the most important activity being traffic enforcement. Inevitably, behaviour-change campaigns require individuals to change what they currently do on the roads. In almost all cases, individuals and road users *do not want to change*. Consequently, they will oppose the campaign, they will object to the campaign message and they will always look for reasons why the campaign message does not apply to them.

These circumstances mean that the task confronting persuasive/behaviour-change campaigns is vastly more difficult than any other form of public communication, and makes the task of product advertising look simple in comparison. Evidence shows that while the skills of advertising agencies are important to developing effective campaigns they must be guided to ensure the best outcomes (4).

Where legislative support does not exist to support the relevant behaviour, publicity campaigns have been shown to be very weak in their effectiveness. A good example is the “Speed Kills” campaign, commenced in Victoria, Australia in 1990 and linked to a wide-ranging programme of initiatives that included high levels of increased police enforcement. This campaign recorded substantial reductions in injury outcomes linked to the publicity levels, creative approach and police enforcement activity. On the other hand, a second campaign, “Concentrate or Kill”, used identical publicity levels and creative approach, but without enforcement of any relevant traffic law. This campaign failed to show any significant outcomes in post-campaign evaluation (5).

### **Agenda-setting campaigns**

Agenda-setting campaigns are used to broaden public understanding of key issues or problems in road safety, and seek to gain public support for action to be taken, usually some time in the future.

Agenda-setting campaigns can be valuable when road safety research has identified the need for an initiative, but market research has identified a lack of public awareness of the specific problem, or even public apathy and opposition to effective countermeasures.

In these circumstances, the authority responsible for achieving improvements in road safety faces a difficult task to obtain approval for the countermeasure and to generate the necessary budget and expenditure that might be required. In the context of road crashes involving drinking and driving, market research in a country or jurisdiction may identify that people are unaware of the effects of alcohol on the body, or more particularly, the level of involvement of alcohol in road trauma and the impacts of that trauma on the community. These are the circumstances in which an agenda-setting campaign should be mounted. Its objectives would be to shift the understanding and awareness of the relevant target groups so that the issue and its importance become understood. This understanding should be seen as a necessary pre-condition to generating the public and political support required to attempt to change the behaviour in a follow-up behaviour-change campaign.

Agenda-setting campaigns often have large components of information as part of the campaign, so in this respect are similar to information campaigns. Additionally, however, these campaigns must seek to address public consciousness and heighten public

concern over the issue. Consequently these campaigns will also require some of the persuasive approaches used in behaviour-change campaigns.

### **Inter-organizational campaigns**

Because of the multi-disciplinary nature of road safety, staff in public works departments, police officers, transport departments, hospitals and others need to support strongly any programme developed, and to understand the safety benefits that can be achieved from implementing road safety programmes.

For this reason, inter-organizational campaigns often target the staff and officials of major agencies responsible for road safety. These staff are at the frontline of contact with the public, and are sometimes subject to public inquiry and abuse in relation to campaigns that target behaviour change. Inter-organizational campaigns can provide such staff with the information and support designed to counter public criticism.

A further reason for these campaigns is to drive home to frontline staff the importance of the example they set for the public. If transport officials drive vehicles without wearing seatbelts, if police officers ride motorcycles without helmets, if bus drivers are seen to be drunk, if teachers ride home on scooters which have bald tyres and are not maintained, if public buses are allowed to drive on roads without full lighting, or if police drive on the wrong side of the road, then the public will take the attitude that the major officials really do not care about the problem and do not see it as important.

Inter-organizational campaigns are designed to drive home the importance of modelling safe behaviour and the pivotal role of key agencies and their staff in building a sustainable road safety programme.

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## Acronyms

ALS	Advanced life support
ATSB	Australian Transport Safety Bureau
BAC	Blood alcohol concentration
BATF	Bangalore Agenda Taskforce
BCC	Bangalore City Corporation
BDA	Bangalore Development Authority
BLS	Basic life support
BMTC	Bangalore Metropolitan Transport Corporation
BrAC	Breath alcohol concentration
CEA	Cost effectiveness analysis
CBA	Cost-benefit analysis
CIROS	Citizen's Road Safety Group
DDR	Drink/drive rehabilitation
DWI	Driving while intoxicated
EMS	Emergency medical services
FIA	Fédération Internationale de l'Automobile
FORS	Federal Office of Road Safety
GRSP	Global Road Safety Partnership
ICAP	International Center for Alcohol Policies
LMIC	Low and middle-income countries
MADD	Mothers Against Drunk Driving
MLDA	Minimum legal drinking age
MP	Members of Parliament
NHTSA	National Highway Traffic Safety Administration (USA)
NIMHANS	National Institute for Mental Health and Neuro Sciences
PAADD	PATVORA Awareness Against Drunk Driving
PATVORA	Prompt Assistance to Victims of Road Accidents
QALY	Quality adjusted life year
SARTRE	Social Attitudes to Road Traffic Risk in Europe
TRL	Transport Research Laboratory
WHO	World Health Organization