

**PREVENTIVE MEASURES;  
EDUCATIONAL PROGRAMS**



# **Expanding the Focus for Educational Programmes in Drink Driving**

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## **Keywords**

Drink driving, educational programmes, evaluation, theory

## **Abstract**

Over the past twenty years there has been a series of research based educational and rehabilitation initiatives used to reduce drink driving in Queensland, Australia. This conceptual paper examines the implications of the variety of different approaches to education and rehabilitation they have employed. It is proposed that there needs to be both clarity and selectivity in targeting programmes and new strategies and approaches to implementation in this problem area. Four research based statewide and regional programmes are examined which include two high school programmes, a rehabilitation programme and a prevention programme designed for a juvenile detention centre population. The programmes are analysed in terms of targets, theoretical and pedagogical models, evaluation outcomes and implementation and continuity constraints. The findings demonstrate outcome effectiveness for well-designed behaviour change programmes and the need for programme designers to determine their target group and to focus programmes on the target's particular needs. It is possible to define a general school population and its need for knowledge, information and appropriate social skills however ensuring continuity for such programmes is a major problem. Evaluation findings also indicate that there may be very different theoretical paradigms required for effective programmes for those who already have involvement in drink driving and other criminal behaviours. Research and educational attention should move to selecting and trialing the types of theoretical paradigms and implementation strategies that are relevant for particular and diverse groups. Attention is drawn to the problems faced by model interventions in finding and establishing a continuing role in densely packed and dynamic school curricula and proposes possible alternative approaches. Finally, the very different situation of the programme poor environment of juvenile detention centres and the competing personal and developmental issues faced by these young persons is discussed.

## **Background**

Over the past twenty years the Centre for Accident Research and Road Safety in Queensland has been involved in a series of research based educational initiatives to reduce drink driving by young people. Not unlike other western countries in the late seventies and early eighties transport and health authorities became deeply concerned by the high incidence of alcohol affected young people in the road fatality tolls. In Australia, more than half the fatal crashes

involving 17-25 year olds involved alcohol<sup>1</sup> and this proportion was consistent with U.S. and Canadian data<sup>2</sup>. In most affected countries this led to major community concern and commitment to reducing the problem. In turn, in spite of relatively poor reports in available literature at the time on the effectiveness of educational programmes in reducing alcohol related problems, there was a growth in funding by relevant departments to support research and interventions. Whilst similar programmes and developments were taking place in other jurisdictions and other countries the core research team in the Centre were the major researchers and innovators in the area and in association with relevant departments took the lead in research, implementation and evaluation of interventions in the state.

This paper reviews our experiences of four programmes, their process, and where available, outcome effectiveness and longevity in the relevant delivery system.

The four high school based programmes to be discussed include:

- a school based drink driving prevention programme for the state high school population [PASS]<sup>3</sup>;
- a modified version of the above programme that was developed and taught to indigenous community based children [When you think about it]<sup>4</sup>;
- an end of high school celebration alcohol safety programme [Thrills without Spills]<sup>5</sup>;
- and finally, an intervention for adolescents in juvenile justice detention centres which is currently in the developmental stage. This is a group in which a large proportion of children are Indigenous.

Based on these review findings it examines the implications for different approaches to education.

## **Objectives**

The data are used to examine the effectiveness of:

- theoretical clarity and programme design targeted to identified groups; and
- implementation and maintenance of programmes in this problem area.

## **Methods**

Four research based statewide and regional programmes are examined. Two of these are for the general school population and two are specially developed for targeted sub-groups. The programmes are analysed in terms of target behaviours, theoretical and pedagogical models, process and outcomes (where available) and implementation and continuity constraints.

## **Results**

### **Programme 1: PASS. The ‘Plan a Safe Strategy’ drink driving education programme for high school students<sup>3</sup>**

This programme was designed to strengthen new behaviours through implementing the Ajzen and Madden<sup>6</sup> theory of planned behaviour. It explicitly aimed to reduce fatalities and serious injuries due to drink driving through targeting passenger behaviour and training children in the use of alternatives to being a passenger of a drink driver. It was taught experimentally in a staged entry methodology to all grade ten students in High Schools in the state that had been randomly assigned to an experimental or control group. Because of its aim it was designed to

change young males' behavioural intentions though it was taught to both male and female students<sup>7</sup>. It was based on extensive research to ensure that the core behaviour change variables of the theoretical model were identified and change strategies operationalised. Developmental research examined the theoretical constructs with the young male target group and content was designed to reflect their experiences. It also was explicitly aimed at the general population of students and did not directly address issues raised by high risk students.

It was taught in a highly structured and organised fashion so that sessions were integrated and built on the previous lesson's content. It was taught over twelve lessons and was part of a major initiative of the state education department's alcohol and drug programmes unit. All teachers delivering the programme in the schools were specifically and intensively trained. Other special programmes were developed for other teachers in the schools, principals and parents<sup>8</sup>. It was a directed behaviour change programme and was extremely tightly focussed to learning principles and effective behaviour change strategies based on research literature.

The programme was intensively evaluated on a number of occasions. It received extensive process evaluation to ensure the programme could be taught and was taught as designed<sup>7</sup>. A three month follow up evaluation to ensure that it had changed attitudes, knowledge and reported behavioural intentions<sup>7</sup>; a three year follow up of changes in reported drink driving and passenger behaviours and self reported history of offences<sup>9</sup>; and the 62,000 participants have been followed up for traffic and drink driving histories and currently for serious crashes, fatalities and other risk taking injuries after 12 years<sup>10</sup>. It was followed up after two years by an independent evaluation of best practice road safety programmes in Australia<sup>11</sup> and the teachers who had taught the programme in the first trial were followed up after five years for feed back on their experience with the programme.

The evaluation findings are instructive. The programme seemed to have a significant effect in the right direction on knowledge, attitude and reported behaviour at three months; on self reported passenger behaviour at three years but no effect on traffic history data after ten years.

The independent evaluation found it was a model of best practice and very highly valued by teachers. The follow up of teachers after five years was only able to locate a small number [30] of the 150 trained and involved teachers because the majority had either moved on with promotional positions or had left teaching. A number of the teachers who were located mentioned that they had participated in the trial because they thought it would be useful additional training and experience and they could use it to move to a better position. The Education Department unit which had been responsible for managing the statewide use of these programmes was closed after four years when there was a change of government.

### **Programme 2: 'When you think about it'<sup>4</sup>**

As part of the earlier programme it was concluded that a particular effort should be taken to make the programme relevant to minority Indigenous students. An Indigenous team of writers and of video producers was found and the programme was redesigned for teaching in an Indigenous community school. This version was a much shorter four lessons. It was designed to cover similar content issues though more attention was given to alcohol knowledge and management as distinct from drink driving. The pedagogic methods were different and there was more explicit effort to develop a community focus. In this case teachers were given some training but there

was considerable turn over of teachers during the lead up to the evaluation and for a variety of reasons there was only limited community and parent knowledge of it. The programme did not evaluate well. Students liked the videos and role play exercises but the strict organisation of the model and materials could not be maintained in the context of extremely poor school attendance. Of the potential 102 students on the school role only 36 students completed the four lessons of the course. The qualitative data obtained in evaluation indicated that there were very severe problems associated with alcohol consumption in the community which had a major impact on children<sup>12</sup>.

This programme also vanished with the closure of the relevant section of the Education Department and within a year it was impossible to locate copies of it or teachers who had been associated with it. The community in question has undergone severe stresses in the years since the programme was conducted with a very high suicide incidence among young people. The town is now one of the first of the large coastal Indigenous communities to commit to closing down the local liquor outlet.

### **Programme 3: ‘Thrills without spills’<sup>5</sup>**

This programme was also developed and implemented in association with the state government drug and alcohol programme unit. It was specifically designed for final year students in rural schools and aimed to reduce the drink driving crashes and other alcohol associated injuries that occurred at the end of the high school celebration week and the following summer holiday. Designed as a trial programme in a rural region it linked lesson based student change behaviour strategies with community outreach publicity and alcohol control strategies. This school programme which consisted of five lessons was also based on the Ajzen and Madden theoretical model<sup>6</sup> and specifically designed to change students intentions. However this programme made much more use of the contribution of the variable ‘perceived behavioural control’. It had become clear from our own research and leading programmes in alcohol education in the international literature at the time that if students were to be assisted in managing alcohol related activities in a rural community it was important to enlist the support of relevant stakeholders<sup>13</sup>. Consequently, in addition to classroom activities, this programme built in community intervention strategies for students, teachers, parents and designated stakeholders such as liquor outlet managers and police. The programme was run in the region and whilst it was very positively received by teachers and students it did not lead to any measurable significant change in relevant injury rates compared with a control community. Other relevant issues here are that the programme again was directed at the general school population and content targeted to the research findings from young males. There was no attempt to identify the particular issues that could be of relevance to very high risk young people though they presumably would have been under represented in this sample.

A further matter of interest is that once again this programme ceased to be available when the alcohol and drug education unit closed.

### **Programme 4: ‘The risk taking youth intervention’**

The final programme to be discussed here is an intervention that is still in the developmental stage and is being undertaken in association with the state juvenile justice system<sup>14</sup>. In this case the focus is on defining the theoretical model and approaches that should inform a drink driving behaviour change programme directed towards a known high risk group. The programme is to be provided for young adolescents who are committed to a juvenile justice detention centre as part

of sentencing for multiple offending. Preliminary research indicates that all involved students will have a history of motor vehicle offences including unlawful use of a motor vehicle. They will all have a profile of alcohol or drug use and they disproportionately include Indigenous young males. Once again the behaviour to be changed can not be directly targeted and a model for changing intentions through knowledge and attitudes needs to be determined. In this case the key issue is that the constructs need to be operationalised through situations, experiences and significant others that are directly relevant to these high risk taking young people.

In the time since the original programmes were developed a variety of new findings and new concepts and theoretical paradigms have emerged that have implications for this type of intervention. A major relevant work is a recent report on the longitudinal study of substance use by young adults<sup>15</sup>. This exceptional study which commenced in 1976 reports findings similar to those of the PASS evaluation. These researchers have found that the best predictor of later substance use is use at an earlier (or adolescent) stage and that the factors that reduce risk are well established in early adolescence. They identified two core predictive attitudinal variables which were 'disapproval of the behaviour' and 'perception of risk'. As in the early PASS evaluations this research is dependent on self reports and probably disproportionately represents the views of the low risk majority of the population rather than the high risk sub-group. There are two other emerging theoretical areas that are consistent with findings from the earlier work and supported by current pilot research as having meaning for these young people. These are 'models and meanings given to maleness and masculinity'<sup>14</sup> and the recent critical examination of the traits of sensation seeking and risk taking<sup>16</sup> from the perspective of 'reputation enhancement' theory<sup>17</sup>.

## **Discussion**

There are a number of findings and propositions arising from this twenty year experience in developing interventions to reduce or prevent drink driving by young people. Attitude, knowledge and behaviour change can be achieved but programmes tailored to a general school population will probably not reach the small sub-group of high risk children engaged in problem behaviours. These young people will need special interventions designed to meet their particular needs and circumstances. The models for such successful interventions remain to be developed and the quixotic nature of risk taking and risk perceptions for this group may need to be carefully monitored. Early drink driving remains a predominantly male behaviour and there may be aspects of role identity that influence such behaviours and need to be examined at the community level. The earlier in the young person's life that an intervention takes place, the more likely it is to be effective or to reduce the likelihood of the behaviour being taken up. The minimal effectiveness of the Indigenous school programme in a community experiencing severe disruption as a result of dysfunctional alcohol use suggests that interventions in this context. They have to target and involve the wider community in which the young person has to live his life.

Finally, as yet we have found no solution to the problem of effective programmes ending up undisturbed on school library shelves. It is possible to define a general school population and its need for knowledge, information and appropriate social skills however ensuring continuity for such programmes is a major problem. Strategies to embed ownership of health promotion initiatives in schools and communities remain to be developed.

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# **The Potential for Collaborative, Preventative Approaches to Reduce Road Trauma Among Youth**

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## **Keywords**

Adolescent, behaviour, education, prevention, risk.

## **Abstract**

This paper details findings of an exploratory research project that has focused on a complementary avenue of considering road trauma within a broader framework of health determinants and outcomes. To date, road safety and health promotion initiatives in research, programs, and interventions are largely focused on describing single behaviours and single solutions (eg. drink driving, drug and alcohol use, crime prevention), rather than working on common causes and common synergistic responses. However there is a growing body of evidence that indicates common antecedents underlie multiple, negative health outcomes (Catalano et al, 1998; Homel et al, 2001, Jessor et al, 1991) Using information obtained from studies and programs that have addressed some of these issues as well as information from workshops with health and road safety professionals, it appears that a co-operative approach to protecting young people from these common antecedents could have great benefits across many sectors. Collaborative partnerships between different sectors, who all share the goal of preventing the antecedents which lead to multiple and negative health outcomes, may have the potential to reduce road trauma among young people and warrants further investigation and development.

## **Introduction**

Road safety programs have traditionally focused on encouraging road users to develop safe attitudes and behaviours with the explicit aim of reducing road trauma. While this approach has been successful to a certain extent, particularly when used in conjunction with other activities like enforcement, engineering and education, one area that has not been fully examined is the potential to consider road trauma within a broader framework of health determinants and outcomes.

Many areas of health promotion, like those targeting substance abuse, criminal behaviour, depression and suicide, adopt a similar approach to those in road safety. That is, the specific behaviour that is being targeted is the sole focus of the treatment and/or intervention program. While some approaches have been “borrowed” or “exchanged” between the health and road safety fields, the predominant practice up until now has been for specific agencies to work independently to develop “single issue” focused programs, policy and research.

While the continuation of programs designed to address specific health behaviours is important, the possibility of focusing programs at a more preventative or causal level, rather than treating the symptoms, may have a range of long-term benefits. Studies on the role of risk and protective factors note that efforts to reduce risk should be supplemented by intervention efforts to enhance protection (Costa et al, 1999). Indeed prevention is a central theme within the field of health promotion, with intervention being a supportive, rather than sole means of addressing health issues.

One question that researchers from many sectors have tried to address is what “factors” can predict which individuals will develop unsafe or unhealthy behavioural patterns later in life. This gives rise to further questions of:

- whether these predictive factors are common across a range of health and social outcomes;
- how can these factors be prevented from causing negative outcomes; and
- what value is there in working collectively, rather than singularly, to prevent factors from causing multiple, negative outcomes for a range of sectors?

In order to investigate these questions, an explorative research project was commissioned. RACV, TAC and VicHealth jointly funded the “Common Solutions” project, which commenced in January 2001. Crime Prevention Victoria, a new agency established by the Victorian State Government, joined the partnership in April 2002.

The Common Solutions Project is an innovative response to addressing the antecedents that underlie a range of health and social problems. Our thinking is akin to that of Schorr (1997) who notes that there is a growing consensus in the USA that “...multiple and interrelated problems...require multiple and interrelated solutions”, and that it is insufficient to address issues such as road safety, poverty, education, housing, crime, health and employment one at a time.

This paper provides a broad overview of investigative research findings, explores the dynamics of the unusual but successful cross-sectoral Common Solutions partnership, and outlines some possibilities for future activities.

The aims of the Common Solutions project are to:

- determine whether certain groups of people are more at risk of experiencing a multitude of risky behaviours such as drink driving, early school leaving, substance misuse, and criminal behaviour rather than just one or two of these behaviours;
- draw conclusions about what influencing factors can be addressed to improve health outcomes and what elements of upstream programs are most effective;
- examine the effectiveness of approaches that are currently being used to address “upstream” factors in a range of settings;
- determine what are likely benefits and/or disadvantages of this type of approach to reducing road trauma.

## **Methodology**

In this investigative work, a very broad review of health promotion, education, and road safety literature was conducted. International searches were undertaken through libraries, the internet and electronic databases. Key points to emerge from the literature were:

- A significant amount of time (at least five years) needs to be allocated to the development and implementation of larger projects.
- Intersectoral collaboration is a key ingredient in every successful project.
- Although the issues can vary, from motor vehicle crashes to unintended teenage pregnancy for example, the factors that protect against these are the same. These can include a caring relationship with at least one adult, connectedness to school, and effective problem solving skills.
- For protective factors to be in place across different transitional life stages, such as moving from primary to secondary school, various settings need to be targeted simultaneously for different risk factors.
- The combination of factors, rather than any one alone, is often the stronger predictor of later outcomes. However, there is a need to simultaneously target various settings to intervene or prevent any one of these factors being the catalyst to risky outcomes.

There were two workshops held, the first with the transport, health and juvenile justice sectors. The second workshop had representatives from the drug and alcohol, sexual health, education and transport sectors. These workshops were designed to identify any unpublished work that had been conducted that would contribute to the project, as well as gaining the insights, experience and thoughts of experts from a broad cross-section of health areas.

Participants were asked to describe issues that they faced when working with young people. Common issues amongst these sectors are:

- There is an understanding that all sectors are trying to work with the same population group – young people – and although the issues are different, the underlying antecedents are similar.
- Societal pressure on young people is widespread. Young people face the win/lose, success/failure dichotomies that are so prevalent in society today, and this has a significant impact on behaviour.
- There is a need to have common messages about working collectively occurring within and between sectors to assist in overcoming difficulties posed by terminology and language issues.

## **Research findings**

There appears to be a significant amount of data that places road trauma within a broader context of communities, schools, and families. Alongside road trauma appear issues like substance use, violence, and sexual behaviour, which with road trauma, appear to share similar population groups, and occur in similar contexts. The following section will explore the meanings of some of these findings, and how they relate to understanding the potential for collaborative, preventive approaches to reducing road trauma among youth.



# Victim Impact Panels Do They Impact Drinking And Driving Behavior?

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## Keywords

Victim Impact Panels, Prevention, Drunk Driving

## Abstract

Results of two randomized trials with Victim Impact Panels (VIPs) were compared. Trials have found that while there is considerable movement among intention and self-efficacy measures, Impact Panels have little effect on subsequent Driving While Intoxicated (DWI) arrest or drinking and driving behavior.

## Introduction

Victim Impact Panels (VIP's) have been instituted throughout the United States in hope of reducing DWI's. VIP's represent a considerable investment of resources for individuals associated with Mothers Against Drunk Driving (MADD), for local justice systems (in many locales, first-time offenders are required to attend VIP sessions as part of their sentence), and for those attending the VIP.<sup>1</sup> If effective, VIP's could be a cost-effective means of further reducing DWI morbidity and mortality. If not, resources may be better utilized elsewhere.

Investigations of the effectiveness of MADD VIPs do not provide unequivocal evidence about the effects of VIP experiences on subsequent alcohol consumption, drinking and driving behavior or recidivism. MADD-sponsored studies have found that those who attended MADD VIP's had a lower recidivism level than non-VIP participants. The Washington County, Oregon study found the recidivism rate of VIP participants was 8.8 percent, compared to a non-participant re-arrest rate of 40 to 45 percent.<sup>2</sup> A similar study in Clackamas County, Oregon found that the re-arrest rate for VIP participants was one-third that of non-participants.<sup>3</sup> One study found that those who did not attend a VIP were more than twice as likely, 18.7% as compared to 9.3%, to be re-arrested for DUI [Driving Under the Influence] during the 12 months following post-test data-collection.<sup>4</sup> Fors and Rojek found that the 12-month re-arrest rate for 404 VIP participants in one Georgia county was 6 percent, compared to 15 percent for 431 DWI offenders who did not experience a VIP.<sup>5</sup>

Other investigations have not supported the effectiveness of VIPs as a DWI deterrence strategy. Shinar and Compton for example, compared the recidivism rates obtained from driving records for several thousand DWI offenders in California and Oregon with (1) a comparison group matched on gender and age, and (2) a comparison group of DWI offenders sentenced to a VIP but who failed to attend. The results showed that the VIP experience had no measurable effect on recidivism.<sup>6</sup> Additionally, a study which compared 3,517 DWI offenders who were sentenced to attend VIP's with 1,721 DWI offenders who were not so sentenced in Bernalillo County, New Mexico found that a VIP referral did not increase re-arrest rates but lowered them marginally to not at all.<sup>7</sup>

The above-mentioned studies have two major limitations. They employed either a panel survey design or a quasi-experimental design that lacked randomization of respondents to treatment or control. Thus they cannot provide clear, unequivocal evidence as to the effectiveness of VIP programs.

Two controlled randomized field trials of the effectiveness of VIP's have been conducted in two counties of New Mexico, USA, the MADD VIP Trial (MADD) and the Customized VIP Trial (Customized). Both trials involved court-defined first-time DWI offenders. Both trials analyzed traffic safety records two years following VIP condition. Measures of drinking and driving behavior for each trial were obtained from self-report data following VIP condition. There are a number of differences between the trials: sentencing of the offender; majority population; follow-up to panel presentation; length between and number of follow-up points.

## **Methods**

The findings of two randomized trials of the effects of Victim Impact Panels on drinking and driving behavior were compared.

The population of the MADD VIP trial was predominately Hispanic (46%). Participants in the MADD trial were court-defined first-time DWI convicted from the Bernalillo County Metro Court in Albuquerque, New Mexico. MADD participants were randomly assigned following court sentencing for DWI to either a MADD VIP and DWI school group or a DWI school only group.

MADD participants were assessed at pretest, post-test, one year and two year follow-up time points. Their traffic safety records were obtained from the State of New Mexico for the two years following the VIP condition. Drinking and driving information was obtained at each follow-up point.

The Victim Impact Panels in this trial were presented in a large public hall. The audience ranged between 100 and 200 people, police officers patrolled the aisles. Audience members were asked to complete an evaluation form following the presentation.

Native Americans accounted for 60% of the population in the Customized VIP trial. Participants were inmates in a court-mandated 28-day DWI Detention/Treatment Program in San Juan County, New Mexico (SJCDWI). Participants were recruited upon their entrance into the 28-day Program. They were randomly assigned to either the Program including VIP or program and no-

VIP upon their entrance into the 28-day Program. Participants in the Customized trial were assessed on three occasions: intake, the day preceding their release and two month follow-up.

The Victim Impact Panels in the Customized trial were tailored to the audience with regard to ethnicity, language and lifestyle. The VIP's were held in the courtroom where most of the offenders had been sentenced. The audience was primarily inmate offenders numbering between 30 and 40 individuals. Detention center guards were also present. Following the Panel, inmates were returned to their dorms where they participated in a discussion of how drinking and driving had affected their lives. Each inmate was required to fill out a workbook, which they later reviewed with their counselor.

**Table 1: Demographics Study Participants**

	MADD Participants		Customized VIP Participants	
	n	%	n	%
<b>Gender</b>				
Male	625	(75%)	66	(67%)
Female	208	(25%)	33	(33%)
<b>Ethnicity</b>				
African American	17	(2%)	5	(5%)
Anglo	300	(36%)	29	(29%)
Hispanic	383	(46%)	6	(6%)
Native American	100	(12%)	59	(60%)
Other	34	(4%)	0	

**Results**

There was no significant difference in re-arrest or drinking and driving behaviors between those who attended and those who did not attend the VIPs in both trials.

The MADD trial found a non-significant trend in the direction of VIP subjects reporting more drinking and driving behavior at both one-year and two-year follow-ups. Re-arrest rates for DWI approached being significantly different across groups, with the mean for the VIP group (0.242) being approximately 30% higher than that for the DWI only group (.186),  $F(1,780)=3.60, p=.0583$ .<sup>8</sup>

The Customized trial had similar findings. A 2x2 Chi square analysis was conducted with group assignment as one dimension (VIP, no-VIP) and subsequent DWI arrest for a two-year period after release from the Program on the second dimension (yes/no). Chi square was not significant,  $c(1) N=89, 1.40, p<.24$ , indicating that there was no differential rate of recidivism based upon group assignment. Chi squares indicated no significant differences between the two groups with relation to drinking in the past 60 days (yes/no), driving after drinking in the past 60 days (yes/no), number of days with five or more drinks (yes/no), or driving after drinking five or more

drinks (yes/no): Drinking in the past 60 days,  $P^2(1, N=81)=.020$ ,  $p=ns$ ; driving after drinking,  $P^2(1, N=81)=.202$ ,  $p=ns$ ; five or more drinks,  $P^2(1, N=81)=.073$ ,  $p=ns$ ; driving after five or more drinks,  $P^2(1, N=81)=.171$ ,  $p=ns$ .<sup>9</sup>

## Discussion

Results of the two randomized trials indicate that, regardless of the population, setting of the panel, sentencing of the offender, customizing of the panel or utilization of the panel in treatment, VIPs do not appear to produce a differential benefit with regard to recidivism or drinking and driving behavior of court-defined first-time DWI offenders

VIPs are set up to appeal to the emotions of those in the audience. The overall intent of the VIP is to bring the offender face-to-face with the broad range of negative consequences that drinking and driving bring about.<sup>8</sup> This type of emotional appeal does not appear to have a long-term effect on the larger issues of alcohol abuse and/or dependency, which are more likely to be the underlying reasons for drinking and driving. While they may prove to be beneficial to the panelists and the public at large may see them as a valuable educational tool, Victim Impact Panels do not appear to have a significant impact on drinking and driving.

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# Development and Analysis of a Drug and Alcohol Driving Awareness Program

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## Keywords

Alcohol, education, prevention

## Abstract

This paper describes an alcohol/drug education program that focuses upon prevention of unsafe driving behavior because of use of alcohol or other drugs. Results of a survey analysis of the program are included.

## Introduction

The state of Texas has the highest incidence of alcohol related traffic deaths in the United States. In 2000, National Highway Safety Administration (NHTSA) data revealed that 50% of all traffic deaths in Texas were alcohol related as compared to 40% for the United States as a whole (1). In addition, research has shown that young people are significantly more likely to be in fatal motor vehicle crashes than adults (2) (see Table 1)

Table 1

AGE	BAC		
	.020-.049	.080-.099	.150+
16-20	M - 5 F - 3	M - 52 F - 15	M - 15,560 F - 738
21-34	3	13	572
35+	3	11	382

Youth in Texas are also significantly over-represented in alcohol related fatalities related to their numbers in the licensed population. (3) (See Table 2)

**Table 2**

<b>DWI DRIVERS INVOLVED IN FATALITIES IN TEXAS</b>					
Age	16-20	21-25	26-30	36-40	46-50
Licensed Drivers	8%	10%	11%	12%	10%
DWI Drivers Involved in Fatalities	15%	21%	14%	12%	6%
Representation	88% Over	110% Over	27% Over	EVEN	40% Under

Two important pieces of legislation, specific to young drivers, have been enacted to seek to prevent alcohol related traffic crashes in Texas. These are:

- Legislation which prohibits attempted purchase, purchase, possession, consumption or misrepresentation of age by minors.
- Zero tolerance legislation making it illegal to drive a motor vehicle with any detectable amount of alcohol by persons under age 21.

While these have been shown to have a measure of success (4, 5), neither addresses a positive or educational approach to prevention of intoxicated motor vehicle operation.

**Methods**

Texas has had an intervention alcohol/drug education program for persons convicted of DWI for over 20 years. Evaluation has shown that it reduces recidivism by persons who successfully completed the program. (6) In 1995, a decision was made by the Texas Commission on Alcohol and Drug Awareness (TCADA) and the Texas Board of Insurance to seek to adapt this successful program for use in preventing unsafe driving behavior. Procedures to achieve this goal included:

- Phase one involved review of the basic 12- hour curriculum to determine the key concepts to be included in the prevention program. Professionals from the Texas Commission on Alcohol and Drug Abuse and Texas A&M University met to decide the priority of materials and activities to include. This work resulted in identification of seven topics for the program which was titled Drug and Alcohol Driving Awareness Program (DADAP). The topics selected were:
  - Administration
  - Introduction and Background
  - Explanation of Texas Law

- Physiological and Psychological Effects of Alcohol/Drugs
- Effects of Alcohol/Drug on the Driving Task
- Signs of a Problem
- Decision Making

A brief overview of each topic follows.

1. Module One: Administration - Basic class rules, pre-test and course administration.
2. Module Two: Introduction and Background – This module provides an overview of the course and information on the extent of the alcohol/drug problems in Texas, especially as they relate to specific offenses.
3. Module Three: Explanation of Texas Law – This module provides information on various laws relating to minors in possession (MIP), public intoxication, driving while intoxicated (DWI), DUI by minor and controlled substances as well as possible civil penalties which can be assessed.
4. Module Four: Physiological and Psychological Effects of Alcohol/Drugs – This module provides information on basic effects of alcohol and drugs on the body, absorption, tolerance and other physiological and psychological aspects of alcohol or other drug use.
5. Module Five: Effects of Alcohol/Drugs on the Driving Task – This module shows research related to alcohol on driving task effects and information on the probability of being involved in a DWI-related accident/fatality.
6. Module Six: Signs of a Problem – This module explores the various warnings signs of a problem with the use of alcohol or other drugs.
7. Module Seven: Decision Making – This module provides information on possible actions persons can take to prevent alcohol/drug and driving related problems.

A detailed Administrator/Instructor manual was developed which contains material on program administration, rules, instructor selection, facilities, data collection and resources in addition to the course content.

- The second phase of the program development involved creation of an administrator/instructor preparation program. A 24-hour training program was developed which includes:

Criteria for selection  
 Coverage of the curriculum modules  
 Instructional techniques  
 Written test  
 Student teaching

- Phase three involved securing approval of the program by the TCADA and the Texas Department of Insurance.

The curriculum materials were submitted for review to these two agencies and approval was obtained. The Texas Department of Insurance agreed to provide a 3 year, 5% automobile insurance premium reduction for any driver successfully completing the program. Persons who had been convicted of DWI or MIP within the previous seven years are not eligible for this discount.

- Phase four involved administrator/instructor training. A series of workshops throughout Texas were held to prepare persons to provide the course.
- Phase five involved ongoing efforts to monitor, evaluate and up-date the program. Collection of data related to demographics and test scores is conducted. In addition, procedures have begun to seek to determine the incidence of alcohol/drug related traffic violations and crashes of persons who complete the program. Annual updates are conducted to incorporate new legislation, research findings and software.

### Results

The DADAP is presently provided in approximately ten locations in Texas, primarily as part of high school driver education programs. Efforts have been made to provide the course to companies and governmental agencies as well as the general public.

A survey of instructors providing the program has enabled identification of areas of strength and weakness. These findings have shown:

1. Most programs and instructors believe the DADAP is a valuable educational tool. For example 86% felt it should be required of all beginning drivers in Texas.
2. The most highly rated feature of the program was the quality of the instructor preparation program while the areas rated lowest were information on decision making and the quality of the transparencies. (See Table 3)

**Table 3: DADAP Survey Results**

Area	Mean (10 point scale)
Texas laws	8.3
Basic Alcohol/Drug effects	8.7
Driving ability effects	8.7
Alcohol abuse	8.8
Decision making	8.1
Manual format	8.8
Transparency quality	8.1
Video quality	8.6
Instructor preparation quality	9.0

It should be noted that there was a high degree of agreement and no mean was rated lower than 8.1 on a ten point scale.

1. The survey also asked instructors how effective this course is in providing alcohol/drug/traffic safety education for high school driver education students and the public at large. On a ten point scale, instructors rated the program 9.0 and 9.1 respectfully for high school driver education students and the general public.
2. Areas in need of improvement – Narrative comments illustrated several areas which instructors feel need to be improved. These were:
  - More decision making exercises
  - Improve software quality
  - Interim quizzes for high school driver education students
  - More information on non-alcohol drugs
  - Better advertisement of the program

Each of these areas are being addressed with updates to be in place by September 30, 2002.

### **Discussion**

The Texas DADAP is an initial educational step in providing alcohol and other drug information related to traffic safety. While no education program can inoculate against poor decisions by drivers, this program has the potential to assist drivers of all ages in making sound decisions. The survey results indicate that instructors feel the program is worthwhile as well as point out areas in need of improvement.

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# **The Role of Formative Evaluation in Developing a Prevention Program for New Young Drivers**

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## **Keywords**

Evaluation, Prevention, Youth

## **Abstract**

Over 350 youth between 15 and 19 years of age were killed in automobile crashes in Canada in 2000 and 30,000 were injured. One approach to reducing risky driving behaviour among new drivers is family-oriented strategies, such as driving contracts. The I Promise Program (IPP) is a road-safety program targeting new young drivers and their parents. Its primary objective is to reduce traffic-related injury and death among new young drivers through a Parent-Youth Mutual Safe-Driving Contract and a Rear-Window Decal eliciting community feedback. Formative evaluation ensures that program materials and strategies are appropriate and acceptable for the program and target population(s). Because youth, IPP's major target group were not included in program development, we conducted a formative evaluation of the program with the three groups it impacted [new young drivers, parents of new young drivers, community members]. Acceptability of the IPP and its components to the target groups were assessed through focus groups with young drivers, parents of young drivers, and members of the community. Content analyses were conducted to evaluate descriptive data on the target populations' attitudes toward the IPP and its components. Analyses indicated the need to review the IPP contract's language-level, comprehensiveness, length, format and content. Discussion regarding the decal addressed its visual acuity, memory issues, anonymity of reporting, and general feasibility.

## **Introduction**

Ideally, evaluation is a process that begins with the conception of a new injury-prevention program idea, interweaves with program activities, and ends upon completion of the program (1). The first stage of evaluation, known as formative evaluation, is a way of making sure program plans, procedures, activities, materials and modifications will work as planned. Formative evaluation also occurs when an existing program is being modified, has identified barriers with no obvious solutions, or is being used in a new setting with a new population or to target a new problem or behaviour (1). The reasons to conduct formative evaluation of programs, particularly injury-prevention programs, are both important and numerous. First, to learn whether the proposed program materials are suitable for the people who are to receive them. Second, to learn whether program plans are feasible before they are put into effect. Third, to have an early warning system for problems that could become serious if left unattended (1).

By virtue of being open-ended, qualitative methods are especially valuable during the formative evaluation phase when proposed procedures, activities, and materials are being developed. Qualitative methods allow the evaluator “unlimited scope to probe the feelings, beliefs, and impressions of the people participating in the evaluation and to do so without prejudicing participants with the evaluator’s own opinions” (1). One method of qualitative research is focus groups. In small-group settings, focus groups allow an evaluator to probe the strength and weaknesses of a new or modified program before it is in effect, or the cause of a problem should one develop after a program is in effect. Focus groups allow the exploration of specific program issues with input leading to specific program modifications (e.g., program purpose and concept, language, format, cost). As different combinations of people will yield different perspectives, several focus groups are often conducted in order to maximize one’s understanding of the situation under evaluation (2).

Whether their purpose is to prevent a problem from occurring, to limit the severity of a problem, or to provide a service, all injury-prevention programs should be evaluated (1). Given this, Plan-it Safe employed a focus group methodology to conduct an independent formative evaluation of a new and innovative driving program. The I Promise Program (IPP) is a primary injury prevention program developed for new young drivers and their parents. Youth are at greatest risk of being in a motor vehicle collision. They are over represented in crashes relative to the rest of the population and have higher per capita death and injury rates than any other age group. In Canada in 2000, over 350 youth between 15 and 19 years of age were killed in car crashes and 30,000 were injured (2). These statistics indicate that teen drivers account for 11.5% of driver deaths and thus constitute a major traffic safety problem in Canada.

The IPP is based upon 1) a mutual safe-driving contract between parents and youth; and 2) a 1-800 number on a rear-window decal that allows community members to file reports on a driver’s behaviour to a professional call-centre. The program and its materials were developed over a 2-year period in consultation with police departments and insurance companies, and subsequently launched to the public in January 2002. However, the program’s target audiences, particularly new young drivers, parents of new young drivers, and members of the community were not consulted during the developmental phase. Using IPP as an example of an injury prevention program developed without formative evaluation, the objective of this paper is to review the importance of formative evaluation as a primary step in developing prevention programs targeted to specific behaviours and/or groups.

## **Methods**

To assess the acceptability and feasibility of the I Promise Program and its components in Eastern Ontario, Plan-it Safe conducted a series of focus groups with the three groups it impacted [new young drivers, parents of new young drivers, community members]. Eight focus groups were conducted between October 2001 to February 2002. Four were conducted with 42 new or soon-to-be new young drivers (18 from an urban setting, 23 from a rural setting). Two were conducted with 19 parents of new or soon-to-be new young drivers (9 from an urban setting, 10 from a rural setting) and two were conducted with 14 community members (9 from an urban setting, 5 from a rural setting). Participants received a \$50.00 honorarium for their participation.

Trained youth moderators facilitated the four focus groups with youth, while the remaining were facilitated by trained adult moderators. Each session was audio-recorded for later transcription.

The sessions began with a verbal description of the overall program and an invitation for the group's initial perceptions. Participants were then given two versions of the driving contract (the original version and a modified "youth-friendly" version developed by Plan-it Safe), as well as the registration brochure and frequently asked questions information sheet. They were also shown the program's rear-window decal. For each component, participants were asked to provide feedback in terms of their likes, dislikes, and suggestions for change. Following this, participants were asked for feedback regarding potential incentives, social marketing strategies, peer reactions, additional modifications, and their willingness to participate.

Audio-recordings were transcribed and qualitative analyses using content analysis procedures (i.e., identification of themes, categories) were conducted to describe the target populations' attitudes toward the IPP and its respective components.

## **Results**

Analyses of the focus group transcripts indicated the emergence of 3 general themes: overall program concept and message; presentation style of program materials (format, language, content); and influences on participation (program cost, incentives, advertising).

Overall Program Concept and Message. Conceptually, youth and parents identified the program and the driving contract as an effective communication tool that provided families the opportunity to discuss expectations and concerns, and revisit responsible driving behaviours. Given that both parents and youth agree to the contract, it was felt that by participating both may engage in safer driving behaviours. Youth felt that by participating they could give parents and community-members the message that they wanted to be responsible drivers. Youth and parents alike appreciated the concept of mutuality underlying the program, specifically that the program made parents accountable to, and role models for, their children. However, youth were concerned that parents would not abide by the contract conditions, while parents were concerned that youth would remove the rear-window decal.

Despite their positive reception of the program, parents and youth both expressed concerns that some parents would coerce youth into participating in the program by threatening a loss of the car and/or driving privileges. Youth also felt somewhat targeted by the program, stating that adults also tend to drive irresponsibly. Youth's initial impressions of the decal were of embarrassment, while the overall message of the program was seen as not to teach responsible driving, but to simply put a sticker on one's car. Participants were of the opinion the public would not take the time to call nor would they know what information to provide upon seeing the decal as it did not refer to being part of a driving program. Although parents liked the concept of the decal and the option of filing a report on one's driving behaviour to someone other than police, some were concerned that the program would generate more negative calls than positive calls. Parents were also concerned that the potential for negative calls could drive a wedge between parents and youth, and questioned if reports to the call-centre would become part of one's driving record or get back to police/insurance agents. All participants addressed the difficulties in getting the required license plate information, calls' legitimacy, possibility of verifying reports, and specifics of the call-centre (location, staffing).

Parents and youth agreed that the program would only work with responsible youth and would not work in families where issues related to responsibility and safe-driving were being addressed

for the first time. Further, participants stated that the contract and brochure erroneously implied that participation in the program would guarantee safety, as well as gave the message to parents that they did not care about their children if they did not purchase the program.

Presentation Style of Program Materials: Format, Language, Content. The program materials' presentation style, as specifically related to format, language, and content, also emerged throughout the focus groups. Participants felt the original documents contained too much text and were therefore too difficult and unappealing to read. Recommended revisions included the use of bullets (e.g., point-form), graphics and statistics, use of a less formal font, and use of techniques such as shading, page/paragraph bordering, and bolding.

With respect to the decal, although participants liked the colours used, concerns were raised about its visual acuity. Participants felt it was too small, plain, and that there was too much information on it. Participants felt the current phone number was too difficult to recall, and unanimously recommended that it be replaced with either a "catchier" number or a "word" (e.g., PROMISE). Participants also asked if the decal would withstand different climactic conditions and was sufficiently reflective to be seen at night and through tinted windows.

Level and tone of the documents' language was also raised in the focus groups. The original documents were identified as too "legal speak". Both youth and parents felt the original documents spoke to parents only and implied youth were not mature if they were not willing to participate in the program. Participants recommended that the documents be made more "youth-friendly" by using language that was appealing to youth. Participants stated that phases in the contract and registration brochure were condescending and insulting (e.g., "sit at a table", "cars are expensive machines"). Both youth and parents stated there was too much redundancy within and between the program components, particularly between the brochure and FAQs. Participants recommended that all program components be made more succinct.

With respect to the content of the various program components, the main theme that emerged in the focus groups was the relevancy and appropriateness of the information. Youth felt there were too many rules and conditions in the original contract and expressed dislike for items such as no smoking or eating in the car, no talking on cell-phone, music volume level, and the phrases "registered vehicle owner" and "on parents' side". With respect to the modified contract, parents and youth liked the use of the words "I Promise" and the succinctness with which all items were stated. Youth liked a paragraph about what to do in case of an emergency as well as the following items: mood, running late, peers, and loud music could effect their driving; driver alone is responsible for fines; car-maintenance responsibilities section; don't get in car with impaired driver.

Participants felt there should be more emphasis on the statements "driving is a privilege", "parents as role models", and on the possibility of parents being the recipient of a negative call-centre report. Parents were concerned about youth driving under the influence of drugs (e.g., marijuana) and thus suggested that "I promise to drive sober" be changed to "I promise to drive sober and drug-free". Parents indicated a need for clarification regarding the term "incident", specifically if it referred to a negative report, an infraction, or a crash.

Youth and parents were unanimous in their agreement that the disclaimer included in the contract and brochure was too long. Participants suggested that it be stated whether interested families can register on-line and that a link for youth be provided on the website. Participants stated that it be specified that information is confidential and will not be sold to insurance companies. Parents requested information about the effectiveness of other similar programs.

Participants suggested that the following issues be addressed as an FAQ: how and where interested families can contact the IPP for additional information; when the report will be sent/received; possibility of prank calls, and how they will be detected/handled by the call-centre staff; information about the call-centre, specifically staffing, location, and assurance of report accuracy; what families should do upon receiving a report; and information about the company and program developer, specifically who or what is IPP.

Influences on Participation: Program Cost, Incentives, Advertising. With respect to the program cost, participants expressed reservations about its specified cost. They questioned the amount of the registration fee, program expenses, cost of re-registration for a 2<sup>nd</sup> year, whether the program was non-profit, and/or whether any of the program's proceeds were going to charity. In the absence of information to address these issues, participants expressed a hesitancy to participate in the program.

Insurance discounts and rewards for "incident-free" driving were offered as a planned incentive to participants in the program. Feedback regarding the planned incentives addressed their potential effectiveness and appropriateness. Both youth and parents not only felt that there was too much emphasis on insurance discounts in all of the program's components, but that the references were misleading and inconsistent. Participants stated that the involvement of the insurance companies should be stipulated, specifically what they are able to offer and which companies have agreed to honour a family's participation. Participants questioned what information would be provided to insurance agents for the purposes of later evaluation.

Contrary to expectations, neither youth nor parents liked the concept of "rewards" in the program's contract. Youth stated that one's rewards are staying alive and use of the car, and that rewards for driving responsibly are unnecessary. Parents had reservations about the provision and frequency of rewards.

All focus group participants unanimously stated that large-scale advertising campaigns should be conducted to ensure that the public would recognize the program upon seeing the decal, would know the process involved in filing a report, and would know they could call with both compliments and concerns. Without this, participants questioned the potential effectiveness of registering in the program. Participants recommended various advertising mediums be used (i.e., television, radio, newspaper, posters) in locations where youth and parents converged (e.g., high schools, arenas, community centres), in both urban and rural settings.

## **Discussion**

Many programs are developed without the target population(s)' input. Although the I Promise Program was developed in consultation with numerous police officers, insurance agents, etc., it is an example of an injury-prevention program that was developed without the formal inclusion of its target audiences in the development process. This paper highlights the importance of

formative evaluation in the development of a new program targeting new drivers and their parents. The results of the formative evaluation conducted by Plan-it Safe indicate that the program in its original form was not acceptable to the target populations. The target audiences identified numerous issues with the overall program and its specific components that, if addressed and modified accordingly, could increase the appeal and acceptability of the program to the various target populations. Specifically, results indicated the need to consider the following three issues. First, acceptability of the overall program concept and message (i.e., message given and received). Second, presentation issues such as language (i.e., level, tone, redundancy), format (i.e., readability), and content (i.e., relevancy). Lastly, issues influencing participation such as cost (i.e., specifics of expenses), incentives (i.e., consistency/accuracy of information, effectiveness), and advertising (i.e., large-scale, target audiences, mediums).

Following the synthesis of results, the program developer was presented with the groups' feedback and recommendations, as well as modified drafts of the program materials as developed by Plan-it Safe based on the results. Modifications were reviewed and implemented accordingly. Youth and parent recommended modifications to the driving contract, registration brochure, and frequently asked questions included making the documents youth-friendly, succinct, presentable, and program-relevant. Based on these recommendations, Plan-it Safe's proposed documents consisted of language that was reader-friendly to parents and youth in level, tone, and vocabulary. Where appropriate, text was made more succinct by using point-form rather than sentence-form. Program-relevance was addressed by ensuring that all the content was parent- and youth-specific, applicable, practical, and family-specific.

Redundancy in information among the materials was minimised by combining the registration brochure and frequently asked questions into one comprehensive brochure addressing the various issues raised by youth and parents (e.g., prank calls). Statistics, graphics, and bolding were included to make the document more appealing to the reader. The brochure was modified to include the following: information about the program's components, program's developer, how the program works (e.g., communication tool, contract examples, placement of decal), who gets the reports, when the reports are received, information on the call-centre staff, information regarding confidentiality of the reports, involvement of all family members, effectiveness of other programs, ability of program to keep family members safe, provision of road-side assistance, cost of the program, expenses covered by the registration fee, cost of re-registration, involvement of insurance companies, means of acquiring additional information, registration procedures, and a distinct registration form.

With respect to the rear-window decal, the main recommendation was that the current phone number be replaced with an easier number or word. It was also recommended that the IPP logo and/or website be included on the decal to show the driver is part of a driving program.

In conclusion, the results of the formative evaluation highlighted the importance of formative evaluation as a primary step in developing prevention programs targeted to specific behaviours and/or groups. More specifically, the results indicated that while a driving program developed to reduce youth-crashes may be positively received conceptually, it is imperative that the initiative's target audiences, specifically youth, parents, and community members, be included in the development phase of such an initiative.

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# The Guide to Community Preventive Services: Systematic Reviews and Evidence-Based Recommendations for Community-Based Interventions to Reduce Alcohol-Impaired Driving

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## Keywords

review literature, motor vehicles, accidents, traffic, automobile driving, alcohol drinking

## Abstract

We conducted systematic reviews of the effectiveness of five community-based interventions to reduce alcohol-impaired driving for the *Guide to Community Preventive Services*. Results of the reviews were presented to the Task Force on Community Preventive Services (Task Force), a 15-member independent, nonfederal group with expertise in public health policy, behavioral and social sciences, and epidemiology. Based on these results, the Task Force made recommendations for implementing the interventions. This paper summarizes the findings of the systematic reviews and lists the recommendations issued by the Task Force. It is based on previously published papers in the American Journal of Preventive Medicine (1,2).

## Introduction

Alcohol-impaired driving is a pervasive problem. Individual states and communities have implemented a broad range of strategies to reduce its occurrence. These systematic reviews were undertaken to assess the effectiveness of five such strategies: .08 blood alcohol concentration (BAC) laws; lower BAC laws for young or inexperienced drivers; minimum legal drinking age laws; sobriety checkpoints; and training for servers of alcoholic beverages. Because of space limitations, the citations for the papers reviewed are not included in this report. The reference list is contained in an American Journal of Preventive Medicine paper (1), which is available at [http://thecommunityguide.org/GUIDE/MVOI/pdf/alc\\_driving.pdf](http://thecommunityguide.org/GUIDE/MVOI/pdf/alc_driving.pdf).

## Methods

The systematic reviews summarized in this paper were conducted for the *Guide to Community Preventive Services (Community Guide)* ([www.thecommunityguide.org](http://www.thecommunityguide.org)). Detailed methods have been described elsewhere (3,4). Briefly, we conducted a comprehensive search for peer-reviewed

journal articles, technical reports, and Association for the Advancement of Automobile Medicine proceedings to screen for inclusion in the review. To be included, a study had to: (a) be primary research published in English before June 30, 2000; (b) provide data on at least one outcome related to alcohol-impaired driving (e.g., single-vehicle nighttime crashes); and (c) meet minimum research quality criteria.

We often had to select from several possible effect measures. We established and consistently applied rules for identifying the outcome measure that most adequately reflected alcohol-related crashes and addressed potential confounding variables. When available, we selected effect measures that compared alcohol-related fatalities to non-alcohol-related fatalities (e.g., proportion of all fatal crashes involving drivers with BACs of  $\geq 0.10$  g/dL; ratio of single vehicle nighttime fatal crashes to multi-vehicle daytime fatal crashes) over the absolute number of alcohol-related fatalities. These effect measures help control for both the long-term downward trend in total fatal crashes and factors that influence the total number of crashes, such as weather, economic conditions, vehicle miles traveled, and safety characteristics of vehicle and highways (5). When available, we also selected effect measures that incorporated a concurrent comparison group such as drivers in adjacent states or drivers within the same state who were unaffected by the intervention. For these studies, results were reported in the form of the net change, reflecting the difference between the percent change for the intervention group and the comparison group. For studies using interrupted time series or other regression-based analyses, results were reported in terms of the percent change estimated from the model.

The primary outcomes assessed in this literature were fatal and nonfatal injuries resulting from alcohol-related motor vehicle crashes. Other outcomes included BACs of drivers at roadside surveys, and measured and estimated BACs of people leaving bars or other licensed establishments. In this report, we included a median effect measure for at least one outcome per intervention. For median effect measures based on seven or more studies, the interquartile range is reported; otherwise a simple range is reported.

## **Results**

### **.08 BAC Laws**

These laws establish the illegal BAC of 0.08 g/dL for drivers aged 21 years and older in the United States (lower BAC levels are established for drivers aged 20 and younger). The literature search identified nine studies of .08 BAC laws in the United States, all of which met the inclusion criteria. One study presented data in a form that could not be converted to our summary effect measure. Seven studies provided state-specific results, and the remaining study provided a summary result for the 16 states that enacted .08 BAC laws before January 1, 1998. The median post-law percent change in alcohol-related motor vehicle fatalities was -7% (interquartile range (IQR): -15%, -4%). Post-law follow-up times ranged from 1 to 14 years (median = 5).

### **Lower BAC Laws for Young or Inexperienced Drivers**

Lower BAC laws for young or inexperienced drivers establish a lower illegal BAC for these drivers than for older or more experienced drivers. The literature search identified 14 studies of the effectiveness of these laws, of which six met the inclusion criteria. Four of the six studies were conducted in the United States, and the remaining two were conducted in Australia. Each of the six studies reported a post-law reduction in crashes. The three studies that examined fatal

crash outcomes reported percent changes of -24%, -17%, and -9%. The two studies that examined fatal and nonfatal injury crashes reported percent changes of -17% and -3.8%. The study that examined crashes in which the investigating police officer believed that the driver had been drinking alcohol reported a percent change of -11%. Post-law follow-up times for individual state laws ranged from less than 1 year to 15 years (median = 22 months).

### **Minimum Legal Drinking Age Laws**

Minimum legal drinking age (MLDA) laws specify an age below which the purchase or public consumption of alcoholic beverages is illegal. Studies included in this review assessed the effect of raising or lowering the MLDA on motor vehicle crashes; most of the studies assessed the effect of changes in the MLDA from 18 to 21 years or vice versa. Thirty-three studies met the inclusion criteria. Twenty-seven of the included studies were conducted in the United States, four were conducted in Australia, one was conducted in the United States and Canada, and the remaining study was conducted in Canada. When the MLDA was raised, crashes likely to involve alcohol among the targeted age group declined by a median of 16% (IQR: -26%, -10%). When the MLDA was lowered, crashes likely to involve alcohol among the targeted age group increased by a median of 10% (IQR: 2%, 30%). The effects were consistent over follow-up times ranging from 7 to 108 months.

### **Sobriety Checkpoints**

At sobriety checkpoints, law enforcement officers systematically stop drivers to assess their degree of alcohol impairment. The goal is to deter alcohol-impaired driving by increasing the perceived risk of arrest. There are two types of sobriety checkpoints. At random breath testing (RBT) checkpoints, all drivers are stopped and tested for blood alcohol levels. RBT checkpoints are common in Australia and several European countries. In the United States, selective breath testing (SBT) checkpoints are used. At these checkpoints, police must have a reason to suspect the driver has been drinking (i.e., probable cause) before testing blood alcohol levels (6).

Seventeen studies of the effectiveness of RBT checkpoints were identified, of which 12 met the inclusion criteria. Eleven of the studies were conducted in Australia, and the remaining study was conducted in France. For RBT checkpoints, the median percent changes were -22% (IQR: -35%, -14%) for fatal crashes and -16% (IQR: -20%, -11%) for fatal and nonfatal injury crashes. The two RBT checkpoint studies evaluating property damage crashes estimated decreases of 15% and 26%. A single study assessed the effect of RBT checkpoints on the observed incidence of drinking and driving. This study found that during an RBT checkpoint program, the proportion of drivers with any detectable BAC level decreased 13% and the proportion of drivers who were above the legal limit of 0.08 g/dL decreased 24% from prior levels.

Fifteen studies of the effectiveness of SBT checkpoints were identified, of which 11 met the inclusion criteria. Nine of the studies were conducted in the United States and two were conducted in Canada. One study presented data in a form that could not be converted to our summary effect measure. SBT checkpoints were associated with percent changes in fatal crashes of -20% and -26% in the two studies reporting this outcome. Median percent changes of -20% (IQR: -23%, -9%) were found for fatal and nonfatal injury crashes and -24% (IQR: -32%, -14%) for property damage crashes.

Aggregating across all crash types, median percent changes were -18% (IQR: -22%, -13%) for RBT checkpoints and -20% (IQR: -27%, -13%) for SBT checkpoints. Length of time from initiation of the checkpoints through the follow-up period ranged from 1 to 120 months (median = 14 months) and was not related to the extent to which crashes decreased ( $r = -.14$ ,  $p = .54$ ).

### **Intervention Training Programs for Servers of Alcoholic Beverages**

Server intervention training programs provide education and training to servers of alcoholic beverages with the goal of altering their serving practices to prevent patron intoxication and alcohol-impaired driving. These practices may include offering patrons food with drinks, delaying service to rapid drinkers, refusing service to intoxicated or underage patrons, and discouraging intoxicated patrons from driving. In the United States, there are currently no standards for server training programs, and their implementation varies widely in terms of the content covered, instructional time, and mode of delivery (e.g., face-to-face, videotaped) (7).

The literature search identified eight studies of the effectiveness of server training, five of which met the inclusion criteria. These studies suggest that server training programs can potentially affect server behaviors, the level of intoxication of the drinkers being served, and the number of traffic crashes. Both of the studies that evaluated server behaviors noted improvements following server training. Similarly, the three studies that evaluated intoxication among patrons or research assistants acting as patrons each found that the proportion of intoxicated drinkers declined following server training (median change = -33%; range -17%, -100%). Finally, one study evaluated the effect of a statewide 1-day mandatory server training program. Based on a time series analysis that adjusted for single-vehicle nighttime *fatal* crashes in other states, server training was associated with a net decrease of 23% in single-vehicle nighttime *injury* crashes.

Based on the findings from these five studies, the Task Force concluded that intensive, high-quality, face-to-face server training, when accompanied by strong and active management support, is effective in reducing the level of intoxication in patrons. Four of the studies, however, evaluated programs that were implemented on a limited scale, in a small number of drinking establishments. These training programs were relatively time-intensive (longer than 4 hours), involved face-to-face training, and covered a broad curriculum including specific intervention practices. This contrasts with training programs generally in use, which vary widely in intensity, mode of delivery, and content (7). Thus, the studies we reviewed may reflect the efficacy of server training under near-optimal conditions. It is not clear to what extent these findings might generalize to larger-scale community-wide programs, to programs with different training methods or content, or to programs that do not recruit well-motivated managers. Thus, further research is needed to determine if server intervention training programs that are delivered community-wide are effective at decreasing intoxication and, ultimately, alcohol-impaired driving.

**Table: Task Force on Community Preventive Services recommendations for community-based interventions to reduce alcohol-impaired driving**

Interventions to Reduce Alcohol-Impaired Driving	Task Force Recommendation
.08 blood alcohol concentration (BAC) laws	Strongly Recommended
Lower BAC laws for younger drivers	Recommended
Minimum legal drinking age laws	Strongly Recommended
Sobriety checkpoints	Strongly Recommended
Server intervention training programs (face-to-face instruction with management support)	Recommended

### Discussion

Interventions to prevent alcohol-impaired driving are implemented within the social and legal context of a community. Although these reviews evaluate each intervention as an independent activity, effective prevention of impaired driving requires a comprehensive and systematic approach that addresses various individual and ecologic influences on drinking and driving behavior (8-10). These reviews can help decision makers identify and implement effective interventions that fit within an overall prevention strategy.

There is sufficient or strong evidence for the effectiveness of these five interventions to reduce alcohol-impaired driving. However, important issues related to optimizing their efficiency and effectiveness require further research.

### General question

- What effects do community-based interventions to reduce alcohol-impaired driving have on social norms regarding drinking and driving?

### Laws to reduce alcohol-impaired driving

- How do variations in enforcement levels influence the effectiveness of laws to reduce alcohol-impaired driving?
- What are the independent effects of publicity on the effectiveness of these laws?
- Does public compliance with new laws change over time?

### Sobriety checkpoints

- Do passive alcohol sensors improve the deterrent effects of sobriety checkpoints?
- How do various configurations of sobriety checkpoints (e.g., intermittent blitzes vs. continuous, weekend nights vs. random time periods, number of officers per checkpoint) affect deterrence?
- What level of enforcement and publicity is needed to maintain effectiveness over time?
- Are sobriety checkpoints less effective if warning signs are posted that allow drivers to avoid the checkpoints?

### Server intervention training

- Are server intervention training programs that are delivered community-wide effective at decreasing alcohol-impaired driving and alcohol-related crashes?
- What essential content areas should be included in all server intervention training programs?

- What effect does the method by which training is delivered (e.g., videotapes, lectures, role-playing) have on the effectiveness of server training programs?
- How do mandatory vs. voluntary server training programs differ with respect to: 1) management support for program goals; 2) level of participation in training programs; and 3) effectiveness in decreasing patron BACs and drinking and driving?
- What specific management policies and practices are necessary to get the maximum benefits from server intervention training?
- What is the long-term effect of server intervention training programs? Are “booster sessions” required to maintain effectiveness?
- What effect does server intervention training have on alcohol sales, overall revenues, and tips?

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# Effectiveness of Sobriety Checkpoints for Preventing Alcohol-involved Crashes

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## Keywords

Review literature; motor vehicles; accidents, traffic; accident prevention; automobile driving; alcohol drinking

## Abstract

A systematic review of the effectiveness of sobriety checkpoints in reducing alcohol-involved crashes and associated injuries and fatalities was conducted using the methodology developed for the Guide to Community Preventive Services. Results suggest that both RBT and SBT checkpoints can play an important role in preventing alcohol-related crashes and associated injuries. This paper is based on research previously published in the American Journal of Preventive Medicine (1).

## Introduction

Sobriety checkpoints have become a popular tool for enforcing laws against alcohol-impaired driving, and procedures for conducting them vary in different countries. At random breath testing (RBT) checkpoints, which are used in Australia and several European countries, all drivers stopped are given breath tests for blood alcohol levels. Issues regarding the violation of constitutional protections against unreasonable search and seizure prevent the use of RBT checkpoints in the United States (2), where selective breath testing (SBT) checkpoints are used. At SBT checkpoints, police must have reason to suspect the driver has been drinking (i.e., probable cause) before they can demand that a driver take a breath test.

Although sobriety checkpoints remove some drinking drivers from the road, their primary goal is to deter driving after drinking by increasing the perceived risk of arrest. This perceived risk can be influenced by the level of publicity accompanying the enforcement effort, visibility of the checkpoint operations themselves, drivers' beliefs about their ability to avoid detection, and the objective likelihood of detection (3).

In this review, we estimate the overall effectiveness of sobriety checkpoints. We also examine their long-term effects and the relative effectiveness of RBT and SBT checkpoints.

## Methods

This systematic review of studies of sobriety checkpoints was conducted for the *Guide to Community Preventive Services (Community Guide)*. Detailed methods have been described elsewhere (4, 5).

A comprehensive search was conducted for peer-reviewed journal articles, technical reports, and Association for the Advancement of Automobile Medicine proceedings to screen for inclusion in the review. To be included, a study had to: (a) be primary research published in English before June 30, 2000; (b) provide objective data on one or more outcomes related to alcohol-impaired driving (e.g., single-vehicle nighttime crashes); and (c) meet minimum research quality criteria. When multiple papers used similar methods to evaluate a specific intervention, only the paper with the longest post-intervention follow-up time was included in the review.

When available, we selected effect measures that compared alcohol-related crash outcomes to non-alcohol-related outcomes (e.g., comparing single vehicle nighttime crashes to multi-vehicle daytime crashes). These effect measures help control for the long-term downward trend in total crashes and for other factors that influence the total number of crashes, such as safety characteristics of vehicles and highways, weather, economic conditions, and vehicle miles traveled. To further address potential confounding, when possible we also selected effect measures that incorporated a concurrent comparison group such as drivers in communities without checkpoints. For studies incorporating comparison groups, results are reported in the form of the net change, reflecting the difference between the percent change for the intervention group and the comparison group. For studies using interrupted time series or other regression-based designs, results are reported in terms of the percent change estimated from the model. In addition to reporting results from individual studies, we calculated medians and interquartile ranges to summarize outcomes for the three levels of injury severity. We also aggregated results across levels of injury severity to evaluate whether the intervention's effect varied by the type of checkpoint (RBT vs. SBT) or by follow-up time.

## Results

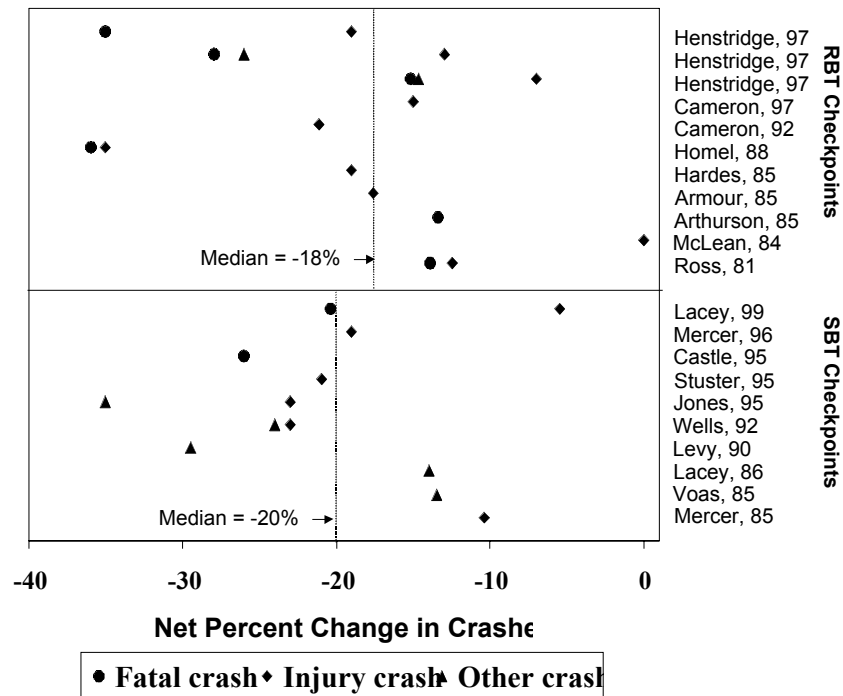
The literature search identified 17 studies of the effectiveness of RBT checkpoints that evaluated outcomes of interest. Of these, 12 met the quality criteria for inclusion in this review (three of these studies were reported in one paper) (6 – 15). For RBT checkpoints, median decreases were 22% (interquartile range (IQR): -35%, -14%) for fatal crashes and 16% (IQR: -20%, -11%) for fatal and nonfatal injury crashes. The two RBT checkpoint studies evaluating property damage crashes estimated decreases of 15% and 26%.

A single study assessed the effect of RBT checkpoints on the observed incidence of drinking and driving. This study found that during an RBT checkpoint program, the proportion of drivers with any detectable BAC level decreased 13% and the proportion of drivers who were above the legal limit of 0.08 g/dL decreased 24% from prior levels (13).

Our search identified 15 studies of the effectiveness of SBT checkpoints. Of these, 11 met the quality criteria for inclusion in this review (16 – 26). One of these studies presented data in a form that could not be converted to our summary effect measure (26). SBT checkpoints were associated with decreases in fatal crashes of 20% and 26% in the two studies reporting this outcome. Median decreases were 20% (IQR: -23%, -9%) for fatal and nonfatal injury crashes and 24% (IQR: -32%, -14%) for property damage crashes.

Outcomes from the studies reviewed are presented in the Figure. Aggregating across all crash types, median decreases were 18% (IQR: -22%, -13%) for RBT checkpoints and 20% (IQR: -27%, -13%) for SBT checkpoints. Length of time from initiation of the checkpoint program to the end of follow-up ranged from 1 to 120 months (median = 14 months; IQR: 10 months, 42 months), and was not related to the extent to which crashes decreased ( $r = -.14$ ,  $p = .54$ ).

**Figure: Percent change in crashes likely to involve alcohol after implementing RBT and SBT checkpoint programs**



### Discussion

These results provide strong evidence that both RBT and SBT sobriety checkpoints are effective in reducing alcohol-related crashes and associated fatal and nonfatal injuries. The greater sensitivity of RBT checkpoints in detecting drinking drivers might lead one to expect a stronger deterrent effect leading to improved effectiveness in reducing alcohol-related crashes relative to SBT checkpoints (12). The results of this review did not provide evidence of such differential

effectiveness. None of the studies reviewed directly compared RBT and SBT checkpoints, however, so these results should be interpreted cautiously.

Despite differences across studies in design, setting, period of observation, and outcome measures evaluated, the results were generally consistent in direction and size. The consistency of the results obtained was further supported by stratified analyses, in which similar beneficial effects were obtained for crashes of varying levels of severity and for both short-term and long-term checkpoint programs.

The results of this review suggest that sobriety checkpoints maintain their effectiveness over time. Some authors have suggested that aggressive enforcement using sobriety checkpoints could eventually result in permanent changes in social norms regarding the acceptability of drinking and driving (3, 27). The degree to which changes in social norms have contributed to the long-term maintenance of the beneficial effects of sobriety checkpoints is unclear.

Several questions remain regarding potential methods for improving the effectiveness and efficiency of sobriety checkpoints. For instance, although passive alcohol sensors have been shown to improve the detection of alcohol-impaired drivers at checkpoints (24, 28), any resulting improvement in the deterrent effects of checkpoints has yet to be evaluated. Further research into the optimal configurations of checkpoints (e.g., number of officers, timing) and the optimal overall level of enforcement and publicity to sustain their deterrent effects is needed.

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# The Educational Measure Alcohol and Traffic

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## Keywords

Alcohol, Educational Measure, Prevention of drunken driving

## Abstract

This article deals with preliminary results of the effects of the educational measure alcohol and traffic on drunken driving in the Netherlands. It appears that this measure has a number of interesting positive effects on the prevention of drunken driving and therefore on traffic safety as a whole. It seems worthwhile to continue the implementation of this measure instead of and/or next to criminal sanctions.

## Introduction

As in many other modern countries the excessive abuse of alcohol in traffic in the Netherlands is an extensive social problem. About 15% of the serious traffic accidents are directly linked to drunken driving. The traditional criminal sanctions -like short term imprisonment, fines and temporary withdrawal of the driving license- that are usually imposed are not very effective in terms of prevention or deterrence. Therefore, in recent years a new approach has emerged in the Dutch policy towards drunken driving. The most significant instrument in this approach is the so-called educational measure alcohol and traffic. This instrument has been largely implemented in the Netherlands since September 1996. The main goal of this measure is to create an insight and awareness in the causes of drunken driving and to learn alternative behavioural strategies to diminish the chance of drunken driving in the future.

This educational measure is an administrative sanction that only can be imposed on authority of the Dutch Ministry of Traffic. The use of this authority is not limited by any criminal sanction imposed for the same offence: the 'ne bis in idem-rule' does not apply (no double jeopardy)(1). The implementation of this measure is in the hands of institutions for addiction health care. The measure can be imposed on drivers:

- that had a blood alcohol level between 1,3 and 1,8;
- that had a blood alcohol level above 1,8 only after psychiatric evaluation;
- that are recidivists: in a period of five years on two or more occasions they have had a blood alcohol level above 0,5 (the minimum illegal level in the Netherlands) and on one of those occasions a level above 0,8;

This measure is generally not implemented in cases of drunken driving that led to a serious traffic accident, when the driver has serious psychiatric problems, the driver is not able to speak Dutch and the driver already had concluded this measure within the last five years.

The measure itself consists of a three-day training and education programme and a fourth day in which the measure is closed by means of an individual evaluation. In the three days the main subjects of training and education are: the use of alcohol in the Netherlands, alcohol and the ability to drive, consequences of drunken driving on (the lack of) traffic safety, alcohol and justice, use and abuse of alcohol and prevention of drunken driving. After a sufficient conclusion of this measure the drivers' license is returned.

This measure has to be concluded in twelve weeks after the day the drunken driving was detected. The costs of the implementation of this measure are partly born by the State but the drunken driver has to pay for the majority of the direct costs involved: he has to pay a fee of about 200 US Dollars. Refusal to conclude this measure as well as refusal to pay the required fee leads to the permanent withdrawal of the drivers' license.

### **Methods**

Due to the recent implementation of this measure only short term and mid-long evaluation has been possible until now. The results of this evaluation have been gathered in a comprehensive research by the investigation bureau called Traffic Test(2). This evaluation basically has been founded on the method of a quasi-experimental investigation design. This meant that two groups of drunken drivers were investigated: the experimental group of drunken drivers that did participate in and concluded the educational measure and a control-group of drunken drivers that were detected and convicted but did not participate in the educational measure.

Members of the experimental groups received a questionnaire two weeks before the start of the implementation of the educational measure and five weeks after the conclusion of this measure. This implies that between the first and the second questionnaire a period of about two months elapsed. In the same period also the members of the control group received the two questionnaires with the same set of questions. Beside, separate in-depths interviews were held with both members of the experimental group and the control group that responded to the two questionnaires. The purpose of these interviews was to collect additional and anecdotal information concerning their response.

The first questionnaire was send to 382 persons in the experimental group of which 221 returned the questionnaire in good order. The second questionnaire was send to these 221 persons of which 77 returned the questionnaire in good order. The final response was therefore just above 20%. The first questionnaire was also send to 732 persons in the control group of which 165 returned the questionnaire in good order. The second questionnaire was send to these 165 persons of which 93 returned the questionnaire in good order. The final response for this group was therefore about 13%.

The reason for these low response percentages is not quite clear, as there was no opportunity for a non-response investigation. The fact that the second questionnaire was received more than one month after the conclusion of the educational measure could explain the poor response in the experimental group. But then the low response in the control group still remains unexplained. From

reactions during the interviews another probable explanation can be derived: the length of both questionnaires was perceived as 'quite long'. Apparently this perception was not compensated by the fact that the persons that returned both the questionnaires in good order were rewarded with a ten US Dollars reward.

Before the evaluation the relevant background information - like age, sexe, the date of detection, the blood alcohol level and prior detection of drunken driving - of both the persons in the experimental and the control group was completely available. During the evaluation comparison between the response and non-response in both groups appeared not to be 100%-possible for all the relevant background information-features. Moreover, this comparison was not helped by the fact of the different response percentages to the two questionnaires. Given these obstacles, it appeared that the persons in the response group were older and that the period between detection of the drunken driving and the response is relatively short(er). Also, in the control group there was a better response of females.

This all adds up to the conclusion that the results of this evaluation have to be interpreted with moderation.

## **Results**

There is a considerable positive effect on the level of knowledge on issues concerning drunken driving in the experimental group after conclusion of the educational measure. Both the participants and the educators in this measure consider this increase in knowledge as an important learning experience.

There is a slight positive effect on the social behaviour in risks situation that could lead to drunken driving in the experimental group. After conclusion of this measure the participants seem to have a better social understanding and coping behaviour in risk situations such as parties and business meetings with drinking clients.

There is a positive effect on the social behaviour towards other persons in risk situations that could lead to drunken driving in the experimental group. After conclusion of this measure the participants seem to take more initiative to make agreements with other persons to prevent themselves from drunken driving: they are more willing to leave the car at home, be driven home by others and they make more use of public means of transport.

The fact that drunken driving can lead to this measure is experienced as very annoying by the experimental group and thus in itself seems to have a preventive effect on drunken driving.

It appears that this measure has no influence on more structural social-emotional features, like personality, level of responsibility and internal attribution. These are, however, important learning goals of the measure.

Nor does the conclusion of this measure have any effect on the perception of the chance of being detected by the police for drunken driving (the next time) in the experimental group.

Although the period of this evaluation has been too short for a long-term investigation in the recidivist behaviour of the experimental group, there are signs that lead to the provisional

conclusion that in fact drunken driving in the experimental group has diminished considerably after conclusion of the measure.

### **Discussion**

Comparing these results with the general lack of positive results in the control group, the overall conclusion should be that the educational measure alcohol and traffic seems worthwhile in itself and also in addition to the criminal sanctions imposed on drunken driving. This conclusion is in line with educational interventions in other countries(3). Beside, the financial costs and required time for both State authorities and participants seem acceptable. Also, when this measure is used instead of criminal sanctions there is the obvious positive effect on the criminal justice system: less drunken drivers will have to be tried in (usually costly and traumatising) criminal proceedings. Moreover, the long-term effect of the implementation of criminal sanctions on drunken driving appear to be quite moderate in terms of prevention and deterrence. Therefore, the alternative approach of the educational measure should be given credit, although future long-term research to the effects of this measure remains necessary.

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# The Educational Measure Alcohol and Traffic (EMA)

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## Keywords

Driving under influence, rehabilitation, legal framework.

## Abstract

In 1996 in the Netherlands a new course model was introduced to reduce the problem of drunk driving: the Educational Measure Alcohol and traffic (EMA). Anyone apprehended while driving with a blood-alcohol-concentration (BAC) of between 1.3 and 1.8 per mille qualifies him- or herself for a three day educational course followed by an individual evaluation. By using a so called quasi-experimental design in which an experimental group of course participants was compared with a control group of non-participants the effects of the EMA were studied.

## Introduction

The Educational Measure Alcohol and traffic (EMA) was introduced in 1996 and is imposed within the framework of administrative law. The legal procedure starts with the assumption that a holder of a driving licence doesn't meet the standards of driving anymore. Generally this information is gained by police-officers, because they observe deviant traffic behaviour (in this case drunk driving). The police inform the Minister of Transport (actually it is the Dutch Driving Test Organisation CBR because the Minister delegated this task to the CBR) about the assumption. Based on this assumption and depending on the criteria a decision will be made. Either a person has to go to a medical test or to a rehabilitation program.

The main criteria for the imposition of the EMA are the following:

- The driver has been apprehended with a blood-alcohol-concentration between 1.3 and 1.8 per mille.
- Within a period of 5 years the driver has twice been apprehended with a blood-alcohol-concentration higher than 0.8 per mille.
- Anyone apprehended with a blood-alcohol-concentration higher than 1.8 per mille has to participate in a medical test. If a person succeeds this medical examination he still has to follow the rehabilitation program because of his lack of attitude towards drinking and driving.
- If a person refuses the breath-analysis.

The EMA-courses are organised by didactically skilled workers of the Centres for Alcohol and Drugs. The course leaders are usually group-workers or health education-workers and specially

trained in working with people who have a problem on alcohol. Qualification criteria for course leaders are: degree in behavioural sciences as psychology, adult education, pedagogics and health education or specially trained in health and social studies.

The EMA-program aims at increasing relevant knowledge regarding the risks of alcohol in motor traffic. The legal consequences are discussed as well as the influence of alcohol on the ability to drive a car. Apart from increasing knowledge, the program also aims at influencing attitudes towards the combination of drinking and driving. It tries to convince the participants that other than even a modest alcohol consumption before driving should be considered as irresponsible behaviour. It also tries to raise the participants consciousness of his pattern of alcohol consumption, also in combination with high risk social situations and alternatives in such high risk situations.

The EMA-course counts three course-days spread over a three week period. The EMA is concluded with an individual interview between course-leader and each participant. After completing the interview the participants receive a certificate for following the EMA. On a yearly basis about 8,000 DWI-drivers are referred to the EMA. This means about 800 courses are performed each year.

The EMA-program is partly based on the theory of Fischbein and Azjen reasoned action model. The most important elements for changing the DWI-behaviour are:

- *Increase of knowledge*: having enough knowledge about facts concerning driving and drinking is one of the main conditions to be able to change this behaviour.
- *Influencing the positive and negative outcome expectations*: these expectations are calculated, such as the chance to be caught, taking the risk of an accident etc.
- *Social influence*: it is important to take into account the influence of significant others (for example partners, friends, colleagues, relatives) on the decision whether to drive after drinking or not.
- *Personal effectiveness*: this is a personal estimation on the ability to perform the adequate behaviour in certain circumstances (for example someone is able to resist social pressure when it comes to refusing alcohol, or someone is depending on alcohol).
- *Habitual behaviour*: when it comes to this kind of behaviour the person is not aware of this behaviour. When performing habitual behaviour people do not anticipate any longer on the outcome of this behaviour (whether the outcome is positive or negative). So the person is also not aware of the risks that come by conducting this behaviour. For example when drinking and driving have become habitual behaviour you are not aware of the fact that you are conducting behaviour with a high risk. This is influenced by personal positive outcome experiences while performing this habit; never been caught by the police or never having caused an accident.

Another important theory that is used in the EMA is the ‘circle of change’ of Prochaska and DiClemente. For the trainer it is very important to find out in which stage of change the course participant is situated: for instance is he still in the stage of preview or has he already made a decision for himself to separate his drinking and driving.

## **Methods**

The experimental design of the evaluation study was a so called quasi-experimental design in which an experimental group of course participants was compared with a control group of non-participants. The control group was also arrested for driving under the influence, but their BAC's were just below the criteria for the EMA. So these offenders could not be obliged to attend the EMA. In most cases the control group had to pay a fine and were confronted with a temporary driving ban.

A total of 382 course participants were asked to take part in the research. Of them 221 persons (58%) filled in de pretest and 77 persons of this group filled in the posttest as well (20%). In the control group 732 persons were asked to take part in the research. Of them 165 persons returned the questionnaire of the pretest (23%) and 93 persons of this group also returned the posttest (13%).

Respondents of the experimental and control group do not differ much on most demographic variables. Only age (higher in the control group) and employment (a higher percentage in the experimental group has a job) do differ between groups. On several traffic related variables the groups do differ. Car use is higher in the experimental group (more daily use of the car and more kilometres driven). In this group dependence on the car is also higher. Furthermore the BAC in the experimental group is somewhat higher than in the control group. This is of course a consequence of the fact that the respondents of the control group do not meet the criteria for referral the EMA. In the experimental group respondents had been arrested for DWI more frequently than in de control group.

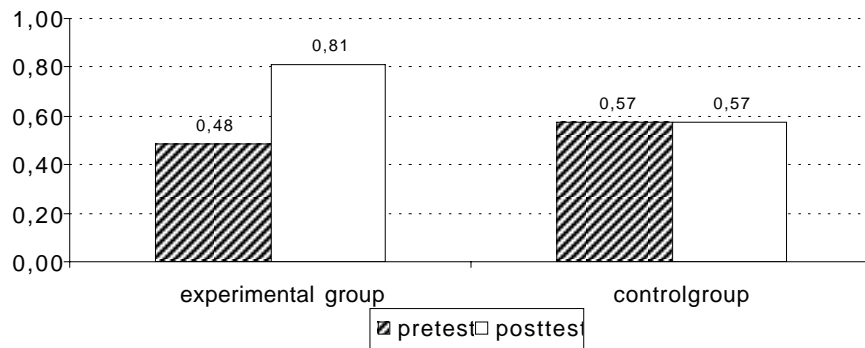
In the statistical analyses the differences between experimental and control group are controlled for by matching both groups on the variables DWI-recidivism and car use. After matching the groups on those variables most differences in the other variables (age, mileage, dependence on the car) disappear.

## **Results**

### **Increase in knowledge**

The experimental group scores significantly better on knowledge about alcohol and DWI in the posttest than the control group. In this case the EMA has a strong learning effect (see Figure 1).

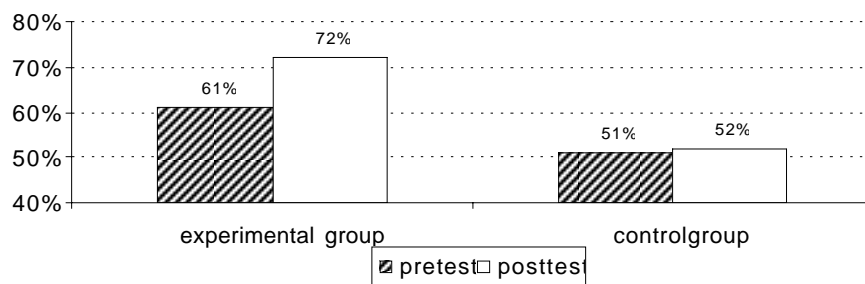
**Figure 1: Knowledge about alcohol use and DWI**



### **Intention to perform the desired behaviour**

In Figure 2 is presented the percentage of respondents that say they will not drive after having drunk more than two glasses even though there would be no legal rule that prohibited doing so. In the experimental group the intention not to drive after having drunk two glasses or more has considerably increased after attending the EMA. There is a statistically significant difference between experimental and control group. In a certain way the EMA-group has internalised the legal rule not to drive after having drunk two glasses or more.

**Figure 2: Not driving after having drunk 2 glasses or more even if there would be no legal rule prohibiting it**



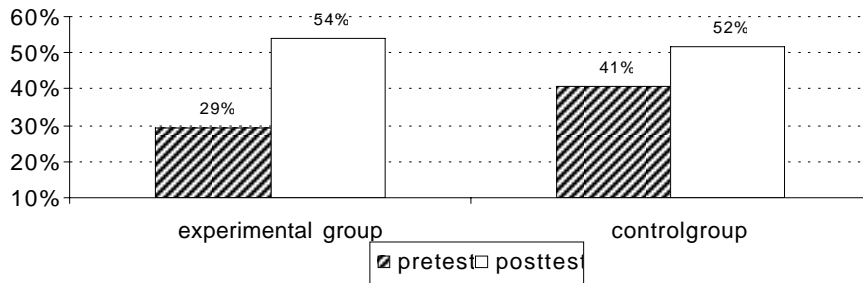
### **Use of alternative transport**

After the course the EMA-group makes more use of alternatives for the car (public transport, taxi, bicycle) when they have been drinking. EMA-course participants also make more often arrangements about driving along with another person.

### **Influence of significant others**

Significant others (for example partners, friends, colleagues and relatives) can have a great influence on the choice whether or not to drive after drinking. After following the EMA participants say they are more open for criticism of persons in their direct social environment. The same goes for the control group, but in this group the difference between pretest and posttest is not as pronounced as in the experimental group (see Figure 3).

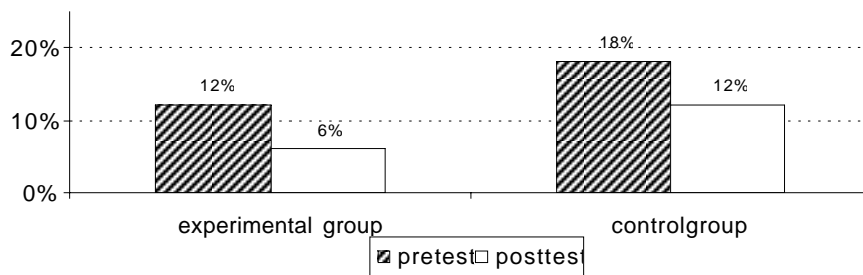
**Figure 3: Influence of criticism of significant others on DWI**



**Self reported recidivism**

In Figure 4 for both experimental and control group the percentage of persons is presented that say they have driven while under the influence of alcohol (two glasses or more). In both groups we can see a slight decrease in DWI. The percentages in the experimental group being somewhat smaller (pretest as well as posttest) than in the control group. In the experimental group the recidivism rate is diminished by 50% (a decrease of 6 percentage points). The differences are however statistically not significant. We should notice that the period over which recidivism is reported by the respondents is very short (about three months between pretest and posttest). For a good insight into the recidivism rate both groups must be followed for at least a year or two and beside self report data also data of police registration should be taken into account.

**Figure 4: Self reported recidivism of DWI**



**Motivation, internal control, problem awareness and self-condemnation**

Respondents were (in both pretest en posttest situation) asked to what extent:

- they are motivated not to drive a car after having been drinking (*motivation*);
- they think they have control over themselves as to not go driving after drinking (*internal control*);
- they are aware of the fact that DWI is a personal and social problem (*problem awareness*);
- they disapprove of their own DWI behaviour (*self-condemnation*).

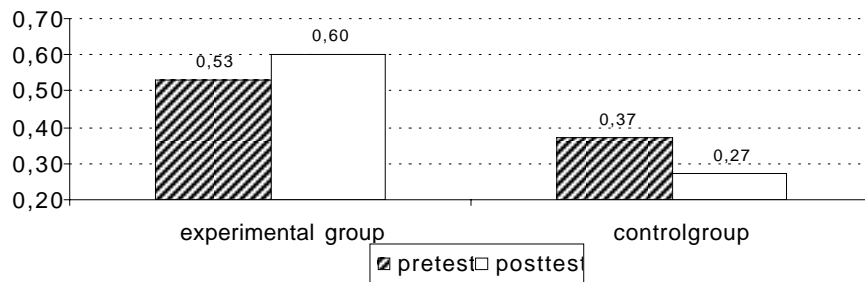
Both groups do not differ on any of the four aspects in a statistically significant way. When there is an increase between pretest en posttest situation, there is an increase in both groups. Therefore the EMA does not seem to have an effect on any of the four aspects.

Although the experimental group scores significantly better on the motivation factor, this is not a result of the EMA-course. It is rather a result of the fact that the respondents are confronted with a legal procedure that eventually can end with losing the driving licence.

### Social pressure

Figure 5 shows that the capability to cope with social pressure is slightly better in the experimental group after following the EMA. In the control group we see exactly the opposite: a slight decrease. In this case the difference is statistically significant. In other words the EMA helps participants to better cope with social pressure.

**Figure 5: Coping with social pressure**



### Perceived consequences of new arrest

The experimental group thinks the consequences of being arrested again for DWI are more serious than the control group does. This is already the case in the pretest situation and although it is slightly increased in the posttest situation, it is more an effect of the threat of the legal procedure than an effect of the EMA.

### Discussion

The EMA is imposed as part of a legal procedure that in the end can lead to an invalidation of the driving licence. Confrontation with this legal procedure is experienced by offenders as very drastic. Motivation to refrain from DWI is therefore much greater in this group than in the control group that is only confronted with a fine and a temporary driving ban. Also the motivation not to combine drinking and driving is more pronounced in the experimental group than in the control group. This is mainly due to the panic reaction that the legal procedure provokes.

Beside these “shock effects” of the legal procedure the EMA on its own brings about the following positive changes in course participants:

- After attending the EMA knowledge about facts concerning drinking and driving increases considerably.
- The EMA has a positive influence towards the use of the social environment to control the drinking and driving behaviour of course participants.
- The EMA increases the capability to resist social pressure.
- The EMA stimulates the use of alternative ways of transport after drinking.

In certain aspects though the EMA is not effective:

- The EMA seems to have no significant influence on a number of social-affective factors such as problem awareness, awareness of guilt, sense of responsibility and internal attribution.
- The EMA seems to have no influence on the perceived chance of being caught again for DWI.
- The EMA not yet leads to a significant reduction in recidivism of DWI.

Given the results of the evaluation study and based on the fact that a growing number of course participants are being close to a problem drinker, the EMA-program has been rearranged. In the new program, which has recently been introduced, transfer of information is much less important and more emphasis is laid on techniques to motivate course participants to separate drinking and driving. The individual interview with course participants at the end of the EMA has been replaced by an interview at the start of the course. Like in the old situation the interview is performed by the course leader, but it now has the character of an admission interview. It is meant to motivate the DWI-driver to participate in a constructive way and to reduce his resistance against the EMA-course and the course leader.

Beside these adaptations of the course also a quality system was introduced. In this system the quality of the realisation of the EMA itself (are all parts of the course performed in the prescribed way) and of the performance of the course leader are monitored on a continuous basis.

Information is collected by written questionnaires that are filled in by participants as well as by course leaders. The function of the quality system is threefold:

- signalling shortcomings in the EMA-program;
- signalling common shortcomings of course leaders;
- signalling individual shortcomings of course leaders.

On the basis of the quality system defects can be discovered in an early stage and corrective measures can be taken. Hopefully hereby the effectiveness of the EMA can be increased.

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# **Bob in Belgium: Preventing and Deterring Drink Driving**

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## **Abstract**

Since 1987, the Belgian police forces and the Belgian Road Safety Institute (BRSI) have been joining efforts in organising the year-end campaigns to prevent drink driving. The main objective is to reduce the number of alcohol-related accidents by deterring and preventing drink driving. In 1995 Bob, the person who does not drink when he has to drive, was introduced. Right from the start, this prevention campaign has been a real success. Evaluation based on a comparative study of the alcohol-related accidents and on the breath tests carried out by the police, shows that the problem of drink driving is still present: the number of positive breath tests and the number of accidents are increasing. The main cause of this evolution is the fact that the number of repressive actions (breath tests) seriously decreased. The number of impaired drivers during the year-end campaign is lower than during the rest of the year. This confirms the statement that the combination of repression and prevention is more effective than prevention (or repression) on its own.

## **Introduction**

In Europe, in-depth studies reveal that alcohol is implicated in 19% of injury accidents and in 22% of serious accidents (1).

In Belgium in 2000, 8.5% of all injury accidents were alcohol-related. Alcohol was implicated in 10.2% of all serious accidents (accidents with death or serious injury). 23.8% of these accidents happen during weekend-nights, 18.5 % during week nights (2).

In 1996, The Belgian Toxicology and Trauma (3) study reveals that 28% of people arriving at the emergency service after an injury accident have an alcohol rate higher than the legal limit. During the weekend nights, this percentage reaches 50%.

In 1987, collaboration was set up between the Belgian police forces and the Belgian Institute for Road Safety (BRSI), in order to prevent drink driving during the year-end period (from the 1<sup>st</sup> of December till the 15<sup>th</sup> of January). This collaboration includes two parts: the first one consists of a prevention campaign, the second part consists of reinforced repressive actions (breath testing). In 1995 Bob, the person who does not drink when he has to drive, was introduced in Belgium. At the same moment the legal alcohol limit was brought back from 0,8 ‰ to 0,5 ‰.

## **Objectives**

The main objective of the campaign is to reduce the number of alcohol-related accidents by deterring and preventing drink driving. The strategy to attain this target is based on the principle that repression and prevention should go hand in hand.

Bob is presented as a person with a very positive image. In fact, Bob is someone positive, friendly, self-confident, who takes initiatives and has a sense of humour. He is widely appreciated because he drives without having drunk and his friends can count on him to bring them home safely.

Each year, this concept is supported by posters (see below), spots on TV and radio, Bob's website ([www.Bob.be](http://www.Bob.be)) and the 'horeca' campaign (in bars and cafés). Concerning the horeca campaign, the Arnoldus Group, the Confederation of Belgian brewers, is the partner of the BSRI since the creation of the Bob concept. More than 9000 cafés are actively implicated in the year-end campaign. They put Bob-posters on the walls, the Bobs of the evening can have Bob-key rings, tee shirts, balloons and other Bob-gadgets. This material reminds their customers that drinking and driving do not go together. The public transport companies are joining the year-end campaign as well: more busses and metros are driving during the night of 31 December. Price reductions and free tickets have to stimulate people to use the public transport facilities.

But the presence of Bob is not limited to the year-end period. The Bob bus is present at different music festivals and at every other big event all over the year. Each summer, Bob-games, quizzes or other activities are organised in touristic areas.

The main objectives of the Bob campaigns are:

- insisting on the fact that drinking and driving do not mix;
- to make drink driving socially unacceptable and
- to encourage people who are going out to choose their Bob.

The baseline "It's party time when Bob drives" remained unchanged. The Bob concept has evolved. Firstly, people had to know who Bob is (1995/1996 ; 1996/1997), afterwards their attitude toward drink driving had to be changed (1997/1998 ; 1998/1999 ; 1999/2000). The latest campaigns (2000/2001 ; 2001/2002) are targeted at a behaviour change.

For the repressive part of the campaign, the police forces were asked to increase the number of alcohol controls and to organise random breath testing (objective risk of being caught). The drivers with a negative result are rewarded with a Bob-key ring. During the campaign the results of these actions are announced to the press, in order to influence the subjective risk of being caught.

## **Methods**

An evaluation is carried out by means of a comparative analysis of the number of accidents (official statistics NIS - BSRI) and of the number of positive breath tests during police controls. Concerning the results of these controls, we must be very careful to generalise conclusions: the data collection is done on voluntary base, which means that the number of participating police forces and those who send the results to the BSRI change every year.

Each year, an evaluation (before and after) of the Bob-campaign takes place, during which a significant part of the Belgian population is interviewed.

## Results

### Alcohol-related accidents

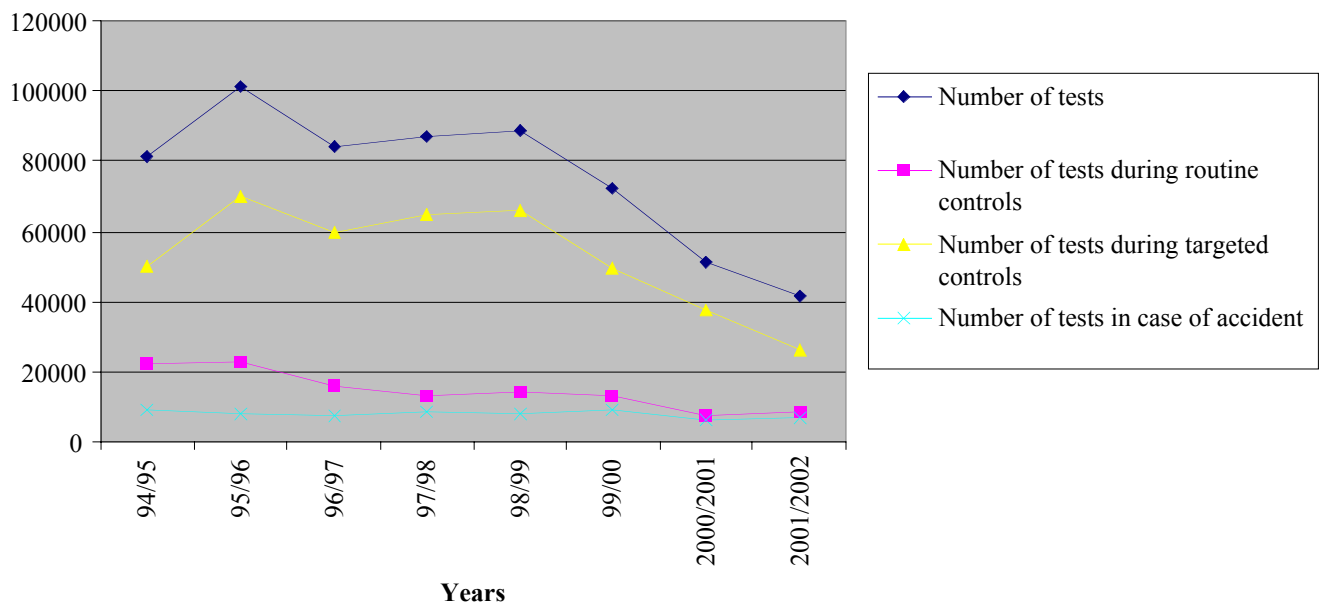
Between 1994 and 1999, the number of accidents during the months of December and January has increased. In 1995, there were 561 accidents under influence of alcohol (dec94 / 31jan95). By 2000, the figure had increased to 812 (dec99 / 31jan00), which represents an increase of 251 accidents (61% of the total increase of accidents). This evolution is not a steady evolution but globally, the number of accidents under influence of alcohol has increased.

### The repressive campaign

During the latest campaign (2001/2002) 41601 persons had to do a breath test. These controls resulted in 3293 people with a positive breath alcohol level (7.9%) and 935 driving licences were immediately withdrawn (2.25%).

The number of breath alcohol tests has decreased between 1994 and 2002. Whereas there were 81234 tests in 94-95, the number of tests is now 41601, which represents a decrease of 51%.

**Evolution of breath tests between 94-95 and 01-02**



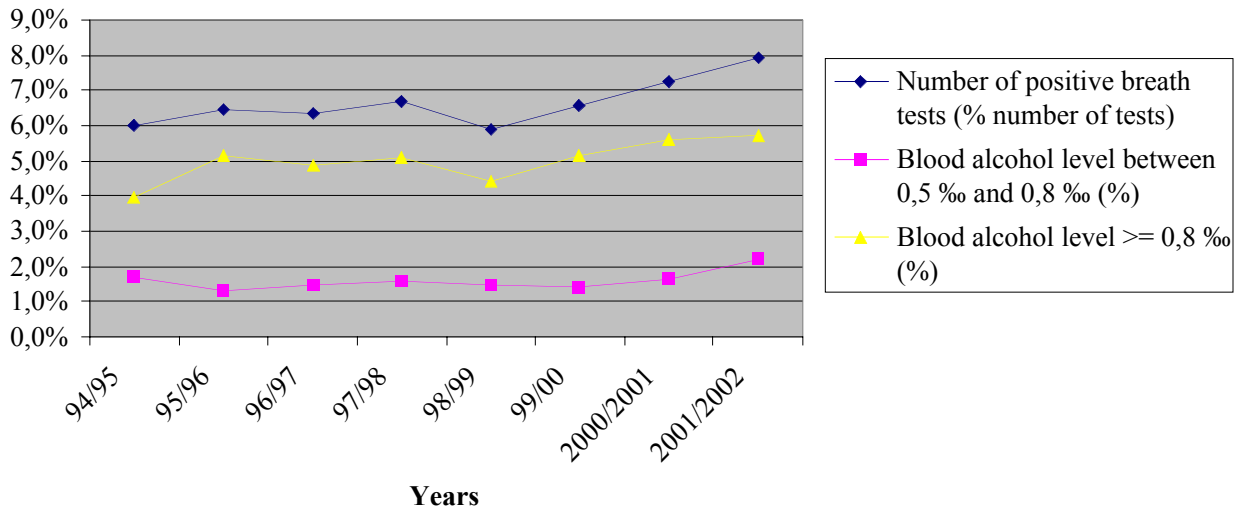
In this graphic, we can see that since 98-99, all types of controls have decreased, after an irregular evolution between 94-95 and 98-99, except for the controls carried out after accidents, which are more stable.

However, the percentage of positive breath alcohol tests has known a different evolution.

Between 94-95 and 98-99 the percentage was globally stable (between 6% and 7%), but has increased afterwards.

As from 2001-2002, the number of tests and the number of positive alcohol breath tests seem to be directly appositively connected: while the number of tests decreases, the number of positive alcohol breath tests increases. The percentage of positive alcohol breath tests was 5.9% in 98-99 and it is now 7.9% in 01-02, which means an increasing of 2% in 4 years. This percentage is however lower than the amount of drink drivers caught during the rest of the year, +/- 10%.

**Evolution of the percentage of positive breath test:  
between 94-95 and 01-02**



Moreover, we can see in this graphic that whereas the evolution of the number of tests with an alcohol rate of 0.5‰ to 0.8‰ is more or less stable, the evolution of the number of tests with an alcohol rate of more than 0.8 follows the same trend as the percentage of positive alcohol breath tests.

Concerning the evolution of the positive breath tests during targeted controls, the same trends can be noticed.

In 2001-2002, 6.9 % of the targeted controls were positive and 2.9% were between 0.5‰ and 0.8‰ and 4.0% higher than 0.8‰.

This means that people are likely to drink when they esteem that the risk of getting caught is low. On these moments, they allow themselves to drink large quantities of alcohol. In fact, almost 3 Belgian persons out of 10 (26%) say that on a typical journey they will ‘never’ be breathalysed (37% for EU countries) and more than one third (36%) say that they ‘rarely’ expect to be breathalysed (also 36% in EU countries) (4).

## Results of the prevention campaign

The 'Bob' concept was first launched in Belgium in December 1995 and has been a tremendous success over the past years. Already after one year (December 1996), 9 out of 10 Belgians had heard of Bob and thought it was an excellent initiative. In 2002, 96% of the Belgians know Bob (5).

The success story of Bob has allowed him to pass our borders: last year, Bob was even present in France ("faire le taxi") and in the Netherlands during the year-end period.

The evaluation of the campaign 2001/2002 shows that the drivers (64%) are less convinced than the passengers (81%) about the fact that drinking and driving do not mix. People from 55 years and older also say that they decide themselves whether they drink and drive. They tend to be less sensitive to the Bob character because the campaign is not specifically targeted at them.

Moreover, the evaluation of the campaign shows that less Bobs are elected during the year-end campaign (in comparison with the year before).

Basis: everybody: N= 1050 %	1996	1997	1998	1999	2000	2001	2002
offer themselves to be Bob	-	27	32	31	33	36	33
were elected Bob	20	26	32	31	33	35	30
know someone who was elected Bob	-	42	59	61	64	66	70
were driven home by Bob	18	28	41	36	35	43	39

The success of the campaign resulted in a (reported) behaviour change: at moment of the latest post-test (January 2002), 35% of all respondents declared they had been Bob yet (20% in 1996), and 43% had been driven by Bob (18% in 1996).

## Conclusion

On the one hand, we have a very successful prevention campaign and on the other hand, the number of alcohol tests is decreasing and the number of impaired drivers is increasing. Unfortunately, there is no positive effect on the number of accidents. This goes to prove one more time that prevention and repression have to go hand in hand. When there is little risk of getting caught (objective and subjective risk), a prevention campaign, how good it may be, can't be efficient. To conduct a real behaviour change, deterrence is necessary.

Nevertheless the number of impaired drivers during the year-end campaign is lower than during the rest of the year, so it's important to find an effective way to extend this effect to the rest of the year.

Bob gives persons who are going out in group an alternative for drink driving. That's why Bob has a lot of success amongst young people. But, lots of people are travelling alone, so the question remains which alternative can be offered to them.

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# Experimental Testing of the Designated Driver Concept

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## Keywords

Alcohol, designated drivers

## Abstract

In theory, the designated-driver concept holds great promise for reducing the incidences of drunk driving. It is simple, inexpensive, almost universally recognized, and generally positively regarded by the U.S. population as a means for avoiding drunk driving. In practice, however, research has shown that implementing the designated-driver concept is often flawed. To function properly, groups of drinkers must commit to the three stages: (1) the group must designate a driver before starting to drink, (2) the designee must abstain from drinking, and (3) the designee must fulfill his or her responsibility to be the driver. Failure at any of these three stages of implementation could result in potentially impaired drivers either claiming to be the designated driver or usurping the role of the designated driver. The research described was designed to address factors that may impede proper implementation of the designated-driver concept. Six intervention trials were designed to (1) cue the use of designated drivers, (2) change the attitudes of the group, and (3) affect group norms to support the proper use of designated drivers. There were 309 participating groups recruited as they crossed as pedestrians into Tijuana, Mexico from San Diego, California. Each was assigned at random to the conditions. Results indicate that cueing alone decreased the returning BACs of drivers. Using group members to deliver pro-designated driver messages decreased driver and passenger BACs even farther.

## Introduction

Programs clearly fitting the harm reduction paradigm are “safe-ride” and “designated-driver” campaigns that focus mostly on reducing the consequences of heavy drinking rather than reducing the amount consumed. Ross pointed to the problems in the United States caused by the fact that most commercial drinking establishments (and most friends’ homes as well) must be reached by automobile (1). Consequently, drinking and driving becomes almost inevitable. This supports two harm reduction concepts. The use of “safe-rides” where the drinking establishment or a public organization provides transportation home for individuals too impaired to drive safely, and the “designated-driver” concept where one member of a group attending a drinking event refrains from consuming alcohol in order to provide a safe ride home for others in the group.

Several communities have organizations that provide rides to individuals who have been drinking and who believe they cannot drive safety home. Harding, Apsler, and Goldfein surveyed 335

such ride service programs in both large and small communities across the country (2). They discovered that most of these programs provided free transportation for impaired drinkers but only 15 percent provided a method for returning the drinkers' vehicles to their homes. This is a major limitation that apparently accounts for the low usage of the safe-ride programs.

Both concepts—safe-ride and designated-driver—can help minimize the highway safety consequences of heavy drinking. Alternatively, it must also be recognized that one of the informal controls on the amount of drinking is the individual's perception of the risk of crash involvement or arrest if driving while impaired. A designated driver may also sense group pressure to limit consumption. The availability of a substitute driver, either through a safe-ride program or through a designated-driver program, can act to remove these constraints. This raises the possibility that heavy drinkers who know they will be a passenger will consume more than if they had to drive. This, in turn, could cause additional harm due to the increased dependence on alcohol or the increased risk of non-traffic-related trauma (e.g., falls, fires, or violence). Harding and Caudill conducted telephone and barroom surveys of drinkers who had been transported by a designated driver (3). Their respondents reported small, but significant, increases in their drinking outside the home when a designated driver was available. Thus, evaluators of designated-driver programs need to consider two issues: (1) the extent to which these programs reduce the crash risk of drivers being transported by designated drivers, and (2) the program's potential for increasing consumption that results in increased drinking-related problems in non-traffic safety areas.

DeJong and Wallack felt that this potential was problematic enough to suggest that designated-driver programs should only be advocated when used with other environmental interventions that would influence alcohol consumption (4). They claim that encouraging the use of designated drivers sends a "mixed message" to people, as it appears to condone heavy drinking. They cite others who go as far as to suggest that designated driving is tantamount to "enabling." However, they also acknowledge that there is no empirical evidence to support this fear. Wagenaar also notes the lack of data on this point, stating "We urgently need controlled studies of designated-driver programs, including direct observation data on the specific patterns of response of drinkers to the availability of a designated driver" (5, p. 444).

Perhaps more serious than the question of "enabling", are the questions raised related to implementation. Studies have demonstrated that designated drivers often drink, sometimes at high levels (6). Further, even though the concept is quite familiar and popular to a vast majority of the population, it clearly is not always used, as drunk driving still occurs all too often.

The research presented here examines the effectiveness of a number of brief interventions designed to enhance the proper use of designated drivers in a high-risk drinking setting. Testing of passengers' returning BAC will also allow for analysis of the "enabling" hypothesized effects of designated drivers.

## **Methods**

### **Participants**

Participants were recruited on the U.S. side of the San Diego/Tijuana pedestrian border crossing. Whole groups of young people were approached and asked a number of screening questions.

Eligible groups must have included a San Diego County resident between the ages of 18 and 30, arrived by private car, and averaged at least one passenger per driver. Eligible participants were offered \$10 to participate.

There were 309 groups recruited that successfully completed the data collection. There were 1,159 total participants (59.3% males). Ages ranged from 18 to 46 ( $M=20.4$ ,  $SD=2.86$ ). All data collection reported here occurred on approximately one Friday and Saturday night per month between June 2000 and June 2001. Recruitment times were between 10 PM and 1 AM. Returning times were between 12 AM and 6 AM.

### Experimental Conditions

Each group was randomly assigned into one of seven experimental conditions. These conditions are summarized in Table 1.

**Table 1 Experimental conditions**

Condition	Description
1. Control	Participants are treated identically to other conditions, but no questions about designated-driver use are included.
2. Cueing only	Participant groups are asked to identify their designated driver.
3. Cue plus physical reminder	After identifying the designated driver, the driver is asked to wear a special ID bracelet with the words "Designated Driver" printed on it.
4. Attitude change through dissonance reduction	The identified designated driver is asked to read a pro-designated driver use statement that may evoke feelings of hypocrisy. This in turn may create a dissonant reduction effort that results in a more pro-designated-driver attitude.
5. Reward of driver	The identified designated driver is offered a reward for returning from Tijuana sober.
6. Normative pressure through reward	All members of the group are offered a reward if the driver returns sober.
7. Normative pressure through attitude change	A randomly selected participant group member reads aloud a pro-designated driver use statement. Then the group selects the designated driver.

### Procedures

Two survey staff members wearing colored windbreakers, and carrying clipboards recruited participants. Initial group selection was based upon an appearance that the group may meet the eligibility requirements, and being the next group to cross a tapeline placed on the sidewalk once the other surveyors were ready to accept a group for processing.

The survey was described as an effort to make the Tijuana border area safer and more enjoyable for those who visit it. Participants were informed about the nature of the task, and that they would receive a \$10 money order upon their return to the United States, if they checked in with a member of the research survey team before 6:00 AM on their way back. We decided to offer the incentive as a \$10 U.S. Postal Money Order instead of cash to hinder possible attempts to return to Tijuana to drink more. The entire group must have agreed for the group to participate in the study.

Once the group agreed to participate, members were given a questionnaire on a clipboard and asked to wear a hospital style ID bracelet with a subject code number. This allowed us to match arrival with returning data while maintaining the anonymity of the participant. These methods matched closely those described previously by Lange (7).

After the participants completed the self-administered questionnaire, they were asked to provide a breath sample for an alcohol test. Then the group was exposed to the experimental manipulation, thanked for their participation and they continued on their way into Mexico.

Upon their return to the U.S., after completing the Immigration and Naturalization Service and U.S. Customs checks, participants could easily see our survey staff waiting inside the border crossing building. They could then approach our table and check in with the survey staff. They were administered a brief standardized interview, asked to submit to another alcohol breath test, and given their incentive fee. Those participants who had been in either condition 5 or 6 were also read a debriefing statement, since they were provided the additional reward regardless of their actual BAC. This was done because the breath test devices used were programmed to store the BAC internally, but not to display the result. Therefore, there was no way to properly assess whether the reward was justified for any given group. The debriefing statement made it clear that they were receiving the reward based upon participation, not their assessed BAC. They were further encouraged to take a taxi if they had been drinking.

### Dependent Measures

The primary dependent measure is the resulting BAC of drivers and passengers as they return to the U.S. from visiting Tijuana, Mexico. BACs were measured using a handheld BAC test unit (CMI Intoxilyzer SD-400; CMI, Inc., Owensboro, KY). The units stored the BACs internally only.

### Results

The results are summarized in Table 2. Both driver and passenger returning BACs are presented along with results of planned comparisons between the *control*, *cue-only* and other interventions. The *cue-only* intervention was treated as a comparison because all of the other treatments contained some element of cue in addition to the other elements of the intervention. The planned comparisons were performed using the Univariate GLM procedure of SPSS, version 10.1.3. The ANOVA indicated that differences by condition existed for both drivers,  $F(6, 309)=3.214, p<.005$ , and passengers,  $F(6, 831)=3.482, p<.005$ .

**Table 2: Returning BACs by driver status and experimental condition**

	Treatment	N	Mean BAC	Std. Error
Drivers	Control	35	.036	.006
	Cue only	32	.027 <sup>a</sup>	.007
	Cue plus	45	.019 <sup>a</sup>	.006
	Attitude change	64	.016 <sup>a</sup>	.005
	Driver reward	37	.014 <sup>a</sup>	.006
	Group reward	48	.029	.005
	Group norm	55	.007 <sup>a, b</sup>	.005
Passengers	Control	112	.064	.006
	Cue only	108	.070	.006
	Cue plus	112	.057	.006
	Attitude change	162	.064	.005
	Driver reward	92	.064	.006
	Group reward	105	.078	.006
	Group norm	147	.047 <sup>c, d</sup>	.005

- a. Mean difference significant from Driver Control,  $p<.05$ .
- b. Mean difference significant from Driver Cue only,  $p<.05$ .
- c. Mean difference significant from Passenger Control,  $p<.05$ .
- d. Mean difference significant from Passenger Cue only,  $p<.05$ .

## Discussion

First, it is clear that drivers tend to have lower BACs than their passengers. This is an important consideration given that there is also an indication that at least for some of those in the sample, the designated driver concept is being misapplied. Mere mention of the concept, and prompting the public designation prior to drinking resulted in a reduction in the returning BAC of drivers. Observations of the groups in the experiment confirmed that many were rather surprised by the designated driver cue. At times, the cue prompted negotiations between group members that one would have expected to occur prior to our contact with them. This may indicate that a major impediment to proper use is not awareness, or even attitudes, but cognitive processes that do not even consider the issues of returning travel.

Additionally, it is interesting that the only intervention that demonstrated significant improvement over the *cue-only* condition was the group-norm intervention. In that intervention, a group member is enticed to read a pro-designated driver statement and ask the group about their use of a designated driver for the evening. There are a number of possible mechanisms by which this may have more impact than cueing alone. One possibility is that the driver observing the friend read the statement will misattribute the persuasive message to their friend's true internal beliefs. This would follow from the logic of the Fundamental Attribution Error literature (8). The result would be an increased persuasive force for the message, and thus a lower driver BAC. Additional research is needed to determine if this is a plausible hypothesis.

Aside from the prevalent misapplication of the concept, designated drivers have been criticized because of the possibility that they facilitate greater drinking by passengers. The results of this experiment indicate that this may not be a valid concern. Increasing the proper use of designated drivers produced no significant increases in passenger BACs. To the contrary, when group members were solicited to offer the pro-designated driver message, passenger BACs were actually reduced. The mechanism by which this effect occurred is not clear from the present data analysis.

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# **Responsible Beverage Service Training Programmes: A Good Way to Decrease Alcohol, Related Problems**

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## **Keywords**

Alcohol, Responsible service, waiters, servers, bars, accidents.

## **Abstract**

There is a lot of talk about Responsible Beverage Service Training Programmes and how effective they really are in combating drunk driving, social problems related to excessive drinking and the sale of alcohol to minors. Some of the obstacles to implementing the programmes include staff turnover, fear of a drop in sales and a lack of political will. A critical analysis of the effectiveness of Responsible Beverage Service Training Programmes was conducted recently by compiling the results of more than 25 research studies. Experiences in several countries highlight the most promising aspects of the programmes and most favourable conditions for their implementation.

The programmes sensitise serving staff and give them the means to take action. But the programmes cannot be effective without backing from the milieu, support from the owners and managers of drinking establishments, and appropriate legislation. While it cannot be proven irrefutably that Responsible Beverage Service Training Programmes alone contribute significantly to reducing drinking-related problems, they are nonetheless efficient when they are supported, understood and made mandatory.

## **Introduction**

- Responsible beverage service training programmes were introduced in the 1980s in Australia, Canada, the U.S. and other countries.
- Often supported or required by legislation, they are designed to prevent the sale of alcohol to minors and excessive drinking by customers in licensed establishments.
- Do they work?
- If they do, under what conditions?
- How should they be implemented?

## Methods and Results

### Effectiveness

29 studies examining the effectiveness of such programs have been analysed.

#### I. Evaluation of serving staff awareness, attitudes and behaviours

Howard-Pitney *et al.* (1991): The impact of a 1-day training course on awareness, beliefs and behaviours, as well as on house rules and policy (Park City, Utah).

Results:

- Significant difference in awareness and belief that customers will be favourable towards the policies and practices of responsible beverage service.
- Little effect on the development of strategies for taking action.
- Establishments where staff had taken the course posted more notices about the availability of non-alcoholic beverages, and fewer employees were drinking on the job.

Gliksman *et al.* (1993): Impact of a server intervention program (SIP) on serving staff in Thunder Bay, Ontario.

Results:

- Significant increase in awareness.
- More positive attitude towards the idea of intervening with customers.
- SIP would appear to be significantly effective in changing behaviour.
- Doubt as to support from managers and owners in establishing house policies.

McKnight (1991): Factors that might influence the effectiveness of training programmes and lead to responsible action (3-6 hours of training for 1,079 servers in 100 establishments in 8 U.S. cities).

Results:

- Significant improvement in awareness, attitudes and behaviours, as reported by serving staff.
- When observed, behaviour with intoxicated customers did not change significantly.

#### II. Evaluation of impact on customer drinking

Toomey *et al.* (1999): Ability to recognise the signs of alcohol intoxication and strategies in such cases (24 establishments studied, 68 attempted entries in an urban area of Minnesota).

Results:

- Five refusals.
- Of the 63 admitted, 20 were refused service on the first request, and 20 more were refused on the second request.
- In 8% of the 66 drinks served, serving staff said they recognised that the customer-actors were inebriated.
- Strategy: Refuse to serve alcohol (68% of refusals) or serve non-alcoholic beverage (18% of refusals).

Toomey *et al.* (2001): The impact of the Alcohol Risk Management (ARM) programme on the sale of alcohol to intoxicated customers.

Results:

- Two out of five establishments have set clear, written policies.
- No significant reduction in the sale of alcohol to intoxicated customers.
- No reduction in the sale of alcohol to minors.

Buka and Birdthistle (1999): Long-term impact of the Rhode Island Community Alcohol Abuse and Injury Prevention Project (CAAIPP).

Results:

- No significant difference in the sale of alcohol to minors or to intoxicated customers, and no major change in preventing inebriation.
- Initial Increase in general practices of responsible service during follow-up, followed by a decline.
- Importance of adding "booster" sessions after initial training.

Russ and Geller (1987): Impact of a training programme on dealing with inebriated customers as they leave the bar (with actors playing the role of inebriated patrons).

Results:

- Increase in number of cases of intervention by serving staff.
- Trained staff more frequently offered water and food.
- Increase in delays before serving.
- Comments on driving while impaired.
- More checking of ID cards.
- No refusal to serve a sixth drink.
- Promising future for training programmes.

### **III. Evaluation of the impact on driving while impaired**

Wagenaar and Holder (1991): The impact of responsible service practices on road accidents involving impaired drivers in Texas, between 1978 and 1989.

Results:

- Significant reduction in the number of road accidents involving an impaired driver.
- Clear impact of media coverage of lawsuits.
- Effective in making serving staff more responsible.

Holder and Wagenaar (1994): The impact of mandatory training sessions for serving staff on road accidents occurring at night and involving impaired drivers in Oregon.

Results:

- As serving staff became trained, the number of accidents decreased.
- Server training proved effective.
- 68% of serving staff who completed the training reported positive changes in their awareness, attitudes and behaviour towards customers.

Levy and Miller (1995): Costs and profits generated by the introduction of a law respecting responsible beverage service; Washetenaw, Michigan.

Results:

- Reduction in human costs, including suffering, loss of quality of life and health care costs.
- Reduction in financial losses.
- Reduction in consequences for others.
- The mandatory responsible beverage service programme in Washetenaw is paying off.

#### **IV. Difficulties implementing and applying rules and policy**

Saltz and Stanghetta (1997): Implementation criteria to maximise the effectiveness of responsible beverage service programmes in three locations in inland California, coastal California and South Carolina.

Results:

Public opinion is important in implementing programmes and awareness must be raised among managers.

Wittman (1989): The experience of alcoholic beverage-related strategies developed for university students of Greek background in the western U.S.

Results:

Serious resistance to establishing the programme, but three solutions suggested by fraternity representatives:

- Influential individuals likely to oppose the project should be identified and advance action taken before the programme is implemented.
- Organisations with decision-making power within the community should participate in applying a system for controlling the consumption of alcoholic beverages.
- Value conflicts with community opinion leaders should be resolved.

Simons-Morton and Cummings (1997): Evaluated the TEAM programme in Houston, Texas, by consulting serving staff.

Results:

- Significant improvement in staff awareness of their preventive role.
- Some difficulty putting the programme into practice.
- Staff continue to serve intoxicated customers for the following reasons:
  - don't want to lose profits and tips
  - customers who are refused service are not pleased
  - pressure from managers to maximise alcohol sales and keep customers happy and satisfied.

McKnight (1996) also concludes that responsible service programmes are often used to shift responsibility from managers to serving staff, and this tendency is encouraged by the law limiting manager responsibility if serving staff have been trained.

Single (1990) believes that

- responsible beverage service programmes can be effective in reducing drunkenness;
- such programmes should receive more support from management policy that is more preventive than legal-oriented;
- the success of such programmes cannot be extrapolated to a reduction in social problems related to alcohol abuse.

Holder *et al.* (1993) also conclude that the degree of responsibility in the United States is linked to publicity about responsible beverage service and the degree of awareness among the owners and managers of licensed establishments.

Turrisi *et al.* (1999) analysed the perceptions of bar owners and serving staff with regard to responsible beverage service policies.

Results:

- No significant difference between the attitudes of owners and serving staff.
- Policies that are designed to do customers a favour are perceived as positive.
- Those limiting the sale of alcohol were not well received.

## **Discussion**

- The programmes are effective for increasing awareness and changing the attitudes of serving staff.
- Results are not as clear with regard to behaviour.
- Various factors can affect the effectiveness of the programmes.
- After training, serving staff know how to deal with an inebriated customer or someone they suspect is a minor.
- This knowledge does not get put into practice.

The issue is to identify the factors that limit and facilitate responsible service:

- The server is often portrayed as the person whose job it is to provide pleasure.
- That leads to ambiguity when he or she must stop serving drinks.
- Customers will be unhappy if they are refused service, and servers then have to deal with the situation *and* the fact that they will not get a tip.
- If the establishment does not support responsible beverage service practices, servers who follow them risk being reprimanded or even fired.
- Some servers wait longer between drinks, offer coffee and make comments about impaired faculties, all while pouring the customer another drink.
- Responsible service practices cannot be implemented without support from the environment, i.e. the manager or owner:
  - who encourages training
  - who sets clear house policy
- Programmes are effective when they are mandatory and backed by sanctions (studies in Oregon, Texas and Michigan).

- Media coverage of lawsuits against servers is a key factor in applying responsible service practices and reducing alcohol-related road accidents.
- Programmes are more effective if they are supported by public opinion, if managers adopt clear, written house policies and if employees are encouraged to implement them.
- Effectiveness also depends on the type and duration of the training, and the training objectives.

### **Conclusion**

- The effectiveness of responsible beverage service programmes cannot be demonstrated conclusively, but some factors cannot be ignored:
  - Serving staff cannot be held solely responsible.
  - Governments must promote the programmes and make them mandatory.
  - Owners and managers must participate actively in implementing them.
  - Public opinion must provide support.
  - Programmes must continue to be evaluated in order to remove obstacles to their implementation.
- Éduc'alcool and its partners have launched a new program in Québec, *Service in Action*, taking all these aspects into account. Evaluation and results are yet to be determined. A brief presentation of the program is made.

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# **An Evaluation of Coin-Operated Breath Testing Machines in South Australian Licensed Premises**

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## **Keywords**

Alcohol, breath test, evaluation

## **Abstract**

A six month trial of coin-operated breath testing machines was conducted in licensed premises in South Australia to examine public attitudes towards, and use of, the machines, the effect on drinking and driving behaviour, and also matters such as commercial viability. Data was collected by down loading from the memory in each breath testing machine, direct observation, and interviews with machine users, non-using patrons, and interviews with the licensees of the premises.

Coin-operated hotel breath testers were generally well received by both the hotel patrons and hotel licensees and they appeared likely to have had some effect in reducing illegal drink driving. Selective targeting of the larger hotels, particularly with young clientele, should be a priority to ensure commercial viability.

## **Introduction**

Campaigns have been directed to educate the public about 'standard drinks' and how to count them, but this approach has its limitations as other variables complicate estimation of BAC levels. Improving drivers' ability to estimate their BACs before deciding whether or not to drive has the potential to further decrease drink driving and alcohol-related road crashes.

A study of drivers and riders admitted to the Royal Adelaide Hospital as a result of a road crash, found the majority of respondents (50%) nominated hotel-based premises as the last place of alcohol consumption (1). Coin-operated breath testing machines in licensed premises could provide drinkers with an accurate source of BAC feedback at the point where the decision to drive is made.

Transport SA commissioned a six month trial of installing Australian Standard certified coin-operated breath alcohol testing machines in twenty five South Australian licensed premises. This report on the trial addresses the financial viability of the machines, the patterns of machine usage, perceptions of machine users and the effect of BAC feedback from the machine on subsequent drinking and driving behaviour.

## **Methods**

Twenty five machines were installed in 12 metropolitan hotels, 6 metropolitan football clubs, 5 rural hotels and 2 rural clubs throughout South Australia. Venues were selected on the basis of being well patronised and if the licensees agreed to participate in the study.

Quantitative data was recorded electronically by each of the breath testing machines. The number of tests was recorded in addition to the time of testing, date of testing and BAC reading for each completed test. The machines were calibrated and data was down loaded on a monthly basis. The cost per test was one dollar.

One hundred and nine patrons who chose to use the coin-operated breath tester were unobtrusively observed and their BAC readings were recorded before they were approached for an interview. Patrons leaving the premises were randomly selected and interviewed (N=614). Respondents from both of these groups were breath tested using a hand held breath tester (Alcolmeter, SD 400) to compare the BAC distributions of machine users and non-users. Respondents were asked to rinse their mouth with water if they said they had consumed alcohol in the last 5 minutes to minimise the risk of mouth alcohol inflating the reading.

The licensee of each of the 25 participating venues was interviewed by telephone to determine their attitudes towards the machines, their observations of machine use, the perceived impact on their business and any problems they had experienced.

## **Results**

### **Financial Viability and Usage Patterns**

A total of 24,129 tests were recorded by the machines, an approximate average daily usage rate of 5.4 tests per machine. This was not enough to cover their cost in the majority of licensed venues (see Table 1). Each machine cost \$340 (Australian) per month to lease from the distributor. This meant each machine was required to be used 2,040 times at \$1 each to break even for the 6 month trial. This equated to an average rate of 11.2 tests per day over the 6 months. Hence, as shown in Table 1, machines were commercially viable in only two venues.

The two venues that generated enough revenue to cover leasing costs in this trial were large, busy, establishments with relatively young patrons. Accessibility to the machines was rated as 'good' in both establishments and each machine was located in a central position near the main bar area. The machines in football clubs and the smaller hotels were particularly under-utilised.

A summary of specific data recorded by the breath testing machines is collated and presented in Table 2. Overall, the machines were most frequently used between 8pm and 4am on Friday and Saturday nights. These times coincide with the peak time for alcohol involvement in road crashes (2).

**Table 1: Number of tests and financial return for machines**

Location	Type	Area	Total Tests	Average Tests/Day	Net Profit
1	Hotel	Metropolitan	2430	13.3	\$390
2	Hotel	Metropolitan	2202	12.1	\$162
3	Hotel	Rural	2034	11.1	-\$6
4	Hotel	Rural	1804	9.9	-\$236
5	Hotel	Metropolitan	1763	9.7	-\$277
6	Hotel	Metropolitan	1724	9.4	-\$316
7	Hotel	Metropolitan	1622	8.9	-\$418
8	Hotel	Metropolitan	1352	7.4	-\$688
9	Club	Rural	1057	5.8	-\$983
10	Hotel	Metropolitan	1012	5.5	-\$1,028
11	Hotel	Metropolitan	1000	5.5	-\$1,040
12	Hotel	Rural	925	5.1	-\$1,115
13	Hotel	Metropolitan	853	4.7	-\$1,187
14	Hotel	Rural	735	4.0	-\$1,305
15	Hotel	Metropolitan	626	3.4	-\$1,414
16	Football club	Metropolitan	533	2.9	-\$1,507
17	Hotel	Rural	484	2.7	-\$1,556
18	Football club	Metropolitan	483	2.6	-\$1,557
19	Football club	Metropolitan	466	2.6	-\$1,574
20	Club	Rural	390	2.1	-\$1,650
21	Hotel	Metropolitan	385	2.1	-\$1,655
22	Hotel	Metropolitan	321	1.8	-\$1,719
23	Football club	Metropolitan	321	1.8	-\$1,719
24	Football club	Metropolitan	308	1.7	-\$1,732
25	Football club	Metropolitan	188	1.0	-\$1,852
Total			25018	137.1	-\$25,982

**Table 2: Number of tests recorded by day of week and hour of day**

Hour of Day	Day of Week							Total Number	Total %
	Sun	Mon	Tue	Wed	Thu	Fri	Sat		
0000-0359	3775	83	67	29	638	773	2632	7997	33.1
0400-0759	100	3	2	4	20	45	109	283	1.2
0800-1159	69	34	21	28	84	60	80	376	1.6
1200-1559	463	174	198	163	230	276	294	1798	7.4
1600-1959	729	227	319	277	344	582	861	3339	13.8
2000-2359	549	453	663	971	1406	3041	3253	10336	42.8
Total Number	5685	974	1270	1472	2722	4777	7229	24129	100.0
Total %	23.6	4.0	5.3	6.1	11.3	19.8	30.0	100.0	

**Machine Use**

Self-testers were predominantly males (64%) and under 30 years of age (81%) reflecting the overall gender ratio at these licensed venues (the legal drinking age in Australia is 18 years). The majority held a current full car licence (84%).

Self-testers had a significantly higher mean BAC (0.091) than those who did not use the breath testing machine (0.067). Seventy four per cent of self-testers had a BAC at or above the legal

BAC limit in Australia of 0.05g/100mL, compared to 51 per cent of non-testers. Self-testers also had a slightly greater percentage at high BAC levels of 0.15 or above than non-testers (17% vs 14%). This indicates that the machines were being used by the target population of heavy drinkers, an attribute of high risk crash groups. (Thirty eight per cent of hospital admissions resulting from a road crash had a BAC level at or above 0.15 (1).)

Nearly 70 per cent of self-testers who were intending to drive prior to testing reported using the breath testing machine because they were intending to drive (Table 3). The greatest percentage of those intending not to drive before testing were using the machine to satisfy their curiosity (35%). Intentional misuse of the machines such as game playing, testing for ‘fun’ or to ‘see how drunk’, was self-reported by 6 per cent of intending drivers and 41 per cent not intending to drive. Limiting the maximum BAC displayed by the machine to 0.10 may discourage this type of misuse.

**Table 3: Self-testers’ reasons given for testing by driving intention prior to testing**

Reason for Testing	Driving Intention Before Testing	
	Drive(%)	Not drive (%)
Driving	68.6	8.1
Curiosity	20.0	35.1
See how drunk I am	2.9	25.7
Fun	2.9	14.9
Friends wanted me to	2.9	10.8
Test accuracy	2.9	-
Other	-	5.4
Total number	35	74

### Drinking and Driving Intentions

Fourteen self-testers who had intended to drive found that they were above the legal limit of 0.05, and this led two of them to decide not to drive (Table 4). The other 12 who were over the legal limit intended to drive away from the venues but 10 of them either had already stopped drinking, intended to do so, or had decided to limit their alcohol. Six cases are missing because the BAC readings were not able to be observed.

**Table 4: Summary of driving intentions before and after testing by breath testing machine BAC reading**

Driving Intention Before Testing	Driving Intention After Testing			
	Drive		Not drive	
	<0.05	≥0.05	<0.05	≥0.05
Drive	17	12	1	2
Not drive	1	-	11	59
Total	18	12	12	61

A summary of all self-reported intended drinking plans after testing are cross tabulated with driving intentions and BAC levels in Table 5. BAC readings were not observed in six cases. Despite few changes to driving intentions, 19 of the 30 (63%) self-testers intending to drive after testing also intended to stop drinking or limit the amount of alcohol to be consumed.

**Table 5: Intended drinking and driving decisions following testing by breath testing machine BAC reading**

Drinking Decisions After Testing	Driving Intention After Testing			
	Drive		Not drive	
	<0.05	≥0.05	<0.05	≥0.05
No effect, continue drinking	2	2	5	44
No effect, already stopped drinking	4	2	2	2
No more alcohol	8	6	4	6
Limit alcohol	3	2	1	8
Other	1	-	-	1
Total	18	12	12	61

### Attitudes of Non-testers

Almost half (49%) of the non-testing respondents not intending to drive, and 43 per cent of those intending to drive indicated they did not use the breath testing machine because they were not aware there was one available on the premises (Table 6). Respondents intending to drive did not think testing was necessary because they were not drinking (20%) while others stated it was because they were not intending to drive (30%).

**Table 6: Reasons given for not testing on this occasion by driving intention**

Reason for not testing	Driving Intention	
	Drive (%)	Not drive (%)
Didn't notice machine	43.2	49.4
Not drinking	19.5	3.5
Sure BAC under limit	16.8	2.6
Not driving	2.7	30.1
Machine not accurate	2.7	2.3
Cost	2.7	1.4
No reason	3.2	2.3
Other	8.6	5.8
Unknown	0.5	2.6
Total number	185	429

### Perceptions of Machine Accuracy

When questioned about machine accuracy, self-testers were more likely to perceive the machines to be accurate (39%) than non-testers (28%). While similar percentages believed the machines were not accurate (30%, 31%), a greater percentage (41%) of non-testers were uncertain about the accuracy, indicating that hands-on experience with the machines appeared to play an important role in patrons perceptions. Despite accuracy concerns, 95 per cent of self-testers and

89 per cent of non-testers believed that coin-operated breath testing machines should be more widely available.

### **Licensee Attitudes**

Licensees were generally positive towards the machines, with 44 per cent reporting from observation a moderating effect on patrons' drink driving behaviour, although some (16%) were concerned about the accuracy of the machines and game playing. Alcohol sales were seen as being reduced due to the machine by only 12 per cent of licensees. Overall, 80 per cent of licensees were interested in continuing to have a breath testing machine in their venue, although a number questioned the financial viability of the machines.

### **Discussion**

The results from this trial indicated that coin-operated hotel breath testing machines were well received by both the hotel patrons and hotel licensees. They appeared likely to have had some effect in reducing illegal drink driving, although the number of relevant cases observed was very small. Of the 14 people who were observed to have registered a blood alcohol reading at or above 0.05 and who were intending to drive before testing, two decided not to drive based on their high reading. However, 8 of the remaining 12 altered their drinking pattern in an attempt to lower their blood alcohol concentration (BAC). Therefore, the machines biggest role appears to be as a useful educational tool in relation to drinking drivers learning when to stop drinking.

The modest change found in driving intention for those above the legal limit of 0.05 may be due to practical reasons such as not feeling comfortable leaving the vehicle at the venue overnight. It must be also noted that these were both *stated* drinking and driving intentions because it was not practical in this study to observe actual behaviour.

The availability of coin-operated breath testing machines should be targeted at the groups potentially benefiting most from knowledge of their BAC - young males with high BAC levels. The demographic characteristics of the self-testers in this study and in previous research (3,4) were similar to those of high crash risk groups (1,2).

Under the negotiated leasing arrangement, the machines were financially self supporting in two large metropolitan hotels with young clientele. Selective targeting of these types of venues should be a priority to ensure commercial viability. Innovative financial packages may need to be offered in other venues to provide an incentive for licensees to install and promote the use of the machines.

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