

ALCOHOL AND ROAD SAFETY IN THE NETHERLANDS

Contribution for "Alcohol, drugs and driving"

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1. Introduction

In the Netherlands people drink a lot of alcohol; 12 litre of pure alcohol per user per year. That is more than a 1000 glasses of wine, beer or spirits, or 3 glasses a day, every day of the year.

About half of the drinks are consumed outside the family home, Most of it is drunk in pubs or restaurants, during work and in club houses.

After the drinking of alcohol people have to go home and most of them do that as they came, on the bicycle, the moped or in the car. A road user with a higher BAC than 0.5 o/oo is punishable by law. Sometimes a person with a lower BAC cannot drive safely and is then punishable too.

Just after midnight in the weekends of 1988 one out of eleven drivers had a BAC over the legal limit. Around three o'clock in the morning it was one out of nine. 26% had visited friends, 40% a bar or restaurant and 10% had been at a party.

This article will present firstly recent data on the extent of the problem in the Netherlands at this moment. Next, an overview will be given of the developments of DWI since 1970 and the governmental policy during this period. The following paragraphs are based on the results of a large number of studies which have been performed in the Netherlands by SWOV as well as by other institutes. Most of these studies have only been published in Dutch. For that reason no reference has been made to the original publications.

2. The present situation: Results of roadside surveys

Thanks to roadside surveys of SWOV the extent of drinking and driving by motorists is fairly well known. These national surveys have been held periodically on weekend nights since 1970, the last time in 1988. In these surveys drivers were stopped randomly, interviewed and breath tested on Friday and Saturday nights between 22.00 and 04.00 o'clock. For the first time in 1987 surveys were also held during the same hours of weekdays (Tuesday, Wednesday and Thursday) as well as from 16.00 to 22.00 o'clock during weekdays and weekends (Saturday and Sunday). These surveys had a much smaller sample size with about 300 drivers, compared to about

2000 for the regular weekend-night surveys. The 1988 survey was again restricted to weekend nights.

The results of the 1987 surveys will be presented first to give an overall picture of drinking and driving by car drivers. A more detailed presentation of drinking and driving during weekend nights will be based on the most recent 1988 survey. There are differences between the results for the weekend nights for 1987 and 1988, which will be discussed in a later paragraph.

Table 1 gives results for six six-hour periods of the week, which were covered by the 1987 surveys. The results, as far as they refer to weekday nights, represent an average for Tuesday, Wednesday and Thursday. The table shows that the percentage of drivers over the legal limit is almost the same for Saturday, Friday and weekday nights (between 7 and 9%). During weekday evenings this is only 1%. Also, Saturday and Sunday evenings show low percentages with 3 and 4% resp. However, during the weekend evenings the percentage of drivers with a BAC between 0.2 and 0.5 o/oo is not much different from weekend as well as weekday nights (between 5 and 7%). Again this percentage is only 1 for weekday evenings. A direct comparison of absolute numbers of drinking drivers during these periods cannot be made without knowing the traffic volumes. When these are taken into account it is found that the absolute number of drivers with a BAC over 0.2 o/oo is relatively low on weekday evenings, higher on weekday nights than weekend nights and highest on Saturday and Sunday evenings. Except for weekday evenings, the number of drivers over the legal limit is about the same for all other periods of the week..

The results for the weekend nights of 1988 are presented for two-hour periods in Table 2. It can be seen that for each two-hour period the percentage of drivers with a positive or illegal BAC is higher for Friday nights than for Saturday nights. For both nights the percentages increase from early to late at night, with a shift in the direction of higher BAC's. On Friday nights from 02.00 to 04.00 o'clock the percentage of drivers over 0.5 o/oo is highest with 15%. The traffic volumes decrease from early to late at night and more so on Fridays. As a result the absolute number of drivers with a positive BAC is stable before 02.00 o'clock on Fridays and drops to the same, lower level as for the whole Saturday nights. The absolute number of drivers with an illegal BAC shows

a peak on Friday nights between midnight and 02.00 o'clock. On Saturday nights this number is higher after midnight than before and lower than Fridays during the whole period of the night.

Drinking and driving during weekend nights is related to sex of driver, trip origin and age of driver. In 1988 only two percent of the female drivers had an illegal BAC and of all drivers with a BAC over 0.5 o/oo only 9% were female, whereas of all drivers, regardless of BAC, 24% were female. For drivers coming from a bar or restaurant the percentage with a BAC over 0.5 o/oo was 13% in 1988, which is more than twice the average for all weekend-night drivers. Although 19% of all drivers came from a bar or restaurant, their share among drivers over the legal limit is 39%. Age of drivers and drinking are also related. Drivers between 25 and 50 years of age have been drinking more often than both younger and older drivers. They also represent 70% of all drivers over the 0.5 o/oo limit, against 60% of all drivers regardless of age.

3. The present situation: accident statistics

It is not known how many accidents in the Netherlands are alcohol related, nor in how many victims they result. There only are estimates.

A first estimate can be based on a comparison with other countries. In countries like Norway and Sweden, where less alcohol is consumed and where less drivers are intoxicated, 20 to 30% of the fatally injured have a BAC higher than 0.5 o/oo. In Canada and the USA, where the extent of DWI is comparable to the Netherlands, 40 to 50% of the fatally injured have a BAC higher than 0.8 o/oo. These data are collected by the coroners who in these states have to check for the consumption of alcohol in all fatal accidents. It seems therefore reasonable to expect that in the Netherlands at least 40% of the fatally injured have a BAC of 0.5 o/oo or higher.

A second estimate is provided by the official Dutch accident statistics. These statistics report that in 1988 132 people were killed in 118 accidents with alcohol use (i.e. by one of the drivers involved) and that 3693 people were injured in 2738 such accidents. These data are derived from the police registration forms. In less severe accidents sometimes no form is filled out. In fatal accidents the form is filled out, but often alcohol consumption is indicated as none, even though it was not checked. If alcohol consumption is reported no quantity is indicated. It is clear that in that respect the official statistics only are an approximation of reality.

In 1984 SWOV did a pilot study in some hospitals in Rotterdam into the BAC of traffic casualties. 282 blood samples of victims over 16 years old were tested. In 25% of the injured drivers and pedestrians a BAC of 0.5 o/oo or higher was found; for car drivers only this percentage was 43%. On weekend nights (Friday, Saturday and Sunday between 22.00 and 04.00 o'clock) this percentage was even some 70% for car drivers as well as other road users. It is interesting to note that in most of these cases the BAC was far in excess of 0.5 o/oo. Another interesting point is that 21 of the car drivers with a positive BAC were injured on weekend nights and only five on week-day nights. The number of car drivers with a positive BAC who were injured during evenings was 9, spread over all days of the week. Based on the results of this hospital study and on other information a best estimate for the Netherlands in 1988 results in about 200 people being killed and 6000 injured as a consequence of DWI.

The financial-economic damage in the Netherlands has also been calculated. This calculation is based on standard figures for different severity classes of accidents as used by the Dutch government. These figures have been criticised for being on the low side and do not express immaterial damage. The total damage from traffic accidents is estimated to be NLG 5400 million in 1988. The damage due to alcohol would be NLG 560 million, i.e. 10%.

4. Developments since 1970

Up till now an overview of the present drink-driving problem in the Netherlands has been given. Since 1970, a lot has been done about the problem and eventually with success. Table 3 gives a review of the results of roadside surveys which were held since 1970. The first three years show a high level of drinking and driving during weekend nights. In 1974 a legal limit of 0.5 o/oo was introduced. This was followed by a short-term decline in drinking and driving. In 1977 the situation seems to have stabilised at a slightly lower level of drinking than before 1974. Somewhere between 1980 and 1985 a decreasing trend has started, which was still going on until 1988. These developments will be described in more detail in the next two paragraphs, making a somewhat arbitrary division between the years 1970-1980 and the years following 1980.

4.1. The years 1970-1980

Until 1974 it was an offence to be unable to drive correctly as a consequence of the drinking of alcohol. This had to be proven by testimony of the police on the intoxicated state of a driver (bloodshot eyes, failed equilibrium test etc.) or by the result of a voluntary bloodtest. The police used to trace offenders who were involved in accidents or by suspicious behaviour (e.g. staggering, driving very fast or without lights). Mainly drivers with a high BAC were traced in this way. The average BAC determined at the (voluntary) blood analysis was about 1.5 o/oo.

In 1974 it became illegal to drive with a BAC higher than 0.5 o/oo, with the result of a blood test as sufficient proof. Because the bloodtest had been made obligatory it became easier to prove a suspect's guilt, especially in case the behaviour or look of a driver gives little information on the influence of alcohol. The police was empowered to stop drivers at random and to check their consumption of alcohol with the use of chemical test-tubes. The modification of the law and the intention of the police to strictly enforce these rules, were widely published as a warning to drivers who used to drive intoxicated.

The effects of the 1974 changes have been studied extensively, from which it was concluded that for weekend nights alone the number of fatal car accidents in 1975 fell by about 100 (to slightly above 200). As mentioned before, the long term effects have been small.

An explanation for the effects of the 1974 changes is that as a result of the publicity at the end of 1974 many drivers had the impression at first that the probability to be checked and caught had become very high. When, in practice, this appeared not to be so they recovered their former driving and drinking habits.

Actually the rate of police arrests for drunken driving had almost doubled after 1974 with ca. 20,000 arrests a year and has continued to rise to ca. 35,000 by 1980. However, with 1.4 o/oo, the average BAC of these drivers was only slightly lower than before 1974. The number of court trials shows the same rising trend as the number of arrests, but the number of imprisonments remained at a stable level of ca. 4,000 a year between 1970 and 1980. This implies a change in sentencing, which is the result of guidelines for the Public Prosecutor. In 1974 these guidelines indicated a prison sentence at a BAC of 1.5 o/oo. In 1977 the level was raised to 2.0 o/oo.

It is improbable that the change influenced the driving and drinking behaviour. Research has not yet been able to prove that lighter punishments have a less preventive effect than heavy punishments. This insight was confirmed by research into the general preventive effect of the severity of punishment for DWI, executed in the Netherlands in 1973. Randomly stopped drivers hardly appeared to know what punishment to expect and those who said to expect imprisonment had consumed as much alcohol as those who expected a fine.

A minority of all the police stops and arrests was the result of special alcohol controls. The usual type of alcohol control was a roadblock where all or a random selection of drivers were stopped. The breath testing, however, was selective and only drivers who were suspected of alcohol consumption were tested. This type of control was frequently applied shortly after the introduction of the BAC limit but was soon thought to be ineffective. It required a lot of extra manpower (during nighttime) and very few drunken drivers were caught. For several reasons the police preferred to consider the control of drunken driving as part of their normal traffic patrol. Research has shown that selective testing leads to a low probability of detection for drivers over the legal limit. Between one and two out of three drivers who were stopped at a special alcohol control and were over the limit escaped the attention of the police. In addition the chemical test tubes are not very accurate. On the basis of the results of several studies a best estimate of the chance of detection for a driver with an illegal BAC during a weekend night was between one in 2,000 and one in 15,000.

It must be concluded that the legal changes of 1974 have only resulted in an increase of the level of traditional enforcement, which has made a very limited long-term effect on drinking and driving.

4.2. The years following 1980

Major changes have occurred in drinking and driving on weekend nights since 1983. By 1988, the percentage of drinking drivers had virtually halved in all BAC categories. There are small differences with respect to the rate of change and/or the time of onset depending on day of weekend, sex and age of driver, trip origin and region. For example, on Friday

nights the percentage of drivers with a BAC over 0.5 o/oo has changed gradually between 1977 and 1988 from 13% to 7%. In comparison the change for Saturday nights was more abrupt with a change between 1983 and 1987 from 14% to 7% (and a further change to 5% in 1988). The difference in change between Friday and Saturday is such that since 1988 the absolute number of drivers with a BAC over 0.5 o/oo is higher on Friday nights than on Saturday nights, which has always been the reverse.

In all, this has led to a significant reduction in the number of deaths and injuries on the roads. This can be deduced from data on two types of alcohol-related accidents: fatal accidents in which alcohol consumption has been observed and registered by the police and a so called surrogate measure. As has been mentioned before, the first type of alcohol accidents is not registered completely. However, there is no particular reason to assume that registration patterns have changed in this respect in recent years so that the proportion of alcohol accidents can be used to establish relative changes. Fatalities or hospital admissions of car occupants involved in accidents during weekend nights (i.e. Friday, Saturday and Sunday nights between 10.00 p.m. and 4.00 a.m.) are used as the surrogate measure.

The number of fatal accidents shows a long period of decline and so does the number of those accidents for which the police registered the use of alcohol. In recent years the number of alcohol accidents has declined more rapidly (see Table 4). Expressed as a percentage of all fatal accidents, the fatal accidents represented between 14 and 15% until 1985. This percentage has been falling since 1985 to 9% in 1988. The difference in percentages represents an extra decrease of roughly 70 fatal alcohol accidents in 1988.

The surrogate measure is also falling as shown in Table 5. Among car occupants killed or admitted to a hospital the percentage for weekend nights ranged between 16 and 18% until 1985. Since that time, the percentage has dropped to 13% in 1988. This represents a reduction in 1988 of about 250 victims per year. The number of victims from alcohol accidents also fell in other periods, albeit less sharply than on weekend nights.

Although the exact figures are difficult to establish, all the available information indicates a clear fall in the number of alcohol-related

accidents during the last five years. This development can be explained by a decrease in DWI on weekend nights and probably also during other periods of the week.

There is not enough evidence for a conclusive explanation for these developments in drinking and driving. However, it seems probable that at least part of the explanation can be found in the policy pursued in the Netherlands in recent years. This had two key elements: improved enforcement procedures and more 'aggressive' public information.

In the years following 1980 the number of police arrests for drunken driving has continued to grow, reaching ca. 40,000 in 1983 and 1984. In more recent years the number of police arrests is slowly decreasing to ca. 30,000 in 1988. In May 1983 the Public Prosecutor was given the power to offer a financial settlement for lower BAC's to diminish the workload of bringing cases to court and to relieve the judges. Nowadays 25% of the offenses is settled this way. Since then, the number of court trials has remained the same, but between 1980 and 1988 the number of imprisonments has more than halved to ca. 1600 in 1988. Again this is the result of changing the level at which the guidelines for the Public Prosecutor indicate a prison sanction: in 1983 from 2.0 o/oo to 2.5 o/oo.

In recent years, a number of changes have gradually been introduced in police surveillance. In a growing number of police forces, chemical test tubes have been replaced by more advanced electronic breath testers for screening purposes. Police are also increasingly using a truly random control strategy in which drivers are stopped at random and are always breathalysed. This strategy was tested in the city of The Hague in 1986 and showed a small but positive effect. This strategy is similar to the one applied in New South Wales, Australia which was very successful. However, the level of testing and the budget for publicity was much lower than in Australia.

Following a legal amendment introduced on 1 October 1987, a start was made to replace the compulsory blood testing by evidential breath testing at police stations. The limit is set at 220 microgram alcohol per litre exhaled air, being equal to a BAC of 0.5 o/oo, the former legal limit. The evidential breath testing devices are now in use throughout the country since 1 October 1989.

All these changes have led to an improvement in the efficiency and effectiveness of police surveillance, and the objective chance of stopping

and catching drunk drivers has risen. Additional to the increased risk of detection, the probability and quickness of punishments for lower BAC's has improved.

The explanation could also be sought in another element of the governmental policy pursued, i.e. the public information campaigns.

From as long ago as the 1960's, the Veilig Verkeer Nederland (Dutch Road Safety) organization has organised annual information campaigns on drinking and driving. Since 1986, the character of these campaigns has hardened. Drinking and driving is frankly stamped as socially unacceptable or even criminal. In 1987 the Ministry of Health also launched a long term, national campaign, to discourage drinking in general, with publicity campaigns playing an important role.

Road safety campaigns have been evaluated among the primary target group, young male drivers. The Groningen State University conducted behavioral studies and inquiries for this purpose. The results show that more drivers were sober at the wheel in 1988 than in 1986, while the number of cyclists with a BAC over 0.5 o/oo rose. However, these changes cannot simply be explained by the publicity campaigns. They were primarily aimed at influencing attitudes and social norms and the inquiries show that these have not changed among the target group of the campaign. Probably other factors therefore account for these behavioral changes, like the improved police enforcement.

Part of the explanation may also be found in altered attitudes to a healthy lifestyle in general and in a decreasing use of alcohol.

Till 1980 alcohol use has been growing constantly: from 5 litre pure alcohol per user per year in the beginning of the sixties to 14 litre in 1979. Since then it went down somewhat, to 12 litre in 1988.

5. Summary and conclusions

It is estimated that about 200 people are killed yearly in the Netherlands as a result of drunken driving. Although drinking and driving seems to be a problem during all nights of the week, alcohol accidents are more frequent during weekend nights. Drinking and driving is predominantly a problem of male adults.

The introduction in 1974 of a 0.5 o/oo limit, compulsory blood testing and roadside breath testers has resulted in an increase of the level of traditional enforcement, but a limited long term effect on drinking and driving. Since 1980 the situation is improving. The percentage of drinking drivers during weekend nights has halved and the number of alcohol related accidents has decreased relative to other accidents. This seems to be the result of a combination of factors, including gradually improved law enforcement and continuing, large scale publicity campaigns.

Neither roadside surveys, nor accident statistics give indications that the downward trend has stopped or is slowing down yet. Further improvements can also be expected because some of the changes in enforcement have only recently been introduced or have not yet been used nationwide.

Despite the changes since 1980, drinking and driving is still a major road safety problem in the Netherlands and continuous efforts should be made to combat and study the problem. The weekend night roadside surveys are a useful source of information. However, information for other periods of the week is limited and with the decreasing proportion of drinkers it becomes more difficult to obtain reliable conclusions for this group, in particular for drivers with a high BAC. Another limitation of roadside surveys is that it is difficult to make inferences about the number of accidents resulting from drinking and driving. In addition, the official accident statistics are very poor with respect to the role of alcohol. Routine BAC measurement of all road users involved in an accident would solve these problems. Periodic hospital studies would be a step forward, but are difficult to perform, as shown by the pilot study.

Looking at the trend in drinking and driving, it wouldn't be surprising if the number of drivers with the high BAC's would decrease at a slower rate than the lower BAC's. This would be reflected in a slower rate of change in the number of alcohol related accidents than in the last year.

Policy makers will be confronted with two main questions in the near future. The first one relates to the (successful) policy pursued in the past: how long should it be continued and especially when can police-enforcement be replaced by effective educational efforts that result in internal motivation to abstain from alcohol use in traffic. The answer depends largely on the availability of such effective educational instruments. Research is going on into these subjects.

The second question reads: what should be done to reduce the higher BAC's in particular? Up till now this is being tried by means of driver improvement courses, revocation of drivers' licenses etc. Even if these would be 100% effective (which has not been demonstrated at all), the impact would be limited because of the small share of the target population that is reached by these instruments. This leads to the pessimistic conclusion that the Netherlands may have to live with a small group of drivers with high BAC's in the near future.

Period of week	BAC	
	≥ 0.2 o/oo	≥ 0.5 o/oo
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Weekday		
16.00-22.00 hours	2%	1%
22.00-04.00 hours	14%	7%
Friday		
22.00-04.00 hours	16%	9%
Saturday		
16.00-22.00 hours	9%	3%
22.00-04.00 hours	13%	7%
Sunday		
16.00-22.00 hours	9%	4%

Table 1. Percentage of drivers at or over BAC 0.2 o/oo resp. 0.5 o/oo, in the Netherlands for six periods of the week (1987).

Period of weekend night	BAC	
	≥ 0.2 o/oo	≥ 0.5 o/oo
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Friday		
22.00-24.00 hours	10%	3%
00.00-02.00 hours	21%	10%
02.00-04.00 hours	25%	15%
Saturday		
22.00-24.00 hours	8%	2%
00.00-02.00 hours	12%	6%
02.00-04.00 hours	16%	7%

Table 2. Percentage of drivers at or over BAC 0.2 o/oo resp. 0.5 o/oo in the Netherlands for weekend nights (1988).

Year	BAC	
	≥ 0.2 o/oo	≥ 0.5 o/oo
1970	25%	14%
1971	31%	18%
1973	33%	16%
1975	23%	11%
1977	25%	12%
1983	24%	12%
1987	14%	8%
1988	14%	6%

Table 3. Percentage of drivers at or over BAC 0.2 o/oo resp. 0.5 o/oo during weekend nights, in the Netherlands since 1970.

Year	All fatal accidents	Alcohol use	% Alcohol use
1977	2518	346	13,7
1978	2085	314	15,1
1979	1795	265	14,8
1980	1837	270	14,7
1981	1650	247	15,0
1982	1569	236	15,0
1983	1620	233	14,4
1984	1477	214	14,5
1985	1323	185	14,0
1986	1401	175	12,5
1987	1355	145	10,7
1988	1258	118	9,4

Table 4. Fatal road accidents and police-registration of alcohol use, in the Netherlands since 1977.

Year	Total	Weekday		Weekend		% Weekend night
		day	night	day	night	
1978	9178	4631	755	2271	1479	16.1
1979	8186	4038	776	1983	1350	16.5
1980	7690	3798	731	1827	1260	16.4
1981	7201	3525	684	1770	1160	16.1
1982	6764	3306	562	1614	1238	18.3
1983	7108	3541	646	1645	1222	17.2
1984	6721	3330	598	1584	1152	17.1
1985	6362	3200	580	1540	996	15.7
1986	6352	3269	587	1526	916	14.4
1987	6359	3489	548	1369	901	14.2
1988	5759	3125	452	1414	763	13.2

Table 5. Fatalities and hospital admissions of car occupants in the Netherlands since 1978.

