

THE HANDBOOK OF ROAD SAFETY MEASURES

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8.3 BLOOD-ALCOHOL CONCENTRATION LEGISLATION

Problem and objective

Driving under the influence of alcohol probably increases the risk of road accidents more than any other forms of traffic law violation. In 1936, Norway became the first country in the world to introduce a fixed blood-alcohol concentration level (*per se* law). The law stated that if a driver had a blood-alcohol concentration higher than 50 milligrams of alcohol per 100 millilitres of blood (usually denoted as 0.05 percent), he would be regarded as being under the influence of alcohol.

On the basis of the roadside survey in Norway in 1981-82, and the official road traffic accident statistics, the following relative accident rates for drivers with different blood-alcohol concentrations have been estimated (Glad 1985, Assum and Glad 1990, Glad and Vaas 1993).

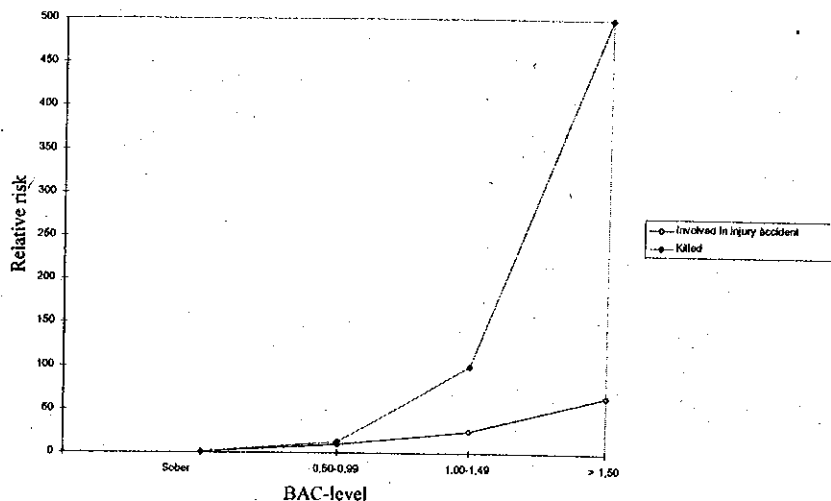


Figure 8.3.2: Risk with different blood-alcohol concentrations in relation to sober drivers. Norway. (Source: Glad and Vaas 1993)

Blood-alcohol concentration legislation (BAC-legislation) refers to regulations of permitted blood-alcohol concentrations (BAC limits), changes in such regulations and legislation regulating the availability of alcohol. Such laws, in conjunction with drink-driving enforcement and sanctions, are intended to reduce the incidence of drink-driving and thereby reduce the number of accidents.

Description of measure

The measures included in this chapter are as follows:

- Introducing a *general* blood alcohol concentration (BAC) limit, banning driving a vehicle if the blood alcohol concentration exceeds a certain limit (*per se* law).
- Introducing a *special* blood alcohol concentration limit, for example for novice drivers, where these drivers subject to a lower permitted BAC-level than drivers in general.
- Changing the blood alcohol concentration limit, normally from a higher level to a lower level.
- Introducing or changing the minimum drinking age - normally by making it illegal to sell alcohol to persons below a certain age.
- Introducing a *per se* law against drink-driving. A *per se* law is a law stating drink-driving *per se* is banned and police enforcement can be targeted at this offence by itself (primary enforcement). Before the introduction of *per se* laws, straight drink driving enforcement ("primary enforcement") was not always permitted, meaning that the police could only test for drink-driving if another offence had been committed - such as speeding ("secondary enforcement").

Effect on accidents

The following studies have been used as a basis for meta-analyses of the effects of the measures:

- Naor and Nashold (1975 - Wisconsin, United States): Reducing the drinking age
Ferreira and Sicherman (1976 - Massachusetts, United States): Reducing the drinking age
Brown and Maghsoodloo (1981 - Alabama): Reducing the drinking age
Wagenaar (1982 - United States): Increasing the drinking age
Hingson et al (1983 - Massachusetts - United States): Increasing the drinking age
Cook and Tauchen (1984 - United States): Increasing the drinking age
Maisey (1984 - Western Australia): Reduced blood-alcohol concentration limit for novice drivers
Haque, Strang and Crabb (1986 - Victoria, Australia): Zero-limit for novice drivers
Males (1986 - Florida, United States): Increasing the drinking age
Epperlein (1987 - Arizona, United States): Introduction of *per se* drink-driving laws with mandatory imprisonment
Hingson et al (1987 - Maine, United States): Introduction of *per se* laws on drink-driving
Dyke and Womble (1988 - United States): Increasing the drinking age in 13 American states
Smith (1988 - Queensland, Australia): Reduced blood-alcohol concentration limit

Haque and Cameron (1989 - Victoria, Australia): Reduced blood-alcohol concentration limit ("zero limit") for novice drivers

Brooks and Zaal (1993 - Australian Capital Territory): Reduced blood-alcohol concentration limit (from 0.8 to 0.5) for all drivers

Deshapriya and Iwase (1996 - Japan): Introduction of blood-alcohol concentration limit (0.5)

Norström and Andersson (1996 - Sweden): Reduced blood-alcohol concentration limit (from 0.5 to 0.2)

Table 8.3.2: Effect on accidents of bans on drink-driving, introduction of blood-alcohol concentration limits, reducing blood-alcohol concentration limits and changes in the drinking age. Results from meta-analyses. Percentage change in number of accidents.

Percentage change in number of accidents			
Accident severity	Types of accident affected	Best estimate	95% confidence interval
Introduction of drink-driving laws/per se laws/blood-alcohol concentration limits:			
Fatal accidents	All	- 26	(-28; -24)
Injury accidents	All	-3	(-4; -2)
Fatal/injury accidents	Night-time/single-vehicle accidents	- 13	(-14; -11)
Fatal/injury accidents	Accidents in daytime	- 0	(-2 +1)
Reducing the blood-alcohol concentration limits for all drivers:			
Fatal accidents	All	- 8	(-12; -4)
Injury accidents	All	- 4	(-5; -3)
Property damage only accidents	All	+ 3	(+1; +5)
Fatal/injury accidents	Night-time/single-vehicle accidents	- 7	(-9; -6)
Fatal/injury accidents	Accidents in daytime	+ 1	(-2; +3)
Reducing blood-alcohol concentration limits - novice drivers:			
Fatal accidents	All	+ 8	(-31; +68)
Injury accidents	All	- 10	(-15; -5)
Fatal/injury accidents	Night-time/alcohol-related accidents	- 3	(-7; +1)
Fatal/injury accidents	Accidents in daytime	+ 5	(-10; +22)
Increasing the drinking age:			
All	Age group affected	-18	(-19; -17)
Fatal accidents	All	- 24	(-26; -23)
Injury accidents	All	- 31	(-32; -30)
Reducing the drinking age:			
All	Age group affected	+ 18	(+8; +31)
Fatal accidents	All	+ 17	(+4; +32)

The effect of introducing general legislation banning drink-driving is a statistically significant reduction in the number of fatal accidents of 26%. Single-vehicle accidents and accidents at night are often regarded as proxies for alcohol-related accidents. The effect on these accidents is a statistically significant reduction of 13%.

Reducing existing blood - alcohol concentration limits has been implemented and evaluated in Australia and Sweden (Smith 1988; Brooks and Zaal 1993; Norström and Andersson 1996). The measure is associated with a relatively marginal, but statistically significant reduction in accidents. A reduction in fatal accidents and injury accidents of 8% and 4%, respectively, has been found. Property-damage-only accidents have been found to increase by 3%. Reducing blood-alcohol concentration limits for novice drivers has been evaluated in Western Australia and in Victoria (Maisey 1984; Haque, Strang and Crabb 1986; Haque and Cameron 1989). Blood-alcohol concentration limits were reduced to 0.2, 0.0 and 0.0 per 1000. A reduction in the number of injury accidents of 10 % was found, which is statistically significant. For fatal accidents, there is a tendency towards an increase in the number of accidents, but this result is highly uncertain. In all three cases, the measure applied to novice drivers during the first year after they acquired their driving licence.

Changing the drinking age has only been evaluated in the United States. Increasing the drinking age is normally from 18 to 20 years, but increases from 18 to 19, 18 to 21, 19 to 20 and 19 to 21 years are also found. A reduction in the drinking age only appears as a reduction from 20 to 18 years. Increasing and reducing the drinking age results in changes in the number of accidents which are the same size in absolute values, but in opposite directions. Raising the drinking age gives a somewhat lower reduction in fatal accidents than in injury accidents, of 24% and 31%, respectively. Reducing the drinking age results in an increase in fatal accidents of 17%, but there is no basis for estimating the effect on injury accidents. All changes in accidents associated with changes in the drinking age are statistically significant.

Effect on mobility

No effects on mobility have been found for any of these measures.

Effect on the environment

No effects on the environment of any of these measures have been documented.

Costs

The measures described in this chapter all refer to legislation. The costs of enforcing legislation - i.e. drink-driving enforcement, sanctions, punishment and legal measures, driving licence withdrawal etc. are discussed in chapter 8.4. The direct costs of drafting legislation are therefore purely administrative costs, i.e. the costs incurred in developing and administering these laws.

Cost-benefit analysis

Possible measures in this area include a general reduction in the blood - alcohol concentration limit, or the introduction of a particularly low blood - alcohol concentration limit for novice drivers. Costs and benefits of the latter measure are evaluated in an American cost benefit analysis (Miller, Lestina and Spicer 1997). The analysis referred to the possible introduction of a 0 per 1000 blood-alcohol concentration limit for drivers under the age of 21 years (16 is the most common age for driving licences for cars in the United States). The benefit was estimated to around US dollars 0.042 per km driven for drivers aged between 16 and 21 years. The costs were estimated to around US dollars 0.0038 dollars per km driven for the same drivers. The costs consisted of a loss of benefit, attributable to the fact that previously legal driving became illegal, and additional costs of sanctions (withdrawal of driving licences and possible prosecution). According to this analysis, the benefit was around 11 times greater than the costs. The same study found that the accident costs of driving with blood - alcohol concentrations above 0.08 percent were greater than the driver's benefit from these trips.

8.4 DRINK-DRIVING ENFORCEMENT AND MEASURES AGAINST RECIDIVISM

Problem and objective

Historically, driving under the influence of alcohol in Norway has long been defined as a traffic safety problem. As early as 1935, a law was passed enabling blood tests to be taken. At the same time, new sanctions were introduced which meant that anyone caught driving while under the influence of alcohol could be sent to prison. In 1936, Norway became the first country in the world to introduce a fixed blood-alcohol concentration limit. The law stated that drivers with levels higher than 0.5 per 1000, (50 milligrams of alcohol per 100 millilitres of blood) would be considered as driving under the influence of alcohol.

The actual extent of drink driving in Norway today is not known. The only study ever made in Norway to determine the amount of drinking and driving was carried out in 1981 - 82 (Glad 1985A, 1985B, 1985C). It was found that around 0.3% of all drivers had blood-alcohol concentrations above 0.05 percent.