MEDICAL PRACTICE

Contemporary Themes

Drinking and driving: success of random breath testing in Finland

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Abstract

Since the introduction of random breath testing in Finland in 1977 the drinking and driving rate has halved, and there has been an appreciable reduction in the rates of death and injury from road accidents associated with drinking. The results of Finnish studies indicate that random breath testing deters social drinkers and detects problem drinkers. Problem drinkers are more likely to be driving in morning traffic, when vulnerable road users such as children are about, and are more likely to be detected by random breath testing than by any other police activity.

Random breath testing is a popular measure and has not only saved lives but has paid for itself by savings in health service and other resources. Introducing random breath testing into Britain could save at least 400 lives a year. The main recommendation of the Blennerhassett report of 1976—discretionary testing—is compared with the success of random breath testing in Finland.

Introduction

Each year roughly a quarter of a million road accidents occur in Britain in which over 5500 people die at a cost to the community of £2700m. This compares with 127 deaths a year from opiates, but opiates receive more official attention.¹ The Department of

Transport estimates that a quarter of deaths from road traffic accidents are associated with alcohol, but even this is an underestimate.¹⁻³

Because of concern about the decreasing effectiveness of drinking and driving laws in Britain a departmental committee of inquiry—the Blennerhassett committee—was set up by the Department of Transport and reported in 1976.⁴ It recommended discretionary breath testing of drivers, which was rejected by the government as an infringement of civil liberties, a burden on police resources, and damaging to police relations with the public.⁵ The government claimed that the present law gives the police adequate powers to test drivers at random, but this power has not been used.

Random breath testing in Finland

In 1977 discretionary or random breath testing was introduced in Finland with a legal limit of 50 mg alcohol/dl blood. None of the political parties opposed random breath testing because education and publicity campaigns, breath testing of drivers in accidents, and severe legal penalties such as imprisonment had all failed. Over the next five years Finland had one of the greatest reductions in injuries from accidents⁶ and Britain the smallest.

THE CHECKPOINT

Random breath testing is a highly visible deterrent and attracts press reporting, which magnifies the effect. At a typical checkpoint eight to 12 policemen, each with an Alcolimeter PST-M1 breath screening device, stand along the centre line in the road. The sites are chosen so that it is impossible for a driver to avoid being tested. Drivers of all vehicles except emergency service vehicles are tested. Most drivers know the procedure, which takes only seconds to perform, and it is almost unknown for drivers to refuse to give a sample or show resentment. The checkpoint is maintained for half an hour during which 500 drivers may be tested and one or two found to be over the legal limit (fig 1).

When the breath test is positive a blood sample is taken and the driver's licence suspended. If a driver who is suspected of having been drinking refuses to provide a blood sample the police may obtain it compulsorily by

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law, and the sample is taken by a physician at a health centre. Suspending a driver's licence before trial is a safety precaution aimed at keeping irresponsible drivers off the road.

PUBLIC ACCEPTABILITY

There is universal public support for random breath testing, and the Finnish police regard it as an important part of their work. The results of surveys have shown an initial refusal rate as low as five per 10 000, though all the drivers agreed to breath testing when confronted with the alternative of blood sampling and suspension. Finnish drivers warn each other of speed checks by citizens' band radio or flashing lights but usually do not warn each other of checkpoints for random breath testing. A report from New South Wales, Australia, indicated that 60% of voters were in favour of random breath testing before it was introduced and 90% one year after it was introduced.⁷

FIG 1—Breath testing a driver at a checkpoint in Finland.

THE EFFECTS

The most accurate measure of the frequency of drinking and driving is obtained from extensive roadside surveys of alcohol concentrations in drivers on different types of road throughout the year.⁸ This is not permitted in Britain but has been carried out to study changes in drinking and driving behaviour in Finland.⁹⁻¹¹

Altogether 133 332 drivers were breathalysed by the same team in research surveys on Tuesdays and Saturdays in the province of Uusimaa, comprising the capital Helsinki and its surroundings. In 1979, the first year of the surveys, 579 drinking drivers were detected, giving an overall incidence of 1.43% of drinking and driving in normal traffic flow. One third of drivers

(0.46%) had a blood alcohol concentration of over 50 mg/dl. Since 1979 Finnish police have used random breath testing routinely in traffic supervision. This has raised the perceived risk of detection considerably (table).

In the follow up surveys the frequency with which drinking drivers were detected declined significantly to 0.59% in 1985, a reduction of 58% since 1979. It seems, therefore, that the frequency of drinking and driving in normal traffic has more than halved in the period since the introduction of random breath testing. Over the same period the numbers of deaths and injuries due to drinking and driving have appreciably decreased, although the consumption of alcohol, the numbers of cars owned and drivers' licences issued, and the volume of traffic have slightly increased in Finland. Intensified traffic supervision with random breath testing deserves credit for the favourable trend as there have been no other recent changes in road safety measures.

The patterns of drinking and driving in Finland have been better understood since random breath testing was introduced. As in Britain it was thought that the highest incidence occurred on Friday and Saturday nights, but it was in fact between 7 am and 10 am, especially on Saturday morning, when the rate was twice that during normal late night traffic on Friday and Saturday. Drivers are generally unaware of how long it takes to eliminate alcohol from the body. The frequency of drinking and driving in Finland is low compared with that in most European countries where similar breath test surveys have been carried out at the roadside. On the other hand, a lower incidence has been reported in Norway (0.17%) and in Sweden (0.14%).¹²⁻¹⁵

Problem drinkers

The characteristics of drivers who have been arrested by random breath testing in Finland correspond with those of the drivers identified as problem drinkers in Tayside, Scotland¹⁶⁻²⁰: a high proportion of divorced men; of older people; of people from higher social classes; more heavy goods and public service vehicle drivers, who have a high risk of accidents; and many drivers are likely to be arrested in morning traffic. Two thirds of them drive over 12 500 miles (20 000 km) a year. They differ most noticeably from other offenders in the distribution of blood alcohol concentrations (fig 2).

FIG 2—Alcohol concentrations among offenders arrested after random breath testing compared with those in drivers arrested during normal supervision of traffic by police.

Finnish roadside surveys: proportion of drinking drivers in normal road traffic 1979-85

	No of drivers tested	Drivers with positive alcohol concentrations	
		>50 mg/dl	<50 mg/dl
1979	40 389	0.46	0.97
1980	16 416	0.39	0.80
1981	17 522	0.36	0.59
1982	15 976	0.34	0.68
1983	9 636	0.24	0.46
1984	15 294	0.20	0.48
1985	18 089	0.20	0.39
Total No	133 322	458	923

The distribution of blood alcohol concentrations among drivers arrested in normal police activities in Finland is similar to that in Britain. In contrast drivers arrested by random breath testing have lower alcohol concentrations (mean (SD) 103 (47) mg/dl and 158 (74) mg/dl). This has been said to show that random breath testing detects social drinkers but has been refuted since so many drinking drivers are detected in the morning, and 40% have raised serum γ -glutamyltransferase activity compared with 30% of drivers in normal police arrests. Such drivers may have much higher concentrations of alcohol on other occasions, which would be expected to raise the risk of an accident further if they drive. This may account for the higher alcohol concentrations found in people who have died in road accidents.

In Britain low detection rates for drinking and driving result in apparently low recidivism rates (one per 1500 a year), permitting even problem drinkers to go undetected until they have an accident.²¹ The value of random breath testing in identifying such offenders early is clear. In Finland one third of offenders report a previous arrest for drinking and driving. This suggests much higher enforcement levels in Finland than in Britain.

Benefits and savings from random breath testing

According to the Finnish Ministry of the Interior there has been no increase in police staffing for random breath testing and no reduction in other police activities despite a 30-fold increase in breath tests. Perhaps the reduction in road accidents and drinking and driving has freed police for other activities.

No cost analyses for random breath testing in Finland, Sweden, and Norway have been carried out, but the results of the New South Wales study show net cost savings. Random testing and advertising on television costs \$A 4m, but \$A 131m a year is saved in health and welfare costs.⁷ The figures are probably comparable with those in Finland as in both countries there has been an appreciable sustained reduction in death and injury, and in New South Wales the police test an average of one in three licence holders a year. In both countries random breath testing is popular. The same benefits could be expected in Britain, with a consequent reduction in health service waiting lists, fewer drivers facing prosecution, and lower insurance costs.

What about the future?

One problem remains—the problem drinker. Gjerde *et al* have drawn attention to the similar prevalence of abnormal γ -glutamyl-transferase activity among drunk drivers in studies in Europe—that is, 20–25%.²² The 40% prevalence among those detected by random breath testing shows that large numbers of problem drinkers are detected by this method. In contrast with expectations random breath testing does not capture many social drinkers, but it does identify drivers whose drinking is out of control and for whom treatment may be a better option.

Valverius has shown in northern Sweden that only 0.12% of drivers in normal traffic have more than 50 mg alcohol/dl in the blood, but drivers in 47% of single vehicle fatalities had alcohol concentrations exceeding this limit. He draws attention to the high level of alcohol problems among these offenders.²³ It is well recognised that problem drinkers have a high risk of road traffic accidents.^{21 24} These dangerous drivers are less likely to be arrested in normal traffic supervision by the police and more likely to be detected by random breath testing.²⁵

The higher social class background among the group arrested by random breath testing is likely to reflect low policing levels in areas where these drivers live and drive. Random breath testing increases uniformity and fairness of enforcement. It also detects more problem drinkers among people who drive in their work, who should be of particular concern. The large numbers of drinking drivers in morning traffic is a serious threat to traffic safety as they share the roads with vulnerable road users such as schoolchildren. These drivers are seldom detected in Britain, although there is evidence of a high proportion of problem drinkers with low alcohol concentrations in morning traffic in Britain, too.¹⁸

Random breath testing has implications for traffic supervision by police. Traditionally the police are more alert to drinking and driving in the late evening, especially at weekends. The Finnish experience of random breath testing suggests that presumably many of the most potentially dangerous drivers are on the road in the morning and that they are difficult to detect by traditional means.

Random breath testing should now be regarded as a method of identifying dangerous problem drinkers among drivers. The next stage in controlling drinking drivers may be the development of treatment programmes for these offenders. Once identified, problem drinkers should be required to convince the court that their driving no longer presents a danger to other road users before their driving licences are restored. Problem drinkers contribute disproportionately to road traffic accidents and cause a major public health problem which requires medical care.^{13 23 25}

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References

- 1 Friends of the Earth. *Policing the road*. London: Friends of the Earth, 1986. (Road safety paper No 1.)
- 2 Everest JT, Jones W. *Patterns of accident and injury associated with alcohol*. Crowthorne: Transport Road Research Laboratory, 1986.
- 3 Department of Transport. *Road accidents in Great Britain, 1985*. London: HMSO, 1986.
- 4 Department Committee, Department of the Environment. *Drinking and driving*. London: HMSO, 1976.
- 5 Department of Transport. *Consultation document on drinking and driving*. London: DOT, 1980.
- 6 European Conference of Ministers of Transport. Round table 63. *Cost benefits of road safety measures*. Paris: Organisation for Economic Cooperation and Development, 1984.
- 7 Arthurson RM. *Evaluation of random testing*. New South Wales, Australia: Traffic Authority of New South Wales, 1985:24–31.
- 8 Pikkarainen J, Penttilä A. Drinking and driving in Finland. In: Nishikawa S, ed. *Traffic research report No 26*. Tokyo: Japanese Traffic Science Council, 1986:162–5.
- 9 Penttilä A, Kataja M, Lindbohm R, Maki M, Pikkarainen J. *Rattijuopumus Suomessa*. Helsinki: Kansanterveyslaitoksen julkaisuja A1, 1984:1–146.
- 10 Penttilä A, Aas K, Nevala P, Piipponen S, Pikkarainen J. Drunken driving in Finland, II. The profile of frequency based on road-side surveys. In: Goldberg L, ed. *Alcohol, drugs and traffic safety*. Vol 1. Stockholm: Almqvist & Wiksell, 1981:234–50.
- 11 Penttilä A, Maki M, Pikkarainen J. Drunken driving in Finland. Late-night, weekend incidence in five communities in 1978. *Journal of Traffic Medicine* 1979;7:30–2.
- 12 Glad A. *Drunken driving in Norway. The results of a nation-wide survey 1981–82*. Oslo: Institute of Transport Economics, 1983:1–47.
- 13 Glad A. *Research on drinking and driving in Norway*. Oslo: Institute of Transport Economics, 1985:11–6.
- 14 Valverius MR. *Drinking and driving in Nordic countries: an overview*. Stockholm: Karolinska Institute, 1985:8–13.
- 15 Valverius M. Roadside surveys in northern Sweden. In: Valverius M, ed. *Roadside surveys. Proceedings of the satellite conference to the 8th international conference on alcohol, drugs and traffic safety*. Stockholm: Swedish Council for Information on Alcohol and Other Drugs, 1982:7–32.
- 16 Dunbar JA, Penttilä A, Pikkarainen J. Random breath testing: an effective means of reducing drinking and driving and identifying problem drinkers. *Proceedings of 10th international conference on alcohol, drugs and traffic safety*. Amsterdam: Elsevier (in press).
- 17 Dunbar JA, Martin BT, Devgun MS, Hagart J, Ogston SA. Problem drinking among drunk drivers. *Br Med J* 1983;286:1319–22.
- 18 Dunbar JA, Ogston SA, Hagart J, Ritchie A, Martin BT. Tayside Safe Driving Project: alcohol problems among drivers. In: Nishikawa S, ed. *Proceedings 10th congress of international association for accident and traffic medicine*. Tokyo: Japanese Council of Traffic Science, 1985:175–9.
- 19 Pikkarainen J, Penttilä A. Screening of arrested drunken drivers for alcoholism. In: Goldberg L, ed. *Alcohol, drugs and traffic safety*. Vol 1. Stockholm: Almqvist & Wiksell, 1981:288–99.
- 20 Pikkarainen J, Penttilä A, Oksanen A, Laaksonen H, Kataja M. In: Kay S, Meyer G, eds. *Proceedings 9th international conference on alcohol, drugs and traffic safety*. Washington DC: National Highway Traffic Safety Administration, 1985:1109–16.
- 21 Dunbar JA, Ogston SA, Ritchie A, Devgun MS, Hagart J, Martin BT. Are problem drinkers dangerous drivers? An investigation of arrest for drinking and driving, serum gammaglutamyl transpeptidase activities, blood alcohol concentrations, and road traffic accidents: the Tayside Safe Driving Project. *Br Med J* 1985;290:827–30.
- 22 Gjerde H, Sakshaug J, Morland J. Heavy drinking among Norwegian male drunken drivers: a study of gammaglutamyl transferase. *Alcoholism: Clinical and Experimental Research* 1986;10:209–12.
- 23 Anonymous. Punishment or treatment. In: Valverius M, ed. *Proceedings of the international workshop*. Stockholm: Swedish Council for Information on Alcohol and Other Drugs, 1985:7–11.
- 24 Papoz L, Weill J, L'Hoste J, Chich Y, Got C, Goehers Y. Biological markers of alcohol intake among 4796 subjects injured in accidents. *Br Med J* 1986;292:1234–7.
- 25 Dunbar JA. *Drinking and driving in the United Kingdom*. London: Institute of Alcohol Studies, 1985:13–22. (Occasional paper No 7.)

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Is there any evidence that long sustained strenuous physical activity reduces resistance to infections or that the severity of an infection is increased if strenuous activity is taken in the early stages of the infection?

Evidence exists that strenuous exercise, as undertaken by athletes, is associated with changes in both humoral (reduced secretory IgA) and cell mediated (reduced lymphocyte response to mitogen) immunity. Surveys comparing athletes in training with less active controls show an excess of upper respiratory infections in the athletes. Furthermore, mice which undergo strenuous exercise are more susceptible to viral infection by Cocksackie B3. Thus it appears that strenuous exercise does increase susceptibility to infection. The second part of the question is more difficult to answer. There are numerous anecdotal reports of severe complications and even death in young sportsmen who exercised during the early stages of acute infections. Most of these reported deaths were inexplicable other than by the effects of recent infection but this does not prove cause and effect. Nevertheless, athletes are advised to avoid strenuous exercise during the early stages of infection.—J ALAN ROBERTS, senior medical registrar, Southampton.

Roberts JA. Viral illness and sports performance. *Sports Medicine* 1986;3:296–303.