



**CANADA'S IMPAIRED DRIVING
FRAMEWORK: THE WAY FORWARD:
PROCEEDINGS OF THE
DRINKING AND DRIVING
SYMPOSIUM**



The knowledge source for safe driving

CANADA'S IMPAIRED DRIVING FRAMEWORK: THE WAY FORWARD

Proceedings of the Drinking and Driving Symposium

**MAY 17, 2012
OTTAWA, ONTARIO**

Robyn D. Robertson / Dr. Ward G.M. Vanlaar
Traffic Injury Research Foundation

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 research 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.

Traffic Injury Research Foundation
171 Nepean St. Suite 200
Ottawa, ON K2P 0B4
Ph: (613)238-5235
Fax: (613)238-5292
Email: tirf@tirf.ca
www.tirf.ca

February 2013
Traffic Injury Research Foundation
Copyright © 2012
ISBN: 978-1-926857-36-7

ACKNOWLEDGMENTS

The Drinking and Driving Symposium was made possible with financial support of the Brewers Association of Canada through their Centre for Responsible Drinking and their continued sponsorship of Change the Conversation (www.changetheconversation.ca), Canada's national education program on impaired driving developed by the Traffic Injury Research Foundation in partnership with arrive alive DRIVE SOBER®.

Established in 1943, the Brewers Association of Canada is a voluntary association of 23 brewers from coast to coast that represents 97% of the beer brewed in Canada.

The Brewers Association of Canada works with its members, governments, stakeholders and the public to progressively improve the marketplace for beer, while encouraging the responsible use of beer and the protection of the environment.

Brewers Association
of Canada



L'Association des
brasseurs du Canada

Changetheconversation



TIRF gratefully acknowledges the many speakers who participated in this event and shared their knowledge and expertise with attendees.

Sheilagh Stewart
Crown Counsel
Ontario Ministry of the Attorney General

Dr. Kwei Quaye
Assistant Vice President, Traffic Safety and Driver Services,
Saskatchewan Government Insurance (SGI)

Jim Fell
Research Scientist
Pacific Institute for Research and Evaluation (PIRE)

Anne Leonard
Executive Director
arrive alive DRIVE SOBER

Matt Evans
Executive Director

Ontario Students Against Impaired Driving (OSAID)

Bill Grodzinski
Chief Superintendent (Retired), Highway Safety Division,
Ontario Provincial Police (OPP)

Lisa Thompson
Senior Marketing Planner
Ministry of Transportation, Ontario

Dr. Ward Vanlaar
Vice President, Research
Traffic Injury Research Foundation (TIRF)

Wendy Schilling
Program Manager, Alberta Impaired Driving Programs
Alberta Motor Association

Dr. Louise Nadeau
Professor, Psychology Faculty
University of Montreal

Dr. Brian Jonah
Senior Researcher
Canadian Council of Motor Transport Administrators (CCMTA)

Mr. John Sleeman,
Chair, Brewers Association of Canada

TIRF also would like to acknowledge the more than 70 attendees from 9 jurisdictions who attended and participated in discussions during the Symposium. Participants represented Federal and provincial/territorial governments, research institutes and universities, impaired driving programs, law enforcement, the alcohol industry, health and treatment professionals, road safety advocacy organizations, insurance companies and the media. We thank them for sharing their insights, perspectives and experiences to increase understanding of the context in which impaired driving strategies are delivered and the opportunities that exist to move forward to enhance Canada's impaired driving framework.

TABLE OF CONTENTS

ACKNOWLEDGMENTSI

FOREWORDV

1. INTRODUCTION 1

2. CANADA’S IMPAIRED DRIVING FRAMEWORK..... 3

 2.1 Canada’s National Road Safety Strategy 3

 2.2 Criminal and Administrative Laws 4

 2.3 Police Enforcement..... 5

 2.4 Public Education..... 6

 2.5 Administrative Licence Suspension and Revocation 7

 2.6 Alcohol Monitoring Technologies..... 7

 2.7 Remedial Impaired Driving Programs 10

 2.8 Treatment Interventions..... 11

3. RECOMMENDATIONS 15

 3.1 Recommendation 1: Increase the level of impaired driving enforcement. 15

 3.2 Recommendation 2: Expand the use of educational initiatives..... 18

 3.3 Recommendation 3: Achieve a balance between administrative and criminal approaches. 21

 3.4 Recommendation 4: Use technologies to create opportunities to respond to difference levels of risk and achieve a better balance between punishment and rehabilitation..... 24

 3.5 Recommendation 5: Conduct research to guide the development of more holistic approaches to offender management. Research can guide the development of more holistic approaches to offender management..... 26

 3.6 Recommendation 6: Leadership from governments essential..... 27

 3.7 Recommendation 7: Implement low-cost, effective and achievable strategies. 28

 3.8 Recommendation 8: Adopt a more holistic approach to increase understanding of impaired driving behaviour and ways to prevent it..... 28

4. CONCLUSIONS..... 32

5. REFERENCES..... 33

FOREWORD

I am pleased to welcome all of you to the Drinking & Driving Symposium, hosted by the Centre for Responsible Drinking. This initiative is borne out of the collaboration of the Brewers Association of Canada and the Traffic Injury Research Foundation.

I am happy to see many familiar faces this morning, people with whom I have had the opportunity to work with in the fight against drinking and driving over the years. I also see a number of new faces, who I am sure bring a variety of new and innovative ideas to address this issue.

Over the past number of years, great efforts have been made to reduce incidents of drinking and driving. And while the efforts by all attendees, governments, non-governmental organizations, law enforcement, interventionists, my colleagues in the brewing industry and others, have helped change perceptions and attitudes about drunk driving, there remains a great deal still to be done.

As an industry, brewers have always been very involved in the fight against drunk driving. We are proud of our product, but we also recognize that when it is abused or misused, it can factor in bad decisions and potentially terrible consequences. Given this, Canadians have seen numerous campaigns, at the point of sale, on our packaging, over the air, on radio, TV, internet, or billboards from the Brewers Association, from Sleeman and from many Canadian brewing companies. It has always been and remains a key part of our industry's responsible consumption messaging. This issue concerns all Canadians, and we will continue to work with all of you.

At Sleeman, we have been involved for years in the fight against drunk driving. More specifically, some of our campaigns have also addressed the issue of drinking while boating (a campaign titled 'Water on the water, beer on the pier'), and other campaigns have targeted a younger generation, who are key to changing long-term attitudes towards drinking and driving.

Events like the one we host today are necessary, not only to take the measure of where we are as a society in addressing this problem, but also to share best practices, to examine successes and failures in other jurisdictions and to look at the next steps to build on those successes of the past.

Today, we will hear about the current drunk driving policy framework in Canada, about the various strategies employed by decision makers, about enforcement strategies and techniques and treatment interventions. Of particular note, you will hear the Minister of Justice's Parliamentary Secretary detail the federal government's most recent initiatives. Finally, critically important will be the afternoon session on future steps.

I would like to thank Robyn Robertson and her team at the Traffic Injury Research Foundation. The Foundation does great work in measuring progress in reducing drunk driving, working with partners to develop policies to address the most pressing needs, and to assess the impact of new technologies on this issue.

I would like to encourage everyone to participate freely and to join in the conversation. This is an open forum and everybody's ideas and thoughts are very welcome.

I hope you enjoy the day. I thank you for your participation. Welcome.

John Sleeman
Chairman, Brewers Association of Canada
Founder and Chair of Sleeman Breweries Ltd.

1. INTRODUCTION

Drinking and driving has been a primary road safety concern among Canadians for more than three decades. During this time, there has been considerable progress in reducing the number of fatalities and injuries resulting from this behaviour as jurisdictions have worked to develop a comprehensive approach to address the problem. Since the 1980s, education and awareness programs have proliferated, enhancements have strengthened criminal and administrative laws, and enforcement activities have become prominent and commonplace.

It must be underscored that a continued focus on this issue is warranted. The progress achieved since the late 1990s has been nominal and the number of persons killed and injured in crashes involving drinking drivers remains high. In 2010, (the most recent year for which data are available), 32.3% of fatally injured drivers in Canada had a blood or breath alcohol concentration (BAC) in excess of the illegal limit of .08 (Mayhew et al. 2011). In addition, in 2009, 714 people were killed in Canada in road crashes that involved a driver who had been drinking and approximately 2,913 drivers (excluding Newfoundland and Labrador) were involved in alcohol-related serious injury crashes in Canada (Mayhew et al. 2011)¹.

The good news is that efforts to address this problem have evolved considerably in the past three decades as our understanding of the problem has grown. Today, there is growing awareness among researchers, policymakers and practitioners of the limitations of a solely punitive approach to the problem, although there is less awareness of these limitations among the public and a demand for the “get tough” philosophy still dominates much of the application of justice.

More recently, increasing recognition of the importance and benefits of tools such as risk assessment and treatment as alternatives to complement punitive measures has emerged. Research shows that properly-designed strategies and tools designed to match offenders’ risks and needs with appropriate programs and interventions have beneficial effects (Taxman 2007), including reductions in repeat offences as well as reductions in substance misuse that translate into long-term risk reduction and public safety.

Hence it is timely to take stock of Canada’s existing framework to reduce drinking and driving and examine what opportunities exist to further strengthen the continuum of programs and policies and to make the best use of available resources to achieve greater declines in the magnitude of the problem.

To this end, the Brewers Association of Canada, through its Centre for Responsible Drinking, partnered with the Traffic Injury Research Foundation (TIRF) to organize a drinking and driving symposium in Ottawa, Canada on May 17th, 2012. The objective of this one-day event was to review the continuum of different strategies that have been put in place to manage impaired

¹ More information about the alcohol-crash problem in Canada can be found in the Alcohol-Crash Report (www.tirf.ca/publications/publications_show.php?pub_id=269) prepared by TIRF under funding from CCMTA and Transport Canada and also the Injury in Review 2011: Spotlight on Road and Transport Safety (www.tirf.ca/publications/publications_show.php?pub_id=283).

drivers in Canada, to explore the strengths and challenges associated with each of these strategies, to identify lessons learned, and to gauge what opportunities exist to further enhance Canada's impaired driving framework moving forward. Information about this event was sent to a wide range of agencies with a vested interest in impaired driving issues and all agencies were welcome to attend. More than 70 attendees from nine jurisdictions representing a broad cross-section of agencies participated in this event.

These proceedings were developed based on the presentations and discussions that took place during the Symposium and are structured to highlight many of the key issues that were raised. In addition, relevant research surrounding many of these issues has been included where appropriate to better inform the reader. These proceedings do not represent the views of the sponsors, individual presenters, or any attendees.

Copies of the individual presentations delivered at the Symposium are also available online and can be viewed at www.responsibleddrinking.ca/index_en.php?p=35.

2. CANADA'S IMPAIRED DRIVING FRAMEWORK

Canada has put in place a continuum of laws, policies and programs designed to target the many different types of drinking and impaired drivers that exist and the varying levels of risk that they pose². Drivers who consume alcohol before driving constitute a minority of Canadian drivers (i.e., between 15% and 20%). And among these drivers who do consume alcohol before getting behind the wheel, most have a BAC below the illegal limit of .08. To illustrate, according to a 2011 national public opinion poll, between 5% and 6% of Canadian drivers admitted to driving when they thought they were over the illegal limit in the past year, and this number has been consistent for the past few years (Vanlaar et al. 2012).

2.1 Canada's National Road Safety Strategy

Canada has had a broader national road safety plan since 1996 which has included a focus on impaired driving among several other road safety issues. The most recent plan (Road Safety Vision 2010) was recently concluded and a new, five-year plan (Canada's Road Safety Strategy 2015) was officially launched in May 2011. The development of this plan was a collaborative effort that involved the Canadian Council of Motor Transport Administrators' (CCMTA) jurisdictional members, representatives from the engineering and infrastructure community, the enforcement community, and industry and non-governmental organizations.

The vision of the plan is to enable Canada to have the safest roads in the world, and the plan itself was created as an overarching framework that provides direction for the development of individual jurisdictional plans. The four objectives of the plan are:

- > enhanced enforcement;
- > communication, cooperation and collaboration;
- > improved data in support of research and evaluation; and,
- > public awareness and commitment.

Of importance, the plan is holistic in nature and comprises a best practice framework. It is not intended to be prescriptive, but to instead provide guidance to jurisdictions that are now in the process of developing individual plans. The plan itself is designed to be fluid and flexible, and contains no hard targets in terms of reductions in road deaths and injuries. It does identify a number of key risk groups including young drivers, high-risk drivers, vulnerable road users, medically-at-risk drivers, motor carriers and the general population. It also specifies several key risk

² For drivers with low-BACs, the risk of being involved in a serious crash is relatively low, compared to the average nondrinking driver. Such risk also varies as a function of age and gender (see for example, Zador et al. 2000) but BACs of .03 are associated with about a two- to three-fold increase in risk; BACs of .05 with between a 6 and 17 time increase in risk. Research shows that drivers with a BAC at .15 are about 150 times more likely to have a fatal crash than the average non-drinking driver. At BACs of .20 or higher this risk increases to some 460 times (Simpson et al. 1996).

factors that are worthy of continued attention including impaired driving, speeding, aggressive driving, non-use of safety restraints such as seatbelts and the road environment. Key strategies to address these issues that are recommended are comprehensive and include legislation/regulation, enforcement, education, communication, technologies, infrastructure improvements and linkages across disciplines.

CCMTA is the designated custodian of Canada's new road safety strategy which is designed as a living document such that efforts to identify new or emerging road safety best and promising practices will be continuously pursued. Some of the tools that CCMTA will make available to the road safety community include a new website and call to action (Rethink Road Safety) as well as informational materials and a jurisdictional planning template. It will also provide a number of framework documents to share important research on priority issues.

More specifically, Canada has also had a national Strategy to Reduce Impaired Driving (STRID) which was first developed in 1990 and has since formed a component of Canada's subsequent, larger road safety strategies. In this context, impaired driving is more broadly defined to include fatigue and distraction in addition to alcohol and other drugs. There are several program elements including education and awareness, policy and legislation, police enforcement, health promotion and research, and jurisdictions can also still refer to this program when developing their new road safety plans. Of interest, the main target groups of STRID include repeat and high-BAC offenders, new/young drivers, social drinkers, first offenders and drivers impaired by drugs.

It is important to recognize that alcohol-positive drivers are a heterogeneous population that includes drivers with low-BACs, moderate-BACs close to the illegal limit, and high-BACs that may be two or even three times the illegal limit. Moreover, these drivers may engage in this behaviour rarely or frequently, may be very young, middle-aged or older, and may be male or female. Each of these drivers can benefit from different types of interventions that reflect the level of risk that they pose. For this reason, Canada has implemented a broad range of programs and policies and these are briefly described below.

2.2 Criminal and Administrative Laws

Similar to many Western countries, Canada has developed a two-tiered system for impaired driving. First, all offenders that have a BAC above the illegal limit of .08 can be prosecuted in a court of law in the criminal justice system under the Criminal Code of Canada. The Federal Government has authority over the implementation of all criminal laws in Canada and these laws are uniform across all 13 provinces and territories. Those offenders who are criminally convicted are subject to a broad range of penalties as part of sentencing that can include fines, a driving prohibition, a term of probation, or treatment services. The severity of the offence determines the types of penalties that are imposed.

Canada also has an administrative system of provincial/territorial driving offences and associated penalties that are part of the driver licensing system and contained in provincial/territorial Highway Safety Acts. Offences and penalties are created by the authority of individual provinces and

territories who have jurisdiction over driver licensing. Both offences and penalties can and do vary across jurisdictions.

Low-BAC laws. Almost all jurisdictions in Canada have low-BAC offences meaning the drivers who have a BAC above .04 or .05 (depending on the jurisdiction) but below the illegal limit of .08 may be charged with a provincial impaired driving offence. These low-BAC offences were first implemented in Canada some 25 years ago and most often result in a short-term licence suspension to ensure impaired drivers are immediately removed from the road. More recently, many jurisdictions have pursued the use of escalating penalties for repeat low-BAC offences as a result of the Strategy to Address Lower BAC Drinking Drivers that was developed by the CCMTA (see www.ccmta.ca/english/committees/rsrp/strid/strid-reports.cfm).

Low-BAC drivers are subject to administrative penalties as a result of their conviction; similarly, many criminally convicted drivers are also subject to administrative penalties resulting from their conviction. Under the administrative system, penalties can include a licence suspension for a specified period of time, an alcohol ignition interlock, remedial impaired driver programs and treatment interventions. Administrative penalties must be completed by all drivers in order for them to regain their driving privileges.

Summary. Canada has two different systems in place to handle drinking drivers and address the different levels of risk that drivers may pose according to the amount of alcohol they have consumed. These systems are designed to be complementary and each one operates in a distinct environment that has different objectives, different parameters, and different strengths and limitations.

2.3 Police Enforcement

The enforcement of impaired driving laws continues to be a priority among police agencies across Canada. Despite the progress that has been made, impaired driving is a leading cause of criminal death in Canada and alcohol is a factor in more than 30% of fatal crashes on our roads.

Police agencies use a variety of enforcement strategies in addition to routine patrols. Each of these has different objectives and is described below.

Sobriety checkpoints. In Canada, these checkpoints are frequently referred to as Reducing Impaired Driving Everywhere or RIDE programs. A sobriety checkpoint typically involves police officers stopping all passing vehicles or a systematic selection of vehicles (e.g., every third vehicle) to evaluate the driver's level of impairment. Officers approach the vehicle and identify themselves to the driver, explain the purpose of the stop, and ask the driver a series of questions to gauge whether or not they have consumed alcohol. Those drivers who do not indicate that they have been drinking and do not show physical signs of impairment are able to continue on their way. Drivers that show signs of impairment are detained in a safe holding area where they are asked additional questions and may be asked to perform standardized field sobriety tests and/or a breath test. Based on the results of these tests, drivers will either be released or arrested for impaired driving.

Sobriety checkpoints have a powerful general deterrent effect across all drivers and arrests are not the main or sole objective of this tool. Checkpoints counter drinking drivers' beliefs that they can drive well enough to avoid attracting attention because with sobriety checkpoints drivers can be stopped regardless of their behaviour (Ross 1992). This strategy targets all potential drunk drivers and research shows that sobriety checkpoints are one of the most effective approaches to deterring impaired driving among members of the general public (Lacey et al. 1999; Shults et al. 2001; Stuster and Blowers 1995). Studies show they can reduce the number of alcohol-related crashes by up to 20% (Elder et al. 2002; Shults et al. 2001). Checkpoints are most effective when they are highly publicized, highly visible, and frequently used (Fell et al. 2004)³.

Saturation patrols and targeted enforcement efforts. Police agencies often utilize saturation patrols and other targeted enforcement efforts that combine a strong police presence (usually in identified problem areas) with intensive enforcement. To illustrate, several officers may patrol a neighbourhood or stretch of roadway where alcohol-related crashes are more common, or impaired drivers are often detected, and engage in a large number of traffic stops to increase the likelihood of detection of these drivers. These initiatives are typically fixed in duration and are increasingly determined based upon an analysis of police data. This is particularly common among police agencies in Ontario, Alberta, and other jurisdictions in Canada.

Of concern, it is much more challenging to consistently employ these approaches in rural areas of Canada because of the limited availability of police officers who are required to patrol large geographical areas and respond to a multitude of calls for service. Yet, the importance of effective strategies to enforce impaired driving laws in rural jurisdictions is paramount as a significant portion of deaths and injuries from alcohol-impaired road crashes occur in these areas.

2.4 Public Education

There has been a long history in Canada of education campaigns to raise awareness among all Canadians of the risks associated with drinking and driving. And, these programs have evolved in terms of content and messaging as the nature of the problem and our understanding of it has changed during the past three decades.

Research examining campaigns has served to increase knowledge about effectiveness. Generally speaking, education campaigns should have a clear goal and incorporate a variety of mediums to ensure messages reach the targeted audience. They should address public attitudes, myths, misconceptions, false beliefs with facts, and use consistent, simple, personal, memorable messages that emphasize benefits. The credibility of campaigns is essential and the involvement of communities, parents and peers in these efforts are important. Some campaigns have benefited tremendously from the use of spokespersons representing different populations (e.g., police, celebrities, business leaders, driver clubs). Campaigns should also be monitored so that messages and content can be refreshed and re-focused as appropriate.

³ For more information about research and implementation issues associated with sobriety checkpoints please visit www.tirf.ca/publications/publications_show.php?pub_id=265.

Education campaigns have been developed and delivered by governments, the insurance industry, the alcohol industry, driver associations and road safety advocates. In Ontario, two of the largest and most-recognized grassroots organizations have developed and delivered education campaigns for more than two decades; one of these is targeted towards all members of the public (arrive alive Drive Sober) whereas the other is targeted specifically towards youth (Ontario Students Against Impaired Driving; OSAID). Of interest, these campaigns have successfully developed a wide range of collaborative partnerships, strived to ensure messages were evidence-based, credible and relevant to their audience, and adopted social norming and positive messaging approaches. To learn more about some of the many available education programs see www.arrivealive.org, www.osaid.org, and www.ontario.ca/transportation.

2.5 Administrative Licence Suspension and Revocation

More than 25 years of research has examined general and specific deterrent effects; and the short- and long-term effects of these tools on driver behaviour. All Canadian jurisdictions have implemented ALS/ALR for impaired driving offences and these tools have been proven to be effective with first and repeat offenders.

Research. As evidence of this, studies of ALS/ALR laws show that crashes are reduced by an average of 13%. A TIRF study that evaluated general and specific deterrent effects of ALS and impoundment in Manitoba revealed that the combined sanctions reduced overall drinking-driving fatalities by 12%, night-time single vehicle crashes by 26%, and repeat impaired driving offences within 4 years by 44% (Beirness et al. 1997). Similarly, a study by Voas et al. (1999) examined effects of ALS on repeat impaired driving offender recidivism in Ohio. The results showed that the group convicted prior to the ALS law had a one year recidivism rate of 19%; the post-ALS group recidivism rate was about 5%. However, the study also noted that other legal changes contributed to these effects.

Challenges. The main problem associated with ALS/ALR is that while some drivers will comply with ALS/ALR laws, many will not. The reality is that impaired drivers who have not held a valid licence for many years, will most likely continue to drive, albeit perhaps less often (McCartt et al. 2002; Griffin and DeLaZerda 2000). It has been shown that perceptions of risk and the presence of consequences influence the effectiveness of these laws. Based on these findings, ALS/ALR is an important part of Canada's framework, but without supporting strategies they are not a complete solution to reduce impaired driving.

2.6 Alcohol Monitoring Technologies

Alcohol monitoring technologies have come of age in the past decade and have increasingly been used to monitor and supervise impaired driving offenders. While the device most often used in Canada is the alcohol ignition interlock, more recently, other technologies have emerged on the market and are available to monitor alcohol use among impaired drivers. These are briefly described below.

Alcohol interlocks. This is a breath testing device that is connected to the starter or other on-board computer system of a vehicle. It prevents convicted drunk drivers from starting their vehicle if their

alcohol breath test result is greater than a pre-set limit (typically 0.02). The device requires the driver to safely pass repeated breath tests while the vehicle is in use to ensure that he/she remains sober while driving. These devices possess a range of anti-circumvention features but will not interfere with a running engine. Devices serve to protect the public while allowing offenders to remain employed, participate in family life, and attend treatment. All provinces in Canada have an alcohol interlock program as of 2012 and almost 30,000 devices are installed.

Alcohol interlocks are associated with substantial and impressive reductions in repeat offences ranging from 35-90% while the device is installed (Voas and Marques 2003; Vezina 2002; Tippetts and Voas 1997; Coben and Larkin 1999). A meta-analysis revealed that interlocks reduce the relative risk of repeat impaired driving offences by an average of 64% while installed (Willis et al. 2005). Several studies have shown that alcohol interlocks are effective in reducing repeat offences among both first and repeat offenders (Tippetts and Voas 1997; Voas et al. 1999; Vezina 2002; Voas and Marques 2003). In particular, a random assignment study in Maryland showed that interlock program participation reduced the risk of committing an alcohol traffic violation within the first year by 65% while the device was installed (Beck et al. 1999). While repeat offences increase over time to pre-interlock rates once the device is removed, those offenders who had an interlock will have an overall lower re-offence rate than those offenders who did not have an interlock (Beirness 2001; Beirness et al. 1998; Coben and Larkin 1999; Marques et al. 2001; Raub et al. 2003; Elder et al. 2011).

To date, there is no uniform approach to delivery across jurisdictions, and some strategies are more developed than others. Also, the sub-optimal implementation of these devices has often contributed to their inconsistent application and low participation rates. This has occurred as a result of limited guidance to support the implementation of these devices although this is now changing (see e.g., TIRF's report entitled *The Implementation of Alcohol Interlock Programs: A Roadmap* available at www.tirf.ca, and TIRF's *Alcohol Interlock Curriculum for Practitioners* available at www.aic.tirf.ca). More research is needed to identify optimal delivery features to achieve the maximum benefits of these devices. Recently, a number of jurisdictions including Ontario, Quebec, and Alberta have undertaken to review and strengthen their programs and such initiatives are encouraged.

Continuous alcohol monitoring (CAM). This technology is designed to monitor alcohol consumption among offenders who use alcohol, including drunk drivers. It does not physically prevent a driver from driving after drinking like an interlock does but it will issue an alert when the offender is drinking and surpasses a minimum threshold (.02). Generally speaking, this technology is an ankle bracelet that continuously monitors and measures alcohol consumption 24 hours a day / seven days a week. The device has a tamper-resistant strap and tests samples of vaporous perspiration (sweat) collected from the air above the skin at regular intervals and can contain a GPS component. Test results are transmitted daily using wireless means to a secure central website for review, and actions are taken in response to tampering or drinking events. CAM technology focuses on the drinking behaviour and allows offenders to participate in family and community life, maintain employment and access treatment services. Some CAM devices are more well-researched and well-

established than others, however, new devices are being released as other vendors enter the market. It is emphasized that not all devices are the same.

Approximately 22 peer-reviewed studies, along with a variety of experimental studies, have established that consumed alcohol can be measured in perspiration through the process of transdermal alcohol testing (Robertson et al. 2006a). A variety of experimental studies have also shown that transdermal alcohol testing is a valid method to determine whether an individual has consumed alcohol. It is designed for use as a screening device to provide an estimate of how much alcohol has been consumed (i.e., none, small, moderate, or large amount).

Transdermal alcohol readings are similar to breath or blood alcohol readings, although simultaneous measures should not be expected to produce similar results at a single point in time. This is due to the delay between the consumption and absorption of alcohol, and the excretion of alcohol after it has been metabolized. The effectiveness and success rates of transdermal alcohol bracelets are promising, and some devices have been evaluated (Bock 2003; McKelvie 2005; Flango and Cheesman 2009; Sakai et al. 2006). However, literature concerning the consistent effectiveness of CAM devices is sparse as it is a relatively new technology. More research is required to confirm initial findings and to examine new vendor products for reliability and validity.

In-home alcohol testing devices. New alcohol monitoring technologies have continued to emerge with the goal of monitoring drinking behaviour and offender compliance with court-ordered abstinence. One of the more recent devices is an in-home alcohol testing device with a picture identification feature. One of the target populations for this device is impaired driving offenders, particularly those who claim to not own a vehicle, often in an effort to avoid the installation of an alcohol interlock device. However, it can also be applied to offenders who require daily monitoring of alcohol consumption. The device contains an alcohol-specific fuel cell sensor that complies with international device standards. It is a one-piece unit that plugs into an electrical outlet; a cellular version of the device is also available. The device permits up to ten customized testing windows per day, it is camera-equipped for positive offender identification and includes anti-circumvention features. This device is particularly useful in a court-setting. While not yet available in Canada, this device is currently used in the United States and is generating interest in many jurisdictions. It provides another alternative to the alcohol interlock device and CAM.

Summary. Technologies are an important impaired driving tool that can be used to create a continuum of supervision as well as facilitate treatment interventions. Such approaches can enable jurisdictions to achieve a better balance between supervision and rehabilitation. However, a caveat to consider with the application of any of these technologies is that their use requires careful planning and coordination to ensure their effective implementation. Historically, limited attention has been devoted to this issue, although in the past few years jurisdictions have turned their attention to strengthening implementation efforts and much is being learned in Canada and the United States. In this regard, Ontario, Alberta and British Columbia have all taken steps to or are in the process of making improvements.

2.7 Remedial Impaired Driving Programs

Jurisdictions generally offer two separate remedial impaired driver programs and both are typically developed with a research foundation that guides program content and structure. Programs are often offered in multiple locations in order to best accommodate all residents of a jurisdiction.

First offenders. The first program type is an alcohol education program designed for first offenders. It is approximately one day in length. This type of program is relatively standard across all jurisdictions and its general focus is to increase awareness among offenders of the effects of alcohol on the body and also the consequences associated with driving after drinking. To some extent it can be argued that this program is designed as a brief intervention.

Repeat offenders. The second program is more intensive and designed for second and subsequent offenders. This latter program includes an assessment component, individual and group counselling sessions, and the development of a case plan. These programs may further examine the stages of change according to the “Stages of Change” (a theoretical model) and tailor services to meet offender needs according to the relevant stage of change. Once the program is completed, staff members may make recommendations to the licencing agency for further treatment depending on the case.

In addition to the formal remedial impaired driver programs offered through the provincial licencing authority (although typically delivered through a separate agency), some jurisdictions also have other private or for-profit programs for offenders that are somewhat comparable. Offenders may elect to enrol in these programs either in lieu of the provincial program or in addition to it as part of a plea agreement or to avoid jail.

Delivery. The method used to deliver these more intensive programs can vary according to jurisdiction. For instance, in some jurisdictions these programs are delivered over a period of two days and they may or may not be residential. Of note, while residential programs have a number of benefits, they can be more challenging to deliver if adequate facilities across a jurisdiction cannot be easily or affordably secured. For this reason, the scheduling of these courses may be more limited and not as many programs may be offered.

In a small number of jurisdictions, the management of offenders with more significant substance use problems can be more individualized. As opposed to participation in a standard two-day program, offenders may be required to meet with a clinician on a one-on-one basis for a more intensive assessment and to develop a case plan that may last several months. As part of the development process, clinicians conduct an interview with the offender, and possibly identify collateral contacts that can provide additional information about the offender and their history. This information is used to inform the development of a treatment plan or framework that includes input from the offender to ensure it is practical and achievable. In some instances, offenders may further be encouraged to involve family members in this process.

Once the development of the plan is completed, offenders may meet with the clinician at multiple points over a period of several months and revisions to the plan may be made in consultation with

the clinician. During the last meeting, the clinician will determine if the objectives have been met and then prepare a recommendation regarding next steps that is submitted to the driver licencing authority.

Of interest, in some jurisdictions it is the assessment process that determines what level of program offenders must complete. In a few jurisdictions, the initial assessment may result in a more comprehensive assessment before a determination is reached. Conversely, in other jurisdictions program participation is determined solely by the number of impaired driving offences.

Programs for offenders exiting jail. A few jurisdictions also offer specially designed programs for impaired driving offenders who pass a criminal risk assessment prior to release from jail. For those offenders exiting jail, communication about the availability of remedial impaired driver programs targeted towards them may be less formal and offenders may not be aware of these programs or may only hear about them through word of mouth.

Research. Generally speaking, educational approaches to impaired driver programs have been utilized to target impaired drivers for more than four decades. A number of these programs have been evaluated and several comprehensive reviews have been produced, including a meta-analysis that reveals that these programs can have some effect in terms of reducing recidivism. Generally these studies show an average reduction in recidivism around 10% (NHTSA 1986; Wells-Parker et al. 1995). Among offenders who suffered from some degree of substance misuse problems, those programs that utilized a therapeutic approach are considered to have a greater effect, illustrating the value of treatment as an intervention to encourage rehabilitation and behaviour change (Wanberg et al. 2005).

Summary. Remedial impaired driving programs have evolved in the past two decades, and efforts are needed to undertake rigorous evaluations of these initiatives. This is of some importance, in light of emerging issues that programs in many jurisdictions are now encountering. Anecdotally, it is the perspective of some program staff that these programs are experiencing shifting demographics among program participants, including more impaired drivers representing younger age cohorts and women as well as minority populations. In addition, some jurisdictions are also reporting an influx of participants from other Canadian jurisdictions such that efforts are needed to better coordinate the delivery of these programs across jurisdictions to ensure that out-of-province offenders are able to complete the requisite programs and regain their driving privileges.

2.8 Treatment Interventions

There are a variety of treatment interventions that are increasingly being applied to impaired drivers and are available to varying extents across Canada. These include screening and brief interventions, motivational interviewing, and cognitive behavioural approaches. In addition, pharmacotherapies are gaining in popularity, particularly in the United States. While there is some research about the effectiveness of these approaches with impaired drivers, more research in this field is needed. Each of these interventions is briefly described below.

Screening and brief interventions (SBI). These types of interventions are based upon a structured set of questions that are followed by discussion and referral. The treatment provider evaluates answers provided and shares this with the offender along with encouragement to create an action plan to address the problem. These interventions are generally recommended for offenders who misuse alcohol or who are at risk for dependence, although they have been applied with other populations (e.g., patients in hospital emergency rooms) (Lapham 2004/2005). A wide range of these interventions are available and generally they can last from 5-15 minutes up to 30-60 minutes for as many as four sessions (NHTSA 2007). Screening can be done with minimum of training depending on tools used and these interventions are low-cost because they are smaller in number and shorter in duration. Screening and brief interventions have been increasingly applied in a variety of settings and their effectiveness has been evaluated (WHO 2010; Davis et al. 2012; Moyer et al. 2002; Poikolainen 1999). However, few studies have examined their benefits with criminal justice populations except brief motivational interventions (see below). A recent study involving a specially designed brief intervention for repeat impaired drivers in Canada revealed significant declines of 25% in risky drinking and greater improvements at six-month follow-up (Brown et al. 2010). There is some evidence that recidivists who are younger, male, and exhibit more negative consequences and ambivalence towards their problem drinking show the most improvement with this brief intervention compared to other groups (Brown et al. 2011).

Motivational interviewing (MI). A form of brief intervention, motivational interviewing is a patient-centered, non-confrontational approach that involves individual brief counseling sessions. The goal is to engage offenders who are resistant to changing their behaviour by building rapport and this may be the most acceptable strategy to those who are new to treatment. MI can occur at three stages: when sharing test results and any diagnosis to encourage action, following the assessment for those unready to change, or during the supervision period to provide critical feedback and reinforce progress.

A meta-analysis of 29 randomized control trials (RCTs) concluded that MI takes on average 15 hours to learn (Dunn et al. 2001) and 60% of these studies showed at least one significant behaviour change effect size. There is substantial evidence to show MI is an effective intervention when used by clinicians who are non-specialists in substance abuse treatment, however self-training efforts have not been shown to be effective. This approach is considered more useful with clients in early stages of change, and while research suggests that this approach may not be more effective than others, it does seem to work faster.

Cognitive behavioural therapeutic approaches (CBT). These interventions include a wide range of cost-effective, psycho-therapeutic approaches to deal with cognitions and beliefs as a means to reduce problematic behaviours. Examples include cognitive therapy, rational emotive behaviour therapy, reality therapy and multi-modal therapy to name a few. The purpose of these approaches is to identify thoughts, beliefs, assumptions, and behaviours that are related to negative emotions and underlying dysfunctional problems and replace them with more realistic and functional ones. Sessions are structured and usually short-term, although commitment on the part of the offender is required.

These approaches can be used with individuals or groups and may be delivered by a therapist or using computer-based software. Training of practitioners to effectively deliver CBT is more substantial compared to other approaches. Minimal requirements include a Masters Degree in psychology, counseling, social work, three years of experience with substance abusing population; and familiarity with, and commitment to this approach.

CBT interventions have been successfully used to treat many disorders and behaviour problem and several studies support their effectiveness in treating alcohol abuse. In particular, CBT has demonstrated better outcomes compared to patients who did not receive therapy, are shown to be comparable to or more effective than other treatments, are effective in reducing severity of relapse and are also cost effective (Longbauch et al. 1999; Carroll 1996; Carroll 1998; Holder et al. 2000; Berglund et al. 2003).

Pharmacotherapies. Today, many medications can be used for alcohol treatment purposes and are becoming increasingly popular, particularly in the United States. Disulfiram (Antabuse) is perhaps the most well-known and has been available for several years. It interferes with the metabolism of alcohol by the liver, permitting a toxic breakdown product of alcohol to accumulate in the bloodstream, however the side effects are severe and can make the user extremely ill if they consume alcohol after taking Antabuse (Fuller and Gordis 2004). There are also two newer, approved products on the market in the United States: naltrexone (ReVia; Vivitrol) is an opioid antagonist with side effects that include nausea, dizziness and fatigue; acamprosate (Campral) is a synthetic compound and side effects include mild diarrhea. All of these medications are used in combination with brief psychosocial interventions, and potential users do require a medical examination prior to receiving a prescription for the drug (Anton et al. 2006; Johnson et al. 2007).

There has been a wealth of research on this topic in the past decade. The main study designs involve RCTs that were double-blind and included multiple treatment groups. Across studies samples sizes varied with some being sufficient and others not. In most cases, studies were generally short in duration (an average of 12 weeks) although some were longer and additionally tracked patients post-treatment. The study populations were mainly alcoholics in clinical settings and usually alcohol dependent, however, some studies involved populations that were drinking whereas others were recently abstinent. Overall, the study populations were diverse in relation to age and gender, ethnicity, and geographic location.

In summary, a 2004 meta-analysis of 17 RCTs revealed that acamprosate was associated with a significantly higher number of abstinent days and continuous abstinence rates at six months were significantly higher (Mann et al. 2004). It appeared to be especially useful in a therapeutic approach targeted towards achieving abstinence in recently detoxified, motivated alcohol-dependent patients. A 2005 meta-analysis of 24 RCTs showed that naltrexone significantly decreased relapses but not return to drinking (Srisurapanont and Jarusuraisin 2005). It seemed more appropriate for programs geared towards controlled consumption. Studies of both medications indicated that reductions in craving were mixed, and treatment compliance is a significant issue in studies and in practice.

Summary. A variety of treatment interventions have shown some effectiveness in reducing recidivism among impaired driving offenders and these are available to varying degrees across Canadian jurisdictions. However, each of these strategies rely upon different levels of resources, staff with different backgrounds and qualifications, different amounts of time and have different costs. In addition, some interventions are more easily implemented and delivered than others.

At the same time, there is growing evidence to suggest that combining appropriate sanctions and supervision with treatment interventions can be more effective than either strategy alone. The partnering of these different strategies can expand opportunities to achieve long-term risk reduction and to prevent and reduce repeat offending. In order to maximize the effectiveness of this approach it must be assessment driven, and combine appropriate levels of supervision with appropriate treatment interventions.

3. RECOMMENDATIONS

Several common themes emerged throughout the course of the presentations and discussions that took place at the Drinking and Driving Symposium. Priority strategies were considered in some detail, not only in terms of strengths and benefits, but also in relation to lessons learned and cautionary tales. It was underscored that the two different systems used to manage impaired drivers in Canada were intentionally designed to be both complementary and synergistic. Moreover, the focus on punishment and sanctions must be appropriately balanced with efforts to rehabilitate impaired drivers to reduce risk and prevent re-offending in the long-term. Priority recommendations emerging from discussions are described in more detail below.

3.1 Recommendation 1: Increase the level of impaired driving enforcement.

A primary theme that emerged from presentations as well as discussions at the Symposium centered on the need to increase the likelihood of detection by strengthening enforcement strategies. The likelihood of Canadians to be detected for driving while impaired is low as is the case in many Western countries. It has been well-established that drivers may drink and drive between 200 and 2000 times before being detected; even during periods of high enforcement drivers are still estimated to be able to drive 80 times before being stopped (Voas and Hause 1987; Phillips et al. 2011). And while a majority of Canadians do not drink and drive, there is a small but persistent minority that does (Marcoux et al. 2011) and that are resistant to education, licence suspension, and other strategies that are effective in deterring a majority of drivers (Simpson et al. 1996).

Research has proven that there is considerable value in the more consistent application of the different enforcement strategies (e.g., sobriety checkpoints and saturation patrols) already utilized in Canada, and the need for more resources to achieve this goal was underscored.

It cannot be overlooked that impaired driving is just one of several road safety priorities that law enforcement is tasked with in addition to their responsibilities associated with the enforcement of criminal laws. Available resources are already stretched thinly as agencies make tough decisions about where and how to deploy officers. This is no less the case among road safety enforcement initiatives as emerging issues like distraction and drugs compete for attention and priority. The reality is that law enforcement often serves as a “catch-all” for these issues yet their ability to dedicate time, attention and resources to them on a consistent basis to effect real change in driver behaviour is limited in the current funding environment. So while efforts to increase impaired driving enforcement are much needed, decisions to redress this issue should not be pursued in the absence of discussions about funding to achieve this goal.

Random breath testing. There was also discussion about the growing interest in random breath testing (RBT) which has been implemented in other European and Australian jurisdictions. RBT refers to the random breath testing of drivers at the roadside for alcohol use. This means that police do not need grounds to believe the driver has been drinking in order to demand the breath test. RBT is colloquially used as a term for a law enforcement strategy that is designed to both deter

and detect drivers who have been drinking. It is typically based on the use of sobriety checkpoints except that all drivers passing through the checkpoint are stopped and asked to deliver a breath sample that is tested for alcohol, rather than only those drivers who are suspected to have consumed alcohol.

Goal: The main goal of RBT is to create a general deterrent effect among the public to prevent as many drivers as possible from driving under the influence of alcohol. This general deterrent effect is typically created by achieving a balance between the actual chance of getting caught while drinking driving (through actual enforcement) and the perceived chance of getting caught (through high visibility enforcement and publicity of these activities). It is believed that this will make the majority of the public believe that they will get caught if they are drinking driving and therefore they will refrain from doing it. Of note, the actual enforcement levels have to be sufficiently high and sustained to create and perpetuate the perception among the public of the likelihood of detection. To achieve this goal, it is estimated that between one-third and one-half of the driving population must be tested annually (Henstridge et al. 1997).

The main difference between RBT checkpoints and the traditional sobriety checkpoints currently used in the United States and Canada is that in the latter model only drivers who are suspected of alcohol consumption are selected for breath testing. Hence, these are referred to as selective breath testing (SBT) checkpoints or sobriety checkpoints. In contrast, with RBT all drivers who are stopped are tested for alcohol, regardless of whether there are grounds to believe they have been drinking or not.

In North America, drivers are selectively tested at the checkpoints due to constitutional protections. This means that police officers must have a legitimate reason ("reasonable suspicion" is the legal standard in Canada) to suspect that a driver stopped at the checkpoint has been drinking before they can legally administer a breath test. In essence, this means that SBT uses checkpoints to stop all drivers who are driving by, but only a selection of them will be asked to deliver a breath sample, i.e., those who are suspected of having consumed alcohol as evidenced by noticeable signs such as their demeanor, responses or the odor of alcohol.

Effectiveness: An important question to consider is the effectiveness of RBT. In theory, one would expect RBT to be more effective than SBT given that it is always possible that certain drinking drivers do not show visible signs of impairment during a short roadside interview and, as a result, manage to slip through the cracks at a sobriety checkpoint. Indeed, research has shown that police officers are not always capable of accurately detecting drinking drivers during such a short roadside interview without administering a breath test. As a consequence, drinking drivers have been found to go unnoticed at checkpoints. To illustrate, studies have shown that police officers miss 60% or more of drivers with a BAC of at least .05 and 50% of drivers with a BAC of at least .10 (Ferguson et al. 1995; Wells et al. 1997).

Despite this weakness existing research does not provide evidence that RBT is more effective than SBT. A systematic review of 23 studies on the effectiveness of RBT and SBT concluded that there was no evidence to suggest that the levels of effectiveness of both strategies differed. Of equal

importance, the review revealed that no available studies have been designed to directly compare the effectiveness of RBT and SBT (Shults et al. 2001).

Another systematic review also concluded that evaluation studies of RBT and sobriety checkpoints showed a comparable range of outcomes. Of interest, there was limited evidence to suggest that RBT may be slightly more effective than SBT, and that administering a breath test to all stopped drivers with RBT may indeed lead to a stronger perception of being caught than the more selective approach with sobriety checkpoints. However, this study also attests that the evidence is not conclusive and points to the possible confounding effect of more intensive enforcement levels that have typically been used with RBT in Australia compared to those of SBT as an explanation for the difference in effectiveness (Fell et al. 2004).

One particular study that provides some information regarding the effectiveness of RBT versus SBT comes from Australia where sobriety checkpoints were used before introducing RBT. This one study concludes that RBT is more effective than SBT but also reports that the quality of data about enforcement levels was sometimes questionable and this means that the observed difference in effectiveness between SBT and RBT could also be explained by different levels of enforcement (Henstridge et al. 1997).

To summarize, the available evidence supports both SBT and RBT and suggests that what really matters is the balance between enforcement levels that are sufficiently high and publicity about the enforcement to establish the required general deterrent effect.

Implementation issues: On a practical level, legislation allowing Canadian police officers to conduct RBT rather than sobriety checkpoints would likely accommodate a more efficient approach. This is because demonstrating reasonable suspicion would no longer be required and it may also increase the likelihood of conviction by reducing the opportunity for legal challenges regarding reasonable suspicion. But this is tempered by some very important real-world challenges including concerns about officer safety, available resources, and constitutional protections in Canada.

Current Canadian safety protocols for conducting roadside stops would likely prevent police officers from standing beside a stopped vehicle on the road while dealing with the driver who is sitting at the wheel. These existing protocols are based on the safety requirements of the Canada Labour Code or Provincial Labour Codes and will likely make it challenging, if not impossible for police officers to conduct RBT in the same fashion as in other jurisdictions around the world (including Australia and Europe) where police officers typically stand beside the vehicle and ask the driver to open their window and deliver a breath sample at RBT checkpoints. Hence it would require officers to spend more time per driver tested, and result in delays in testing all drivers that may be considered unreasonable from the perspective of constitutional protections, particularly in medium- to high-volume traffic areas.

At the same time, there are concerns associated with the financial cost associated with implementing RBT across Canada. For RBT to be effective in a country the size of Canada, the police would have to conduct anywhere between 11 to 22 million breath tests per year. Current

enforcement levels are well below this level, and it would require considerable resources to achieve a significant increase in enforcement. Moreover, consideration will have to be given to ensure that equipment such as the alcohol screening devices used to collect breath samples is readily available (i.e., some officers currently do not have an approved screening device on hand at all times).

Summary. Given the established relationship between police enforcement and the impact on human behaviour, it appears that traffic safety in Canada could benefit from increased and intensified drinking driving enforcement using either RBT or more sobriety checkpoints. However, proper implementation of RBT or the increased use of sobriety checkpoints will require (1) sustained high enforcement levels, i.e., several million tests per year, (2) well-publicized, high visibility enforcement and (3) careful consideration of legal and practical issues in order for benefits to accrue. Ultimately, key considerations that will influence the pursuit of this initiative involve available resources and public acceptance of the ability of officers to randomly stop drivers.

During discussions about impaired driving enforcement, consideration was also briefly given to the issue of drug-impaired driving as this is a growing road safety concern in Canada. While it was acknowledged that there had been progress on this front with the implementation of drug-impaired driving laws and the creation of a Drug Recognition Evaluator (DRE) program for police in Canada in 2008, it was also well-recognized that there were some notable lessons learned that are relevant to the pursuit of new strategies to address alcohol-impaired driving.

The implementation of the DRE program has occurred slowly as a result of the significant costs to deliver training for a sufficient number of officers in agencies across Canada, and the inability of many agencies to absorb these costs and to consistently certify and retain officers. Of equal concern, the successful prosecution of these cases at trial has been increasingly influenced by limited educational efforts to increase knowledge of the science surrounding this issue among prosecutors, as well as the need for sufficient evidence of impairment by drugs to meet the burden of proof in Canadian courts

As a result of these critical gaps, the enforcement of drug-impaired driving laws has not proceeded as intended. And without concerted efforts to maintain the qualifications of these officers to conduct evaluations, and more effective and widespread enforcement and prosecution, real change is not likely to occur. Based on these lessons learned with the DRE program in Canada, when considering the pursuit of RBT, the bottom line is that our ability to successfully implement RBT in Canada in a way that achieves the expected level of effectiveness will similarly be influenced by the ease with which resources are allocated and education is pursued. Moreover, policymakers must consider whether it is even viable to further fracture the limited resources available for police education and training to accommodate efforts to support both DRE and RBT programs.

3.2 Recommendation 2: Expand the use of educational initiatives.

The value and importance of education was a key topic of discussion throughout the Symposium. Public awareness of this issue is essential not only to encourage behaviour change but also to facilitate informed discussion and decision-making around important policy issues. And early

education for the public, before they become impaired driving offenders is a must. Four priority issues emerged that are in need of action and these are described in more detail below.

Adopt and incorporate more web-based and social media tools. The value of the expanded use of these tools is believed to have immense benefits, particularly for drivers middle-aged or younger. In today's information-age, the forms, styles and methods of communication have evolved dramatically. People increasingly seek and access information in ways that are quite unlike the traditional strategies to which many of us were previously accustomed. In addition to being accurate and user-friendly, there is increasing demand for information that is instantaneous, accessible, and relevant to its audience. Think about the last time you read a newspaper, used a phone book, or booked travel, selected a restaurant, or did your banking without using the internet. It was generally agreed that educational programs and public awareness campaigns that failed to adopt web-based or social media strategies are likely to be dismissed, ignored or overlooked by the public.

Target younger audiences with drink driving messages. It was also emphasized that there is an ongoing need for sustained educational efforts among youth, and web-based components and social media initiatives are particularly relevant to this audience. It must be underscored that, while for many Canadians this topic may be "old news" it most certainly is not for the new cohort of drivers that emerges each year and participates in driver education and graduated driver licensing programs across the country. This issue is always "new" to them. So while the style and content of messages may change along with the ways in which they are delivered, we must not forget that young drivers have the highest crash risk of all drivers, even when sober, and they are not often familiar with the perils of drinking and driving. Impaired driving awareness programs that specifically target younger drivers continue to be vital to reduce impaired driving in the long-term. It cannot be stressed enough that those who fail to adopt safe driving practices at a young age are potentially destined to become the high-risk drivers of tomorrow with long and dangerous driving careers ahead of them.

The value of targeting educational messages towards a younger audience was also viewed in terms of the opportunities it can create to increase awareness and stimulate behaviour change among parents and older Canadians who have not gotten the message. It was acknowledged that it can be a powerful experience for adults to hear such messages from younger family members and loved ones.

Increase education around low-BAC strategies. Although a majority of Canadian jurisdictions have adopted provincial low-BAC laws and impose escalating sanctions for these offences, surprisingly many Canadians remain unaware of these policies and programs or the consequences/penalties associated with these charges. National polls such as the TIRF Road Safety Monitor reveal that only a small percentage of Canadians are aware of such laws, and a much smaller percentage knows the actual administrative BAC limit in their jurisdiction. In light of the fact that low-BAC strategies form an integral part of Canada's impaired driving framework, the presence and use of these strategies, and rationale behind them should be clearly incorporated into educational campaigns to

raise awareness about the risks associated with driving at low-BACs and to help promote positive behaviour change.

Increase use of positive messaging and social norming approaches. Discussion also highlighted differences in educational approaches and the importance of using strategies that are effective with the intended audience. While the use of fear-based appeals⁴ has grown in recent years, research suggests that this style may not be appropriate for, or effective with younger audiences for whom they are often intended.

In a 2009 study published in the *Journal of Marketing Research* by researchers from the Kellogg School of Management and the Kelley School of Business, it was reported that public service announcements that emphasize shame or guilt should be used cautiously as this style of campaign may not elicit the desired outcomes. Similarly, a leading road safety research institute in the Netherlands, SWOV, conducted an international review of the literature on fear-based appeals that was published in April 2009 and is available at their website (www.swov.nl). The review noted that some studies showed that this approach can have positive effects but only if it includes clear messages about personal vulnerability to risk and reasonable alternatives to the risky behaviour. However, they also identified a number of studies that showed that the target audience denies, trivializes or ridicules the message. A key finding from this review was that “Recent studies have shown that in males and in young people frightening road safety information has less positive effects than information which uses positive emotions like humour and sets positive behavioural examples” (SWOV 2009: p.1).

There is also growing interest in the use of social-norming approaches which emphasize the actions of the majority to encourage behaviour change (e.g., campaigns focus on the fact that most Canadians do not drink and drive, in contrast to the small minority that do). This approach has been developed as a campaign entitled “Most of Us” and evaluated by the Center for Health and Safety Culture at Montana State University and found to be effective, particularly with a younger audience. Those who are interested in learning more about this research can visit their website: www.mostofus.org.

Summary. Increasing the availability of education program materials and messages through web-based and social media strategies is encouraged. Not only should these programs include information specifically targeted towards younger drivers, but they should also highlight the presence of low-BAC initiatives. Research suggests that the use of fear-based appeals should be adopted cautiously and targeted towards an appropriate audience. In addition to an emphasis on positive messaging, campaigns that adopt a social-norming approach are increasingly popular. A good example of a campaign that incorporates these two approaches is Change the Conversation and it can be accessed free-of-charge by all Canadians at www.changetheconversation.ca.

It was also emphasized on multiple occasions by attendees that there is a need to better combine education and enforcement efforts as the benefits of these partnerships are well-recognized. This is

⁴ Fear-based appeals are awareness campaigns that use fear to motivate behavioural change through the use of graphic visuals and messages focused on negative consequences.

imperative given that many people believe they are better-than-average drivers and either do not understand the risks or take inappropriate risks. For this reason, they may believe that education about problems like drinking and driving do not apply to them and it can be very difficult to get through to them with education campaigns. In this regard, educational efforts are not uniformly effective for all drivers and do not reach all of the drivers who may need it or benefit from it. For this reason, it is important to partner education with other strategies such as enforcement and penalties.

Awareness efforts around the presence of enforcement activities are also important. General deterrence theory predicts that the actual and perceived likelihood (fear) for getting caught are important motivators for people to comply with the law (Ross, 1992). Homel (1988) tested this theory using data from random breath testing (RBT) and confirmed that not just the actual chance of getting caught is important but the perception of the likelihood of getting caught plays an equally important role. These findings led to the practice of using high-visibility road checks when enforcing drinking and driving laws, primarily to increase the subjective chance of getting caught among the public. The objective of such prevention efforts is to make as many people as possible believe that police officers are out on the road, enforcing drinking and driving laws and that drinking drivers will most likely be caught. Such practices have generally acknowledged that high-visibility road checks have little (or less) impact on the actual chances of a drinking driver getting caught but serve to escalate the perceived likelihood of arrest and, as a result, deter drivers from drinking and driving.

The benefits of combining awareness/education and enforcement have demonstrated the success that can be achieved in changing driver behaviour when the case of seatbelt usage is considered. For example, in Canada national seatbelt usage rates are in excess of 95%, although usage rates are somewhat lower for passengers in the rear seat. However, these high usage rates have been largely a result of the combined use of education and enforcement (Phillips et al. 2011).

3.3 Recommendation 3: Achieve a balance between administrative and criminal approaches.

Presentations throughout the Symposium highlighted that Canada's impaired driving framework comprises a continuum of effective strategies that are housed within two different systems: one administrative and one criminal. It was widely acknowledged that each system serves a different purpose, has different goals, and faces different constraints.

Lower level interventions are important in light of research that shows that drivers at low-BACs do have an elevated risk of crashing relative to sober drivers, although it is lower than the risk posed by much higher BAC drivers. And based on this research, most jurisdictions have applied administrative penalties within their respective driver licensing systems, including 12 and 24 hour roadside suspensions. The adoption of lower administrative BAC limits by provincial and territorial governments enables police officers to protect the public and take reasonable steps to remove drivers from the road who have an elevated crash risk due to consumption of lower levels of alcohol, yet who have a BAC under the Federal criminal code under which the combination of alcohol consumption and driving does not meet the threshold for criminal prosecution.

Recent trends towards better tracking of low-BAC drivers have emerged to help identify those low BAC drivers who persist in this behaviour and to create new opportunities to prevent impaired driving through early intervention. This is believed to be a positive step forward, and it should be emphasized that the goal is not to prevent people from consuming responsible amounts of alcohol in moderation during the course of an evening out with friends.

At the same time, while it is widely believed that the use of administrative penalties for lower risk drivers has a place within the continuum of strategies applied to different types of impaired drivers, it is also acknowledged that the presence of these penalties should not erode the focus on, nor the available resources for dealing with, those who drive with a BAC in excess of the illegal limit of .08, who pose a much greater risk to the public, and who are responsible for more deaths on our roads. There is consensus that these higher risk offenders should consistently be subject to escalating criminal sanctions as the level of offending increases.

In this regard, one concern that emerged from discussion about this issue related to the increased availability of escalating penalties for low-BAC offences, and the extent to which an unintended negative consequence of the availability of these sanctions may be that administrative penalties would be substituted in lieu of criminal penalties for dealing with high BAC offenders because they are less burdensome and more efficient to apply at the roadside than the criminal arrest of offenders.

The potential consequences associated with a blurring of the lines between these two systems, and the substitution of a streamlined administrative process in lieu of the more demanding criminal process, are a source of real concern. This blurring of lines could serve to erode public confidence in these systems as a result of the loss of procedural protections guaranteed by our Constitution and negative perceptions about the objectives of administrative processes. So while there is certainly recognition of the benefits of administrative processes to deal with low-BAC drivers, these concerns suggest that the application of administrative processes should be used judiciously and with appropriate safeguards to ensure they are only applied to the population of drivers for whom they have been put in place.

At the same time, there were also concerns associated with the developing trend towards including low-BAC drivers in remedial licensing programs for criminally convicted impaired drivers. In a criminal justice setting, offenders are assigned to interventions and treatment based on a risk-need-responsivity model (Ward et al. 2007). The basic premise of this model is that the risk level of offenders should be identified through assessment, and the intensity of interventions and/or treatment should be proportional to that level of risk. These interventions are designed to take into account individual criminogenic needs in an effort to address the underlying causes of offending (Bonta et al. 2000; Ogloff and Davis 2004; Andrews and Dowden 2006). Responsivity refers to tailoring an intervention to best meet the capabilities and needs of an individual offender. The key component of this model is matching an offender to an intervention based on their propensity or risk to reoffend (Ogloff and Davis 2004).

Of importance, research has shown that it is of primary importance to tailor interventions to meet the needs of offenders that were identified in the risk assessment (NIDA 2006). The risk level should

also factor into the decision-making process when determining what intervention is most suitable. The risk-needs-responsivity model dictates that intensive interventions be reserved for those offenders classified as high risk as they have more criminogenic needs (Andrews and Bonta 2010).

Moreover, research clearly suggests that requiring offenders to participate in inappropriate programs can be more harmful than rehabilitative (Gendreau and Goggin 1997; McGuire 2001, 2002; Brusman Lovins et al. 2007). There is also evidence that indicates that applying intensive interventions to offenders who pose a lower risk of recidivating not only wastes resources, but can also have an undesirable effect – an increase in their likelihood of recidivism (Andrews et al. 1990; Lowenkamp and Latessa 2002; Lowenkamp et al. 2006).

In a study examining the provision of intensive services to low risk offenders Bonta et al. (2000), found that the criminal behaviour of these subjects increased significantly after participating in the treatment program. This study of 171 offenders revealed that low risk offenders who received minimal levels of treatment had a recidivism rate of 14.5% and those who received intensive levels had a recidivism rate of 32.3%. Conversely, the high risk offenders who received intensive treatment had a recidivism rate of 31.6% while those who did not receive the intensive treatment had a recidivism rate of 51.1%. These findings lend support to the risk principle and demonstrate how inappropriate intervention matching has the potential to result in highly undesirable negative consequences. Possible explanations for this phenomenon are that the mixing of low risk and high risk offenders results in a shift in association patterns for those individuals who may not have an extensive criminal history (Williams and McShane 2004). Contact with high risk offenders has the potential to expose low risk offenders to criminal thinking (Bonta et al. 2000).

Another study conducted by Brusman Lovins et al. (2007) also found that low risk offenders had an increased likelihood of arrest after being exposed to the same treatment intervention as high risk offenders. In a study of 1,340 women released into the community findings were consistent with those of Bonta et al. (2000). Low risk women who participated in residential treatment were three times more likely to be re-arrested than low risk women not exposed to residential services. The implication is that lower risk females should be diverted from intensive correctional interventions when possible.

The bottom line is that the placement of low-risk offenders in intensive interventions or programs exposes them to high-risk offenders who can be a potentially negative influence and manipulative. Low-risk offenders are classified as being fairly pro-social. Hence, when they are placed in restrictive, intensive, and highly structured programs they may begin to adopt more anti-social characteristics as they attempt to adapt to their environment and their new peers. This can result in interventions having the opposite effect of what was desired and increasing recidivism as opposed to reducing it.

While this research examined the mixing of low-risk and high-risk criminal offenders generally, as opposed to criminal and non-criminal impaired drivers specifically, its relevance to the issue at hand cannot be discounted. Findings such as these speak to the importance of proper risk classification and the potential dangers associated with mixing offenders with different levels of risk. Offender recidivism can be reduced if the intervention is proportional to the risk to re-offend. There needs to

be a process for differentiating between those who are low risk and those who are high risk so that an appropriate level of treatment, supervision, or sanction can be provided (Campbell et al. 2007).

Summary. The research related to risk assessment and intervention/treatment matching reveals the importance of classifying offenders based on their likelihood to recidivate and assigning them to interventions that best meet their individual needs. Failing to do so misses an opportunity to address underlying causes of offending and could potentially result in an increase in criminal behaviour. This means that, theoretically speaking, from a risk-needs perspective, the most effective response may not be to place low-BAC drivers in programs designed for offenders, many of whom have some degree of alcohol dependency issues and a criminal history as a result of their behaviour.

In the absence of research on this issue, placing all low-BAC drivers in with a criminal drunk driving population without objective indications of the level of risk associated with this former group, may be counterproductive and also potentially erode the effectiveness of these programs for both populations. For this reason, such approaches should, at a minimum, include a proper risk assessment to guide the assignment of drivers to appropriate programs, and be pursued cautiously. A few jurisdictions are in fact adopting this approach. In addition, such initiatives should be carefully evaluated to minimize the potential for unintended negative consequences in the long-term.

3.4 Recommendation 4: Use technologies to create opportunities to respond to difference levels of risk and achieve a better balance between punishment and rehabilitation.

Available technologies to improve the monitoring and supervision of impaired driving offenders have proliferated in the past decade. Alcohol interlocks, continuous alcohol monitoring devices and breath testing units placed in the home of impaired drivers are increasingly accessible in the United States, and to a lesser extent, Canada. It must be underscored that these technologies are distinct and not all of them are designed with the same purpose in mind. Whereas alcohol interlocks are a tool used to monitor driving behaviour and detect drivers who attempt to drive after drinking, continuous alcohol monitoring and in-home alcohol monitoring devices have been developed to monitor drinking behaviour that is not necessarily related to driving. Similarly, not all devices are equal in terms of the sophistication of the technology. Hence they should be applied with these caveats in mind.

Collectively, such technologies comprise a critical component of the continuum of strategies to reduce impaired driving and the potential benefits of these technologies are unique to other interventions. First, these technologies are flexible in their application and can be tailored to respond to the varying levels of risk that are posed by different types of impaired drivers and used to fill gaps that have been pervasive in the impaired driving system for many years. To illustrate, alcohol interlocks serve to overcome the reality that a significant proportion of convicted impaired drivers continue to drive despite licence suspension and/or revocation. The installation of an alcohol interlock substantially reduces the likelihood that offenders can drive after drinking. And continuous alcohol monitors and in-home alcohol testing devices can identify individuals who

continue to consume alcohol in a risky fashion and provide a better indication of the level of risk they pose and the need for additional interventions and/or treatment.

Second, technologies, when partnered with appropriate treatment interventions, have the potential to encourage longer-term behaviour change and achieve long-term risk reduction among impaired drivers. Research clearly shows that interventions that combine a balance between punishment, surveillance, and rehabilitation have the best outcomes (Dill and Wells-Parker 2006).

It is a commonly held belief that treatment is a “weak” alternative to punishment. However, if treatment were easy, offenders would be lining up to participate. The reality is that many offenders would rather spend time in jail than enroll in treatment because treatment requires sustained effort and a willingness to confront personal issues. Treatment is an effective tool to address one of the root causes of the offending behaviour (i.e., abusive drinking or an addiction/dependence on alcohol) and the source of the drinking problem.

To this end, in addition to supervision features, technologies can support the delivery of treatment. They can provide an objective measure of drinking behaviour that can be shared with clinicians to open the door to a substantive discussion with offenders about their alcohol use to begin to move them through the Stages of Change⁵. Those clinicians who have had the benefit of access to data gathered from these technologies for use in sessions with offenders have found that it is easier to overcome denial of problem drinking and move offenders towards readiness for change; a point at which offenders are ready for and receptive to interventions. Hence there is a growing trend to partner technologies with treatment opportunities and this approach has been increasingly adopted in both Canada and the United States.

Third, while technologies provide an important opportunity to detect and respond to non-compliant offenders, they also provide equal opportunities to recognize and reinforce compliant or positive behaviour. Traditionally, these technologies have been applied solely with a punitive purpose in mind. However, research suggests that not only holding offenders accountable for non-compliance but also responding to and reinforcing compliant behaviour can be effective. Positive reinforcement can be as simple as verbally acknowledging good behaviour or potentially reducing the frequency or intensity of supervision. It has been suggested that four positive reinforcements should be applied for every negative reinforcement action in order to achieve optimal behaviour change (Crime and Justice Institute 2004). These actions do not need to be substantial to be effective (Robertson et al. 2006b) and may include:

- > giving verbal praise during regular meetings;

⁵ The transtheoretical stages of change model posits that individuals with behaviour problems, such as substance dependence, experience several conditions and differ in their willingness to acknowledge that they have a problem and work towards change (Alexander 2000). Interventions or treatment strategies are most likely to be successful when geared toward that stage of change that the individual client is in. Adapted from Prochaska et al.’s (1992) readiness for change process stages, the various stages include: 1) Pre- contemplation (lack of awareness of a problem; no contemplation of change; 2) Contemplation (recognition of a problem; contemplation of change; 3) Preparation (consideration of behaviour change); 4) Action (taking steps to change behaviour such as participation in treatment);and, 5) Maintenance (relapse prevention).

- > decreasing the frequency of monitoring/reporting;
- > providing a certificate to recognize compliance;
- > reducing the period of supervision; or,
- > offering small discounts on costs (in cooperation with provider).

Recognizing the progress demonstrated by offenders has the potential to enhance their motivation for continued compliance and to ensure they do not perceive that the penalties applied to them are insurmountable. The danger in focusing on punishment alone is that the more punitive controls that are placed on or sanctions that are applied to offenders, the greater the likelihood that they will violate those conditions and be returned to the criminal justice system. To this end, it is essential that imposed penalties are research-based and relevant to the offending behaviour, but they should also be realistic in terms of the ability of offenders to comply. The tendency to “pile on” sanctions for every instance of non-compliance results in discouragement among offenders who feel the goals are not attainable such that they fail to complete assigned interventions. Accordingly, interventions should balance punitive and rehabilitative approaches, as appropriate, to create accountability as well as recognition of progress, and ensure public safety. Technologies allow us the opportunity to do this. Failing to use these tools to achieve a better balance between punishment and rehabilitation undermines their tremendous potential to reduce impaired driving.

3.5 Recommendation 5: Conduct research to guide the development of more holistic approaches to offender management. Research can guide the development of more holistic approaches to offender management.

In the past decade, new research emerging from a wide variety of disciplines has dramatically increased our understanding of the characteristics and behaviours of impaired driving offenders. Coordination of such initiatives to establish much needed linkages across communities of practice and across jurisdictions is vital to ensure continued progress.

To illustrate, from an intervention perspective, a multitude of research studies in neuroscience have greatly expanded our understanding of the influences of brain development (among young drivers) and brain function (among impaired drivers). Addictions research has also advanced to detect key differences associated with addiction according to sex and confirm the importance of screening and assessment. Research on treatment interventions has begun to identify strategies that are more or less effective with impaired drivers. And criminal justice research has also informed our understanding of different pathways to offending, the involvement of impaired drivers in other types of criminal offending, risk assessment, and the importance of matching offenders to interventions based on their identified risks and needs.

Conversely, from a prevention perspective, research has increased knowledge about the use of educational programs, the benefits of peer-to-peer strategies, the value of positive messaging and social norming, and the application of fear-based appeals.

Collectively, this research suggests that a more holistic approach to the management of impaired drivers must be adopted. Too often, professionals and agencies become fixated on one perspective or approach to the detriment of others. All that has been learned about impaired drivers has served

to repeatedly reinforce the transdisciplinary nature of this social problem. Failing to acknowledge this fact and leverage it to guide solutions to address the problem undermines our potential for effectiveness to better prevent impaired driving and achieve the desired long-term risk reductions.

3.6 Recommendation 6: Leadership from governments essential.

The success or failure of impaired driving interventions frequently hinges on the level, the quality and the extent of leadership afforded to them. An important lesson learned in the past decade is that leadership is required beyond the passage of laws to ensure that programs and policies are implemented, practitioners are properly trained, resources are allocated, agencies work cooperatively, and, ultimately, impaired drivers are actually subject to and complete the programs and sanctions that are imposed through the criminal justice system and administrative driver licensing system. This is a concerning gap that must be addressed. To illustrate, drivers who are suspended or revoked are shown to drive unlicensed and this is not an isolated phenomenon. Indeed, research shows up to 75% of impaired drivers continue to drive unlicensed (McCartt et al. 2003). Similarly, not all convicted impaired drivers participate in remedial impaired driver programs, and not all offenders required to install an alcohol interlock do so (Voas and Tippetts 1997). These outcomes are intimately linked to implementation efforts.

As a result of these findings and others, governments are beginning to devote more attention to the implementation of programs and policies to ensure they are put in place, practitioners have the requisite knowledge to manage them, agencies communicate and share information accordingly, and that they are uniformly and consistently applied to impaired drivers. This trend should be widely adopted and strongly encouraged and it requires strong leadership to sustain it. It cannot be emphasized enough that the reductions in recidivism demonstrated by research will only be accrued if interventions are applied.

The fact that these interventions are delivered in broader systems of justice, licensing and health that are constrained by a range of policies and standard practices also cannot be disregarded. Implementation strategies that fail to account for these limitations or that do not fit well into existing systems are unlikely to achieve their intended goals. For these reasons, it is imperative that frontline practitioners who work in these systems every day and are well-versed in their strengths and limitations are regularly consulted as part of the development of new laws and policies and associated implementation plans.

The inclusion of the necessary resources to successfully implement interventions is also paramount to success. Too often, new programs and policies are in fact “unfunded mandates” meaning that agencies must struggle to implement them without additional resources. Yet, without access to vital resources, implementation will not achieve the desired goals. Leadership is paramount to ensure the appropriate allocation of resources to new initiatives.

The bottom line is that strong leadership is essential on a continuing basis beyond the initial passage of laws. Leadership is also needed to ensure agencies have the tools, resources and partnerships to follow through and deliver policies and programs that ultimately translate into reductions in deaths and injuries.

3.7 Recommendation 7: Implement low-cost, effective and achievable strategies.

One of the key themes repeatedly raised throughout discussions about the many aspects of Canada's impaired driving framework was the importance of resources to ensure that all of the available interventions are consistently applied to the appropriate population of drivers. A critical gap associated with many interventions was the limited ability of jurisdictions to ensure programs and penalties are uniformly applied. This is most often a function of their capacity to monitor and supervise drivers, as well as their authority to do so.

Another concern is the ability of rural jurisdictions to address impaired driving. While a not insignificant portion of fatalities and injuries occur in these areas, smaller communities often suffer from a lack of police resources to carry out intensive and continued enforcement, and insufficient access to interventions such as technology and treatment service providers, and probation supervision. They also lack the resources to develop educational programs that can be tailored to their local context. Increased efforts are needed to begin to address these limitations and to develop feasible and low-cost alternatives to target impaired drivers in rural jurisdictions. It is recognized that this challenge will not be easily overcome, however, it does warrant our attention and research into this issue can begin to guide the development of strategies.

The importance of partnerships and coordination to avoid the duplication of efforts and to reduce the drain on resources that occurs with "re-inventing the wheel" was well-recognized and was strongly encouraged during discussions. To achieve this goal, it is important that agencies share information about new initiatives when they are being developed and/or implemented in order to create awareness such that opportunities for collaboration or synergy are not overlooked. At the same time, consultation with other agencies to consider the relevance of their needs, context, and dissemination strategies can be beneficial to ensure tools are user-friendly and benefit a broader cross-section of professionals. For example, governments that develop public education programs can benefit from consultation with community and grassroots organizations to inform the creation of messages that resonate with the intended audience, and materials that are well-suited to preferred dissemination strategies in order to maximize their reach and penetration. Similarly, law enforcement agencies can work with community groups not only to identify priority road safety concerns but also to leverage existing community resources to begin to address the issue.

3.8 Recommendation 8: Adopt a more holistic approach to increase understanding of impaired driving behaviour and ways to prevent it.

To date, there is not a good understanding of why some offenders repeatedly drive after drinking. While alcoholism and drug addiction account for some of the offending that occurs, there are many other factors at play that require further exploration in order to better identify which offenders with what characteristics are more likely to re-offend following a first offence.

These offenders represent a heterogeneous population and research can increase our understanding of the multiple pathways to persistent impaired driving behaviour and serve to identify clinically meaningful subgroups. This suggests that a more holistic approach is required and multidisciplinary research is an important component to guide strategies to address this problem

In this regard, there is a unique Canadian research initiative underway based upon a more holistic and integrated approach to increase understanding of impaired drivers. It involves a transdisciplinary program of research examining impaired driving onset, persistence, prevention and treatment. It is being led by Dr. Thomas G. Brown, Director of the Douglas Addiction Research Program in Montreal under funding from a five-year team grant by the Canadian Institutes of Health Research (CIHR). There are more than a dozen institutes conducting research as part of or collaborating in this project including the Douglas Mental Health Institute at McGill University, Université de Montréal, Université de Sherbrooke, Traffic Injury Research Foundation, Concordia University, National Institutes of Child Health and Development, University of Massachusetts, Association des centres de réadaptation en dépendance du Québec, Centre Dollard-Cormier, Israel's National Road Safety Authority and Société de l'assurance automobile du Québec.

Several innovative studies comprise this effort including:

- > The exploration of the applied neuroscience of persistent DWI behaviour, the role of alcohol consumption and passengers on driving-related decision-making and simulated driving behaviour.
- > Further development of an innovative conceptual model of impaired driving behaviour that uses perceptual mapping analyses to reveal how complex interacting systems can influence perceptions of concern.
- > The use of artificial intelligence and other innovative statistical methods to predict DWI behaviour from assessment and interlock data.
- > Strategies to improve risk assessment and opportunistic brief intervention strategies.
- > Educational primers examining current knowledge about impaired driving risk factors and current risk assessment practices in Canada to guide the development of novel pragmatic strategies to improve the management of impaired driving offenders and inform future research needs.
- > International collaborations to build capacity in traffic injury prevention research in developing countries.
- > The exploration of the complex interactions between research, policy and practice.

The main premise of the research program is that persistent impaired driving reflects a type of risk-taking behaviour in a very pervasive context: driving a vehicle. To date, the findings stemming from this research program are informative and illustrative of what can be accomplished with a more holistic approach.

To begin, researchers examined the psychobiological pathways to impaired driving offending and determined that offenders show hypothalamic-pituitary-adrenal (HPA) axis dysregulation which can occur due to a combination of social genetic and neurogenetic factors, including early childhood

trauma and family history of alcoholism. This dysregulation can result in reduced risk aversion and behavioural inhibition, greater sensation-seeking, and disrupted emotional information processing. At the same time, it can result in an increased vulnerability to uncontrolled drinking and resistance to interventions. These characteristics were shown to be particularly prevalent among recidivist offenders (compared to a non-impaired driving control group). To summarize, these results suggest that HPA axis dysregulation is a psychobiological marker of a high-risk subgroup of impaired drivers. In lay terms, impaired drivers who show lower HPA axis activity (than non-offenders) and lower levels of academic achievement, higher levels of inattention, non-planning impulsivity, had greater engagement in other risky behaviours such as criminal activity and cigarette smoking (Brown et al. 2005; Couture et al. 2008).

Follow-up studies of impaired drivers also examined the prevalence of deficits in executive cognitive functioning⁶. It revealed that impaired drivers are more likely to exhibit neurocognitive deficits (e.g., problems with memory, planning, flexibility, inhibition and greater susceptibility to immediate rewards), with the severity of impairment related to the frequency of past impaired driving convictions (Ouimet et al. 2007). The reality is that offenders focus most of their attention on the present and what is easiest today and very little on potential consequences or outcomes that occur much later (Bouchard, Brown & Nadeau 2012). This subgroup is also less likely to engage in impaired driving programs, are more resistant to interventions, and have poorer socioeconomic functioning (Brown et al. 2008). So this characteristic (i.e., deficits in neurocognitive functioning) is a marker of a subgroup of impaired drivers who are high risk and are harder to reach through traditional interventions.

Building on the new knowledge gained from these two studies, the research team developed and piloted a brief intervention designed for repeat offenders who had a current alcohol disorder, possessed poor awareness of the problems related to their behaviour and were unmotivated to change, and who were not committed to seeking interventions. An evaluation of this brief intervention revealed a 25% decline in risky drinking, and showed that this intervention was most effective with younger, male impaired drivers who had experienced more negative consequences as a result of substance use, and who were less committed to change (Brown et al. 2010).

To summarize, this program of research has:

- > increased understanding of some of the psychobiological factors that influence impaired driving behaviours;
- > identified high-risk subgroups of impaired drivers;
- > resulted in the development of a new, low-cost intervention to target a specific high risk subgroup.

⁶ Executive cognitive function “involves the set of abilities that allows one to select behaviour appropriate to a situation, including the ability to inhibit inappropriate behaviours and to focus on a specific task in spite of distraction” (Brown et al. 2008, p. 115).

At a broader level, this research has important implications for impaired driving policies and the way that jurisdictions currently deliver interventions. First, it suggests that impaired driving policies that assume offenders will make rational decisions in their own best interest are flawed and will likely not deter the impaired driving behaviour of the offenders who pose the greatest concern. Second, it provides an indication that psychobiological, cognitive and psychosocial markers may be a more useful strategy to begin to identify clinically meaningful subgroups of offenders and also to guide the development of effective interventions to target them. Finally, it demonstrates that interventions must be targeted and specific to interrupt the different pathways to persistent impaired driving behaviour. In other words, it is a clear indication that a “one-size-fits-all” approach to the management of offenders is inappropriate.

4. CONCLUSIONS

The progress that has been achieved in reducing impaired driving in the past three decades is considerable. This has been possible as a result of research to inform our understanding of the problem, the use of methods to monitor and measure progress, and the willingness of agencies to not only evaluate interventions, but also to pursue the implementation of a continuum of evidence-based strategies to target the different facets of the problem.

Yet the plateau that has been increasingly evident over the past decade suggests it is time to re-evaluate and re-assess Canada's impaired driving framework to better leverage new knowledge. There is much to be learned from recent and ongoing research initiatives, and the challenge will be to compile this research, to translate it to interested professionals and government officials to make it meaningful to inform practice, and to guide the development of a more holistic approach to direct efforts. While punishment is both necessary and appropriate in some circumstances, it is clear that a focus on punishment alone, in the absence of treatment opportunities and interventions to target offender risks and need, fails to meet the goals of jurisdictions to protect the public through long-term risk reduction.

This means that efforts to address the problem must move beyond a "moral" model of offending and begin to embrace scientific inquiry and the growing knowledge of multiple disciplines to inform the development of effective strategies focused on harm reduction. Available evidence demonstrates that even the most persistent and high-risk offenders can change their behaviour. As such, approaches to the problem must be pragmatic and evidence-based with the end goal of improving road safety, even if these strategies run counter to traditional emotional reactions to the problem and strong desires for punishment.

Beyond that, continued leadership, collaboration, and the expanded use of alcohol monitoring technologies are much needed and must be critical features of change strategies to ensure that long-term objectives and goals are realized.

The good news is the level of interest and engagement that was readily apparent at the 2012 Drinking and Driving Symposium is a strong indication that the time is right to re-focus our energies to better address impaired driving. The Symposium provided a much-needed opportunity to explore the existing framework and consider a diversity of perspectives. This is an essential first-step in a much longer-term process. Continued dialogue across the spectrum of road safety stakeholders is encouraged.

5. REFERENCES

- Agrawal, N. & Duhachek, A. (2009). Emotional Compatability and the Effectiveness of Anti-Drinking Messages: A Defensive Processing Perspective on Shame and Guilt. *Journal of Marketing Research*. Volume XLVI. American Marketing Association.
- Andrews, D., & Bonta, J. (2010). Rehabbing criminal justice policy and practice. *Psychology, Public Policy, and Law*, 16(1), 39-55.
- Andrews, D., & Dowden, C. (2006). Risk principle of case classification in correctional treatment: A meta-analytic investigation. *International Journal of Offender Therapy and Comparative Criminology*, 50, 88-100.
- Andrews, D., Zinger, I., Hoge, R., Bonta, J., Gendreau, P., & Cullen, F. (1990). Does correctional treatment work? A clinically relevant and psychologically informed meta-analysis. *Criminology*, 28(3), 369-404.
- Anton, R., O'Malley, S., Ciraulo, D., Cisler, R., Couper, D., Donovan, D., Gastfriend, D., Hosking, J., Johnson, B., LoCastro, J., et al. (2006). Combined pharmacotherapies and behavioural interventions for alcohol dependence. *The Journal of the American Medical Association*, 295(17), 2003-2017.
- Beck, K., Rauch, W., Baker, E., & Williams, A. (1999). Effects of alcohol interlock license restrictions on drivers with multiple alcohol offenses: A random trial in Maryland. *American Journal of Public Health*, 89, 1696-1700.
- Beirness, D. (2001). *Best Practices for Alcohol Interlock Programs*. Ottawa: Traffic Injury Research Foundation.
- Beirness, D., Simpson, H., & Mayhew, D. (1998). Programs and policies for reducing alcohol-related motor vehicle deaths and injuries. *Contemporary Drug Problems*, 25, 553-578.
- Beirness, D., Simpson, H. & Mayhew, D. (1997). Evaluation of Administrative Licence Suspension and Vehicle Impoundment Programs in Manitoba. Traffic Injury Research Foundation. Ottawa, Canada.
- Berglund, M., Thelander, S., Salaspuro, M., Franck, J., Andreasson, S., & Ojehagen, A. (2003). Treatment of alcohol abuse: An evidence-based review. *Alcoholism: Clinical and Experimental Research*, 27(10), 1645-1656.
- Bonta, J., Wallace-Capretta, S., & Rooney, J. (2000). A quasi-experimental evaluation of an intensive rehabilitation supervision program. *Criminal Justice and behaviour*, 27(3), 312-329.
- Bouchard, S. M., Brown, T. G., & Nadeau, L. (2012). Decision-making capacities and affective reward anticipation in DWI recidivists compared to non-offenders: A preliminary study. *Accid Anal Prev*, 45(2), 580-587. doi: 10.1016/j.aap.2011.09.012

- Brown, T. G., Dongier, M., Ouimet, M. C., Tremblay, J., Chanut, F., Legault, L., & Kin, N. M. (2012). The role of demographic characteristics and readiness to change in 12-month outcome from two distinct brief interventions for impaired drivers. *Journal of Substance Abuse Treatment*, 42(4), 339-446.
- Brown, T.G., Dongier, M., Ouimet, M.C., Tremblay, J., Chanut, F., Legault, L., Ng Yin Kin, N.M.K. (2010). Brief motivational interviewing for DWI recidivists who abuse alcohol and are not participating in DWI intervention: a randomized controlled trial. *Alcoholism: Experimental & Clinical Research*, 34(2): 292-301.
- Brown, T. G., Gianoulakis, C., Tremblay, J., Nadeau, L., Dongier, M., Ng Ying Kin, N. M., Ouimet, M. C. (2005). Salivary cortisol: a predictor of convictions for driving under the influence of alcohol? *Alcohol Alcohol*, 40(5), 474-481. doi: agh165 [pii] 10.1093/alcalc/agh165
- Brown, T. G., Ouimet, M. C., Nadeau, L., Lepage, M., Tremblay, J., Dongier, M., & Kin, N. M. (2008). DUI offenders who delay relicensing: a quantitative and qualitative investigation. *Traffic Inj Prev*, 9(2), 109-118. doi: 792022278 [pii] 10.1080/15389580801907908
- Brusman Lovins, L., Lowenkamp, C., Latessa, E., & Smith, P. (2007). Application of the risk principle to female offenders. *Journal of Contemporary Criminal Justice*, 23(4), 383-398.
- Bock, S. (2003). Michigan DOC Runs BETA test of New Remote Transdermal Alcohol Monitoring System. *The Journal of Offender Monitoring*, Winter/Spring 2003, 2-6.
- Campbell, M., French, S., & Gendreau, P. (2007). *Assessing the utility of risk assessment tools and personality measures in the prediction of violent recidivism for adult offenders*. (User Report 2007-04). Ottawa: Public Safety Canada.
- Carroll, K. (1996). Relapse prevention as a psychosocial approach: A review of controlled clinical trials. *Experimental Clinical Psychopharmacology*, 4, 46-54.
- Carroll, K. (1998). *A Cognitive- behavioural Approach: Treating Cocaine Addiction*. *Therapy Manuals for Drug Addiction*, Manual 1. NIH Pub. No. 98-4308. Rockville, MD: National Institute on Drug Abuse.
- Coben, J., & Larkin, G. (1999). Effectiveness of Ignition Interlock Devices in Reducing Drunk Driving Recidivism. *American Journal of Preventative Medicine*, 16(1S): 81-87.
- Couture, S., Brown, T. G., Ouimet, M. C., Gianoulakis, C., Tremblay, J., & Carbonneau, R. (2008). Hypothalamic-pituitary-adrenal axis response to stress in male DUI recidivists. *Accid Anal Prev*, 40(1), 246-253. doi: S0001-4575(07)00101-7 [pii] 10.1016/j.aap.2007.06.003
- Crime and Justice Institute (2004). *Implementing Evidence-based Practices in Community Corrections: The Principles of Effective Intervention*. Washington, DC: National Institute of Corrections.

- Davis, H.T., Beaton, S.J., Von Worley, A., Parsons, W., & Gunter, M.J. (2012). The effectiveness of screening and brief intervention on reducing driving while intoxicated citations *Population Health Management*, 15(1): 52-57.
- Dill, P., & Wells-Parker, E. (2006). Court-mandated treatment for convicted drunk drivers. *Alcohol Research and Health*, 29(1), 41-48.
- Dunn, C., Deroo, L., & Rivara, F.P. (2001). The use of brief interventions adapted from motivational interviewing across behavioural domains: a systematic review. *Addiction* 96(12), 1725–1742.
- Elder, R., Shults, R., Sleet, D., Nichols, J., Zaza, S., & Thompson, R. (2002). Effectiveness of sobriety checkpoints for reducing alcohol-involved crashes. *Traffic Injury Prevention*, 3(4), 266-274.
- Elder, R.W., Voas, R., Beirness, D., Shults, R.A., Sleet, D.A., Nichols, J.L., and Compton, R. (2011). Effectiveness of Ignition Interlocks for Preventing Alcohol-Impaired Driving and Alcohol-Related Crashes. *American Journal of Preventative Medicine*, 40(3), 362-376.
- Fell, J., Lacey, J., & Voas, R. (2004). Sobriety checkpoints: Evidence of effectiveness is strong, but use is limited. *Traffic Injury Prevention*, 5(3), 220-227.
- Ferguson, S. A., Wells, J.K. & Lund, A.K. (1995). The role of passive sensors in detecting alcohol-impaired drivers at sobriety checkpoints. *Alcohol, Drugs and Driving* 11(1): 23-30.
- Flango, V., & Cheesman, F. (2009). The effectiveness of the SCRAM alcohol monitoring device: A preliminary test. *Drug Court Review*, 6(2), 109-134.
- Fuller, R., & Gordis, E. (2004). Does Disulfiram have a role in alcoholism treatment today? *Addiction*, 99(1), 21-24.
- Gendreau, P. and Goggin, C. (1997). "Correctional Treatment: Accomplishments and Realities." In P. Van Voorhis (ed.), *Correctional Counseling and Rehabilitation*. Cincinnati, Ohio: University of Cincinnati Press.
- Griffin III, L., & DeLaZerda, S. (2000). *Unlicensed to Kill*. Washington, D.C.: AAA Foundation for Traffic Safety.
- Holder, H., Cisler, R., Longabaugh, R., Stout, R., Treno, A., & Zweben, A. (2000). Alcoholism treatment and medical care costs from Project MATCH. *Addiction*, 95, 999-1013.
- Homel, R., 1988. *Policing and Punishing the Drinking Driver. A Study of General and Specific Deterrence*. Springer Verlag, New York.
- Johnson, B., Rosenthal, N., Capece, J., Wiegand, F., Mao, L., Beyers, K., McKay, A., Ait-Daoud, N., Anton, R., Ciraulo, D., Kranzler, H., et al. (2007). Topiramate for treating alcohol dependence. *The Journal of the American Medical Association*, 298(14), 1641- 1651.
- Lacey, J., Jones, R., & Smith, R. (1999). *Checkpoint Tennessee: Tennessee's Statewide Sobriety Checkpoint Program*. DOT HS 808 841. Washington, D.C.: National Highway Safety Administration.

- Lapham, S. (2004/2005). Screening and brief intervention in the criminal justice system. *Alcohol Research and Health*, 28(2), 85-93. Retrieved from: <http://pubs.niaaa.nih.gov/publications/arh28-2/85-93.pdf>
- Longabaugh, R., & Morgenstern, J. (1999). Cognitive- behavioural coping-skills therapy for alcohol dependence. *Alcohol Research and Health*, 23, 78-85.
- Lowenkamp, C., & Latessa, E. (2002). *Evaluation of Ohio's community based correctional facilities and halfway house programs*. Unpublished manuscript, University of Cincinnati, Division of Criminal Justice.
- Lowenkamp, C., Latessa, E., & Holsinger, A. (2006). The risk principle in action: What have we learned from 13,676 offenders and 97 correctional programs? *Crime & Delinquency*, 51(1), 1-17.
- Mann, K., Leher, P., & Morgan, M. (2004). The efficacy of Acamprosate in the maintenance of abstinence in alcohol-dependent individuals: results of a meta-analysis. *Alcoholism: Clinical and Experimental Research*, 28(1), 51-63.
- Marques, P., Tippetts, A., Voas, R., & Beirness, D. (2001). Predicting repeat DWI offenses with the alcohol interlock recorder. *Accident Analysis and Prevention*, 33(5), 609-619.
- Mayhew, D.R.; Brown, S.W.; and Simpson, H.M. (2011). *The Alcohol-Crash Problem in Canada: 2009*. Ottawa, Ontario: Transport Canada, Road Safety and Motor Vehicle Regulation.
- McCartt, A.T., Geary, L.L., and Nissen, W.J. (2002). *Observational Study of the Extent of Driving while Suspended for Alcohol-Impaired Driving*. DOT HS 809 491. Washington, D.C.: National Highway Traffic Safety Administration.
- McCartt, A., Geary, L., & Berning, A. (2003). Observational study of the extent of driving while suspended for alcohol impaired driving. *Injury Prevention*, 9, 122-137.
- McGuire, J. (2001). "What works in correctional interventions? Evidence and practical implications." In G. Bernfeld and A. Leschied (eds.) *Offender Rehabilitation in Practice: Implementing and Evaluating Effective Programs*. (p. 25-43). New York: John Wiley & Sons Ltd.
- McKelvie, A. (2005). *An Implementation of Remote Alcohol Monitoring in Alaska*. Anchorage: The Alaska Justice Statistical Analysis Center, University of Alaska.
- Moyer, A., Finney, J.W., Swearingen, C.E., and Vergun, P. (2002). Brief interventions for alcohol problems: A meta-analytic review of controlled populations. *Addiction* 97: 279-292.
- National Highway Traffic Safety Administration (NHTSA). (1986). *The Drunk Driver and Jail. The Drunk Driver and the Jail Problem*. Volume 1. U.S. Department of Transportation. Washington, DC.
- National Highway Traffic Safety Administration (2007). *Screening and Brief Intervention Tool Kit for College and University Campuses*. DTNH22-02-H-05108, February 2007. National Highway Traffic Safety Administration, Washington, D.C. Retrieved from: http://friendsdrivesober.org/documents/SBI_College.pdf.

- National Institute on Drug Abuse (NIDA). (2006). *Principles of Drug Abuse Treatment for Justice Populations: A Research-based Guide*. National Institutes of Health, U.S. Department of Health and Human Services. NIH Publication No. 06-5316.
- Ogloff, J., & Davis, M. (2004). Advances in offender assessment and rehabilitation: Contribution of the risk-needs-responsivity approach. *Psychology, Crime, and Law*, 10(3), 229-242.
- Ouimet, M. C., Brown, T. G., Nadeau, L., Lepage, M., Pelletier, M., Couture, S., Ng Ying Kin, N. M. (2007). Neurocognitive characteristics of DUI recidivists. *Accid Anal Prev*, 39(4), 743-750. doi: S0001-4575(06)00205-3 [pii] 10.1016/j.aap.2006.11.005
- Phillips, R.O., Ullebert, P. and Vaa, T. (2011). Meta-analysis of the effect of road safety campaigns on accidents. *Accident Analysis and Prevention* 43: 1204-1218.
- Poikolainen, K. (1999). Effectiveness of brief interventions to reduce alcohol intake in primary health care populations: A meta-analysis. *Preventative Medicine*. 28: 503-509.
- Raub, R., Lucke, R., & Wark, R. (2003). Breath alcohol ignition interlock devices: Controlling the recidivist. *Traffic Injury Prevention*, 4, 199-205.
- Roberston, R., Vanlaar, W., & Simpson, H. (2006a). *Continuous Transdermal Alcohol Monitoring: A Primer for Criminal Justice Professionals*. Ottawa: Traffic Injury Research Foundation.
- Robertson, R., Vanlaar, W. & Simpson, H. (2006b). *Continuous Transdermal Alcohol Monitoring: A Practitioner's Guide*. Ottawa: Traffic Injury Research Foundation.
- Ross, H.L., 1992. *Confronting Drunk Driving: Social Policy for Saving Lives*. Yale University, New Haven, Connecticut.
- Sakai, J., Mikulich-Gilbertson, S., Long, R., & Crowley, T. (2006). Validity of transdermal alcohol monitoring: Fixed and self-regulated dosing. *Alcoholism: Clinical and Experimental Research*, 30(1), 26-33.
- Simpson, H., Mayhew, D., & Beirness, D. (1996). *Dealing with the Hard Core Drinking Driver*. Ottawa: Traffic Injury research Foundation.
- Shults, R., Elder, R., Sleet, D., Nichols, J., Alao, M., Carande-Kulis, V., Zaza, S., Sosin, D., & Thompson, R. (2001). Reviews of evidence to reduce alcohol-impaired driving. *American Journal of Preventative Medicine*, 21(4), 66-88.
- Stuster, J., & Blowers, M. (1995). *Experimental Evaluation of Sobriety Checkpoint Programs*. DOT HS 808 287. Washington, D.C.: National Highway Traffic Safety Administration.
- Srisurapanont, M., & Jarusuraisin, N. (2005). Naltrexone for the treatment of alcoholism: A meta-analysis of randomized controlled trials. *International Journal of Neuropsychopharmacology*, 8(2), 267-280.

SWOV (Institute for Road Safety Research). (April 2009). *SWOV Fact Sheet: Fear-based information campaigns*. Leidschendam, the Netherlands.

Taxman, F. Treatment: the “what works” literature. Paper presented at the Fourth Annual Meeting of the working Groups on DWI System Improvement, March 4-6, 2007, Williamsburg, VA. Traffic Injury Research Foundation.

Tippetts, A., & Voas, R. (1997). The effectiveness of the West Virginia interlock program on second drunk-driving offenders. In: C. Mercier-Guyon (Ed.), *Alcohol, Drugs, and Traffic Safety – T97. Proceedings of the 14th International Conference on Alcohol, Drugs, and Traffic Safety*. Annecy, France, September 21-26, 1997. Annecy: CERMT, Vol. 1, 185-192.

Vanlaar, W., Robertson, R., Marcoux, K., Mayhew, D., Brown, S. and Boase P. (2012). Trends in alcohol-impaired driving in Canada. *Accident Analysis and Prevention*. 48 (1):. 297-302.

Vezina, L. (2002). The Quebec alcohol interlock program: Impact on recidivism and crashes. In: D. Mayhew & C. Dussault (Eds.), *Alcohol, Drugs, and Traffic Safety – T2002. Proceedings of the 16th International Conference on Alcohol, Drugs, and Traffic Safety*. Montreal, August 4-9, 2002. Quebec City: Societe de l'assurance automobile du Quebec, 97-104.

Voas, R.B & Hause, J.M (1987). Deterring the drinking driver: The Stockton Experience. *Accident Analysis and Prevention* 19 (2): 81-90.

Voas, R. & Marques, P. (2003). Commentary: Barriers to interlock implementation. *Traffic Injury Prevention*, 4(3), 183-187.

Voas, R. and Tippetts, A.S. (1997). Requiring Interlocks for Reinstatement: The Florida Example. Paper presented at the 7th Annual International Ignition Interlock Symposium, Bachelor Gulch, Colorado, October 22nd – 24th

Voas, R., Marques, P., Tippetts, A., & Beirness, D. (1999). The Alberta interlock program: The evaluation of a province-wide program on DUI recidivism. *Addiction*, 94(12), 1849-1859.

Voas, R.B., Tippetts, A.S. & Taylor, E. (1999). Effectiveness of the Ohio vehicle action and administrative license suspension laws. Washington, D.C: National Highway Traffic Safety Administration.

Wanberg, K., Milkman, H., & Timken, D. (2005). *Driving With Care: Education and Treatment of the Impaired Driving Offender. Strategies for Responsible Living and Change*. New York: Sage Publishing.

Ward, T., Mesler, J., & Yates, P. (2007). Reconstructing the Risk-Need-Responsivity model: A theoretical elaboration and evaluation. *Aggression and Violent behaviour*, 12, 208-228.

Wells, J.K., Greene, M.A., Foss, R.D., Ferguson, S.A., Williams, A.F. (1997). Drinking Drivers Missed at Sobriety Checkpoints. *Journal of Studies on Alcohol*, 58 (5), 513-517.

Wells-Parker, E., Bangert-Drowns, R., McMillen, R., & Williams, M. (1995). Final results from a meta-analysis of remedial interventions with drink/drive offenders. *Addiction*, 90, 907-926.

Williams, F., & McShane, M. (2004). *Criminological Theory*. (4th ed.). New Jersey: Prentice Hall.

World Health Organization (WHO) (2010). *Screening and brief intervention for alcohol problems in primary health care*. Retrieved from: http://whqlibdoc.who.int/hq/2001/WHO_MSD_MSB_01.6b.pdf

Willis, C., Lybrand, S., & Bellamy, N. (2005). Alcohol ignition interlock programmes for reducing drink driving recidivism (review). *The Cochrane Database of Systematic Reviews*, 18(4), 6-10.

Zador, P.L., Krawchuk, S.A., & Voas, R.B. (2000). Alcohol-related relative risk of driver fatalities and driver involvement in fatal crashes in relation to driver age and gender: An update using 1996 data. *Journal of Studies on Alcohol*, 61, 387-395.