TRAFFIC INJURY RESEARCH FOUNDATION

# EU DRINK DRIVING FORUM

## SUMMARY OF PROCEEDINGS

TIRF

The knowledge source for safe driving

# The Traffic Injury Research Foundation

The mission of the Traffic Injury Research Foundation (TIRF) is to reduce traffic-related deaths and injuries. TIRF is an independent, charitable road safety institute. Since its inception in 1964, TIRF has become internationally recognized for its accomplishments in identifying the causes of road crashes and developing program and policies to address them effectively.

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Prepared by:
Traffic Injury Research Foundation

Sponsored by:
Anheuser-Busch InBev

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# FOREWORD

**Mr. Jo Van Biesbroeck, Zone President Western Europe, Chief Strategy Officer**
**Anheuser-Busch InBev (ABI), Belgium**

Anheuser-Busch InBev's support of the EU Drink Driving Forum is part of our company's current commitment to the European Commission's *Alcohol & Health Forum*, a forum that seeks to bring together stakeholders across Europe to reduce all forms of alcohol misuse, including drink driving. ABI was a founding member of the Forum when it began in 2007 and we have supported the Forum and its goals with a number of commitments each and every year since. But our work to prevent alcohol-related harm and to promote the responsible consumption of our beers predates the establishment of the Alcohol & Health Forum.

At ABI, our dream is to be the *Best Beer Company in a Better World*. Essentially, "Better World" is our company's way of talking about "social responsibility". Better World is our commitment to build a legacy we can be proud of and we do this by focusing on three key areas. These key pillars include minimizing our impact on the environment, giving back to the communities where we do business, and promoting responsible drinking. As a part of these Better World initiatives, we have developed and implemented dozens of campaigns and programs around the world and many of them focus specifically on discouraging the harmful – and preventable – practice of drink driving.

I am proud to say that our company has a long and growing list of drink driving programs and partnerships. One of our most successful campaigns has been our popular Budweiser designated driver ad, featuring Cedric the Entertainer. After this commercial originally ran in the U.S., the spot went global in 2010. First, our China team adapted the ad, and featured instead the Chinese entertainer Eason Chan, launching it in key markets across the country. This was the first nationwide ad to promote the use of designated drivers in China. And in consumer focus groups, the spot received the highest rating ever for a Budweiser TV advertisement; not just the highest rating for a social responsibility ad but the highest rating for a Budweiser ad.

Building on this success, we ran the original Cedric commercial in the United Kingdom during last year's World Cup broadcasts. Consumers selected it as the most-liked ad for the month of June, according to Nielsen polling. Our efforts to promote designated drivers were recognized in the British Parliament with a non-binding motion of support. We then created a Spanish version of the spot that aired in Bolivia under our Paceña brand.

Realizing the impact that these positive messages have on consumers, our marketing team then launched a remake of a Labatt Designated Drive commercial called "Tattoo," which was originally used in Canada. A French version of the spot was created and ran here in Belgium under our Jupiler brand.

In Belgium, thanks in part to the long-running designated driver campaign "Bob", nearly six out of 10 adults say they have been a designated driver or used a designated driver in the past year. Supported by the country's brewers, the program has reached thousands through creative promotions. Bob has also inspired similar programs in 16 other European countries. In the Netherlands, we introduced Blaas Bob at the Jupiler League games. Blaas Bob is a fun promotion that features a hilarious competition among designated drivers on the field to highlight the importance of football fans getting a safe ride home.

These campaigns take a lighter approach to communicate serious messages in a fun, memorable way that resonates with our consumers. They are just a few samples of the work we are doing in local markets to raise awareness and discourage drink driving.

However, we also have global partnerships which take a serious look at the issue of drink driving and solutions to it. One of those partnerships is with today's host organization, the Traffic Injury Research Foundation (TIRF).

TIRF has been a valued partner to our company for more than 15 years. Our support of TIRF helps them to conduct international research related to the causes and effects of road crashes and the development, implementation and evaluation of road safety programs. Specifically, ABI has supported TIRF's work in trying to identify ways to keep hard-core drinking drivers – that is, drivers who repeatedly drink to excess – off the road and to identify loopholes in criminal justice systems. Their excellent work has been widely recognized by governments, non-governmental organizations, traffic safety and criminal justice organizations and we are proud to play a role in supporting what they do.

TIRF has developed a diverse agenda with a broad range of speakers from across the globe. This document contains a summary of their presentations.

# INTRODUCTION

The Traffic Injury Research Foundation is pleased to have organized this exciting forum that provides an opportunity to take stock of recent advances in the field of research, and highlight some of the innovative strategies that are currently being applied to the management of drink drivers with the aim of further reducing alcohol-related deaths and injuries on our roads.

TIRF is an independent, charitable road safety research institute based in Ottawa, Canada. It was established in 1964, and for the past 47 years it has focused its research efforts on road user behaviours which result in driver error and contribute to more than 80% of road crashes. TIRF is perhaps best known for its work in the areas of drink driving and young drivers.

As an independent research institute, TIRF's funding is diverse with some 60% stemming from governments around the world, and the balance coming from associations, industry, and advocacy groups who desire objective research as a basis for decision-making, and who seek to contribute to strategies to mitigate social problems through corporate social responsibility initiatives.

TIRF undertakes some 20 research initiatives each year and the focus of its work is in four main areas. First, it measures the magnitude and characteristics of trends in relation to road user behaviour. Second, it is engaged in program and policy development across the disciplines of transportation, justice and health. Third, it evaluates a broad range of road safety programs and policies.

Finally, and perhaps most importantly, it works directly with diverse road safety professionals to conduct knowledge transfer. In the past decade, TIRF has built strong relationships with frontline road safety agencies and professionals, and worked to engage them in the research process. Listening to and learning from the experiences of those who work on the frontline of road safety every day has helped our organization make its research relevant and meaningful to the audiences who can benefit most from it. And increasing understanding of the context in which professionals work every day has enabled TIRF to work closely with them, to collaborate, and to identify achievable ways to put research into practice.

We welcome our guest speakers for this event who come from across the globe and thank each of them for taking time out of their schedules to participate in the Forum and share their knowledge as a basis for discussion at this event. We also would like to acknowledge Anheuser Busch InBev who has graciously provided the financial support that has made this event possible. Their leadership illustrates the valuable role that beverage companies can play in the partnerships it takes to reduce drunk driving.

As evidence of this, the Brewers Association of Canada has partnered with government and the automotive industry to monitor the attitudes, behaviours and opinions of Canadians with regard to the impaired driving problem. At the same time, they have also been actively involved in the development of a consensus-based National Alcohol Framework. In the United States, Anheuser-Busch InBev has supported independent, landmark research initiatives that provided important insight into priority issues such as hard core drunk drivers, and problems in the justice system and that supported the development of practical solutions. And, in Europe, Australia, and other parts of the world, brewers have promoted public awareness campaigns and responsible drinking initiatives, and supported enhanced legislation, enforcement measures, and evidence-based programs.

So I thank our sponsors for their commitment to reduce drink driving. The global exchange of ideas and networking opportunities that are created by venues such as this forum do much to fuel the innovation that produces progress in achieving our collective goal of reducing drink driving.

This Forum agenda was designed to pull together the latest in research and evidence-based interventions to form the basis for discussion of needed directions in the field. While there has been much progress in reducing drinking and driving in the past three decades, a committed approach to realize further progress is essential to achieving continued declines in alcohol-related road fatalities and injuries.

This Forum involved more than 100 attendees representing 19 countries who came together to share their experiences and expertise to inform and collectively shape future efforts. The following summary of proceedings is designed to highlight key facts, knowledge and experiences that were presented and discussed at the Forum. The proceedings do not reflect the opinions or perspectives of individual participants in attendance.

Robyn Robertson, President & CEO
Traffic Injury Research Foundation (TIRF), Canada

# DRINKING AND DRIVING: A REAL ISSUE

**Despina Spanou,** Chair of Alcohol and Health Forum
Directorate General for Health and Consumers, European Commission, Belgium

- Despite considerable progress in reducing impaired driving in several European countries and the implementation of proven impaired driving strategies, approximately 25% of road fatalities are estimated to be alcohol-related.
- A comprehensive approach, involving public awareness, the use of legal breath alcohol concentration (BAC) limits, enforcement of impaired driving laws and strong partnerships and cooperation across vested agencies is essential to achieve continued progress.
- Results of a Special Eurobarometer conducted in April 2010 by the European Transport Safety Council (ETSC) revealed that less than one-third of respondents to the public opinion poll were able to correctly identify the legal BAC limit in their country. Of concern, 36% were unable to correctly identify the legal BAC limit in their country, and 37% indicated they did not know the answer.
- The same poll also asked respondents about the number of drinks consumed during a two hour period after which a person should not drive. The European average was 62% who said a person should not driver after 2 drinks or less whereas 38% reported they were unsure about the number of drinks, it depended on the situation, or that more than two drinks was acceptable. Results from specific countries varied considerably.
- Research that was completed as part of the European SafetyNet project in 2009 also revealed that 0.8‰ BAC is unacceptable for all drivers of vehicles. In addition, the risk of crash among young drivers is quite high at a lower BAC of 0.5‰. In fact, the relative risk of fatalities among young drivers is 50 to 150 times greater than drivers of passenger vehicles or professional drivers.
- Driver testing by police is a critical feature of efforts to reduce impaired driving. However, results from ETSC's 4th PIN report in 2010 that examined the number of police tests per 1,000 population in 2007 and 2008 revealed that testing levels varied dramatically across countries and these differences may be due to available levels of resources and staffing, and well as changing road safety priorities.
- Over the past few years, the EU drunk driving policy has included a number of important recommendations from the Commission to encourage the use of strategies to address the drink driving problem. These include: the adoption of a 0.5‰ BAC legal limit in conjunction with a lower BAC limit of 0.2‰ for novice and professional drivers; strong enforcement of legal BAC limits; emphasis on reductions in road deaths due to alcohol as a priority of the EU Alcohol Strategy; and, the implementation of Road Safety Action Programs.
- Several organizations have made commitments as part of the EU Commission's Alcohol and Health Forum. These include:
  - Anheuser-Busch InBev's commitment to support TIRF to deliver this Drink Driving Forum;

- » ETSC's partnership with Volvo to deliver the Safe&Sober Campaign and the Drink-driving policy network (2010-2012).
- » Promile, the SABMiller commitment delivered in the Czech Republic, Poland and Slovakia in cooperation with government agencies and NGOs.
- » Brewer's of Europe commitment in several countries and based upon public/private partnerships.

> Collaborative efforts and initiatives are essential to establish linkages between public and private initiatives and also strengthen linkages across transport and alcohol policies. The work of the EU Commission to encourage and support the commitments by partner agencies through the Alcohol and Health Forum can help to achieve goals in reducing drink driving in Europe.

# SESSION I: RESEARCH AND BEHAVIOUR

## A Qualitative Study of Convicted Drink Drivers: Attitudes and Beliefs

**Dr. Sonja Forward, VTI, Sweden**

In Sweden, two small qualitative studies involving semi-structured interviews of convicted drink drivers were conducted in 2007 and 2010. Interviews with participants were recorded and transcribed. The first study involved 11 drink drivers and the second study involved 15 drink drivers. In both studies the samples consisted of mostly male offenders between the ages of 20 and 60 years of age who were contacted through a rehabilitation centre. Key findings from the study include:

- Levels of perceived risk associated with drink driving were low among study participants. The majority reported that they did not believe that drinking would affect their driving ability. As such, having a BAC over the legal limit did not influence their decision to drive.
- Social norms were also an important factor. The majority of participants did not think that friends would disapprove of their behaviour and believed that driving after drinking was a common practice and therefore, acceptable. However, for those who did not believe that it was acceptable, it was very difficult to admit that they had lost their driver's licence because of a drinking and driving offence.
- Perceptions regarding the likelihood of detection were quite low. Participants believed that their chance of being stopped by police was very small although some participants did report using different strategies to avoid detection.
- Once convicted, participants were more likely to feel ashamed if they had to admit they could not control their drinking or if their behaviour violated personal and social norms. Conversely, participants were less likely to feel ashamed if they believed their behaviour was outside of their own control.
- Overall, participants reported that the loss of their driver's licence was insufficient and that some form of treatment was needed to stop them from driving after drinking.
- In conclusion, study participants reported that their driving ability was not affected by their drinking and that the perceived risk associated with driving after drinking and being charged was small. Of interest, participants also reported that it was more difficult to admit to drink driving than other offences, however feelings of guilt could be minimized if participants could blame events outside of their own control for their behaviour. These offenders reported that losing their driver's licence was an insufficient sanction. Without exception they further agreed that they needed help to come to terms with problems related to their addiction to alcohol. However, this would not rule out legal sanctions since detection could start a process of change if it is accompanied by appropriate forms of interventions.

## The Effects of Alcohol on Executive Functioning of Impaired Drivers

**Dr. Tom Brown,** McGill University, Canada

Drink driving and the management of offenders who engage in this behaviour is a transdisciplinary challenge that involves a host of cross-cutting issues including different societies and cultural practices, systems of criminal justice, policy, driver licensing and health, and the applications of technology. Disciplines that are connected to this issue range from an array of sciences and human factors to engineering, public health and business practices. Behaviours associated with drink driving are also diverse and touch upon drug and alcohol misuse, vehicle access and a propensity to drive.

- Drink driving offenders are a heterogeneous population that involves many different subgroups, making the prediction of recidivism difficult.
- The identification of clinically meaningful subgroups consisting of offenders who share common explanatory pathways, distinct biomarkers and behavioural features, and selective treatment responsiveness can provide researchers with an opportunity to interrupt these pathways and develop targeted interventions to address these subgroups.
- Studies into the psychobiology of drink drivers reveal that abnormalities in neuroendocrine response related to stress are associated with alcohol, psychiatric disorders and poor treatment response.
- This led researchers to investigate whether measures of salivary cortisol could clarify mechanisms of drink driving offending and also predict risk of persistent drink driving. Results of a study that was subsequently replicated and extended revealed that:
  - Research showed that repeat offenders had a blunted profile compared to a control group, indicating that this is a marker of high risk offenders.
  - Another study showed that a subgroup of first time offenders with a similar blunted profile as recidivists could be identified, and that they possessed many characteristics associated to recidivism. This indicates that this marker can identify subgroups of higher and lower risk first time offenders.
  - This lack of emotional arousal to stress may signify disrupted affective information processing, diminishing the ability to learn from negative past experiences.
- A related study to investigate cognitive factors associated with drink driving revealed that many repeat drink drivers suffer from neurocognitive impairments, which can also contribute to their persistent behaviour, low compliance with interventions, and poor outcomes.
  - Main findings from this study revealed that neurocognitive functioning of repeat drink drivers is disproportionately lower than expected in a normal population of drivers. Two-thirds (66%) of recidivists showed neurocognitive deficits with the most common deficits observed including memory capacity and executive functioning. As a result, researchers are now beginning to look at the acute impact of alcohol on specific neural systems including psychomotor performance, impulsivity and decision-making.
- Research into why offenders continue to make bad decisions shows two kinds of decision-making. It can either be fast, impulsive and reward seeking without regard for consequences or it can be slow and reflective with consideration of longer term advantages and consequences. Recidivists characterized as more fast decision makers had:
  - More past drink driving convictions in the past;

- » More severe drinking patterns in the past;
- » This despite shared similar socio-demographic characteristics with those who were more slow decision-makers.

> In conclusion, this research demonstrates that a subgroup of high risk drink driving recidivists show significantly more disadvantageous decision-making capacity. In these instances, decision-making is more unconscious, emotionally driven, impulsive and choices and behaviour are dominated by the presence or prospect of reward.

> Hence, problem drinking and early onset of this can contribute to deficits in neurocognitive performance, resulting in problems in relation to memory, planning, flexibility, inhibition and decision-making. These deficits can result in poorer treatment engagement and outcomes to increase the risk of drink driving.

> These findings have important implications for countermeasures for drink driving. Offenders who are hypersensitive to rewards are less motivated to participate in programs where positive outcomes (e.g., re-licensing) are delayed and aversive contingencies are immediate (e.g., fines, program costs, loss of licence). Their increased motivation for immediate gratification contributes to unlicensed driving, non-payment of fines and program costs, and lack of behavioural change. Of equal concern, their psychobiology results in greater refractoriness of behavioural change, greater risk for relapse and greater proneness to risk taking.

> On this basis, if participation of drink driving offenders in remedial and re-licensing programs is deemed beneficial, then current policies of deterrence and punishment may be counter-productive in light of the inherent explanatory pathways to drink driving in some subgroups.

> Moreover, the possible role of neurobiological and neurocognitive functioning to inform the development of drink driving policy and administrative protocols is worthy of exploration, as well as the role of these factors in relation to individual intervention strategies.

## Driving Under the Influence of Drugs, Alcohol and Medicines (DRUID) Findings

**Dr. Horst Schulze, BASt, Germany**

The DRUID project was initiated in late 2006 as part of the 6th EU Framework Program and took five years to complete. This project was coordinated by BASt in Germany and involved 37 partners representing 17 EU Member states and also Norway. A total of seven separate work packages were included in the project: management of the project, experimental research, epidemiology, enforcement, classification and labeling system for medicines affecting fitness to drive, an evaluation of existing driver rehabilitation strategies, strategies for driving bans, and the development of guidelines for the dissemination of project findings.

There were a number of methodological challenges that had to be addressed in the delivery of this project. Priority challenges included developing and implementing a unified study design and establishing a theoretical framework for integrating research results from different studies. In addition, it was necessary to introduce unified toxicological standards and ensure that the conversion of concentration values was consistent across roadside and hospital studies and different biological samples. It was also challenging to assess prevalence and risks associated with substances as well as developing a European classification system for these substances.

> Key findings related to the prevalence of substances among drivers in 13 countries revealed that:

- The EU average for prevalence of all psychoactive substances was 7.43% with a range from 1.34% up to 15.01%.
- The EU average for prevalence of alcohol was 3.48% with a range from 0.15% up to 8.59%. The most prevalent periods for detecting alcohol were weekend nights and weeknights. In addition, alcohol was 2-4 times more prevalent in male than in female drivers and alcohol was most prevalent in drivers aged 50 and older.
- The EU average for prevalence of illicit drugs was 1.89% with a range from 0.22% up to 8.2%.
- Hospital studies of fatally injured drivers in four countries revealed that alcohol, THC and alcohol/drug combinations had the highest prevalence. Hospital studies of seriously injured drivers in six countries revealed very comparable results.

> Key findings from a crash responsibility study conducted in France that compared drivers deemed responsible in fatal crashes compared to drivers who were deemed not responsible showed that:

- The relative risk for drivers positive for alcohol was 8.39 (>0.1g/l) as compared to much lower relative risk associated with cannabis (1.89; ≥1 ng/ml), amphetamines (1.54; ≥20 ng/ml), cocaine (1.17; ≥ 10 ng/ml) and opiates (0.76; ≥ 10 ng/ml).
- The relative risk for various alcohol concentrations ranged from 2.45 up to 19.32.
- The relative risk for THC varied from 1.53 up to 2.01.

> There were a number of policy implications stemming from an examination of classification systems for medicine. In particular:

- The EC and Member States should have responsibility for decisions related to the use of classification systems. However, an EC directive on medicine classification is a preferred solution from the perspective of the DRUID consortium.
- Some member states (e.g., France, Spain) have already made efforts to introduce a classification system for medicines that provides an indication of impairing effects.
- The results of the DRUID project are compatible with existing national systems and could be integrated into them. In addition, the results are compatible with PC based systems that are currently available to and used by physicians.

> Results from the study to evaluate screening devices and gauge the cost-benefit analysis of enforcement showed that:

- Eight of 13 devices were classified as "promising".
- Practical user guidelines and training guidelines for police have been developed.
- Only three devices were positively evaluated in conjunction with blood tests.
- The sensitivity and specificity of devices have not substantially improved since the completion of the ROSITA and ROSITA II projects.
- The choice of the screening device might make a difference with regard to the cost-benefit ratio. Increased drugged driving enforcement using roadside saliva screening is potentially beneficial, particularly in countries with lower baseline levels of enforcement.

- » However, if the level of drink driving enforcement decreases as a result of increased drugged driving enforcement, the net benefit will decline.

> Findings from the review of rehabilitation programs for drink drivers reported that:

- » A legal requirement for program participation is needed to ensure drink drivers participate in this type of intervention.
- » Program participation is typically linked to a reduction in the driver licence suspension period or is a condition of re-instatement of the driving privilege.
- » Formal criteria to directly assign drink drivers to driver rehabilitation programs or counselling is needed to initiate problem awareness or screening for an alcohol and/or drug problem.
- » Driver assessment prior to program assignment is useful to match offenders to treatment.
- » Mandatory participation for high-risk, repeat and young drivers is common.
- » Recommendations stemming from this project include the integration of driver rehabilitation programs into a comprehensive countermeasure system designed for drink drivers in Europe, and that European guidelines for legally regulated driver rehabilitation systems and procedures should be established, taking account of the results of this study.

> An analysis of licensing strategies reviewed practices in 27 EU Member States, Croatia, Norway and Switzerland. Findings showed that practices across countries are very heterogeneous, and that the certainty of punishment is the main general deterrence factor. A secondary factor is the swiftness of punishment. In cases of dependence, this sanction has no deterrent effect and does not result in behavioural change. A degree of conditional licensing following full licence withdrawal is recommended.

## Young Impaired Drivers

**Dr. Jean Pascal Assailly, IFSTTAR, France**

Young drink drivers are an important part of the problem. Given the emerging emphasis on road safety that has resulted from the UN Decade of Action on Road Safety, recent data suggest that drink driving among youth in developing countries is a problem that warrants concern and attention.

Key characteristics associated with young people are relevant to their drink driving behaviour. Some of these characteristics include:

> Age is relevant with a young age of drinking initiation being linked to cohort effects (secular trend on puberty), neurobiology (decisions are influenced more by the socio-emotional system of rewards in the limbic areas than by the cognitive control system in the prefrontal areas), and a risk of alcohol misuse later in life.

> Gender differences between males and females in terms of psychology and biology: research shows that the gender gap is nearly closing in Scandinavian and Anglo Saxon countries, although this is not the case in Latin or Islamic countries and other parts of the world. There is some evidence that the stereotypes of female roles may be a protective or risk factor.

> Cultural differences are evident regarding the ways to behave when one has drunk and there are ethnic disparities in drink driving, even within the same culture. For example, rates of drink driving vary among Cuban, Hispanic, Haitian and Puerto Ricans in the United States.

Psychological distress and harmful or problematic drinking may have mediating effects on the cultural influences on this behaviour.

- Family and environmental influences can play an important role in the drink driving behaviour among youth. Key factors include genetic factors (resistance to the effects of alcohol, low stress response), long-term consequences of affective unsafety in the parent/child relationship as the influence of alexithymia on sensation seeking and addictions, evolution of the family structure, sibling's influences, parental involvement in and perceptions of drinking behaviour and drink driving, situational drinking, perceptions of peers, media influences, and riding with a drink driver. Perceptions among youth regarding the level of enforcement of drink driving laws are also important.

There are two socio-ecological models of drink driving prevention that are relevant to this issue:

- The prevention typology matrix developed by DeJong and Langford (2002) provides a typology for event-specific planning. The first dimension of this model classifies programs and policies into one of five levels: individual, group, institution, community and society. The second dimension features key areas of strategic intervention in terms of changing individual factors (e.g., knowledge, attitudes), eliminating environmental factors that contribute to problems, protecting youth from negative consequences and intervening with youth to demonstrate problem drinking. This matrix captures the idea that many areas of strategic intervention can be simultaneously pursued at several levels.
- The drink driving prevention matrix, developed by Assailly in 2005 promotes a chronological and socio-sequential model of prevention. It involves four stages in the decision process of a drink driving violation and each stage has two possible types of prevention; either formal social control or informal social control.

To date, several different types of strategies have been implemented in an effort to reduce or prevent drink driving among youth. These are briefly summarized below.

- Minimum legal drinking age (MLDA) restrictions are effective in reducing accident fatalities among 18- and 19-year olds in many jurisdictions. However, the effect of changes resulting from MLDA is quite heterogeneous given that in some cases youth need not travel far to cross a border to evade this policy.
- Selective legal Blood Alcohol Concentrations (BACs) for young novice drivers have proven their efficiency.
- Social norms marketing can reduce normative misperceptions, increase use of designated drivers, and decrease drinking and driving among young adults.
- Fear-based appeals have had mixed results on youth (if not followed by cognitive, practical and self-efficacy reinforcing actions, as suggested by the extended parallel responses theory).
- Anti-drink driving enforcement and publicity campaigns have a significant independent effect in reducing crashes of young people but their interactive effect is anti-complementary. Conversely, the anti-speeding enforcement and publicity campaigns had no independent effect but their interactive effect was significant in reducing serious crashes involving young male drivers.
- Drivers using breathalyzers to avoid illegal blood-alcohol levels inadvertently expose themselves to sleepiness-related risks that are associated with alcohol consumption. Personal breathalyzers may even be counterproductive if they make more drivers engage in more frequent or habitual drinking and driving. However, a significant proportion of drivers underestimate their BAC (Beirness, Assailly) and a training effect could be expected from comparing subjective and objective estimates of BAC.

- Designated driver programs vary in that some encourage people to act as designated drivers whereas other programs offer incentives to people who act as designated drivers. While survey results show that individuals report they "often" select a designated driver, these programs appear to have small effects on self-reported drink driving or riding with a drinking driver. Available evidence is not sufficient to draw conclusions about the effectiveness of these programs and more carefully controlled studies are needed.
- Responsible server training programs have proven their efficiency but should be exported from the US and Netherlands into other countries.
- The relationships between the availability of public transportation, the risky decision to consume alcohol, and drink driving have been examined. There is little effect of expanded public transit service on drink driving arrests, alcohol related fatal traffic and alcohol related arrests. However, these overall effects mask considerable heterogeneity across geographic areas. In particular, areas where bars are within walking distance to transit stations experience *increases* in alcohol related arrests and *decreases* in drink driving arrests. There is no indication of behavioral changes in neighborhoods without any bars within walking distance of transit stations.
- Reviews of educational approaches using individual-focused strategies to reduce problematic alcohol consumption by college students have been conducted. Results show that no support was found for information/knowledge approaches alone, or for brief values clarification approaches alone or with other informational content. Evidence was found in support of skills-based interventions and motivational interventions that incorporated personalized feedback, with or without an in-person intervention. Finally, normative re-education interventions received mixed support, though personalized normative feedback was associated with positive outcomes.
- Significant advances have been made over the past seven years with respect to mailed and computerized feedback interventions, and interventions with young people. To date, much of the research reviewed suffered from significant limitations. More research is needed to determine the best methods for disseminating such interventions as well as additional research on interventions with high-risk groups of young people.
- Community approaches with mutually reinforcing components have reduced alcohol-involved crashes, lowered sales to minors, increased the responsible alcohol serving practices of bars and restaurants, and increased community support and awareness of alcohol problems. Such approaches involve community mobilization, responsible beverage service standards, increased drink driving enforcement, and reducing alcohol availability and access through alcohol control policies.

# SESSION II: SOLUTIONS


## Global Actions on Harmful Drinking

**Brett Bivans, International Center for Alcohol Policies, United States**

In 2004, road crashes accounted for nearly 1.3 million deaths and between 20 and 50 million injuries. Data from the World Health Organization indicate that road traffic crashes will be among the leading causes of death and injury by 2030. Of some concern, 90% of road traffic deaths and injuries occur in low-income and middle-income countries which have only 48% of the world's registered vehicles. In 2011 the Decade of Action was launched in response to these concerning statistics.

The overall goal of the Decade is to stabilize and then reduce the forecast level of road traffic fatalities around the world by 2020. Pillars of the plan include a variety of strategies including: road safety management, safer roads and mobility, safer vehicles, safer road users, and improved post-crash responses. There is a strong motivation to create a culture of safety on our roads. This requires support from all segments —of the road safety community including international organizations, non-governmental organizations, policy makers, victims and survivors, youth, media and private companies.

A number of new initiatives designed to reduce harmful use of alcohol have been developed as part of the WHO strategy with input from industry representatives. Their involvement is part of a broader, long-term commitment of 15 Chief Executives of the largest beer, wine, and spirits companies in recognition that industry can and should do more both by expanding the scale, geography & focus of industry actions and also engaging on a local level with partners. Currently, initiatives are being implemented in countries where initiatives are locally relevant and industry is able to assist in implementation. There is an initial focus on 18 low- and middle-income countries in topical areas where industry has expertise and a track record of achievement. There is an immediate focus on self-regulation of alcohol marketing, drink driving and noncommercial alcohol that will occur between 2010 and 2012.

In an effort to be accountable to these commitments, industry will report on progress on a dedicated website (www.Global-Actions.org). In addition, an independent, third-party research firm has been contracted to conduct comprehensive evaluation studies over a three-year period. The overall objective of this evaluation is to generate a knowledge base to help support current and future efforts to reduce harmful drinking through local actions around the world.

Drink driving is a leading contributor to the road crash problem. The WHO-World Bank 2004 World Report highlights that road safety is a shared responsibility and emphasizes the importance of strengthening professional capacity to develop effective safety programs. With regard to drink driving, expanded

partnerships, capacity building based on Good Practice Manuals of the UN Road Safety Collaboration, the use of pilot projects and monitoring and evaluation of activities are needed. To date, key initiatives in these areas have been implemented in China, Colombia, Mexico, Nigeria, Russia and Vietnam. Core activities have focused on: situation assessments, capacity building and training, implementation of projects and monitoring and evaluation at all levels. More information about these initiatives can be found at: http://www.global-actions.org/.

## Road Safety and the European Union Policy

**Maria-Cristina Marolda, European Commission, Directorate General for Mobility and Transport, Road Safety Unit, Belgium**

The policy orientation on road safety in the next decade (2011-2020) emphasizes three key pillars:

- A common and shared European road safety Area;
- An integrated approach including other related policies (e.g., health, environment, employment);
- Shared responsibilities both at an institutional level (EU, national and local) and between public and private stakeholders.

Drink driving and the harm associated with this behaviour is a social problem that requires an integrated, multi-sectoral approach representing diverse disciplines. Activities must rely upon the implementation of educational, enforcement and engineering strategies to target key aspects of the problem: the road user, the vehicle and the road infrastructure. This should include public authorities at all levels, private companies and road users. The participation of interested private companies is also essential in order to raise awareness and reach as broad an audience as possible.

The EU has indicated seven strategic objectives for the coming decade:

- Improving education and training of road users;
- Increasing compliance with road traffic rules;
- Safer road infrastructure;
- Safer vehicles;
- Promotion of modern technology to improve road safety;
- Improving emergency and post-care services; and,
- Improving safety among vulnerable road users.

The effects of drinking and driving are significant. Research shows that 1% of all European drivers checked for alcohol have a Blood Alcohol Concentration (BAC) of 0.5 grams of alcohol per liter of blood, or higher, and over 10% of road crashes are alcohol-related. This is a function of alcohol consumption and risk taking attitude. A clear contrast can be seen between Member states in terms of fatalities. Deaths due to road crashes vary considerably from a low of 39-41 per 1,000,000 population in Sweden, the United Kingdom and The Netherlands, to as high as 120-130 in some Eastern European countries. However, it is important to keep in mind that some Members joined the EU much later than others and, as such, have had less time to adapt to EU regulation and develop a national road safety plan. The same differences between Member

states apply to alcohol consumption and respecting driving rules, which are closely linked to local culture and social norms.

As a general approach there are a number of key strategies that can be applied to reduce drink driving and these are briefly described below:

- Prevention: This includes a combination of education, awareness and appropriate marketing strategies.
- Enforcement: This involves the setting of legal BAC limits and related policies and the use of deterrence which is achieved through sustained and highly visible enforcement not only to increase the real likelihood of detection, but also to increase perception of the likelihood of detection. However, deterrence alone is unlikely to be sufficient to change behaviour.
- Sanctions: A comprehensive approach to countermeasures is important and can include:
  - Licence sanctions which are more effective than fines or jail. In order to be effective a period of not less than three and a maximum of 12 months is recommended. In addition, research shows that combining driving restrictions with rehabilitation/treatment improves outcomes.
  - Driver rehabilitation programs to prevent people from becoming recidivist drink drivers and safely restore their mobility while ensuring traffic safety. Strategies differ for dependent as compared to non-dependent drink driving offenders. Rehabilitation programs can also be combined with structural interventions (e.g., alcolocks, continuous alcohol monitoring).

The prevention of recidivism must remain a priority of drink driving policies. In this regard, Member states should discuss the real social exclusion that results from the removal of the driver's licence, and propose more efficient procedures in terms of preventing recidivism.

Policies based on controls and enforcement and those based on prevention and education lose their efficiency once having reached hard core drink drivers. As evidence of this, a demonstration showed that the monitoring of sober driving in conjunction with an evidence-based educational process and with medical and psychological follow up increases compliance compared to policies of enforcement and prevention. Hence, a good system to control drink driving must include the following elements in a closed loop: education, awareness, deterrence, sanctions, rehabilitation and monitoring, the latter aimed at re-education of offenders.

## Alcohol Ignition Interlocks and Biomarkers

**Dr. Charles Mercier-Guyon, Medical Council of the French Road Safety Association, France**

Drink drivers who are detected are just one part of the drink driving problem. However, there is a much larger problem of drink drivers who are not detected. As evidence of this, research to examine the proportion of drivers who have been tested at the roadside during the past years shows that, on average, just 16% of drivers are tested once, and 13% of drivers are tested more than once. Estimates vary considerably across countries with less than 5% of drivers being tested either once or two or more times,

to as many as 25% of drivers being tested once, and almost 40% being tested two or more times (SATRE 2004). Similarly, progress in reducing drink driving fatalities also varies across countries.

The impairment approach adopted in the United States and United Kingdom that emphasizes an approach involving detection through enforcement is not sufficient to address the problem of undetected drink drivers. The use of random breath testing can address this limitation to improve the detection of drink drivers as can the use of lower legal blood alcohol limits (0,5 g/l and lower). It has also been proposed to apply alcohol ignition interlock devices not just among offenders, but in the vehicles of all drivers. However this approach has stimulated a debate regarding privacy versus safety. The behaviour and acceptability of these strategies among the general population also requires consideration.

There are general strategies designed to change behaviour and prevent drink driving that involve the use of enforcement, punishment and deterrence. This approach can be strengthened by the use of educational programs and demerit points. However, the presence of addiction and the effects of alcohol can make it more difficult for drivers to voluntarily control their alcohol consumption and separate drinking and driving. This raises the question whether punishment is the best approach to discourage recidivism among this population. It is known that alcohol interlocks are effective, and this effectiveness can be further increased with medical follow up, education and rehabilitation programs, and efforts to change driver attitudes. Yet, it is unclear whether alcohol interlocks should be applied to protect specific types of drivers (e.g, offenders, alcohol dependent drivers and professional drivers) or all drivers generally.

To date, alcohol interlock programs have or are developing in nine Member states and surveys show that 34% of EU drivers were in favor of alcohol interlocks in 2003. Studies have shown positive cost-benefits of these devices and there have been positive outcomes from field trials in Sweden, Finland, France and the United Kingdom.

There are a number of questions that must be addressed regarding the proper application of interlocks, including:

- Should interlocks be applied as a punishment based on the legal system, or should it be used to monitor offender behaviour?
- Should just the device be installed on its own, or should the device be combined with a program and monitoring strategies?
- Should rehabilitation strategies and monitoring be combined with the device to support the driver and address the drinking problem?
- Which populations of drivers should be the target of these programs (e.g., heavy drinkers and recidivists, alcohol addicted drivers, first offenders, social drinkers, young drivers)?

In sum, alcohol interlock programs can vary considerably in terms of length, intensity and the use of additional controls.

There are also a number of alcohol biomarkers that can be used for different purposes ranging from the screening for alcohol addiction, to the control of reasonable or complete abstinence, to control of drinking,

and to achieve control for the purposes of an alcohol interlock program. Several biomarkers that are useful in each of these areas have been identified.

However there are some important caveats to keep in mind when considering the application of biomarkers, including:

- A medical examination is needed for a biomarker strategy.
- The results must be evaluated by a medical professional because licensing administrators, justice professionals and even laboratory staff are not educated to interpret results.
- A biomarker battery of tests is a tool; it is not a fine or a punishment.
- The cost of the medical evaluation requires consideration.

Biomarkers can be a useful tool when combined with alcohol interlock programs. Key features of these programs include the interpretation of data from the interlock device, supervision and compliance monitoring, in-home breath testing equipment and the use of biomarkers at the beginning of the program and on request of monitors. When considering the use of biomarkers and other measures to control drink drivers, it is important to determine whether the primary goal is to control drink driving or to control alcohol consumption.

## Transdermal Alcohol Testing

**Dr. Ward Vanlaar, TIRF, Canada**

In the USA, almost all impaired driving offenders are ordered, as a condition of probation, to refrain from consuming alcohol. However, monitoring, in the form of existing blood, breath and urine protocols, is used infrequently and inconsistently. As a result, sobriety among offenders has been notoriously difficult to enforce. To address this problem, in the past decade, continuous alcohol testing technology has emerged – transdermal alcohol testing.

This technology that is available in the form of an ankle bracelet is a passive, non-invasive test that permits the continuous monitoring of offenders for alcohol consumption 24/7 at any location, and is currently being used widely in the USA (46 states in 2009). The Secure, Continuous, Remote, Alcohol Monitoring (SCRAM) device is the most widely available device currently on the market and is produced by Alcohol Monitoring Systems based in Littleton, Colorado (see http://www.alcoholmonitoring.com). Since 2010, several other vendors have entered the market, including the Transdermal Alcohol Detector manufactured and distributed by BI (see http://bi.com/tad).

Generally, these anklets measure alcohol that is excreted through the skin in the form of constant, insensible perspiration. Some vendors have also included a home arrest monitoring component to the device. To date, SCRAM is the leading commercially available system as this device was first on the market and is the most recognized device among criminal justice professionals in the United States. However, it is important to note that there are differences across devices and across vendors. For the purposes of this

presentation, the SCRAM will be used as an exemplar because the most research has been conducted on this device in particular.

There are three components to the SCRAM device:

- The SCRAM bracelet contains an electro-chemical sensor that samples air above offender's skin every 30 minutes. This is the same sensor commonly used in other breath testing devices (preliminary breath testing devices and passive alcohol sensors). It contains a flash memory chip to store information and monitor various functions and transfers data to the modem via radio frequency signals at scheduled times.
- The modem is connected to a regular phone line at work or home. The offender must be within a couple of meters at a scheduled time in order for the data to be transferred from the bracelet and uploaded to a centralized database (SCRAMNET). In addition, the modem will download monitoring and reporting schedules to the bracelet.
- SCRAMNET is a secure data base where encrypted data from the bracelets are stored and analyzed by the manufacturer. The data are reviewed by trained and certified staff and events are confirmed through interpretation and analysis by an examining an alcohol curve based on absorption and burn off measures. Confirmed events result in a notification to the appropriate agency. Authorized users are able to login from any location using a standard internet browser to access customized reports about offenders and caseload.

These devices often utilize an electrochemical sensor and, as such, only register positive readings when exposed to ethyl alcohol. Although some foods and medical conditions produce endogenous alcohol, this is generally not in sufficient quantities to result in a positive reading. It is important to note that certain substances also contain alcohol (e.g., perfume, hand sanitizer), and, therefore, can act as an interferant and will produce a positive test result. However these positive results can generally be distinguished from true positives based on differences in absorption/ elimination rates. It is worth noting that more research into this area is still needed.

These devices also frequently posses anti-circumvention systems that include a tamper clip or strap (to inhibit removal without detection), an obstruction sensor to ensure the device is against the skin, a temperature sensor to ensure the device is being worn by a person, and communication monitoring to ensure the device is uploading data to the modem and the secure database.

Research dating back to 1936 is available to demonstrate that measuring alcohol in perspiration is possible. Ingested alcohol diffuses through water in the body and can be measured in blood, breath, urine, and perspiration. Only about 1% of ingested alcohol crosses the skin as sensible or insensible perspiration, however this is sufficient to obtain a measure of alcohol content. Research has demonstrated that alcohol in sweat increases with mean concentration of alcohol in the blood, although there is a recognized delay in absorption and elimination of alcohol in sweat. This means that simultaneous blood and transdermal readings will not produce comparable results at a specific point in time. Of importance, the dynamics of transdermal testing can vary between subjects and within subjects. To summarize, after 70 years and 22 peer-reviewed studies, it has been clearly established that ingested alcohol can be validly measured in

perspiration and that transdermal testing can qualitatively discriminate between consumption of no, small, moderate, or large amounts of alcohol.

There have been a few studies that have examined the effectiveness of these devices, and to date only two types of bracelets have been tested. The first device, WrisTAS, has shown promising results but is not commercially available. The second device, SCRAM, has been evaluated in five main studies (University of Colorado, Michigan Department of Corrections, Alaska Justice Statistical Center, the National Highway Traffic Safety Administration, and the National Center for State Courts). Overall, these studies have concluded that:

- SCRAM is a valid and reliable way of testing for alcohol use.
- The technology is not designed to provide a precise BAC at a specific point in time.
- Officers and offenders in these studies generally approve of the technology and believe it has merit.
- More large-scale quantitative surveys and case-control studies are needed to corroborate findings and answer questions regarding other issues.

Currently, these devices have been applied to several different offender populations, including:

- first and repeat impaired driving offenders;
- domestic violence offenders where alcohol is a contributing factor;
- illicit drug offenders being actively tested;
- underage drinking offenders with reckless behavior;
- adults with substance abuse issues who supervise minors;
- licensed, practicing professionals with substance abuse issues.

These programs rely on an offender-pay arrangement. The installation fee for SCRAM averages $50-100 (USD), along with a daily monitoring fee of $10-12. By comparison, the installation fee for electronic monitoring devices in the United States combined with alcohol testing is $150 (USD) with a daily monitoring fee of $10-15; incarceration costs an average of $62 (USD) per day.

In conclusion, alcohol monitoring technologies can enhance the quality of supervision if properly implemented. In addition, these technologies can assist agencies in allocating finite resources. However, the use of these technologies also poses challenges. As such, a well-designed program requires planning and input from staff, and evaluations can contribute to the development of evidence-based practices.

TIRF produced a series of primers on the devices that contain additional information and are targeted towards criminal justice professionals. These primers can be accessed at: http://www.tirf.ca/publications.

## Solutions from Poland

**Pawel Widel, Polish Road Safety Partnership, Poland**

The Road Safety Partnership in Poland involved a broad range of partners representing government, police, industry and community organizations. As a first step, a situation assessment was conducted that involved the use of random breath testing, driver surveys and an analysis of crash data. Data from these sources were subsequently used to inform the content of a targeted initiative to reduce drinking and driving. This information formed the basis for the development of an action plan that was drafted using a workshop approach involving city government, police, city councils and community groups. The action plan included the following main activities: social marketing campaigns, community programs, and increased enforcement. The results of these activities were also monitored through random breath testing, driver surveys and regular working group meetings.

There were several goals of these activities. Of importance, the elimination of road crashes due to drinking driving in the City of Olsztyn by 2020 was a primary goal. To help achieve this, immediate activities focused on drivers with the highest risk; young males aged 18-24. Another goal was to increase pro-active involvement of community stakeholders to help prevent crashes.

The publicity campaign was developed using a media and event plan using the most appropriate methods to reach the target group. It was determined that at a minimum the campaign should be used once annually during the highest risk time for drink driving crashes. Materials for the campaign were developed by the National Road Safety Council (NRSC) and the Polish Spirits Association. The campaign was developed and financed by city government, Michelin Poland, Road Safety Partnership, Polish Spirits Association and NRSC.

Community programs consisted of designated driver programs, responsible hospitality training programs, a drink driving curriculum for city and district schools and also driving schools. Enforcement strategies were delivered by establishing a dedicated drink driving enforcement unit and strengthening operational controls. In addition, efforts were made to enhance cooperation between police, courts and prosecutors, and to establish an information sharing system across agencies. Enforcement was also supported by cooperation with media, community groups, and publicity campaigns. Finally, the coordination of these activities was facilitated by a multi-sector working group, the efforts of key agencies, and support from the Mayor's Office.

Results of this initiative on a local level were very positive. There was a 22% decrease in drink driving crashes and an increase of 185% in the use of breath tests by police. The city and surrounding region also built a strong coalition of road safety stakeholders, leading to this area reporting an overall decrease of road crash victims compared to other areas in the country.

This initiative has also received recognition in Europe as it was highlighted at the European Road Safety Day in Paris in 2008 as one of the best practices from the EU. The program won 3rd prize at the Prix Européen de la Sécurité Routière de la Fondation Norato in 2009. The program raised interest internationally and

inspired a visit to Poland and to Olsztyn in 2010 by the Vietnamese National Road Safety Council, who wished to learn from the successful approach. Also, the Don't Drink and Drive Program inspired a group of Members of Parliament to create a Parliamentary Road Safety Group consisting of 21 Members. The Global Road Safety Partnership also has an outside expert with direct access to this group.

## Drinking Driving: Time to Step Up Efforts

**Antonio Avenoso, European Transport Safety Council (ETSC)**

The European Transport Safety Council (ETSC) is a non-governmental organisation that promotes an independent science-based approach to road safety. It is supported in their work by 45 member organisations across Europe, and is funded by members, the European Commission, national governments, and corporate sponsors. It is a forum to bring together practitioners, researchers, policy-makers and parliamentarians from across the EU.

There are two alcohol related initiatives that are delivered by the ETSC. The first is the Drink-driving Policy Network which is supported by DIAGEO. This program targets young and novice drivers and is designed to improve national policies for the prevention of drink driving and also to identify and promote best practices. The second initiative is the Safe & Sober Campaign that is supported by the VOLVO Group and Alcohol Countermeasure Systems. The purpose of this campaign is to improve local, regional and national policies for the prevention of drink driving in commercial transport vehicles. It involves a range of strategies including education, enforcement and engineering and also promotes the value of alcohol interlocks.

Although the dangers linked to drink driving are fairly well understood, and much progress has been made in educating drivers about these dangers, the phenomenon is still widespread in the EU. It is estimated that up to 2% of drivers have an illegal BAC and up to 10,000 road deaths annually (25%) are the result of alcohol involvement. Drink driving also accounts for approximately 35% of driver deaths and alcohol-related crashes are the leading cause of death among drivers aged 16-24.

Surveys to gauge the perceptions of drivers regarding various road safety problems are informative. A majority of respondents indicate that drink driving, speeding, hand-held phone use while driving and non-use of seatbelts are a major road safety problem. Similarly, a vast majority of people believe that governments should do more to prevent drink driving on the roads.

The European Commission has endeavored to address the drink driving issue through recommendations related to BAC limits and to enforcement of these laws. However, to date there is no agreement on a common BAC limit and setting such a limit is perceived to be a matter of national sovereignty and competency by Member states. The good news is that:

- an increasing number of EU countries are lowering their BAC limits to be in line with EU recommendations on maximum legal BAC limits (2001)
- 17 EU countries apply a lower BAC limit for novice drivers (0.0‰ – 0.2‰)
- 14 EU countries apply a lower BAC limit for professional drivers (0.0‰ to 0.2‰)

Unfortunately, when the public is asked about BAC limits in their respective countries, on average only 27% of respondents knew the legal BAC limit, 36% gave a wrong answer and 37% did not know the correct answer.

Greater enforcement of BAC limits is also a critical need. Survey results show that:

- Being checked for drink driving is the exception: a maximum of 1 in 5 drivers are checked in one year.
- SARTRE 3 survey results from 2004 revealed that only 26% of drivers in the EU were checked (2001-2004).
- Many drivers under the influence are hard core drinkers.

Alcolocks together with traditional enforcement methods (for detection) can help addressing hard core drinkers in particular. Currently, these devices are being utilized as part of rehabilitation programmes, as a quality assurance mechanism in commercial transport, and in school buses. To date there have been high levels of acceptance among those who have used these devices. Countries that have either legislation, a pilot program, or a full program include Austria, Finland, Sweden, The Netherlands, France, Belgium, Slovenia and Denmark.

Of interest, the European Commission Road Safety Policy Orientations (2011-2020) in relation to alcohol interlocks state that:

> *"The Commission will examine to what extent measures are appropriate for making the installation of alcohol interlock devices in vehicles compulsory, for example with respect to professional transport (e.g. school buses)"*

And, the Council's conclusions on road safety reported that:

> *"New technical solutions of which the effect is proven can contribute to make it possible to deal with problems like speeding and impaired driving (such as driving under the influence of alcohol, drugs and fatigue)"*

Finally, the draft European Parliament Report on road safety, Article 21, recommends that *"as a reintegration measure, the fitting of alcolocks to the vehicles of road users who are known to drink and drive"* and, Article 29, recommends that *"the fitting of alcolocks to all commercial passenger and goods transport vehicles should be made compulsory"*.

It is hopeful that these recommendations will also begin to translate into policy and practice changes in all Member States in the EU.

For more information about the activities of the ETSC, please visit: www.etsc.eu.

# CONCLUSION

Based on diverse experiences from speakers it appears that there are three distinct trends that are simultaneously emerging in the drink driving field – a demand for knowledge transfer, the creation of agency partnerships to achieve system integration, and a drive for technological innovation. The main challenge for the future is to find ways to effectively leverage the transformations in each of these areas and unite them towards the common goal of reducing deaths and injuries due to drink driving.

### Knowledge transfer

It has been recognized for decades that research and evaluation are the linchpins to achieve the improvements that strengthen road safety strategies. At no other time has the desire to realize these goals been so pronounced. The recession and increased demand for accountability have made it imperative that we know if the dollars spent on road safety are having the intended effects. Therefore, it is crucial to find a strategic approach, based upon evidence-based policies and programs, to inform the allocation of limited resources.

For this reason, the gap between research and practice must be closed and this can be achieved through knowledge transfer initiatives between researchers and those professionals on the frontlines of road safety. Good quality research is not conducted in a vacuum, and it cannot be underscored enough that knowledge transfer is a two-way street and must be reciprocal in nature. Researchers know much about the benefits and reductions in fatalities and injuries that can be produced by proven interventions, but they sometimes know less about the contexts and realities in which these programs and policies are implemented. As a result, research may unintentionally overlook the fact that the development of programs and policies and evaluations has to take account of the environment in which they are applied. This environment is often constrained by policies and practices that are embedded in larger systems of transportation, justice and health. In other words, the development of drunk driving programs and policies has to acknowledge these constraints if they are ever going to be successful.

### Agency partnerships and system integration

The current economic climate has also encouraged agencies to collaborate and share resources to achieve common goals. This is a time when there is a strong push towards improving data collection and management to inform decision-making at all levels.

Legacy systems to collect data are increasingly being replaced by the building of new structures based upon common architecture and terminologies which greatly facilitate information-sharing. This has

further illustrated the need to enhance agency communication and opened doors to collaboration across independent systems that historically operated as silos.

There is a growing recognition that the integration of systems can facilitate the development of a continuum of strategies that are necessary to adequately respond to the differing levels of risks and needs that are present among drink drivers. Adopting such an integrated approach can enable working towards long-term risk reductions by supporting interventions that can truly adapt to offender risk as it changes and encourage and reinforce much needed behaviour change among this population.

### Technological innovation

Finally, today there is an unprecedented level of technological growth and advancement with regard to safe driving technologies designed to influence, monitor and even manage driver behaviour. Sophisticated devices exist that possess special design features and are directly applied to the supervision of drink drivers. These advances will continue. But, in order to leverage their full potential, researchers, governments and road safety professionals must increase knowledge and understanding to effectively incorporate these devices into a continuum of strategies that are appropriate to offender risk and that leverage the strengths of our systems of justice, health and transportation.

Technologies offer a unique opportunity to both punish unacceptable behaviour and alternatively reinforce and encourage compliant behaviour among drink drivers. Research has demonstrated that both approaches are equally important. For more than a century there has been a struggle to achieve a balance between punishment/sanctioning on one hand and rehabilitation on the other when managing offenders. As such, a strictly punitive approach to utilizing these technologies undermines the full potential of what these technologies can realistically achieve.

To summarize, knowledge, innovation, and the desire to collaborate are at an all-time high in this field today. Impaired driving has always been a cross-disciplinary issue, touching the fields of transportation, justice, safety, health, education, and technology. But this has often contributed to a fragmented approach to the issue. The field has now reached a critical point where different disciplines are coming together to collaborate, to share knowledge, to exchange ideas, and to really draw upon advances in other fields. At the same time, there is an increasing level of agency cooperation with an eye towards system integration, and technological innovation. By collectively harnessing these trends and capitalizing on the linkages between them, it is possible to help to deliver the declines in drink driving fatalities and injuries that governments, researchers, road safety professionals, and industry all seek to achieve.

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