

PAHO Regional Meeting on Alcohol, Drugs, and Driving

Meeting Summary

5–6 May 2016

Washington, D.C., USA



**Pan American
Health
Organization**



**World Health
Organization**
REGIONAL OFFICE FOR THE **Americas**

Also published in Spanish:
Reunión Regional de alcohol, drogas y conducción. (Washington, DC. 5-7 de Mayo del 2016)
OPS/NMH/16-007

PAHO HQ Library Cataloguing-in-Publication Data

Pan American Health Organization

PAHO Regional Meeting on Alcohol, Drugs, and Driving. (Washington, DC. 5-7 May 2016).

1. Risk Factors. 2. Roads. 3. Accidents, Traffic. 4. Street Drugs. 5. Substance-Related Disorders.
6. Alcohol Drinking. 7. Alcohol-Related Disorders. 8. Americas. I. Title.

PAHO/NMH/16-007

(NLM Classification: WA 900)

© Pan American Health Organization, 2016. All rights reserved.

The Pan American Health Organization welcomes requests for permission to reproduce or translate its publications, in part or in full. Applications and inquiries should be addressed to the Communications Department, Pan American Health Organization, Washington, D.C., U.S.A. (www.paho.org/permissions). The Department of Noncommunicable Diseases and Mental Health will be glad to provide the latest information on any changes made to the text, plans for new editions, and reprints and translations already available.

Publications of the Pan American Health Organization enjoy copyright protection in accordance with the provisions of Protocol 2 of the Universal Copyright Convention. All rights are reserved.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the Pan American Health Organization concerning the status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the Pan American Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by the Pan American Health Organization to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall the Pan American Health Organization be liable for damages arising from its use.

Table of Contents

| | |
|---|-----------|
| ACKNOWLEDGMENTS | 1 |
| OVERVIEW | 2 |
| Scope and purpose | 2 |
| Background..... | 2 |
| PRESENTATIONS | 4 |
| Welcome and introduction | 4 |
| Burden of disease from drugs and driving and regional and global updates..... | 4 |
| Summary of impaired-driving data and laws and current situation in Latin America | 6 |
| Impaired-driving studies in Brazil: challenges, potential benefits, and gaps..... | 8 |
| Summary of current evidence and studies in the United States and some LMICs | 10 |
| Discussion on priority areas and opportunities for regional collaboration | 12 |
| Alcohol and drug Involvement in traffic crash fatalities: methodological issues..... | 14 |
| Road injuries: case-crossover methodology..... | 15 |
| Drink- and drug-driving countermeasures in Brazil: using evidence to guide policy changes | 16 |
| Roadside surveys: methodological issues, mental health assessment, and types of drivers | 17 |
| Biological sampling: benefits and drawbacks of various methods | 18 |
| Discussion on possible types of studies for future research in the region: What is feasible in Latin America and the Caribbean? What can best inform policy-making? | 19 |
| Logistics of a regional study | 21 |
| Ethical issues for studies that collect biological samples | 22 |
| CONCLUSIONS | 23 |
| The way forward: building consensus on regional protocol development | 23 |
| Next steps..... | 24 |
| REFERENCES | 25 |
| ADDITIONAL RESOURCES | 27 |
| ANNEX I: MEETING AGENDA | 29 |
| ANNEX II: PARTICIPANT LIST | 31 |
| ANNEX III: ABBREVIATIONS | 33 |

ACKNOWLEDGMENTS

The Pan American Health Organization gratefully acknowledges the contributors to this report:

Maristela Monteiro coordinated the production of the document, supervising the content development, technical review, and editing process.

Anthony Ramirez was responsible for drafting the report.

Guilherme Borges reviewed the technical content.

Blake Andrea Smith was responsible for the editing and finalization of the report.

OVERVIEW

Scope and purpose

An international meeting on alcohol, drugs, and driving was held at Pan American Health Organization (PAHO) headquarters in Washington, D.C., USA, 5–6 May 2016. The objectives of the meeting were to:

- Review 1) research gaps on alcohol, drugs, and road injuries and 2) recommendations from the World Health Organization (WHO) Second Technical Consultation on Drug Use and Road Safety held in Spain in 2015
- Review studies carried out in the Americas
- Present possible types of studies for future research in Latin America and the Caribbean (LAC)
- Discuss potential study methods, sampling, laboratory analysis, logistics, ethical issues, and challenges
- Discuss feasibility of undertaking one or more studies using a common protocol
- Reach consensus on main elements of a regional protocol and next steps

Participants included experts on impaired driving and alcohol, and other drug researchers; traffic safety researchers; government agency staff; and staff from both PAHO and WHO (Geneva).

Background

Globally, road traffic injuries 1) claim about 1.25 million lives each year, 2) are the leading cause of death among young people between 15 and 29 years old, 3) are currently estimated to be the ninth leading cause of death across all age groups, and 4) are predicted to become the seventh leading cause of death by 2030 and cost governments approximately 3% of gross domestic product (GDP). Data from WHO's third Global Status Report on Road Safety (2015) show that low- and middle-income countries (LMICs) are hardest hit, with road traffic fatality rates double those of high-income countries and 90% of all road traffic deaths worldwide (1).

A major risk factor for road traffic crashes, injuries, and deaths is drinking alcohol and driving ("alcohol-involved driving" or "drink-driving"). Alcohol-related traffic casualties are of special concern in the Americas, where 1) alcohol consumption is nearly 40% higher than the global average, 2) injuries (25% of which are caused by motor vehicle accidents) represent the main cause of death for adult men in the region's LMICs, and 3) much remains unknown about

alcohol-related traffic injuries and deaths. For example, other than Brazil, where an estimated 40% of traffic deaths are related to alcohol, data on the proportion of injuries and deaths due to alcohol are unavailable (2-4).

In the Americas, the magnitude of problems associated with drink-driving is still being measured; much less is known about using other psychoactive drugs and driving (“drug-involved driving” or “drug-driving”). Global estimates show that about 50 000 road traffic deaths—about 40 000 among men and about 10 000 among women—can be attributed to impairment from use of illicit drugs (traffic deaths related to other psychoactive substances were not assessed). Amphetamine-induced impairment was reported as a key factor in about half of the deaths, and cannabis impairment was found in 20% of deaths (5). The prevalence of drug-driving remains unknown in most regions of the world, including the Americas. In the United States, results from the 2013–2014 National Roadside Survey of Alcohol and Drug Use by Drivers show that approximately 22% of drivers tested positive for either an illicit or prescription drug (6).

However, there is growing recognition among road safety policy-makers and researchers of the problem of drug-driving and its potential impact on road safety. There is also recognition that drug-driving is more complex than drinking and driving for the following reasons:

- The term “drugs” encompasses a wide variety of substances—some illegal but widely used, some prescribed and legally purchased/consumed, some bought over the counter.
- Detecting and measuring levels of psychoactive substances is more complicated than detecting alcohol in breath or blood, requiring samples of blood, urine, or saliva and sophisticated expertise among police to recognize impairment and carry out tests.
- The crash risk for drug use is more complicated to ascertain than that for alcohol use, and varies by drug. Linking a positive drug presence with crash risk is difficult because different types of drugs remain in the bloodstream for different lengths of time.
- The lack of scientific evidence on the links between drug levels, impairment, and crash risk for many drugs makes it difficult to set threshold limits for each substance.

Recognizing the role of alcohol and drugs in traffic injuries and death, and the toll on communities worldwide, the United Nations General Assembly adopted a resolution in 2010 that led to the establishment of the Decade of Action for Road Safety (2011–2020). The resolution called on UN member states to take the necessary steps to make their roads safer (7). In addition to the Decade of Action, the UN’s 2030 Agenda for Sustainable Development, which set a goal of reducing road traffic deaths and injuries by 50% by 2020, reflects growing international recognition of road safety’s effect on health, development, and broader environmental objectives, as well as the potential to improve it (8).

In response to this call for action, PAHO organized a technical meeting with researchers from various countries in the Americas, and WHO and PAHO staff, to 1) review research on drink- and drug-driving carried out in the Americas (particularly LAC countries), and determine research gaps; 2) discuss the types of studies that could be carried out in LAC countries in future; and 3) review the feasibility of undertaking one or more studies using a common protocol.

PRESENTATIONS

Welcome and introduction

Dr. Anselm Hennis and Dr. Maristela Monteiro (PAHO)

Dr. Anselm Hennis (PAHO, Noncommunicable Diseases and Mental Health) provided an overview of the situation, showing the significant burden of death and disability attributed to alcohol and other substance use and road injuries. He highlighted some of the efforts to prevent these harms at global and regional levels, including through the Sustainable Development Goals 2020, but expressed concern about the slow progress within the countries of the Americas in regard to implementing and enforcing prevention policies and reversing upward trends in drug use. Dr. Hennis ended by articulating the need to conduct research in Latin America to help orient next steps in this area and to expand the work related to drink-driving.

Opening remarks (welcome to attendees and introduction of participants) were provided by the meeting chair, Dr. Maristela Monteiro (PAHO, Alcohol).

Burden of disease from drugs and driving and regional and global updates

Dr. Jürgen Rehm (CAMH)

Dr. Margie Peden (WHO), Dr. Luis Alfonzo (PAHO), and Dr. Eugênia Rodrigues (PAHO)

Abstract

Speakers provided information showing that illicit drugs produce impairments that affect a driver's ability to operate a motor vehicle. Global data show that drug-driving is becoming a public health and safety concern, and WHO has taken a more active role in addressing the issue, and filling in research gaps. However, much remains unknown about the extent of the problem. In the Americas, like data on alcohol-involved driving, drug-driving data are scarce. Better law enforcement and stronger surveillance systems to capture data are needed.

Presentation

The meeting began with an introduction by *Dr. Jürgen Rehm* (University of Toronto Center for Addiction and Mental Health (CAMH)) on the burden of disease from drugs and driving, followed by regional and global updates from PAHO and WHO staff.

Dr. Rehm provided an assessment of causality for different categories of drugs as a risk factor. Laboratory studies and some epidemiological studies are consistently showing that drugs other than alcohol—particularly cannabis—produce impairments in reaction time, information processing, perceptual-motor coordination, motor performance, attention, and tracking behavior. Preliminary burden estimates show that about 40 000 traffic deaths globally and about 5 000 in the Americas are due to illicit drug use. More than half of all substance-attributable traffic deaths worldwide are due to amphetamine use (48% in the Americas), and 20% are due to cannabis use, mainly due to the high prevalence of regular use. Compared to other WHO regions, the Americas are highest for traffic fatalities due to cannabis and cocaine use. However, all drugs combined are still causing fewer deaths than alcohol (5).

Dr. Rehm also mentioned the weaknesses of the estimates, including the fact that they do not yet fully incorporate harms to others (i.e., they are limited to traffic injuries and deaths of drug-impaired drivers), and the lack of both roadside surveys and studies on multidrug use.

Dr. Margie Peden (WHO, Unintentional Injury Prevention) provided an update on WHO's second technical meeting on drug use and road safety held in Spain in December 2015 (a follow-up to the December 2014 meeting in Geneva). Both meetings were the result of growing concern about this issue among member states, who have been asking for support from WHO in the form of documents or guidance, and WHO's recognition of the gaps in terms of evidence and solutions.

At the December 2015 meeting in Spain, meeting participants agreed on the content and development process for three reports: 1) an information sheet, 2) a policy brief, and 3) a technical report. The information sheet, disseminated at an information session during the Fifty-ninth session of the Commission on Narcotic Drugs in March 2016, covers epidemiological, testing, and prevention issues related to drug use and road safety, and WHO's response. The policy brief covers various drug use and road safety components (e.g., risk of road traffic crashes by drug type) and compiles current knowledge about drugs and driving (5). The technical report, which is still in process, will cover some of the same components plus guidance on prevention and policy recommendations.

Dr. Luis Alfonzo (PAHO, Substance Abuse) provided a regional update on traffic safety and drug use. In the Americas, many traffic crash injuries and deaths are caused by drivers under the influence of alcohol, illicit drugs, and prescription drugs (medications). However, the data are not reliable and are not collected in a timely manner, making monitoring of the problem difficult. He added that drug use and traffic safety need to be better incorporated into public health campaigns, and there is a need for better data, and improved national systems to capture it.

Dr. Eugênia Rodrigues (PAHO, Traffic Safety) presented more information on road safety in the Americas, including estimated traffic death rates for the region (15.9 per 100 000 drivers) and the mortality rate by type of road user (e.g., motorcyclists, which account for 20% of deaths). Dr. Rodrigues added that the number of countries in the Americas currently in line with WHO criteria for drink-driving laws dropped from 14 (in 2010) to six (in 2013), mainly due to new criteria which added a lower blood alcohol concentration (BAC) limit (less than or equal 0.02 g/dl) for young or novice drivers.

Data were also provided on 1) drink-driving law enforcement, which is still low compared to other regions, but has been improving, and 2) the number of countries in the region with various national drug-driving legislation or regulation. Dr. Rodrigues concluded her remarks by recommending stronger efforts to implement and enforce legislation (e.g., a BAC limit of 0.05 g/dL for alcohol-involved driving) and strengthening surveillance systems to improve the quality of the data for specific groups and areas at greater risk for traffic injuries (9).

Summary of impaired-driving data and laws and current situation in Latin America

Gabriela Rosende Bustos (CONASET) and Jimena Kalawski (SENDA)

Susana Umaña and Carolina Salas Aguilar (IAFA)

Dr. Kavita Singh (Guyana Ministry of Public Health)

Karina Conde (CONICET)

Dr. Guilherme Borges (INPRF / UAM)

Mónica Routi (UNA)

Diane Meerhoff Scaffo (JND)

Abstract

Representatives from various countries in Latin America provided overviews of impaired-driving data and laws (and any related legislation) in their respective countries. As shown in the presentations, several countries have data on both alcohol- and drug-involved driving but others

have not yet developed a system to capture the information, particularly drug-driving data. In some countries, impaired-driving laws have improved, but their enforcement remains limited.

Presentation

In these presentations, participants provided the most recent information on impaired-driving data and laws in their respective countries.

From Chile, *Gabriela Rosende Bustos* (National Commission on Traffic Safety (CONASET)) and *Jimena Kalawski* (National Service for the Prevention and Rehabilitation of Drugs and Alcohol (SENDA)), provided a summary of traffic safety data, including the number of crashes, injuries, and deaths in 2015. They also provided an overview of impaired-driving laws, including two that were recently enacted (the “Zero Tolerance” law (2012), and “Emilia’s Law” (2014)). These laws established lower blood alcohol concentration (BAC) limits, increased penalties for driving under the influence, and made it illegal to refuse breath tests. However, many law enforcement agencies in Chile do not have the proper equipment to test for drugs, especially for roadside testing. One analysis of nearly 3 000 traffic fatalities from 2010 through 2014 in the capital region showed about 11% of drivers were positive for cocaine and 2.5% were positive for cannabis (10, 11).

From Costa Rica, *Susana Umaña* (Consejo de Seguridad Vial (COSEVI)) and *Carolina Salas Aguilar* (Institute on Alcoholism and Drug Dependence (IAFA)) described the country’s impaired-driving laws and various administrative penalties (e.g., confiscation of the license from drivers found violating the law. The BAC limit is 0.05 g/dL and there are increased penalties for drivers with 0.10 g/dL, including incarceration, paying a fine, and having to undergo an alcohol use disorder (AUD) evaluation. However, Costa Rica does not have a way to measure drug use in the driving population.

From Guyana, *Dr. Kavita Singh* (Ministry of Public Health) reported that hardly any data are collected on alcohol or drug use in the country, and although there are strict impaired-driving laws, there are many challenges in enforcing them. Alcohol breath-testing is not compulsory and must be conducted by a senior officer. As very few officers are on the road, many impaired drivers go unnoticed. In addition, there is only one hospital in the country that can do blood alcohol testing.

From Argentina, *Karina Conde* (National Council on Scientific and Technical Research (CONICET)) provided a summary of drink- and drug-driving studies and impaired-driving laws in the country. Ms. Conde noted that data related to the incidence of impaired driving are scarce and are often

not even gathered. For example, police officers recently developed a new crash report form that does not collect any information related to alcohol or drug consumption. The BAC limit is 0.05 g/dL and cannabis use has been de-penalized. Other drug use is prohibited while driving but police do not have screening tools and there is currently no legislation on drug-level limits.

From Mexico, *Dr. Guilherme Borges* (National Institute of Psychiatry Ramón de la Fuente Muñiz (INPRF) and Metropolitan Autonomous University (UAM)) presented information on drug use in Mexico based on survey data. Drug-use trends show increasing use rates for cannabis and cocaine (12). Dr. Borges also showed information on the global burden of disease for alcohol that indicated Mexico has higher drug and alcohol rates than the global average (13). He stated that there is evidence on alcohol and traffic crashes available in the country, including traffic-related death and injury, but no large epidemiological research on drugs and driving.

From Paraguay, *Mónica Routi* (National University of Asunción (UNA)) reported that traffic crashes were one of the leading causes of death and injury. Young drivers 15–25 years old and motorcyclists make up a large percentage of those involved in traffic crashes. According to the Paraguayan National Police (PNP), alcohol was present in 80% of injury crashes. Data from the National Agency on Traffic and Road Safety (*Agencia Nacional de Tránsito y Seguridad Vial*, ANTSV) show that cannabis and cocaine were found in 18% of drivers who died in crashes.

From Uruguay, *Diane Meerhoff Scaffo* (National Drug Board (JND)) provided an overview of data on traffic crash and alcohol and drug use surveys (“past 30 days”). In particular, in 2015, alcohol was found in approximately 7% of drivers involved in crashes (14). A zero tolerance law in Uruguay went into effect in 2015, and in 2013 cannabis was legalized in the country.

Impaired-driving studies in Brazil: challenges, potential benefits, and gaps

Dr. Flavio Pechansky (UFRGS)

Abstract

Researchers in Brazil have extensive experience conducting studies on impaired-driving studies. These studies include roadside surveys, telephone surveys, collecting hospital data, and estimating economic costs related to impaired driving. The speaker described some of the lessons learned from these studies, and future challenges such as funding, database uniformity, and working with law enforcement agencies.

Presentation

In this presentation, *Dr. Flavio Pechansky* (Federal University of Rio Grande do Sul (UFRGS)) described the challenges, potential benefits, and research gaps of impaired-driving studies in Brazil.

The presentation covered the various technologies and methods available during a 2008 series of studies on impaired driving in Brazil, including breathalyzers, personal digital assistants (PDAs), online databases, saliva samples, and telephone surveys (15). At the beginning of these studies, researchers asked the following questions:

- Can we get a baseline?
- What is the role of drugs other than alcohol?
- How do we nest a survey inside a sobriety checkpoint?
- Can we obtain good data by telephone survey?
- Can we work appropriately with enforcement agencies?
- How can we protect the anonymity of respondents without compromising the study?
- Can we geo-reference¹ crashes and relate them to alcohol use?
- What is the impact of impaired driving on:
 - Deaths?
 - Emergency rooms?
 - Economic costs?

Dr. Pechansky provided data and information from some of the eight impaired-driving studies conducted between 2007 and 2009 to show how they addressed the set of questions and demonstrated the possibility of conducting impaired-driving studies in Brazil.

Since those initial studies, other challenges have arisen. These research challenges include the need for new funding sources from Brazilian agencies and incorporating new techniques into the studies (i.e., machine-learning, database uniformity, and on-site drug testing devices). Other challenges include the bureaucracy/"red tape" (time lag to obtain materials such as lab supplies and machines); unusual situations that prevent data collection (e.g., difficult logistics); and training of personnel, including law enforcement (16).

¹ Associate physical map or image of map with specific spatial locations.

Summary of current evidence and studies in the United States and some LMICs

Dr. Richard Compton (NHTSA)

Anthony Ramirez (PIRE)

Dr. Katharine Allen (JHCIRP)

Abstract

Over the last 60 years, great progress has been made in the United States in reducing alcohol-involved driving and alcohol-related injuries and deaths. This progress is the result of many different factors, including research that showed that alcohol impairs driving, and raises the risk of crashing, and study findings on dose–response relationships. Additional factors include the development of technology to measure BAC, improved laws, and better tools for law enforcement. However, drug-involved driving presents different challenges. Much of what is known about alcohol remains undetermined with regard to drugs, including dose–response relationships and crash risk. Recent roadside surveys conducted in the United States show that the prevalence of drivers with some type of drug in their system is much higher than that of drivers with alcohol. The Bloomberg Initiative on Global Road Safety has begun to gather data and work with other countries in the Americas to implement policies to reduce traffic injuries.

Presentation

Dr. Richard Compton (National Highway Traffic Safety Administration (NHTSA)) provided an overview of efforts in the United States to reduce impaired driving over the past 60 years. During that period, great progress has been made in reducing crashes caused by alcohol-impaired driving due to various factors that include research demonstrating that alcohol impairs driving and raises the risk of crashing, and studies on dose–response relationships. Additional factors include the development of technology to measure BAC (i.e., breathalyzers); improved laws (i.e., impairment laws and illegal per se laws); better tools for law enforcement (e.g., portable breath tests and standardized field sobriety tests); and training and education on drink- and drug-driving for prosecutors and judges. Other factors that have contributed to decreased impaired-driving crash rates included research on the effectiveness of laws, enforcement techniques, sanctions, and driver education and treatment programs.

Reducing crashes caused by drug-impaired driving, on the other hand, is much more complex. As Dr. Compton explained, it is known that 1) many drugs have the potential to impair driving-related skills, 2) drivers use drugs, and 3) drug use is prevalent among fatally injured drivers. What still needs to be determined is which specific drugs impair driving, as there are a large

number of potentially driving-impairing drugs, and more about the dose–response relationship (17). For example, what are the impairment thresholds for various drugs? And do higher drug levels in blood or oral fluid mean greater impairment?

Dr. Compton described recent national study results that indicated 22.5% of weekend nighttime drivers in the United States were positive for some type of drug, and 15.2% were positive for an illegal drug (6). Dr. Compton added that the current technology for detecting and measuring drug levels relies on blood or urine sampling, which is time-consuming and expensive. Therefore, what is needed are accurate testing methods that are quicker, cheaper, and easier to apply, such as oral fluid drug-testing devices that can be used at the roadside.

Anthony Ramirez (Pacific Institute for Research and Evaluation (PIRE)) provided an overview of the 2013–2014 National Roadside Survey of Alcohol and Drug Use by Drivers, which shows the average proportion of drivers on the road during the day on Fridays and during nighttime hours on weekends who have alcohol or drugs in their system. The survey was conducted during 2013 and 2014 at a representative sample of 300 locations across the United States. More than 9 000 drivers participated in the voluntary and anonymous study. This was the fifth such survey on driver alcohol use conducted since 1973 and the second survey that has collected information on the use of drugs (legal and illegal).

The survey found that about 1.5% of nighttime weekend drivers had a BAC at or above the legal limit of 0.08, and 8.3% had a measurable amount of alcohol in their systems. The proportion of total drug-positive nighttime weekend drivers increased from 16.3% in 2007 to 22.5% in 2013–2014. The drug showing the greatest increase from 2007 to 2013–2014 was cannabis (THC). The percentage of THC-positive drivers increased from 8.6% in 2007 to 12.6% in 2013–2014 (6).

Mr. Ramirez concluded by describing the benefits of roadside surveys, including 1) the potential use of the initial survey results as baseline data, allowing for examination of trends over time, and thus providing a key resource for interventions on traffic safety and alcohol and drug prevention, and 2) the fact that the roadside survey is a well-established protocol that can be adapted by any state or region.

Dr. Katharine Allen (Johns Hopkins Center for Injury Research and Policy (JHCIRP)) discussed the Bloomberg Initiative for Global Road Safety. One of the Initiative’s projects focused on gathering data on four risk factors, including alcohol, in 10 countries (including Mexico and Brazil). A more recent phase of the Initiative focused on drinking and driving in three Latin American cities: Bogotá, Colombia, and Fortaleza and São Paulo in Brazil.

Baseline data from surveys conducted at sobriety checkpoints show that in Bogotá, 1.1% of screened drivers exceeded the legal limit of 0.02% BAC. In Fortaleza, 2.1% of drivers tested were positive for alcohol, but 18.6% of drivers that were stopped refused testing. In São Paulo, almost 60% of all drivers who were stopped and tested positive for any alcohol using a primary screening breathalyzer tool refused to be further tested. Overall, 14.1% of drivers stopped at checkpoints tested positive for the presence of alcohol and the results for 4.4% were above the legal limit.

Discussion on priority areas and opportunities for regional collaboration

Dr. Ralph Hingson (NIAAA)
Dr. Carlos Blanco (NIDA)
Dr. Eduardo Romano (PIRE)
Kathryn Stewart (ICADTS / PRC-PIRE)
Dr. Ann Dellinger (CDC)

Abstract

Representatives from several U.S. government agencies mentioned an increasing need among government, law enforcement, health department, traffic safety, and alcohol and drug prevention agencies for information from the public on drug use and driving. Currently, opioid/heroin use is of great concern, along with the increasing legality and decriminalization of cannabis and the impact on traffic safety. Several U.S. nongovernmental organizations (NGOs) are working on closing the research gaps on drug use and driving, including one that is attempting to work in coordination with researchers in Latin America.

Discussion

This portion of the meeting consisted of discussions led by representatives from various U.S. governmental agencies and NGOs working on drink- and drug-driving issues. The discussion topics included priority areas and opportunities for collaborating with Latin American countries.

Dr. Ralph Hingson (National Institute on Alcohol Abuse and Alcoholism (NIAAA)) described the growing concern about drug-driving and provided five research priorities:

- 1) *Assessment of crash/fatal-crash risk.* This includes gathering data on driving after use of various drugs, risk to others, and risk to different age groups (18). Dr. Hingson mentioned several types of studies that could be implemented to capture this information, including

experimental laboratory studies, roadside surveys, and epidemiologic studies (culpability, case/control, and cohort).

- 2) *Drug testing of drivers in fatal crashes.* In 2013, only nine U.S. states tested 70% or more of fatally injured drivers for both alcohol and drugs.
- 3) *Development of imputation for various drugs.* In U.S. states where drivers involved in fatal crashes are not always tested for alcohol, the NHTSA uses an “imputation formula” and multiple methods to estimate which fatal crashes involved alcohol.
- 4) *Effects of policy changes related to drugs and driving.* Examples of relevant policy changes include 1) the adoption of drug per se or zero-tolerance laws, 2) administrative license revocation for driving after drug use, and 3) heightened penalties for driving while impaired by alcohol and drugs combined. To capture these types of data, Dr. Hingson recommended research on various enforcement strategies and multicomponent community interventions to reduce alcohol- and drug-impaired driving.
- 5) *Screening and brief intervention for alcohol and drugs.* Dr. Hingson reported that brief interventions for drugs show less consistent benefit than brief intervention for alcohol, but studies showing benefit for drug use reduction are increasing (19).

Dr. Carlos Blanco (National Institute on Drug Abuse (NIDA)) briefly described some of the agency’s priorities, including heroin/opioid use, the effects of marijuana legalization, and the need for evidence that drugs are a risk factor in driving. Dr. Blanco discussed the need to collaborate with the NIAAA to address these concerns.

Dr. Eduardo Romano (PIRE) focused on children injured and/or killed by impaired drivers, and described the issue as an overlooked concern. Dr. Romano provided data from both the United States and Latin America on how many children under 14 years old are killed, injured, or involved in alcohol-related motor vehicle crashes (20–22).

Kathryn Stewart (International Council on Alcohol, Drugs and Traffic Safety (ICADTS) and PIRE Prevention Research Center (PRC)) provided an overview of ICADTS, an NGO whose goal is to reduce mortality and morbidity brought about by impaired drivers. ICADTS sponsors international and regional conferences to collect, disseminate, and share information among professionals. Ms. Stewart said the next international conference will be held in Brazil in October 2016 and that ICADTS is attempting to expand participation from researchers and advocates from developing and lower-middle-income countries. Included in this year’s conference will be forums and training sessions geared toward participants from those countries.

Dr. Ann Dellinger (Centers for Disease Control and Prevention (CDC)) provided an overview of the agency and its priorities, which include prescription drug use and opioid overdoses. The CDC is

currently conducting surveillance surveys on cannabis (THC) and continues to administer the Youth Behavior Risk Survey (YRBS), a survey of middle and high school students. Dr. Dellinger discussed the possibility of looking into whether questions related to drugs and driving could be added to the survey. Dr. Dellinger also mentioned the need for more information on drug-involved driving, as health departments around the United States are asking for guidance, especially on THC and driving.

Alcohol and drug Involvement in traffic crash fatalities: methodological issues

Kathryn Stewart (ICADTS / PRC-PIRE)

Abstract

Worldwide, the reporting of fatal crash data is accurate, but alcohol and drug involvement in crashes, particularly fatal crashes, is underreported. Estimates vary across countries. In addition, differences in definitions and data collection methods across countries make it difficult to make comparisons. As stated by other presenters, measuring and tracking drug-related fatalities is even more complicated and difficult than measuring and tracking alcohol-related fatalities.

Presentation

Kathryn Stewart described methodological issues related to alcohol and drug involvement in traffic crash fatalities. Ms. Stewart said that reporting of fatal crashes worldwide is accurate, but reporting of alcohol involvement is still often a “best guess,” especially in LMICs. One of the methodological issues is underreporting. Looking at international comparisons, Ms. Stewart said that some countries attribute a relatively small proportion of road fatalities to alcohol use, while other countries attribute half of their road fatalities to alcohol use. Ms. Stewart attributed some of the underreporting to the fact that not all drivers in fatal crashes are tested for the presence of alcohol or drugs, and police officers don’t always understand the importance of data collection and therefore do not collect vital crash information.

Another challenge in international comparisons is the differences in definitions and data collection methods, which complicate meaningful international comparability of official data. Suggestions offered by Ms. Stewart include 1) testing for alcohol on all active drivers in fatal crashes, whether they are killed or not; 2) systematic data collection on killed drivers, if alcohol testing can not be done on all drivers; and 3) use of imputation techniques to correct for missing data.

Ms. Stewart concluded her remarks by stating that although alcohol-related fatalities are difficult to measure and track, drug-related fatalities are even more complicated and difficult. This is due to the many different drugs (illegal and legal) and drug combinations; testing procedures that are more difficult and expensive; the fact that there is little established knowledge on impairment at different levels; and because the effects of drugs on traffic safety are not clearly known and likely less than alcohol.

Road injuries: case-crossover methodology

Dr. Guilherme Borges (INPRF / UAM)

Abstract

Impaired-driving studies, particularly roadside surveys and population surveys, often require lots of resources, including funding. In the Americas, most countries do not have sufficient resources to conduct these types of large-scale research projects. Case-crossover studies were presented in this session as an alternative method for filling in some of the research gaps that exist in the region with regard to impaired driving. One limitation of case-crossover studies is the requirement for self-reported data about the use of illicit substances at the time of the accident and during some prior period(s).

Presentation

Dr. Guilherme Borges provided an overview of the case-crossover methodology for nonfatal road injuries and built the case for using this method to capture proximal alcohol and drug use alongside other methodologies such as case-control, roadside surveys, and population surveys. Specifically, case-crossover studies could be used for obtaining substance use prevalence among persons involved in a crash as well as relative risk estimates. Dr. Borges described the case-crossover method as research that uses cases only, including as a hybrid form of case control. Case-crossover studies eliminate control selection biases and address the transient impact of an acute and intermittent exposure. However, these studies cannot estimate the impact of chronic exposure. Case-crossover analyses are carried out like other epidemiological study methods in that they obtain estimates of relative risk and confidence intervals, and dose–response, and look for possible interactions.

Dr. Borges provided examples of alcohol and drug studies using the case-crossover methodology (23–25). He concluded his remarks by providing the following list of reasons why a case-crossover study for substance use and traffic crashes would be relevant in the Americas:

- Cost: As case-crossover studies are case-only studies, they do not require funding for hospital controls or roadside surveys.
- Hospital (emergency department)–based: These studies are carried out at hospitals and thus feasible with current resources in most countries in the region.
- Quick output: these studies can provide estimates for exposure in both hazard and control periods.
- Useful for several types of drugs: Case-crossover methodology is useful for studies on alcohol, cannabis, and possibly two other large psychoactive drug categories, such as psychostimulants and depressants (but is not likely to be used for research on prescription drugs).

Drink- and drug-driving countermeasures in Brazil: using evidence to guide policy changes

Dr. Gabriel Andreuccetti (FMUSP)

Abstract

Researchers in Brazil have been conducting studies on impaired driving for many years, but data are still not systematically collected, and information on drug use and driving remains scarce. However, several studies have shown the extent of drug use among specific driving populations, including truck drivers and motorcyclists. In addition to prevalence rate studies, there is a need to look at the effectiveness of impaired-driving laws.

Presentation

Dr. Gabriel Andreuccetti (University of São Paulo Medical School (FMUSP)) presented additional drink- and drug-driving statistics from Brazil and summarized how the country could be used as a model for studying impaired-driving laws in developing countries.

In Brazil, alcohol-related fatalities are estimated at about 40% nationally, but data are scarce and not systematically collected. In one study, the mean BAC levels of known fatalities were 0.18 g/dL for men and 0.13 g/dL for women. The majority of fatalities occurred among men and women 25–34 years old, and crashes were more likely to occur on weekends between midnight and 6 a.m. (26). Drug-driving statistics in Brazil are not as developed as those for drink-driving, but one study among truck drivers who were stopped randomly, surveyed, and tested for the presence of drugs showed 9% of drivers were positive for either amphetamine, cocaine, cannabis, or multiple drugs (27). In another study, oral fluid samples from injured motorcycle drivers showed that nearly 17% had cocaine or cannabis in their system, and nearly 5% were

alcohol-positive, but alcohol-positive drivers were more likely to be deemed culpable for the crash than drug-positive and drug-free drivers.

Dr. Andreuccetti provided a brief history of changes to BAC limits and stated that there have been few studies looking at the effectiveness of the lower BAC limits but that all studies so far have shown an overall positive effect (28). However, the data may be skewed because drivers can refuse to be breath-tested. Research gaps and further issues to discuss include the following:

- Should stricter laws on impaired driving be implemented, or should more resources be put into enforcing existing laws?
- Systematic data collection should be part of any evidence-based prevention and enforcement program
- Sociocultural barriers should not be ignored in designing or developing impaired-driving policies or programs
- Policy-making on drink- and drug-driving should be a combined effort from government and social organizations

Roadside surveys: methodological issues, mental health assessment, and types of drivers

Dr. Flavio Pechansky (UFRGS)

Abstract

The roadside survey project conducted in Brazil included many different types of studies. Two of those, the roadside survey and telephone survey, provided relevant data on alcohol and drug use among drivers on selected Brazilian highways. Changes the team would have made if they were to conduct another roadside survey include 1) sampling on roads other than federal highways, 2) sampling for more hours per day (especially after midnight), and 3) not making the survey part of a sobriety checkpoint.

Presentation

Dr. Flavio Pechansky (Federal University of Rio Grande do Sul (UFRGS)) provided an overview of roadside surveys in Brazil, including data and methodological issues. Goals of the roadside surveys were to capture information on 1) BAC and drug screening, 2) individual risk factors for DUI, and 3) perceptions of risk for DUI. The roadside survey used a cross-sectional design and captured all vehicles (cars, motorcycles, buses, and trucks) on highways across Brazilian capital cities. A team of seven data collectors, in cooperation with the Federal Highway Police (*Polícia*

Rodoviária Federal or *PRF*), obtained breath and oral fluid samples from 150 drivers per site on Fridays and Saturdays between 12 p.m. and 12 a.m. Overall alcohol prevalence was 4.8%, increasing to 7.3% between 8 p.m. and midnight (15).

A separate cross-sectional study looked at the prevalence of psychiatric disorders among drivers with and without positive BAC and/or other drug use. The sample was captured from drivers who participated in the roadside survey and then participated in a follow-up telephone survey. The data indicated that 1) among those who tested positive for alcohol based on BAC, nearly one-third suffered from depression, and 2) among those who tested positive for drugs in an oral fluid sample, nearly one-quarter had been diagnosed with a substance use disorder (15).

Biological sampling: benefits and drawbacks of various methods

Dr. Renata Limberger (UFRGS)

Abstract

Whole blood is the most effective matrix for DUI evaluation because it is highly related to the scientific evidence on substance abuse and driving impairment and is thus a more precise method than oral fluid for detecting recent substance use and driving impairment. However, oral fluid is the most accessible matrix for roadside detection and the best choice for on-site drug testing when early detection is needed.

Presentation

This presentation focused on the benefits and drawbacks of various types of biological samples for DUI evaluation.

Dr. Renata Limberger (Federal University of Rio Grande do Sul (UFRGS)) presented findings from toxicology studies conducted in Brazil. She provided a list of essential drugs to screen for in any future studies on drug-impaired driving (29) (cocaine, cannabinoids (THC), amphetamines, benzodiazepines, and opioids) but stated that other substances should be included based on the consumption patterns of the region and country.

Biological samples that can be used to test for the presence of drugs include blood, urine, and oral fluid. The benefits and drawbacks of each are as follows:

- Whole blood is considered the gold standard because it has the best correlation with scientific evidence on substance use and driving impairment. However, in roadside surveys, special conditions and qualified technicians (e.g., phlebotomists) are required for proper collection and storage of the samples.
- Oral fluid provides an appropriate substance use response and has a good correlation with blood drug levels and driving behavior. Oral fluid has become the matrix of choice for drug testing roadside because it is an easy and non-invasive procedure. However, thresholds have not been established for many drugs via saliva.
- Urine is used in large-scale lab screening procedures, but it can only provide information about drug use a few days prior to the sampling, so it can't serve as "just-in-time" evidence on drug effects, and thus skews the relationship between drug detection and driving impairment. In addition, private spaces are needed for sample collection and special attention must be given to the samples to prevent tampering.

Other considerations in testing biological samples include the chain of custody, window of detection, and cutoff levels. The chain of custody refers to the ability to trace and safeguard the samples throughout all steps of the research (from collection to analysis and the final report of results). The window of detection is the time frame within which a drug can be detected in the body since last use. Different drugs can be detected over different windows of time in each matrix. Cutoff levels are the criteria that determine if a test result is positive or negative.

Discussion on possible types of studies for future research in the region: What is feasible in Latin America and the Caribbean? What can best inform policy-making?

This open discussion section focused on hearing from meeting participants on the feasibility of conducting alcohol and drug driving studies and what type of information should be captured in these studies that can best help inform policy-makers.

General consensus from representatives of the participating countries is that there is a need to collect data to show the extent of drink- and drug-driving. Although all countries had data related to alcohol and drug prevalence in their individual countries, many did not have any type of information related to alcohol- and drug-involved driving. The need in those countries was on capturing baseline data.

Those countries that did have information on alcohol- and drug-involved driving were interested in having a more uniform way of capturing the data and expanding on what they have already collected or are collecting. Some country representatives discussed ways to capture information using tools already in place. For example, the representative from Paraguay mentioned that a

national survey is conducted every year and that it might be possible to incorporate alcohol- and drug-related questions.

The list of feasible studies mentioned by meeting participants, in no particular order, included the following:

- *Emergency room data*: Studies collecting this type of data would be conducted in hospital emergency departments and would focus on capturing information related to alcohol- and/or drug-involved traffic crash injuries and fatalities. The studies were seen as a key step in helping build a case for and raising awareness about the extent of impaired driving in each country, and linking traffic crash injuries and death to alcohol and drugs was considered a concrete way of showing the public, and policy-makers, the need for effective policies. Case-crossover studies were seen as one way of capturing this type of information.
- *Fatality data*: Studies collecting this type of data would focus on capturing biological samples from drivers involved in fatal crashes to identify the prevalence of alcohol and drugs in those drivers.
- *Prevalence of prescription medication in injury and fatal crashes*: In addition to emergency room data and/or fatality data, participants felt that the prevalence of prescription drugs needs to be known.
- *Self-report surveys on drink- and drug-driving*: These types of studies would focus on surveying the general population and asking questions related to alcohol and/or drug use and driving.
- *Collection of breath tests, oral fluid, and/or blood samples from drivers (roadside surveys)*: These studies would capture prevalence rates in drivers randomly selected from a roadway by asking them to participate in a survey and provide an oral fluid and/or blood sample.

The session concluded with a discussion on the possibility of working with police agencies to capture some of the data described above, particularly in roadside surveys. The majority of representatives from the participating countries had experience working with law enforcement agencies on research projects.

Logistics of a regional study

Dr. Guilherme Borges (INPRF / UAM)

Abstract

Dr. Guilherme Borges (INPRF / UAM) provided the following recommendations for regional studies on drink- and drug-driving:

- Develop a protocol/proposal of common interests and aims
 - With assistance of PAHO/WHO
- Select and define sites and researchers
- Find sources of funding
 - General, to cover the entire project (including training, data management, data quality assurance, and fulfillment of general reporting guidelines)
 - Specific, for each participating site (combination of general and country funds)

Presentation

This presentation focused on the potential logistics of a regional study, including the types of questions that could be addressed and the resources needed to answer those questions.

Dr. Borges opened the presentation by presenting a list of possible topics to address and methods to capture the information. They included:

- Prevalence of substance use among drivers
 - Roadside surveys (using biological samples)
 - Population surveys (self-report)
- Prevalence of substance use among persons involved in a crash and relative risk estimates
 - Case-control studies (using biological samples)
 - Case-crossover studies (using pharmacy prescription records or biological specimen with self-report)
- Prevalence of substance use among persons killed in a crash and relative risk estimates
 - Case-control studies (using biological samples)

Dr. Borges described two studies sponsored by WHO as an example of studies that could be done on drink- and drug-driving in the Americas (25, 30). One study focused on alcohol and injuries in emergency departments and the other focused on the prevention of alcohol-related

injuries in the Americas. These studies had a common protocol/training, used the same questionnaire/survey, and had a centralized data coordinating center for data cleaning.

Ethical issues for studies that collect biological samples

Anthony Ramirez (PIRE)

Abstract

Studies that collect biological samples involve several ethical considerations. These include how to 1) obtain the consent of participants, 2) use law enforcement appropriately (if using), 3) maintain anonymity or confidentiality, 4) protect information collected from biological samples, and 5) deal with impaired drivers in roadside surveys.

Presentation

Ethical concerns related to roadside surveys and crash-risk studies were the focus of this presentation.

Anthony Ramirez (PIRE) provided an overview of U.S. federal guidelines that direct how subjects are approached and handled, and how they provide consent, during survey participation. This included telling potential subjects that 1) participation was voluntary and anonymous; 2) they were free to leave at any time; and/or 3) if they participated, they could skip any question that they did not want to answer.

Using law enforcement in roadside surveys presents additional ethical questions because participation must be voluntary and not coercive. Mr. Ramirez described some procedures that could be used to eliminate any coercive role law enforcement or any law enforcement role that could be perceived as coercive. Other ethical concerns were related to the collection of hospital data and biological samples (oral fluid or blood) and ensuring that collection is done in a safe and sanitary manner and procedures are in place to protect either anonymity or confidentiality. Procedures for handling impaired survey participants were also discussed (6).

CONCLUSIONS

The way forward: building consensus on regional protocol development

Based on the meeting presentations and discussions, alcohol-involved driving in the Americas region remains a concern and drug-involved driving in the region is a growing concern. Meeting participants also acknowledged current research gaps and the fact that the extent of drink- and drug-driving remains unknown. Without a better understanding of impaired driving in the Americas (e.g., who is involved in alcohol- and drug-involved crashes, and when these crashes are likely to occur), implementing appropriate policies to reduce the harmful consequences of impaired driving will be difficult.

Based on the information provided during the meeting, participants developed a list of agreed-upon concepts and aspects to be addressed moving forward.

- 1) *Conduct surveys and collect biological samples*: Participants agreed that even though self-report surveys present challenges, obtaining the information they generate was necessary and useful. Participants also agreed that although biological samples are costlier and more complex to obtain, they must be collected as they provide a more truthful measure of alcohol and drug prevalence rates among drivers.
- 2) *Include alcohol in any study*: Drug-involved driving, and drug use in general, is a growing concern worldwide. However, existing research indicates that alcohol-involved driving is far more prevalent. Participants agreed that any study that looks at drug-involved driving must also include alcohol-involved driving.
- 3) *Provide translational research and partner with NGOs*: Researchers need to work with NGOs and other civil society groups to better disseminate current and future information. Government agencies and researchers may not always have the same impact as civil society groups when pushing for policies to address impaired driving. Likewise, many civil society groups do not fully understand research findings. Participants agreed that better translational research is needed, as are partnerships with NGOs.
- 4) *Establish list of drugs to be tested*: A list of essential drugs to test for should be developed and agreed upon as a way of obtaining baseline comparable data across countries. Countries could add additional drugs to the list based on regional or country-specific concerns.
- 5) *Develop relevant survey questions*: Countries that use surveys to capture the required information may benefit from technical assistance from PAHO/WHO for developing standard questions, training of interviewers and on methods to increase participation rates.

- 6) *Develop protocols on use of blood samples:* If blood samples are to be obtained in emergency room studies, a common protocol on how to obtain, store, and analyze the blood samples needs to be developed. Assistance may be needed for purchasing the necessary equipment.
- 7) *Develop protocols on use of oral fluid samples:* Common protocols for specific devices for oral fluid testing, and how to obtain, store, and analyze samples, need to be developed. Some countries may need assistance in purchasing the necessary equipment.
- 8) *Determine the costs of conducting impaired-driving studies:* The cost of the different types of studies of impaired driving varies by scope and method. Participants agreed that cost estimates are needed for the different types of studies. Cost estimates would help determine how many countries could be included in a study and/or what resources would be needed to conduct it. Some countries may already have some resources, while others would be starting from scratch.

Next steps

Participants agreed on a number of next steps, including the following activities to be coordinated by PAHO:

- Finalize meeting report for publication
- Develop a draft protocol and circulate for comments and revisions
- Identify countries ready to adapt and initiate ethical approval and implementation (pending availability of local funds)
- Seek additional funding for technical cooperation

REFERENCES

1. World Health Organization. Global status report on road safety 2015. Geneva: WHO; 2015. Available from: http://www.who.int/violence_injury_prevention/road_safety_status/2015/en/
2. Andreuccetti G, Gawryszewski V, Diehl A, Monteiro M, Cherpitel CJ. Chapter 3: Alcohol's causal role in interpersonal violence and road traffic injuries in the Americas. In: Cherpitel CJ, Borges G, Giesbrecht N, Monteiro M, Stockwell T, editors. Prevention of alcohol-related injuries in the Americas: from evidence to policy action. Washington: PAHO; 2013. Available from: http://www.paho.org/hq/index.php?option=com_docman&task=doc_view&Itemid=270&gid=23929&lang=en
3. Santos Modelli ME, Pratesi R, Tauil PL. Alcoolemia em vítimas fatais de acidentes de trânsito no Distrito Federal, Brasil. Rev Saude Publica. 2008;42(2):350–2.
4. de Carvalho Ponce J, Muñoz DR, Andreuccetti G, de Carvalho DG, Leyton V. Alcohol-related traffic accidents with fatal outcomes in the city of São Paulo. Accid Anal Prev. 2011;43(3):782–7.
5. World Health Organization. Drug use and road safety: a policy brief. Geneva: WHO; 2016. Available from: http://www.who.int/substance_abuse/drug_use_road_safety/en/
6. Berning A, Compton R, Wochinger K. Results of the 2013–2014 National Roadside Survey of Alcohol and Drug Use by Drivers. Traffic Safety Facts Research Note. Feb 2015. Washington: U.S. Department of Transportation National Highway Traffic Safety Administration; 2015. (Report No. DOT HS 812 118). Available from: www.nhtsa.gov/staticfiles/nti/pdf/812118-Roadside_Survey_2014.pdf
7. World Health Organization. Global Plan for the Decade of Action for Road Safety 2011–2020. Geneva: WHO; 2010. Available from: http://www.who.int/roadsafety/decade_of_action/plan/plan_english.pdf?ua=1
8. World Health Organization. Brasilia Declaration: Second Global High-level Conference on Road Safety: Time for Results. Brasilia, 18–19 November 2015. Geneva: WHO; 2015. Available at: http://www.who.int/violence_injury_prevention/road_traffic/Final_Brasilia_declaration_EN.pdf?ua=1
9. Pan American Health Organization. Road safety in the Americas. Washington: PAHO; 2016. Available from: <http://iris.paho.org/xmlui/handle/123456789/28564>
10. Carabineros de Chile. Anuario Estadística de Accidentes en el Tránsito y Ferroviarios Año 2015. Available from: <http://www.carabineros.cl/>

11. Instituto Nacional de Estadísticas de Chile. Demograficas y vitales. Actualización de población 2002–2012 y Proyecciones 2013–2020. Santiago: INE; 2014. Available from: http://www.ine.cl/canales/chile_estadistico/familias/demograficas_vitales.php
12. Villatoro J, Medina-Mora ME, Fleiz Bautista C, Moreno López M, Oliva Robles N, Bustos Gamiño M, et al. El consumo de drogas en México: resultados de la Encuesta Nacional de Adicciones, 2011. *Salud Ment.* 2012;35(6):447–57.
13. Murray CJ, Vos T, Lozano R, Naghavi M, Flaxman AD, Michaud C, et al. Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet.* 2012;380(9859):2197–223.
14. Unidad Nacional de Seguridad Vial, Sistema de Información Nacional de Tránsito (UY). Informe de Siniestralidad Vial en Uruguay año 2015. Montevideo: UNASEV; 2015. Available from: http://unasev.gub.uy/inicio/sinatran/informes_siniestralidad_vial_uruguay/
15. Pechansky F, Duarte P, De Boni R. Use of alcohol and other drugs on Brazilian roads and other studies. Porto Alegre: National Secretariat for Drug Policies; 2010. Available from: <http://www.cpad.org.br/site2/phocadownload/introduction.pdf>
16. Schmitz AR, Goldim JR, Guimarães LS, Lopes FM, Kessler F, Sousa T, et al. Factors associated with recurrence of alcohol-related traffic violations in southern Brazil. *Rev Bras Psiquiatr.* 2014;36(3):199–205.
17. Kay GG, Logan BK. Drugged Driving Expert Panel report: a consensus protocol for assessing the potential of drugs to impair driving. Washington: U.S. Department of Transportation National Highway Traffic Safety Administration; 2011. (DOT HS 811 438).
18. Gjerde H, Strand MC, Mørland J. Driving under the influence of non-alcohol drugs—an update. Part I: Epidemiological studies. *Forensic Sci Rev.* 2015;27(2):89–113.
19. Tanner-Smith EE, Steinka-Fry KT, Hennessy EA, Lipsey MW, Winters KC. Can brief alcohol interventions for youth also address concurrent illicit drug use? Results from a meta-analysis. *J Youth Adolesc.* 2015;44(5):1101–23.
20. Kelley-Baker T, Romano E. Child passengers killed in reckless and alcohol-related motor vehicle crashes. *J Safety Res.* 2014;48:103–10.
21. Romano E, Kelley-Baker T. Child passengers injured in motor vehicle crashes. *J Safety Res.* 2015;52:1–8.
22. Thomas S, Kelley-Baker T, Romano E, Treffers R, Cannon CL. Transporting young passengers while impaired: the state of the law. *Health Behav Policy Rev.* 2014;1(4):265–77.
23. Borges G, Cherpitel CJ, Mondragón L, Poznyak V, Peden M, Gutierrez I. Episodic alcohol use and risk of nonfatal injury. *Am J Epidemiol.* 2005;159(6):565–71.
24. Borges G, Cherpitel C, Mittleman M. Risk of injury after alcohol consumption: a case-crossover study in the emergency department. *Soc Sci Med.* 2004;58(6):1191–200.
25. World Health Organization. Alcohol and injury in emergency departments: summary of the report from the WHO Collaborative Study on Alcohol and Injuries. Geneva: WHO; 2007.

Available from:

http://www.who.int/substance_abuse/publications/alcohol_injury_summary.pdf

26. De Carvalho Ponce J, Muñoz DR, Andreuccetti G, de Carvalho DG, Leyton V. Alcohol-related traffic accidents with fatal outcomes in the city of São Paulo. *Accid Anal Prev*. 2011;43(3):782–7.
27. Leyton B, Sinagawa DM, Oliveira KC, Schmitz W, Andreuccetti G, De Martinis BS, et al. Amphetamine, cocaine and cannabinoids use among truck drivers on the roads in the State of Sao Paulo, Brazil. *Forensic Sci Int*. 2012;215(1-3):25–7.
28. Andreuccetti G, Carvalho HB, Cherpitel CJ, Ye Y, Ponce JC, Kahn T, et al. Reducing the legal blood alcohol concentration limit for driving in developing countries: a time for change? Results and implications derived from a time-series analysis (2001–10) conducted in Brazil. *Addiction*. 2011;106(12):2124–31.
29. Walsh JM, Verstraete AG, Huestis MA, Morland J. Guidelines for research on drugged driving. *Addiction*. 2008;103(8):1258–68.
30. Cherpitel CJ, Borges G, Giesbrecht N, Monteiro M, Tim Stockwell T, editors. Prevention of alcohol-related injuries in the Americas: from evidence to policy action. Washington: Pan American Health Organization; 2013. Available from:
http://www.paho.org/hq/index.php?option=com_docman&task=doc_view&Itemid=270&gid=23929&lang=en

ADDITIONAL RESOURCES

1. National Institute on Alcohol Abuse and Alcoholism. Alcohol Policy Information System [Internet]. Washington: NIAAA; 2016. Available from:
<http://www.alcoholpolicy.niaaa.nih.gov/>
2. Bloomberg Philanthropies. Public health: road safety. Helping to save lives through proven interventions that reduce road traffic fatalities [Bloomberg Initiative for Global Road Safety]. New York: Bloomberg Philanthropies; 2016. Available from:
<http://www.bloomberg.org/program/public-health/road-safety/>
3. Centro de Pesquisa em Álcool e Drogas. Centro de Pesquisa em Álcool e Drogas [Internet]. Porto Alegre: CPAD; c2016. Available from: <http://www.cpad.org.br/site2/>
4. International Council on Alcohol, Drugs and Traffic Safety. International Council on Alcohol, Drugs and Traffic Safety [Internet]. Utrecht: ICADTS; c2016. Available from:
www.icadtsinternational.com
5. Pan American Health Organization. Report on road safety in the Region of the Americas. Washington: PAHO; 2015. Available from:
http://www.paho.org/hq/index.php?option=com_content&view=article&id=10847&Itemid=41441&lang=en

6. Pan American Health Organization. Regional status report on alcohol and health in the Americas. Washington: PAHO; 2015. Available from:
<http://www.paho.org/alcoholreport2015>
7. World Health Organization. Global status report on alcohol and health 2014. Geneva: WHO; 2014. Available from:
http://www.who.int/substance_abuse/publications/global_alcohol_report/en/

ANNEX I: MEETING AGENDA

ALCOHOL, DRUGS, AND DRIVING MEETING PAHO Headquarters, Room B Washington, D.C., 5–6 May 2016

Objectives

- Review 1) research gaps on alcohol, drugs, and road injuries and 2) recommendations from the WHO Second Technical Consultation on Drug Use and Road Safety held in Spain in 2015.
- Review studies carried out in the Americas
- Present possible types of studies for future research in Latin America and the Caribbean
- Discuss potential study methods, sampling, laboratory analyses, logistics, ethical issues, and challenges
- Discuss feasibility of undertaking one or more studies using a common protocol
- Reach consensus on main elements of a regional protocol and next steps

| AGENDA | |
|----------------------|---|
| Day One – 5 May 2016 | |
| 8:30 | Opening |
| 9:00 | Welcome and introduction <ul style="list-style-type: none"> • Dr. Anselm Hennis and Dr. Maristela Monteiro (PAHO) |
| 9:15 | Introduction of participants |
| 9:30 | Burden of disease from drugs and driving <ul style="list-style-type: none"> • Dr. Jürgen Rehm (CAMH) |
| 10:00 | WHO Second Technical Consultation on Drug Use and Road Safety in Spain (2015): What was covered and what was recommended <ul style="list-style-type: none"> • Dr. Margie Peden (WHO) |
| 10:15 | Regional situation on traffic safety: needs and gaps related to alcohol and drugs <ul style="list-style-type: none"> • Dr. Luis Alfonzo (PAHO) • Dr. Eugênia Rodrigues (PAHO) |
| 10:30 | Break |
| 11:15 | Summary of impaired-driving data and laws and current situation in Latin America (Presentations from Argentina, Chile, Costa Rica, Guyana, Mexico, Paraguay, and Uruguay) |
| 13:00 | Lunch |
| 14:00 | Impaired-driving studies in Brazil: challenges, potential benefits, and gaps <ul style="list-style-type: none"> • Dr. Flavio Pechansky (UFRGS) |
| 14:30 | Summary of current evidence and studies in the United States and some LMICs <ul style="list-style-type: none"> • Dr. Richard Compton (NHTSA) • Anthony Ramirez (PIRE) • Dr. Katharine Allen (JHCIRP) |

| | |
|----------------------|--|
| 15:30 | Break |
| 16:00 | Discussion on priority areas and opportunities for regional collaboration (Presentations from NIAAA, NIDA, PIRE, ICADTS/PRC-PIRE, and CDC) |
| 17:00 | Alcohol and drug Involvement in traffic crash fatalities: methodological issues <ul style="list-style-type: none"> • Kathryn Stewart (ICADTS/PRC-PIRE) |
| 17:30 | Road injuries: case-crossover methodology <ul style="list-style-type: none"> • Dr. Guilherme Borges (INPRF/UAM) |
| 18:00 | Adjourn |
| Day Two – 6 May 2016 | |
| 9:00 | Drink- and drug-driving countermeasures in Brazil: using evidence to guide policy changes <ul style="list-style-type: none"> • Dr. Gabriel Andreuccetti (FMUSP) |
| 9:15 | Roadside surveys: methodological issues, mental health assessment, and types of drivers <ul style="list-style-type: none"> • Dr. Flavio Pechansky (UFRGS) |
| 9:30 | Biological sampling: benefits and drawbacks of various methods <ul style="list-style-type: none"> • Dr. Renata Limberger (UFRGS) |
| 10:00 | Discussion on possible types of studies for future research in the region: What is feasible in Latin America and the Caribbean? What can best inform policy-making? |
| 10:30 | Break |
| 11:00 | Logistics of a regional study <ul style="list-style-type: none"> • Dr. Guilherme Borges (INPRF / UAM) |
| 11:30 | Ethical issues for studies that collect biological samples <ul style="list-style-type: none"> • Anthony Ramirez (PIRE) |
| 12:30 | Lunch |
| 13:30 | The way forward: building consensus on regional protocol development |
| 15:30 | Break |
| 16:00 | Next steps |
| 17:00 | Closing remarks <ul style="list-style-type: none"> • Dr. Maristela Monteiro (PAHO) |

ANNEX II: PARTICIPANT LIST

Regional Meeting on Alcohol, Drugs and Driving Washington, D.C., 5–6 May 2016

| Name | Professional Affiliation | Country |
|--------------------------------|--|-----------------------------|
| Andreuccetti Gabriel | University of São Paulo Medical School (FMUSP) | Brazil |
| Allen Katharine | Johns Hopkins Center for Injury Research & Policy (JHCIRP) | United States |
| Bachani Abdulgafoor | Johns Hopkins Center for Injury Research & Policy (JHCIRP) | United States |
| Blanco Carlos | National Institute on Drug Abuse (NIDA) | United States |
| Bloss Greg | National Institute on Alcohol Abuse and Alcoholism (NIAAA) | United States |
| Borges Guilherme | Instituto Nacional de Psiquiatria Ramon de la Fuente Muñiz (INPRF) and Universidad Autonoma Metropolitana (UAM) | México |
| Café , Eduardo Augusto | Inter-American Development Bank (IDB) | United States |
| Chacón Hugo | Área de Atención Integral a las Personas, Caja Costarricense de Seguro Social (AAIP-CCSS) | Costa Rica |
| Compton Richard | National Highway Traffic Safety Administration (NHTSA) | United States |
| Conde Karina | Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) | Argentina |
| Soria Dalve | Inter-American Development Bank (IDB) | United States |
| Dellinger Ann M. | Centers for Disease Control and Prevention (CDC) | United States |
| Diez-Roux Esteban | Inter-American Development Bank (IDB) | United States |
| Hackett Jacqueline | Office of National Drug Control Policy (ONDCP) | United States |
| Hilton Mike | National Institute on Alcohol Abuse and Alcoholism (NIAAA) | United States |
| Hingson Ralph | National Institute on Alcohol Abuse and Alcoholism (NIAAA) | United States |
| Kalawski Jimena | Servicio Nacional para la Prevención y Rehabilitación del Consumo de Drogas y Alcohol (SENDA) | Chile |
| Kelley-Baker Tara | University of Chicago National Opinion Research Center (UC-NORC) | United States |
| Limberger Renata | Universidade Federal do Rio Grande do Sul (UFRGS) | Brazil |
| Meerhoff Scaffo Diana | Junta Nacional de Drogas (JND) | Uruguay |
| Murray Peggy | National Institute on Alcohol Abuse and Alcoholism (NIAAA) | United States |
| Pechansky Flavio | Hospital de Clinicas de Porto Alegre, Universidade Federal do Rio Grande do Sul (UFRGS) | Brazil |
| Ramirez Anthony | Pacific Institute for Research and Evaluation (PIRE) | United States |
| Rehm Jurgen | University of Toronto Centre for Addiction and Mental Health (UT-CAMH) | Canada |
| Romano Eduardo | Pacific Institute for Research and Evaluation (PIRE) | United States |
| Rosende Bustos Gabriela | Comisión Nacional de Seguridad de Tránsito (CONASET) | Chile |
| Ruoti Mónica | Universidad Nacional de Asunción (UNA) | Paraguay |
| Salas Aguilar Carolina | Unidad de Desarrollo Institucional, Instituto sobre Alcoholismo y Farmacodependencia (UDI-IAFA) | Costa Rica |
| Singh Kavita | Ministry of Public Health | Guyana |
| Stewart Kathryn | Prevention Research Center (PRC) / PIRE) and International Council on Alcohol, Drugs and Traffic Safety (ICADTS) | United States / Netherlands |
| Lesbines Diana | Inter-American Development Bank (IDB) | United States |
| Martinez-Vulin Wendy | Inter-American Development Bank (IDB) | United States |
| Umaña Susana | Consejo de Seguridad Vial (COSEVI) | Costa Rica |
| PAHO | | |
| Alfonzo Luis | Regional Advisor on Substance Abuse | United States |
| Hennis , Anselm | Director, Noncommunicable Diseases and Mental Health | United States |

| | | |
|---------------------------|--|---------------|
| Monteiro Maristela | Senior Advisor on Alcohol and Substance Abuse | United States |
| Rodrigues Eugênia | Regional Advisor for Road Safety | United States |
| Senisse Alessandra | Regional Data Coordinator for Road Safety | United States |
| WHO | | |
| Peden Margie | Coordinator, Unintentional Injury Prevention (UIP) | Switzerland |

ANNEX III: ABBREVIATIONS

| | |
|---------|--|
| AAIP | <i>Área de Atención Integral a las Personas (CCSS)</i> |
| BAC | Blood alcohol concentration |
| CAMH | Centre for Addiction and Mental Health (University of Toronto) |
| CCSS | <i>Caja Costarricense del Seguro Social (Costa Rica)</i> |
| CDC | Centers for Disease Control and Prevention (USA) |
| CONASET | <i>Comisión Nacional de Seguridad de Tránsito (Chile)</i> |
| CONICET | <i>Consejo Nacional de Investigaciones Científicas y Técnicas (Argentina)</i> |
| COSEVI | <i>Consejo de Seguridad Vial (Costa Rica)</i> |
| CPAD | <i>Centro de Pesquisa em Álcool e Drogas (Brazil)</i> |
| DUI | Driving under the influence |
| FMUSP | <i>Faculdade de Medicina da Universidade de São Paulo (Brazil)</i> |
| IAFA | <i>Instituto sobre Alcoholismo y Farmacodependencia (Costa Rica)</i> |
| ICADTS | International Council on Alcohol, Drugs and Traffic Safety (Netherlands) |
| IDB | Inter-American Development Bank |
| INPRF | <i>Instituto Nacional de Psiquiatría Ramon de la Fuente Muñiz (Mexico)</i> |
| JHCIRP | Johns Hopkins Center for Injury Research and Policy (USA) |
| JND | <i>Junta Nacional de Drogas (Uruguay)</i> |
| LAC | Latin America and the Caribbean |
| LMIC | Low- and middle-income country |
| NGO | Nongovernmental organization |
| NIAAA | National Institute on Alcohol Abuse and Alcoholism (USA) |
| NIDA | National Institute on Drug Abuse (USA) |
| NORC | National Opinion Research Center (University of Chicago) |
| ONDCP | Office of National Drug Control Policy (USA) |
| PAHO | Pan American Health Organization |
| PRC | Prevention Research Center (a PIRE center) |
| PIRE | Pacific Institute for Research and Evaluation (USA) |
| PNP | Paraguayan National Police |
| PRF | <i>Polícia Rodoviária Federal (Brazil)</i> |
| SENDA | <i>Servicio Nacional para la Prevención y Rehabilitación del Consumo de Drogas y Alcohol (Chile)</i> |
| UDI | <i>Unidad de Desarrollo Institucional (IAFA)</i> |
| UAM | <i>Universidad Autónoma Metropolitana (Mexico)</i> |
| UFRGS | <i>Universidade Federal do Rio Grande do Sul (Brazil)</i> |
| UNA | <i>Universidad Nacional de Asunción (Paraguay)</i> |
| WHO | World Health Organization |
| YBRS | Youth Behavior Risk Survey |