T2010 Conference

Oslo – Norway – 22. - 26. August 2010

CONGRESS ORGANIZERS

Scientific Program Chairs

Barry Logan, NMS Labs, PA, USA
Jørg Mørland, Norwegian Institute of Public Health, Oslo, Norway

Committee Members

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Robyn Robertson, Traffic Injury Research Foundation, Toronto, Canada
Kathryn Stewart, SPI, and Prevention Research Center, Lafayette CA , USA
Karen Scott; University of Glasgow, Scotland
David Shinar, Ben Gurion University, Israel
Phillip Swann, Vic Roads, Melbourne, Australia
Annemiek Vermeeren, University of Maastricht, The Netherlands
Joris Verster, Utrecht University, the Netherlands
Robert Voas, PIRE, MD, USA
J Michael Walsh, The Walsh Group, MD, USA

CONGRESS ORGANIZERS

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Joris Verster, Utrecht University, the Netherlands

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Hallvard Gjerde, Norwegian Institute of Public Health, Oslo, Norway
Svetlanda Skurveit, Norwegian Institute of Public Health, Oslo, Norway

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WELCOME

The 19th International Conference on Alcohol, Drugs and Traffic Safety (ICADTS) - organized by the Norwegian Institute of Public Health in Oslo, Norway - is coinciding with the 60th anniversary of ICADTS. It is the fourth time an ICADTS meeting is conducted in Scandinavia and the first one in Norway.

ICADTS was founded in 1950 during the first conference from August 30 - September 1 in Stockholm, Sweden. The founding fathers and the relatively small group of researchers and scientists discussing their ideas and findings had come together for the purpose of putting special focus on the role of alcohol in traffic. They would certainly look upon the achievements of the organization with pride as we today express our gratitude to the outstanding contribution of Robert Borkenstein and his colleagues.

In the past 60 years, ICADTS has developed into an organization dedicated to the dissemination of knowledge on alcohol and drugs in all fields of transportation holding triennial conferences in North America, Australia and Europe. In addition to 19 international conferences, ICADTS has conducted, sponsored and co-sponsored satellite meetings symposia and workshops; and many working groups have been established and produced highly useful reports that have become internationally recognized. From the early 90-ties, increasing focus has been paid to the drug related problems in transportation.

We are convinced that the 19th ICADTS conference in Oslo will continue the tradition and yield knowledge that will help reduce fatalities and injuries in many countries around the world, making new contacts for inspiration and future collaboration.

Welcome to ICADTS 2010 in Oslo.

Wolf-Rüdiger Nickel
President ICADTS

Asbjørg S. Christophersen
Local President ICADTS2010

Organized by:

Norwegian Institute of Public Health

OSLO MAP


ROYAL PALACE
NISSEBERGET
ABELHAUGEN
TULLINLØKKA
Historisk Museum
Nasjonalgalleriet
Kunstindustrimuseet
Trefoldigh.-kirken
Deichmanske Bibl.
Tinghuset
Oslo Universitet
Ibsenmuseet
STUDENTERLUNDEN
Teater-caféen
Grand Cafe
Stenersenmuseet
Konsert-huset
Stortinget
EIDSVOLLS PLASS
OSLO CONGRESS CENTER
Oslo Domkirke
Oslo Spektrum
RADISSON BLU PLAZA HOTEL
OSLO CITY HALL
Nobels Fredssenter
RÅDHUS PLASSEN
JERNBANE-TORGET
OSLO RAILWAY STATION
Pascal Cafe & Restaurant
Teatermuseet
KONTRASKJÆRET
Småflaske-museet
Filmmuseet
RÅDHUSBRYGGE 2
PIPERVIKA
Akershus Festning Informasjonssenter
Samtids-museet
Norges bank
Astrup Fearnley Museum For Moderne Kunst
Norges Hjemmefrontmuseum
Akershus Slott
Gamle Logen
BJØRVIKA
FESTNINGSPLASSEN
Forsvarsmuseet
VIPPETANGEN
Tingvallakaia
Akershusstranda nordre
Akershusstranda søndre
Tollbukaia
Langkaia
Revierkaia
Festningskaia
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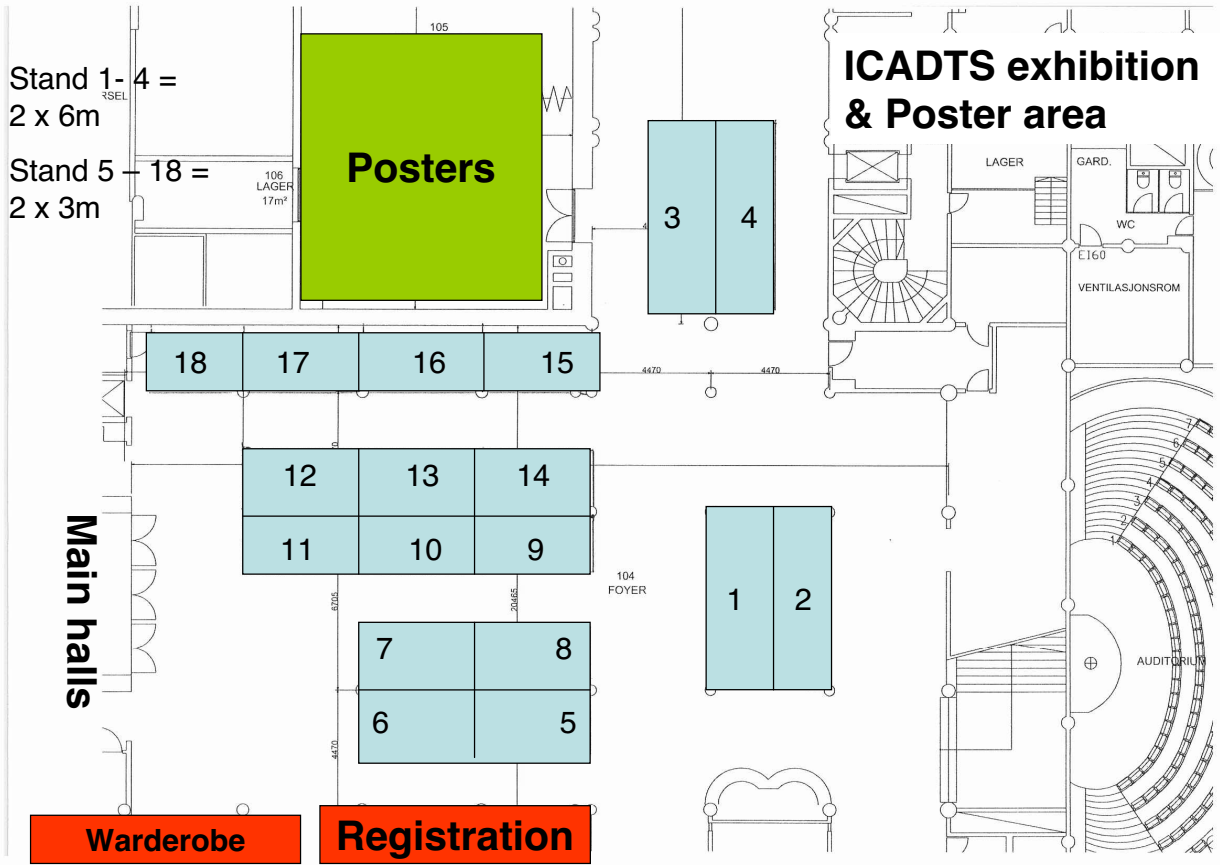
EXHIBITION AREA / EXHIBITORS



COMPANY	STAND NO
Draeger Safety AG & Co. KGaA	1
Lion Laboratories [CMI]	2
Concateno	3
Alcohol Countermeasure Systems	4
Securetec Detektions-Systeme AG	5
Randox Labratories Ltd	6
Intoximeters, Inc.	7
Nanopuls AB	8
Thermo Scientific, Clinical Diagnostics	9
Smart Start, Inc.	10
Waters	11
Biosensor Applications AB	12
SEBIA	13
Next conference	14
CEO, Oxtox Ltd	15
VWR International AS	16
LGC	17
C4 Development Limited	18

Sunday 22 August	Monday 23 August	Tuesday 24 August	Wednesday 25 August	Thursday 26 August
09.00 Meeting room 2 Young scientists meeting **ICADTS - working group meetings:** 10.00-12.30 Meeting room 1 Illegal Drugs & Driving 10.00-12.00 Meeting room 4 Interlock 10.00-12.00 Meeting room 5 Young Drivers	**09.00: Hall A Opening** - Local President - Minister of transport - ICADTS president - Awards	**08:30 Hall A Plenary 4** Social control of the drinking driver. Mary Sheehan	**08:30 Hall A Plenary 5** Acute disinhibiting effects of alcohol. Mark Fillmore	**08:30 Hall A Plenary 6** Non-alcohol drugs and driving. Jørg Mørland
	Hall A Plenary 1 ICADTS - Looking back and into the future. Wolf Rüdiger Nickle **Hall A Plenary 2** Risk factors in car crashes. Fred Wegman **Hall A Plenary 3** DRUID-review and perspective. Horst Schulze	**09.30-11.30** Hall A Symp. 1 **09.30-11.30** Hall B Symp. 2 **09.30-11.30** Hall D Symp. 3 **09.30-11.30** Auditorium Symp. 4	**09.30-13.00** Auditorium Symp. 5 **09.30-13.00** Hall A Symp. 6 **09.30-13.00** Hall B Symp. 7 **09.30-13.00** Hall D Worskshop Developing Country	**09.30-13.00** Hall A Symp. 8 **09.30-13.00** Hall B Symp. 9 **09.30-13.00** Hall D Symp. 10 **09.30-13.00** Auditorium Symp. 11
	13.00-14.00 **Lunch at Posters**	**Posters**	**13.00 - 14.00** **Lunch at Posters**	**13.00 - 14.00** Hall A Closing ceremony - ICADTS President - Local President - Next ICADTS meeting
14.00 - 17.00 Workshop A: Hall B Recent trends in alcohol and other drug involvement in drivers killed in crashes. J. Fell **14.00 - 17.00 Workshop B: Auditorium** Drug analyses in alternative matrices. A. Verstrate	**14.00-17.00 Hall A Workshop C:** DRUID-1 Epidemiology. IM Bernhoft **14.00-17.00 Hall B Workshop D:** Driving simulators for impairment research. J. Verster **17.30** Hall A ICADTS member meeting	**12.30 - 16.30** **Boat trip** **(lunch included)** **Departure from Rådhusbrygge 2** **SS Johanna**	**14.00-17.00 Hall A Workshop E:** DRUID- 2 Experimental studies. J. Ramaekers **14.00-17.00 Hall B Workshop F:** Use of alcohol biomakers to estimate risk of DUI drivers. P. Marques & C. Moore	
17.30 Get together at Oslo Congress Centre (Conference Foyer)	**19.30 Reception Oslo City Hall**	**Evening free**	**19.30 Conference dinner at the Radisson Blu Plaza Hotel**	

PROGRAM SUNDAY 22 AUGUST

09.00-14.00	Young Scientists. ICADTS Working groups
10.00-12.30	Illegal Drugs & Driving. Chair: Michael Walsh
10.00-12.00	Interlock. Chair: Paul Marques
10.00-12.00	Young Drivers. Chair: Andrew Murie
14.00-17.00	Workshop A and B

WORKSHOP A: Trends in Alcohol and Other Drug Involvement in Drivers Killed in Crashes

Chair: James Fell

Jeaun Paul Assaily	Recent French Trends in acohol and Other Drug Involvement in Drivers Killed in Crashes
Douglass Beirness	A Comparison of Drug-and Alcohol-involved Motor Vehicle Driver Fatalities
Paul Boase	Fatally Injured Drivers in Saskatchewan 1988 to 2008
James Fell	Alcohol Involvement in Fatally Injured Drivers in the United States
Ralph Hingson	Alcohol and Drug Use in Fatally Injured Drivers in States that Test over 80% for Both Alcohol and Drugs
A.W. Jones	Occurence of Alcohol and Other Drugs in Femoral Blood Samples from Drivers Killed in Road-Traffic Crashes in Sweden
Daniel Mayhew	Trends in Alcohol-Fatal Crash Problem in Canada
Oliver Plaut	Alcohol and Drugs in Fatal Road Crashes in Western Schwitzerland in 2009
Monica Colas	Drugs and Driving in Spain
René Mathijssen	Drink-Driving Trend 2000-2008 and the Actual Alcohol-Related Road Toll in the Netherlands
Susanne Schönebeck	Alcohol related Road Accidents in Germany-Status Till 2008
Ian Faulks	Trends in Impaired Driving in Australia in 2010

WORKSHOP B: Drug analyses in alternative matrices

Chair: Alain Verstraete

Martin Boorman	Victorian Impaired Driving Legislation (2000) and Random Roadside Oral Fluid Legislation (2004):
Philip Swan	Theory and Results of 2 Different Enforcement Strategies.
Gert de Boeck	The New Legislation on Saliva Testing in Belgium
Alain Verstraete	External quality assessment of multi-analyte chromatografic methods in oral fluid
Alain Verstraete	Comparison of the Concentrations of Drugs in Saliva Collected by Two Sampling Methods
Rainer Polzius	THC Detection in Oral Fluids: Can the Challenge be overcome? Author: Stefan Steinmeyer
Robert Kronstrand	An Introduction to Hair Analysis in Driving License Regranting.

17.30 **Welcome Reception**

PROGRAM MONDAY 23 AUGUST

09.00	Opening - Local President, Asbjørg S. Christophersen - Minister of Transport and Communication, Magnhild Meltveit Kleppa - President ICADTS, Wolf-Rüdiger Nickel - Awards
10.00-11.00	Break at posters and exhibition
11.00-13.00	Pleary Lectures, Chair Barry Logan Plenary 1: ICADTS - Looking back and into the future. Wolf Rüdiger Nickel Plenary 2: Risk factors in car crashes. Fred Wegman Plenary 3: DRUID - review and perspective. Horst Schulze
13.00-14.00	Lunch at posters and exhibition
14.00-17.00	Workshop C and D

WORKSHOP C: DRUID I Epidemiology

Chair: Inger Marie Bernhoft

Inger Marie Bernhoft	An overview of the epidemiological studies in DRUID
Inger Marie Bernhoft	Methodologies for relative risk estimations of driving while impaired and results so far
Tove Hels	Prevalence of impaired drivers in the general driving population in Europe
René Mathijssen	Guidelines for DRIUD roadside surveys, and the resulting design for the Netherlands
Silvia Ravera	Prevalence of drugs in the general population in Europe
Sonja Forward	Driving under the influence of alcohol or narcotics: An in-depth study with convicted drivers
Alain Verstraete	The problem of collecting different body fluids from drivers in the surveys
Martina Walter	Situational Aspects of Drug-Driving Incidences – Results of the German Cell Phone Survey

WORKSHOP D: Driving simulators for impairment research

Chair: Joris Verster

Joris Verster	Introduction
Monique Mets	Postive effects of Red Bull Energy Drink on driving performance during prolonged driving
J.L. Veldstra	Risk taking in traffic: comparing simulated driving with on-road GPS measured driving behaviour.
Jan Raemakers	Residual effects of esmirtazapine on actual driving performance: overall findings ans an exploratory analysis
Eef Theunissen	Acute and subchronic effects of bilastine (20 and 40 mg) and hydroxyzine 50 mg on actual driving performance.
Arne Helland	Development of a driving simulator test battery for assessing drug influence on driving performance. Author: Gunnar Jenssen
Robert Kronstrand	Simulator driving performance after oral dextroamphetamine

PROGRAM TUESDAY 24 AUGUST

08.30	Plenary 4: Social control of the drinking driver. Mary Sheehan Chair: Ralph Hingson
09.15-09.30	Break
09.30-11.30	Symposium 1 - 4

Symposium 1: Interlock Chair: Javier Alvarez / René Mathijssen

Bo Bjerre	A sum up of the Swedish alcohol ignition interlock program (AIIP) after eleven years and the resulting new legislation
Voijtech Eksler	The use of alcohol interlocks in EU Member States and the role of EU as a regulator
Anne McCartt	Effects of Washington State's First-Offender Alcohol Ignition Interlock Law
Robyn Robertson	A Case Study on the Implementation of First Offender Alcohol Interlock Programs
Ward Vanlaar	An illustration of knowledge utilization to inform implementation and delivery of an alcohol interlock program
Robert Voas	Monitored Drinking: An Alternative to the Interlock for Offenders Without Cars?
Robert Voas	Is monitoring drinking an effective alternative to the interlock?

Symposium 2: Toxicology Chair: Elisabeth Øiestad / Merete Vevelstad

Ronald Agius	Increased detection rates of drug use by lowering cut-offs in urine and hair
Thomas Blencowe	Scientific evaluation of the DrugWipe® 5+ and RapidSTAT® devices for the detection of drugs of abuse in oral fluid
Ronald Colin Denney	Misuse And Abuse Of Urine Sampling For Alcohol In The United Kigdom
Marilyn Huestis	Paired Oral Fluid and Whole Blood Cannabinoids From the National Roadside Study
Ray Liu	Analysis of Opiates, Amphetamines and Buprenorphine in Oral Fluid by Rapid Screen Device, GC-MS, and LC-MSMS
Per Mansson	Mass screening for drug abuse in traffic
Elisabeth Øiestad	Comparison of drug concentrations in whole blood and oral fluid collected with the StatSure collection device
Eef Thenuissen	Tolerance and cross-tolerance to neurocognitive effects of THC and alcohol in heavy cannabis users

Symposium 3: Biomarkers - Breath Chair: Christine Moore/ Paul Marques

Hicham Kharbouche	Incorporation of Ethyl Glucuronide into rat hair: influence of hair pigmentation and ethanol dose
Paul Marques	Comparison of First and Repeat Offenders on Independent Drinking Indicators
Dariusz Zuba	Significant differences in dublicate breath alcohol testing
Barry Logan	Approches to estimate uncertainty
David Shinar	An analyses of Alcohol breath test results with portable and desktop
Annika Kaisdotter Andersson	Physiological and usability aspects of breath alcohol estimation
Martin Boorman	An Evaluation of the Deterrent Value of Random Breath Testing (RBT) and Random Drug Testing (RDT)across Australia
Don DeVol	SPEED-02: On the efficiency of a psychological rehabilitation

Symposium 4: Special projects Chair: Asbjørg S. Christophersen / Tori Grytli

Edward Ogden	An integrated software model for alcohol absorption and metabolism
Henriette Skretteberg	Death Trip
Carina Ophus	Girls take action
Kathryn Stewart	The Young Impaired Driver Problem: A Status Report and Plan for the Future
Terje Tørring	"I CAN`T AFFORD TO LOOSE ANY FRIENDS-DON`T DRINK AND DRIVE
Anne Leonard	Road Stories for Young Drivers
Kenneth Beck	A Descriptive Analysis of the Social Contexts of Drinking Among

12.30 - 16.30 Boat trip

PROGRAM WEDNESDAY 25 AUGUST

08.30-09.15	Plenary 5: Acute disinhibiting effects of alcohol. Mark Fillmore Chair: Ralph Hingson
09.15 09.30	Break
09.30-11.00	Symposium 5 - 7 + Workshop developing countries
11.00-11.30	Break
11.30-13.00	Symposium 5 - 7 + Workshop developing countries
14.00-17.00	Workshop E and F

Symposium 5: Legislation - Enforcement Chair: Jørg Mørland / Erika Chamberlain

Matthew Baldock	The first year of roadside drug testing of drives in Western Australia
Douglas Beirness	Drugs and Driving Legislation: Challenges and Choices
Erika Chamberlain	Current Criminal and Administrative Vehicle Forfeiture Provisions in Canada: The Need for an Effective Program
Anne Leonard	Successful Implmentation of New Legislation
Grete Mathisrud	LEGISLATION PACKAGE - regarding law and enforcement for driving under the influence of other drugs than alcohol.
Robert Solomon	The Case for RBT in Canada: Balancing Traffic Safety and Civil Liberties in an Advanced Democracy. Author: Erica Chamberlain
Jens Stener	Tryg Vesta
Matus Sucha	Effectiveness of Breath Testing of Drivers for Alcohol at Road Checks
Peter Thompson	Driver Drug Testing - The South Australian Enforcement Model
Roar Skjelbred Larsen	Enforcing drug drivers by the Norwegian Police Service
Norwegian police	Demonstration of suspected impaired drivers

Symposium 6: Epidemiology - Accidents, injuries

Chair: Liliana Bachs / Knut Hjelmeland

Giorgetti Raffaele	Accident-proneness of DUI offenders in treatment with medications
Narelle Haworth	Should we be concerned about alcohol in bicycle crashes?
Ajman Khan Khoso	Analyis National Highway & Motorway Police injury Surveillance
Ajman Khan Khoso	Trends in road traffic crashes and assiated injury fatallity in Pakistan
Karen Scott	Drug Involvement in Road Traffic Offences and Fatalities in Scotland (1998-2009)
Priscilla Martinez	Drinking and other traffic accident risk factors in Africa: Data from the World Health Surveys
Edeaghe Ehikhamenor	The role of psychoaktive drugs on highway safety
Per Trygve Normann	How to get high inclusion rates in prevalence studies
Jørgen G. Bramness	Methadone, benzodiazepines and traffic accident risk
Edward Ogden	The relationship between responsibility for vehicle accident and presence of drugs in blood of inju red drivers in Victoria, Australia.
Raquel de Boni	Alcohol availability and DUI in a driver probabilistic sample from Porto Alegre, southern Brazil: preliminary findings.
Merete Vevelstad	Gamma-hydroxybutyrate (GHB), pregabalin and driving impairment

PROGRAM WEDNESDAY 25 AUGUST

Symposium 7: Prevention and rehabilitation

Chair: Marilyn Huestis / Katryn Stewart

Mark Johnson	A Field Experiment on the Effect of Norms Correction on Alcohol Consumption
Klaus-Peter Kalwitzki	Individual psychological rehabilitation programmes and their effectiveness on DUI-offenders
Charles Mercier-Guyon	Evaluation of 3 levels pictograms on medicines boxes in drivers and health professionals in France
Lenka Stastna	Effectiveness of Alcohol-Oriented Road Safety Measures in Selected EU Countries
Sheilagh Stewart	A Preliminary Profile of Warn Range Suspended Drivers in Ontario
Sara.Ann Legrand	Survey of prevention and information campaigns on psychoactive drugs and driving. Author Alain Verstraete
Robert Voas	Toward a National Model for Impaired Driver Treatment and Monitoring Programs
Jeremy Davey	Deterring Drug Drivers: A Study into the Initial Impact of Oral Random Roadside Drug Testing in Queensland
James Fell	Minimum Legal Drinking Age 21 in the United States: Why It is an Effective Policy
Tanya Smyth	Medication warnings about driving:Risk perceptions among french and australian communities
Antje Buettner-Telega	Prevalence measurement of sleep apnea syndrome in neurological patients
Susana Monteiro	Evaluating new ways to communicate risk: how patients perceive pictograms about medicines and driving ability.

WORKSHOP DEVELOPING COUNTRIES Chair: Alain Verstraete, Han de Gier

Jonathon Passmore	Preliminary efforts to strengthen prevention of drinking and driving in Vietnam
Martha Hijar	Road traffic injuries and alcohol in Mexico
Ashis Das	Road traffic accidents vis-à-vis substance use in India
Flavio Pechansky	Summary of presentation about the Brazilian situation
Francis Kwaku Afukaar	Road traffic injuries in Ghana: Challenges and measures for improvement
Wilson Odero	Alcohol and Road Traffic Crashes in Kenya

WORKSHOP E: DRUID II Experimental studies Chair: Jan Ramaekers

Marie- Laure Bocca	Combined effects of zolpidem and codiliprane on simulated driving
Wendy Bosker	Ecstasy Effects on Actual Driving Before and After Sleep Deprivation
Wolfgang Grellner	Pharmacokinetic models of performance impairment as assessed in experimental studies
Volker Hargutt	Converting drug effects on experimental performance measures to odds ratios
K.A. Brookhuis	The effects of MDMA (100 mg) and alcohol (0.5 ‰), alone and in combination, on simulated driving performance
Anja Knoche	Goals and current status of experimental work in DRUID
Tim Leufkens	Effects of insomnia and chronic use of hypnotics on driving performance
Marieke Martens	Dexamphetamine effects on simulated driving, alone and in combination with alcohol

WORKSHOP F: Use of biomarkers to estimate risk of DUI drivers

Chair: Paul Marques

Marques/ Moore	Introduction, Overview of the session
Bo Bjerre	Introduction/Clinical uses of alcohol biomarkers in Traffic medicine
Paul Marques	Changes in alcohol biomarkers during an average 8 months of interlock controlled driving
Maria Portman	Predicting DUI recidivism: A study of the impact of alcohol markers and previous drunken driving.
Gordon Smith	EtG as a possible indicator of hangover in crash trauma patients with BAC=0
	Discussion and break
Donata Favretto	Phosphatidylethanol molecular species in heavy and social drinkers
Ronald Agius	Ethyl glucuronide in hair – a highly effective test for the monitoring of Alcohol Abstinence
Christine Moore	Detection time of direct alcohol markers, ethyl glucuronide (EtG) and ethyl sulfate (EtS), in oral fluid and urine
	Open discussion

19.30 Conference Dinner

PROGRAM THURSDAY 26 AUGUST

08.30-09.15	Plenary 6: Non alcohol drug driving. Jørg Mørland Chair: Han de Gier
09.15-09.30	Break
09.30-11.00	Symposium 8 - 11
11.00-11.30	Break
11.30-13.00	Symposium 8 - 11
13.00-13.30	Closing Ceremony

Symposium 8: Epidemiology - Roadside surveys / Impaired drivers

Chair: Wayne Jones / Dominique Lopez

Douglas Beirness	Drug and Alcohol Use Among Drivers: Findings from the British Columbia Roadside Survey 2008
Wayne Jones	What non-alcohol drugs are used by drinking drivers in Sweden? Toxicological results from 10-years of forensic blood
John Lacey	2007 U.S. National Roadside Survey: Methodology
John Lacey	2007 U.S. National Roadside Survey: Alcohol Results
John Lacey	2007 U.S. National Roadside Survey: Drug Results
John Lacey	National Roadside Survey 2007: Results from paired Specimens of Oral Fluid and Whole Blood
Seyed Abbas Motevalian	Random drug tests among public vehicle drivers of Iran
Francois Riguelle	Three editions of the Belgian drink driving roadside survey: results and lessons learned
Hallvard Gjerde	The use of zopiclone among random drivers, arrested drivers and fatally injured drivers in Norway
Dominique Lopez	State of Drugs problem in Europe, innovations in the drug market challenge routine detection
Barry Logan	Case Reports of Impaired Driving Resulting from Butalbital Use
Kerry Armstrong	The culture of young womens drinking in Australia

Symposium 9: Drinking and drugged drivers

Chair: Pirjo Lillsunde / Mark Vollrath

Antti Impinen	The effect of socio-demographic determinants on drinking and driving.
Karoliina Karjalainen	Socio-economic determinants of drugged driving a register-based case-control study
Karin Müller	Women driving while intoxicated
Evelyn Vingilis	Alcohol, Drugs and Street Racing: Results from the Ontario Student Drug Use and Health Survey
Sheilagh Stewart	A Profile of Stunt Drivers in Ontario
Wolfgang Schubert	Indication for the examination of drivers fitness after problematic alcohol consumption
James Freeman	Psychiatric and Substance Abuse Comorbidity among a Large Sample of DUI Texas Offenders
Donata Favretto	Genetic susceptibility to alcohol drinking and abuse in drunk-drivers
Katherine Stewart	Social Media and Its Impact on Introducing Legislation Affecting Young Drivers
Pirjo Lillsunde	The life course of DUI offenders

PROGRAM THURSDAY 26 AUGUST

Symposium 10: First-time and repeat offenders

Chair: Sjoerd Houwing / Kerry Armstrong

Kerry Armstrong	Profiling the offence patterns of disqualified drink drivers in Queensland, Australia
James Fell	An Evaluation of Three Driving-Under-the-Influence Courts in the United States
James Fell	An Evaluation of Three Intensive Supervision Programs for Serious Driving-While-Intoxicated Offenders
Terje Assum	Drink driving in Norway: How to reduce a small, but important problem?
Julie Tison	Patterns of DWI Recidivism by Different Court Adjudications
Hollie Wilson	Who are the real first offenders?
Katherine Wood	I-95 High-Risk Driver Program Analysis
Marie Claude Ouimet	The neuroscience of recidivism in DWI offenders: implications for prevention and intervention.
Thomas Brown	Sex and gender effects in DWI first time offenders: Neurocognitive differences
Thomas Brown	Readiness to change and help seeking as mediators of brief intervention action in DWI recidivists
Sophie Couture	Multidimensional arousal-seeking model of first-time DWI offenders
Sioui Maldonado	Multiple DWI Offenders Show Poorer Decision-making Performance than Healthy Controls

Symposium 11: Experimental studies/ Assessment of impairment

Chair: Charles Mercier-Guyon / Anja Huemer

Mark Vollrath	Is it really alcohol-induced impairment of cognitive functions that leads to crashes?
Charles Mercier-Guyon	Signs of impairment:clinical or behavioral ? from medicine to field evaluation
Amy Porath-Waller	Simplifying the Process for Identifying Drugs by Drug Recognition Experts
Maren Strand	Psychomotor and cognitive functions in subjects receiving methadone and buprenorphine
Michael Berg	The assessment of impairment by test methods: The role of individual variability
Ingebjørg Gustavsen	Psychomotor impairment on three levels of behaviour after intake of zopiclone or ethanol
Christian Giroud	Impact of cannabis inhalation on driving skills in occasional smokers.
Alexander Brunnauer	Affective disorders and antidepressants: Comparative effectiveness of newer antidepressants on fitness to drive
Sara-Ann Legrand	Comparison of a checklist for clinical signs of impairment and detection of drugs in saliva. Author: Alain Verstraete
Anja Huemer	Alcohol effects on driving performance: Compensation may protect controlled actions
Marie-Laure Bocca	1 to 3 therapeutics doses of codeine/paracetamol did not impair driving performance in monotonous surrounding.
René Mathijssen	Evaluation of a checklist of clinical signs of impairment (CSI) during drug

Road traffic injuries in Ghana: Challenges and measures for improvement

Afukaar Francis Kwaku, Building & Road Research Institute

Road traffic crash fatalities and injuries have become a major health and socio-economic burden confronting most developing countries including Ghana. Unlike the high-income countries, where the incidence of road traffic fatalities has been reduced, in Ghana, traffic crash fatalities have been on the rise. The road traffic injury pattern is arguably different and comprises mainly vulnerable road users. A crash database has been developed since 1991 from police reports at the Building and Road Research Institute (BRRI) and it is managed using the Microcomputer Accident Analysis Package (MAAP) software, developed by the Transport Research Laboratory, UK. Traffic crash injury statistics for the period 2000-2008 showed that pedestrians were the road users most at risk, constituting 42% of all road traffic fatalities and children below the age of 16 years accounted for one-third of all pedestrian fatalities. Over two-thirds (67.8%) of all road traffic fatalities occur on the non-urban highways where speeds are excessively high with over 90% of vehicles exceeding the posted speed limit of 50 km/h in settlement areas. Twenty-one percent (21%) of drivers tested in a random roadside breathalyzer survey in Ghana had a detectable Blood Alcohol Concentration (BAC) while 7.3% of the drivers had a BAC greater than the maximum permissible limit of 80 mg/dl. Though there is legislation on drink-driving, enforcement by the police has not been vigorous. To curb speeding and improve pedestrian safety in village settlements along the major highways, speed humps have been installed to slow down traffic. The National Road Safety Commission (NRSC) in collaboration with the Ghana Education Service has also been training school children on safer road user behaviour.

Key words: Pedestrians, traffic injuries, excessive speeds, speed humps, training

ORAL ABSTRACT

Ethyl glucuronide in hair a highly effective test for the monitoring of Alcohol Abstinence in the Rehabilitation of Alcohol impaired drivers

Agius Ronald, Labor Krone

Objectives:
Ethyl glucuronide is a direct, non-volatile, water soluble, stable metabolite of ethanol which has been included in the recently revised guidelines used to rehabilitate alcohol impaired drivers in Germany. The aim of this paper is to compare the number of positive ethyl glucuronide samples in urine with ethyl glucuronide in hair samples of alcohol impaired drivers and hence to compare the efficacy of both tests in driving licence re-granting medical and psychological assessment (MPU).

Methods:
Urine samples were screened for ethyl glucuronide using a commercial enzyme immunoassay test and confirmed with gc-ms. Hair samples were analysed with a HS-SPME-GC-MS/MS method . All methods were fully validated and accredited according to forensic guidelines.

Results:
The new guidelines define a positive sample when its ethyl glucuronide value is greater or equal to 0.1 mg/L urine or 0.007 ng/mg hair using a 3cm segment. Using these guidelines, 20% (80 out of 386 samples) tested positive for ethyl glucuronide in hair, compared to only 2.9% (124 out of 4248 samples) in urine. Additionally 50% of the samples positive for ethyl glucuronide in hair had ethyl glucuronide values greater than 0.03 ng/mg hair , indicating chronic alcohol consumption in the last three months.

Conclusions:
This study shows that ethyl glucuronide in hair reveals a much higher percentage of alcohol impaired drivers who fail to be sober over a three month period than does the test in urine over a three day period; presumeably is the hair test more adequate to monitor long term alcohol abstinence than the urine test as required for the driving licence re-granting medical and psychological assessment (MPU) for alcohol impaired drivers in Germany.

ORAL ABSTRACT

Increased detection rates of drug use by lowering cut-offs in urine and hair

Agius Ronald, Labor Krone

The criteria used for the medical and psychological assessment (MPU) to judge if a person is fit to drive in order to regain a revoked driving licence were revised by the German Society of Traffic Psychology (DGVP) and German Society of Traffic Medicine (DGVM). The revision entered into force on the 1st July 2009 and includes a polytoxicological drug screening in urine and hair to assess abstinence. The aim of this paper is to compare the rate of confirmed positive samples before and after the introduction of new guidelines.

Before the introduction of the new guidelines, urine samples were screened for drugs of abuse using EMIT using the suppliers cut-offs 50 ng/mL for cannabinoids, 500 ng/mL for amphetamines, 300 ng/mL for opiates and cocaine. Screenings for drugs as defined in the new guidelines (10 ng/mL for cannabinoids, 50ng/mL for amphetamines, 25 ng/mL for opiates and 30 ng/mL for cocaine metabolite) were performed using ELISA technique. Positive samples were confirmed by GC-MS or LC-MS/MS. All drug screening and confirmation methods were fully validated and accredited according to forensic guidelines.

371 out of 5058 urine samples were confirmed positive for amphetamines, cannabinoids, cocaine or opiates using ELISA as opposed to 124 out of 3536 urine samples using EMIT screening methods. An average of 70% of the confirmed positive tests lie under the old cut-offs. Out of 3760 hair samples, 57% of the confirmed positive samples (208) for cannabis were below 0.1ng/mg hair but above the new cut-off 0.02ng/mg.

In this study we show that lowering the cut-offs for drugs of abuse in urine and hair results in a significantly increased detection rates of drug use or exposure and hence proving the efficacy of the new guidelines in detecting drivers who are not fit to drive.

ORAL ABSTRACT

Profiling the offence patterns of disqualified drink drivers in Queensland, Australia

Armstrong Kerry, CARRS-Q

Barry Watson, Dr.; Kerry Armstrong, Dr, CARRS-Q, Brisbane, Australia; Kerrie Livingstone, Ms, CARRS-Q, QUT, Kelvin Grove, Australia; Angela Watson, Ms, CARRS-Q, Brisbane, Australia

Objectives:
While unlicensed driving does not play a direct causative role in road crashes, it represents a major problem for road safety. A particular subgroup of concern is those offenders who continue to drive after having their licence disqualified for drink driving. Surveys of disqualified drivers suggest that driving among this group is relatively common.

Method:
This paper reports findings from an analysis of the driving records of over 545,000 Queensland drivers who experienced a licence sanction between January 2003 and December 2008. The sample included drivers who were disqualified by a court (e.g., for drink driving); those who licence had been suspended administratively (e.g., for accumulation of demerit points); and those who were placed on a restricted licence.

Results:
Overall, 95,461 of the drivers in the sample were disqualified from driving for a drink driving offence. During the period, these drivers were issued with a total of 2,644,619 traffic infringements with approximately 12% (n = 8, 095) convicted of a further drink driving offence while disqualified. Other traffic offences detected during this period including unlicensed driving (18%), driving an unregistered vehicle (27%), speeding (21%), dangerous driving (36%), mobile phone use (35%), non-restraint use (32%), and other moving violation (23%). Offending behaviour was more common among men than women.

Conclusions:
While licence disqualification has previously been shown to be a relatively effective sanction for managing the behaviour of drink driving offenders, the results of the current study highlight that it is a far from perfect tool since many offenders continue to commit both drink driving and other traffic offences while disqualified. As such, this study highlights the ongoing need to enhance the detection of disqualified and unlicensed driving in order to deter this behaviour.

ORAL ABSTRACT

The Culture of Young Womens Drinking in Australia

Armstrong Kerry, CARRS-Q

Patricia Obst, Dr, School of Psychology and Counselling, Brisbane, Australia; Hanna Thunstrom, Ms, CARRS-Q, Brisbane, Australia; Helen Haydon, Ms, CARRS-Q, Brisbane, Australia; Jeremy Davey, Professor, CARRS-Q, QUT, BRISBANE, Australia

Objectives:
The purpose of this investigation was to move away from research that is based on male constructs regarding drinking of alcohol and to undertake pilot research to develop an understanding of the current culture of young Australian women s (18-25 years) drinking behaviour from a uniquely female perspective.

Methods:
Two separate focus group interviews were undertaken with women (N = 11) aged between 18 and 25 years living in South-East Queensland, Australia. Women were asked to openly discuss how and why they drink alcohol (ie., their regular drinking behaviour), with an emphasis on the attitudes and values that their influence their behaviour.

Results:
Consumption of alcohol was found to be a largely social phenomenon, where pressures to match the intoxication levels of social group members directly influenced the quantity of alcohol drunken by individual members. Family influence was not found to be significant at this age; rather the focus group data indicated that parental efforts centred on harm minimisation rather than abstinence. In terms of drinking behaviours, particulars drinking venues that tolerated greater levels of patron inebriation were purposely sought out as the women often planned levels of intoxication on given nights. Females did however report that sexual harassment is also tolerated to a greater extent in such venues, which formed part of the sexual abuse risks encountered by young intoxicated females. Other perceived risks related by the women were social (embarrassment). The perceived risks resulted in risk aversion strategies however women did not engage in risk avoidance.

Conclusion:
It is proposed that the findings of this investigation could be used to improve current knowledge regarding young women s drinking culture, associated risks and risk prevention strategies. Further investigation is needed to inform alcohol-related education.

ORAL ABSTRACT

Recent French trends in alcohol and other drug involvement in drivers killed in crashes

Assailly Jean-Pascal, INRETS

This is an invited presentation to J. Fell 's workshop Recent trends in alcohol and other drug involvement in drivers killed in crashes

Objectives:
This paper will review trends in alcohol use in traffic fatalities in France. In 2002, France resolved to make a strong reinforcement of its traffic safety policy, directed mainly towards speed violations (development of 2000 speed cameras, increase of fees, increased license actions, intense media campaigns, and the concept of tolerance zero). The result have been spectacular - in 3 years, the annual number of traffic fatalities fell from 8000 to 4000.

Methods:
Statistics from traffic collisions and fatalities in France involving alcohol use have been collected and evaluated. The review also considers if a policy directed mainly toward speed has or not also effects on alcohol.

Results:
The latest figures show that alcohol is present in 11% of traffic casualties, in 28% of traffic fatalities and in 50% of weekends nights accidents. As the number of traffic fatalities is currently around 4000 in France, we can estimate that around 1200 French traffic fatalities are related to alcohol.
Considering the role of speed enforcement on alcohol use must consider that there are always many causes in an accident. A measure directed towards a risk factor may have effects on other risk factors (for example, with speed cameras, drunk drivers may drive more slowly and will recuperate their mistakes due to impairment more easily, or it will transform a fatal accident into a casualty, or there is a general feeling of surveillance given by the speed cameras, etc).

Conclusions:
The examination of very high B.A.C. indicating problems of alcohol dependence shows clearly that we cannot rely only on enforcement considering drunk driving but that we have also to develop a medical psychological help for these subjects. This means also that traffic safety research on D.U.I. has to set strong links with psychological research on alcohol dependence, as the predictive risk factors and the causes of evolutions are strongly interrelated.

ORAL ABSTRACT

Drink driving in Norway: How to reduce a small, but important problem?

Assum Terje, Institute of Transport Economics - TOI

Objectives:
The objective is to outline the possible reduction of alcohol-related road accidents in Norway. About 0.3 % of all drivers in Norway are above the legal limit of 0.2 g/l, whereas 18-30 % of the fatalities are alcohol related. The official ambition is a 33 % reduction of fatalities and severe injuries from 2005-08 to 2020 in spite of an expected 13 % growth in road traffic volume. A 33 % reduction of fatalities will require a reduction in the alcohol-related fatalities. Reducing the number of alcohol-related fatalities and injuries is a challenge when the alcohol prevalence in general road traffic is almost zero. Some 80 % of the drivers charged for DWI are already in the criminal records, and a third of the drivers causing fatal accidents were already convicted. Another challenge is to keep these delinquents off the roads. The obvious solutions are compulsory alcolocks in all motor vehicles, increased enforcement, more severe penalties, and increased information and education. However, these measures have to be well targeted to avoid difficulties in implementation or effectiveness.

Methods:
A first step can be an analysis of the in-depth reports from all fatal accidents during 2005-2009, some 1250 fatal accidents, to achieve accurate figures of alcohol-related fatalities. A second step can be to test the preventive effects of alcolocks for certain target groups and contribute to the development of alcolocks into inexpensive and easily operated devices.

Results:
Estimating a reliable the percentage for alcohol-related fatalities of all fatalities is necessary to make a realistic plan to reduce these accidents. The results will show the accurate number of alcohol-related fatal accidents, where the killed person or some other person involved was under the influence of alcohol, when and where the accidents happened, and if possible, characteristics of the drink drivers involved in these accidents.

Conclusion.:
The results will indicate how the authorities may proceed to reduce the alcohol-related fatalities and injuries. The police may use the results as guidelines for targeting their DUI enforcement activities.

ORAL ABSTRACT

The first year of roadside drug testing of drivers in Western Australia

Baldock Matthew, Centre for Automotive Safety Research, University of Adelaide

Jeremy Woolley, Dr, Centre for Automotive Safety Research, University of Adelaide, Adelaide, SA, Australia; Mary Lydon, Prof, Centre for Automotive Safety Research, University of Adelaide, Adelaide, SA, Norway

Objective:
In 2007, the Western Australian Road Traffic Act 1974 was amended to allow for new police enforcement practices designed to reduce the incidence of drug driving. The amendment made provision for two new offences: driving with the presence of a prescribed illicit drug in oral fluid or blood, and driving while impaired by a drug. The prescribed drugs were methamphetamine, methylenedioxymethamphetamine (MDMA or ecstasy) and delta-9-tetrahydrocannabinol (THC, the psychoactive compound in cannabis). The Centre for Automotive Safety Research at the University of Adelaide was asked to review the first year of this amended legislation and associated drug driving law enforcement. The present paper does not summarise the entire review but is focused on analysis of the data concerned with roadside oral fluid testing of drivers.

Method:
WA Police provided the authors with all data relating to roadside drug driving law enforcement, including the number of roadside oral fluid tests, the rate of drug positive results in the roadside tests, and the outcomes of laboratory-based confirmatory analyses.

Results:
A total of 9,716 roadside screening tests were carried out in the first 13 months of enforcement. Of these, 517 were positive to one or more of the prescribed drugs (5.3%). The secondary screening test required in the legislation indicated that 109 of these 517 oral fluid samples were negative. However, a follow-up laboratory analysis of 515 of the 517 samples indicated that only 57 were negative, indicating a low level of sensitivity of the second screening test.

Conclusions:
Overall, the roadside oral fluid testing program in WA was found to be successful but a problem with one of the drug testing devices was identified. A positive result on this screening device is necessary (but not sufficient) to obtain a conviction, so the sensitivity of this device needs to be improved.

ORAL ABSTRACT

A Descriptive Analysis of the Social Contexts of Drinking Among

Beck Kenneth, University of Maryland School of Public Health

Ashraf Ahmed, Professor, Morgan State University, Baltimore, United States; Z. Andrew Farkas, Professor, National Transportation Center, Baltimore, MD, United States

Objectives:
To understand the role of social context in contributing to the incidence of alcohol-impaired driving.

Methods:
Telephone interviews were conducted with 80 individuals who received a first time DUI citation. They were predominantly white (70%), male (62%) and 21 45 years of age (62%). They were paid $25 for their participation. Questions asked about their social network, the social context in which they typically drink, the specific location and circumstances where they were drinking at the time of their citation, as well as their risky driving behaviors in the last month.

Results:
Two reliable social contexts of drinking were identified through principle components factors analysis; emotional pain and social facilitation. Analyses of variance showed that drinking in a context of emotional pain (e.g., to deal with depression, stress) was related to drinking alone at this location and driving when they know they ve had too much to drink. Drinking in a context of social facilitation (e.g., with friends, to be sociable) was related to drinking more frequently (at least several times a month) and with others (versus alone) at this location. Social facilitation was also positively related to going over the speed limit and running a red light/stop sign.

Conclusion:
The social context of drinking is important for understanding the social network of drinking drivers, as most (86%) said that someone from their social network was with them at this drinking location. The need to understand how significant others influence the context of drinking as well as the likelihood of impaired driving is critical for program development.

ORAL ABSTRACT

Drugs and Driving Legislation: Challenges and Choices

Beirness Douglas, Canadian Centre on Substance Abuse

Objectives:
The primary objective of this paper is to outline the issues surrounding the three major options for drugs and driving legislation impairment-based statues, per se laws, or zero tolerance.

Methods:
A comprehensive review of the literature on drugs and driving was conducted with particular emphasis on increased risk of crash involvement associated with various types of drugs. Examples of the types of laws in place around the world and the various approaches to enforcement were then examined.

Results:
There is a wide array of substances both illegal and medicinal -- that adversely affect the operate a motor vehicle safely and increase the risk of crash involvement. In an attempt to deal effectively with the problem, governments have generally implemented one of three legal approaches. Impairment laws focus on the extent to which the driver s ability to operate the vehicle safely has been compromised by drugs. Per se laws establish a quantitative value of drug concentration above which it is an offence to operate a vehicle. Zero tolerance laws are a special case of per se laws whereby the limit is set at zero i.e., any measurable amount of the substance in the driver s blood is deemed an offence. Few countries have evaluated the impact of their drug-driving laws or their methods of enforcement.

Conclusions:
There are benefits and liabilities associated with each type of law. No one type of legislation stands out as being clearly superior to the others. In developing a strategy for dealing with drugs and driving, one need to carefully consider the numerous complexities involved in the issue.

ORAL ABSTRACT

Drug and Alcohol Use Among Drivers: Findings from the British Columbia Roadside Survey 2008

Beirness Douglas, Canadian Centre on Substance Abuse

Erin Beasley, Research and Policy Analyst, Canadian Centre on Substance Abuse, Ottawa, Canada
Douglas J. Beirness and Erin E. Beasley

Objectives:
The purpose was to collect information on the prevalence of alcohol and drug use among nighttime drivers in British Columbia.

Methods:
Vehicles were randomly selected from the traffic stream between the hours of 9 pm and 3am on Wednesday through Saturday nights in three cities in British Columbia in June 2008. Drivers were asked to provide a voluntary breath sample to measure their alcohol use and an oral fluid sample to be tested subsequently for the presence of drugs.

Results:
Of the 1,533 vehicles selected, 89% of drivers provided a breath sample and 78% provided an oral fluid sample. It was found that 10.4% of drivers tested positive for drug use and 8.1% of drivers had been drinking. Overall, 15.5% of drivers tested positive for alcohol, drugs or both. Cannabis and cocaine were the drugs most frequently detected. Drugs and alcohol appear to have different patterns of use among drivers. For example, whereas alcohol use among drivers was most common on weekends and during late-night hours, drug use was more evenly distributed across all survey nights and times. Alcohol use was most common among younger drivers; drug use was more evenly distributed across age groups. Driver perceptions of the likelihood of being stopped by the police after drug or alcohol use were also be examined in relation to driver alcohol and drug use status.

Conclusions:
The finding that drug use is now more common than alcohol use among drivers highlights the need for a unique and separate societal response to the use of drugs by drivers comparable to that directed at drinking and driving over the past three decades.

A Comparison of Drug- and Alcohol-involved Motor Vehicle Driver Fatalities

Beirness Douglas, Canadian Centre on Substance Abuse

Erin Beasley, Research and Policy Analyst, Canadian Centre on Substance Abuse, Ottawa, Canada; Jacques LeCavalier, Research Associate, Canadian Centre on Substance Abuse, Ottawa, Canada; Daniel Mayhew, Mr., Traffic Injury Research Foundation, Ottawa, Cana

Objectives:
The objectives of the project were to:
- Compare and contrast the characteristics of fatally injured drivers who test positive for alcohol and those who test positive for psychoactive drugs, and drugs plus alcohol;
- Compare and contrast the characteristics and circumstances of fatal collisions involving alcohol and/or drugs

Methods:
Data from coroners reports and motor vehicle crash records were linked to compare and contrast the characteristics of fatal collisions involving drivers who have used either alcohol, drugs, or both. The Fatality Database houses information on all drivers killed in motor vehicle collisions in Canada. This database contains the results of alcohol and drug tests performed by coroners on victims of motor vehicle collisions in Canada from 2000 to 2007. These data will be linked with detailed information about the crash contained in the National Collision Database.

Results:
Among the over 14,000 driver fatalities in the database, 33% tested positive for at least one psychoactive substance and 38% tested positive for alcohol. The most commonly detected drugs were depressants, cannabis, stimulants and narcotic analgesics. Among alcohol-positive cases, 82.2% of drivers had a Blood Alcohol Concentration over 80 mg%. The findings reveal similarities and differences in the circumstances and characteristics of the crashes of drivers who test positive for alcohol and/or drugs. The paper will describe these key factors and outline the implications for prevention and enforcement.

Conclusions:
The findings provide greater understanding of the impact of the use of psychoactive substances (both illegal and medicinal) by drivers and provide new knowledge that contributes to the development of prevention efforts to improve overall road safety in Canada. In addition, knowledge of the characteristics of collisions that involve a driver who has used psychoactive will provide enforcement with greater ability to identify drug-involved crashes and take measures to investigate and prosecute those responsible.

ORAL ABSTRACT

The assessment of impairment by test methods: The role of individual variability

Berg Michael, I.T.E.A.

Objectives:
The aim of our contribution is to suggest that psychological tests assessing individual performance differences can be helpful to study impairments challenging driving behavior. It is proposed that an observer of driving behavior cannot tell what kind of cognitive impairment caused any given faulty driving, which can derive from several cognitive dysfunctions.

Methods:
First we examined typical impairment caused by alcohol abuse, the so-called tunnel vision effect. Secondly, we examined the working memory performances of senior citizen drivers, especially regarding the share of attentive functions. Poor working memory performance is not necessarily caused by disturbances of the retrieval process, it can also be caused by a lack of attention. We used a test system with maximal comparability of the subtests. Thus, important diagnostic information can be achieved regarding the individual variance. First, performance of selective versus divided attention were compared, secondly a task of spatially focused attention was used to establish baseline performance for the following memory task and later compared to it.

Results:
As suggested by other workers, the first investigated impairment can be explained by a lack of divided , as opposed to selective, attention. Although a different paradigm was used, the same result was obtained. Secondly, in the memory assessment, the share of retrieval, as opposed to intentional deficit is greater than expected.

Conclusion:
Considering individual differences it is possible in both cases to assess impairment disregarding the statistical norm. To create individual references can be more efficient. In real life, if people say "I feel impaired", than they mean a change within themselves, not in comparison

Methodologies for relative risk estimations of driving while impaired and results so far

Bernhoft Inger Marie, Department of Transport, Technical University of Denmark

Objectives:
To describe the various relative risk estimations of driving while impaired within the DRUID project (Driving under the Influence of Drugs, Alcohol and Medicines) and results so far.

Methods:
Risk estimates for drug impaired drivers are based on linkage of drugs in drivers in traffic to drugs in injured drivers, of medication records to accident data and of responsible and non-responsible drivers involved in accidents with drugs as well as without.

Results:
The prevalence of drugs in accident involved drivers will be compared to the prevalence of drugs in the general driving population, resulting in a calculation of the relative risk for drug drivers of being seriously injured in an accident. The influence of confounding factors (like gender, age, day of the week and time of the day) will be adjusted for.
Risk estimations will also be based on a comparison of individual medication records with the person s accident data. The impact of specific medicinal drug use patterns will be revealed, like the risk associated with the first period after the start of medication
Finally, the relative risk for being responsible for a fatal accident or being killed as a driver while impaired will be based on drivers who are responsible for the accident and those who are not.

Conclusion:
Relative risk estimates will serve as input to recommendations for drug thresholds in relation to traffic safety, classification of medicines and guidelines to medical and pharmaceutical practice.

Disclaimer:
This abstract has been produced under the project Driving Under the Influence of Drugs, Alcohol and Medicines (DRUID) financed by the European Community within the framework of the EU 6th Framework Program.
This abstract reflects only the author's view. The European Community is not liable for any use that may be made of the information contained therein.

An overview of the epidemiological studies in DRUID

Bernhoft Inger Marie, Department of Transport, Technical University of Denmark

Objectives:
To describe the various epidemiological studies within the DRUID project (Driving under the Influence of Drugs, Alcohol and Medicines).

Methods:
Several methodological approaches are used both for estimating the prevalence of drug driving and the accident risk for drug impaired drivers, each with different sensitivity and specificity.

Results:
The prevalence in the general population is described my means of a literature review. The prevalence of drug driving is estimated by means of road side surveys and a travel survey and the prevalence of drugs in injury accidents is estimated by means of hospital surveys of seriously injured and killed drivers. Accident risk estimates for drug impaired drivers are based on linkage of results on drugs in drivers in traffic to drugs in injured drivers, on linkage of medication records to accident data and linkage of analyses of accidents with drug impaired drivers to accidents without. Furthermore, characteristics of drivers who have been involved in accidents while drug impaired or convicted for drug driving are investigated by means of interviews.

Conclusion:
The results from the various studies in various European countries (e.g. Northern, Western, Southern and Eastern Europe) will be compared in order to reveal any differences regarding use of psychoactive substances.

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ORAL ABSTRACT

A sum up of the Swedish alcohol ignition interlock program (AIIP) after eleven years and the resulting new legislation

Bjerre Bo, Transportstyrelsen

Introduction:
In Sweden an AIIP has been running for more than eleven years. The AIIP is a voluntary 2-year program open for all DWI offenders and includes regular medical checkups.

Objectives:
AIIP aims to change the alcohol and driving habits of drink-drivers.

Methods:
Regular medical checkups are designed to alter alcohol use habits by continuously following alcohol biomarkers.

Results:
A significant reduction of alcohol consumption was found while participating in the program. Compared to controls the self-reported alcohol consumption was lower among the AIIP participants after one year in the program as well as one year after having completed the program.
While in the AIIP the DWI recidivism was 0.4%/year, whereas those DWI offenders who did not participate had about the same rate of recidivism during the revocation period as before the DWI offence. The rate of police-reported traffic accidents was similar among AIIP participants and controls. Significantly fewer in the AIIP group needed hospital care and sick leave relative to the control group.
The long-term effects have been studied in the maximum 7-year follow-up time after completing the AIIP. Among all participants the rate of recidivism was reduced by 32% compared to the rate of recidivism during the five years before the DWI offence. Among those who completed the 2-year program the reduction was 58%. Among controls, being relicensed after a DWI offence, the recidivism rate was only reduced by 4%.

Conclusions:
The present Swedish AIIP has favourable long-term effects compared to conventional licence revocation, but it also has some disadvantages. There are too few participants and there are too many (almost 40%) excluded participants. The pilot AIIP will now be replaced by a permanent program trying to force (without excluding) all DWI offenders to participate in an alcolock program before being relicensed. This new program will be presented.

Scientific evaluation of the DrugWipe® 5+ and RapidSTAT® devices for the detection of drugs of abuse in oral fluid

Blencowe Thomas, National Institute for Health and Welfare, Finland

Objectives:
On-site tests for screening of drugs in oral fluid (OF) are used as a means of detecting driving under the influence cases. As part of the EU-project DRUID a number of devices were evaluated. The aim of this study was to determine the reliability of the DrugWipe® 5+ and RapidSTAT® devices.

Methods:
In this study 136 cases were screened with the DrugWipe® 5+ and 132 cases with the RapidSTAT®. Altogether 221 subjects were tested. In addition, a reference OF sample was collected. Devices were evaluated according to manufacturer cut-offs and DRUID cut-offs used in the project. Manufacturer cut-offs for the DrugWipe® 5+ and RapidSTAT® devices respectively were, for example, 50 ng/ml and 25 ng/ml for amphetamines and 30 ng/ml and 15 ng/ml for cannabis. The respective DRUID cut-offs were 25 ng/ml and 1 ng/ml.

Results:
At manufacturer and DRUID cut-offs both devices showed a relatively high sensitivity for amphetamines, although the RapidSTAT® was somewhat less sensitive. However, both tests gave some false negative results at quite high concentrations of amphetamines. At the manufacturer cut-offs for cannabis, the RapidSTAT® performed well whilst the DrugWipe® 5+ was relatively poor; however at the DRUID cut-off neither device was satisfactory. The benzodiazepine test of RapidSTAT® appears to be at a relatively good level, although the stated manufacturer cut-off appears to be high in relation to actual concentrations detected. Evaluation of the opiates and cocaine tests of either device and for the methamphetamine test of the RapidSTAT® was not possible.

Conclusions:
There is still potential for improvement to be made in OF screening for drugs with on-site devices, particularly for cannabis. Despite some false negative tests both devices had a comparatively good sensitivity for amphetamines. The range of concentrations of these false negative cases was still relatively low compared to that of true positives, but this does not diminish the concern that cases with such concentrations of amphetamines might conceivably be missed by OF screening.

DRUID disclaimer:
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ORAL ABSTRACT

Fatally Injured Drivers in Saskatchewan 1988 to 2008

Boase Paul, Trasport Canada

Kwei Quaye, Dr.; Brian Jonah, Dr.

The objective of this project was to merge data collected by Saskatchewan Government Insurance with data on alcohol use by fatally injured drivers provided by the coroner in order to assess the level of alcohol use on various elements of the collision and how these may vary based on licence status or over time as new laws have been introduced.

Methods:
Collision records for the 535 fatally injured drivers in Saskatchewan from 1988 to 2008 were identified. These records were merged with licence status from SGI as well as outcomes from coroners inquests. The resulting database contains information on licence status, environmental, temporal and contributing factors related to the collision. Blood Alcohol Concentration Level (BAC) and their licence status were used to categorize the drivers.

Results:
Of the 534 drivers, 333 were reported as having a valid licence for the vehicle they were driving. A further 138 did not, which could indicate an expired licence or driving a vehicle for which they were not licensed. The final 63 drivers had no licence status found. Of all the fatally injured drivers, 208 had no alcohol recorded, 19 were reported with alcohol but below the administrative threshold, 16 were over the administrative threshold but under the legal threshold, 291 were over the legal threshold, with 211 of them having a BAC over 160mg%. These two variables were used to categorize the drivers to examine the other environmental, temporal and contributing factors in the collision.

Conclusion:
The number of drivers without a valid permit for the vehicle being driven is concerning and requires a more in depth study to determine if drivers are driving without a licence or driving vehicles they are not licensed for. A number of differences were found related to the BAC level of the drivers and their licence status.

ORAL ABSTRACT

Combined effects of zolpidem and codiliprane on simulated driving

Bocca Marie-Laure, INSERM ERI27

JN Amato, ., .; Sullivan Marie, PhD, INSERM ERI27, Caen, France; Magalie Loilier, PhD, INSERM ERI27, Caen, France; Véronique Lelong-Boulouard, PhD, PharmD, INSERM ERI27, Caen, France; Pierre Denise, Professor, INSERM ERI27, Caen, France; Catherine Berthel

Objectives:
Elderly people already represent a large part of drivers and the proportion will increase in the future in most occidental countries. Paradoxically, while insomnia is more frequent with age, most experimental studies assessing drugs effects are conducted on healthy young subjects. It is well known that the majority of older adults regularly use several medications. With age, pain and sleep are two of main pathologies. Zolpidem is the first hypnotic prescribed in numerous countries. The antalgics are the most prescribed drugs with around 150 millions of pillboxes per year in France. In previous studies, we have examined separately the effects of hypnotics and antalgics on driving. The aim of this study was to evaluate the effects of the combination of zolpidem taken at bedtime and codoliprane taken at awakening.

Methods:
Sixteen healthy subjects aged 55 to 65 years participated in this cross-over, double-blind, placebo-controlled study. Each subject took, at 11.00 pm the day before each session, a therapeutic dose tablet of zolpidem 10 mg or a placebo. At 8.00 am, they ingested a therapeutic dose of codoliprane (codeine 20 mg - paracetamol 400 mg) or a placebo. Four combinations were also tested: placebo-placebo, zolpidem-placebo, zolpidem-codoliprane, placebo-codoliprane. Mono-screen driving simulator was used. Subjects performed three driving test one hour after the codoliprane intake: monotonous, urban accident scenarios and following car tests. Two blood samples were collected during the morning.

Results and conclusion:
Preliminary results on urban driving did not reveal drugs effects.

ORAL ABSTRACT

1 to 3 therapeutics doses of codeine/paracetamol did not impair driving performance in monotonous surrounding in healthy young volunteers

Bocca Marie-Laure, INSERM ERI27

Jean-Noel Amato, INSERM ERI27, Caen, France; Sullivan Marie, PhD, INSERM ERI27, Caen, France; Catherine Berthelon, Dr; Magalie Loilier, PhD, INSERM ERI27, Caen, France; Antoine Coquerel, Professor, INSERM ERI27, Caen, France; Véronique Lelong-Boulouard, P

Objectives:
Epidemiological studies have revealed that drug consumption is suspected to increase the risk of driving accidents. Among drugs, the association of codeine/paracetamol who is considered one of the most efficient to ease pain as compared to other analgesics of level II in the WHO classification, could decrease vigilance and thus impair driving performance.
The aim of the present experiment was to determine the behavioural effect of therapeutic doses of codeine/paracetamol on driving and psychomotor performance.

Methods:
Sixteen healthy volunteers participated in this study. Monotonous driving performance was evaluated after 1 to 3 doses of codeine/paracetamol. The doses of codeine/paracetamol were 20mg/400mg, 40mg/800mg, 60mg/1200mg. The 3 doses were compared to a placebo. Psychomotor function was tested with the Psychomotor Vigilance Test (PVT), which is highly sensitive in evaluating sleepiness. Visual analogue scales were used to assess the subjective feelings in change of mood and in driving performance.

Results:
Our study did not reveal any effects of codeine/paracetamol doses on the standard deviation of lateral position, which is considered as the most sensitive parameter to investigate drugs effects. The other driving parameters (speed, road exits) were not affected. None of the PVT parameters were impaired. Moreover, subjective scales did not reveal any alertness decrement.

Discussion/Conclusion:
Up to 3 doses of codeine did not impair the driving behaviour. The lack of a codeine/paracetamol effect in driving is supported by the lack of impairment of the vigilance evaluated by PVT and the subjective feelings. Our results are in agreement with other studies revealing that analgesics did not appear at risk for driving, in healthy young subjects.

ORAL ABSTRACT

Victorian Impaired Driving Legislation (2000) and Random Roadside Oral Fluid Legislation (2004): Theory and Results of 2 Different Enforcement Strategies

Boorman Martin, Victoria Police

Philip Swann, Dr.

Objectives and Methods:
The Parliament of Victoria Final Report Road Safety Committee Effects of Drugs (Other than Alcohol) on Road Safety in Victoria No 28 Session 1996 rejected the traditional 1949 law of the concept of driving under the influence of drugs which was in the current Road Safety Act and recommended that new laws be made, to tackle driving whilst impaired and secondly roadside testing .This presentation presents the new legislative frameworks that were introduced in 2000 and 2004, the enforcement strategies which had to be developed and the results of nine years of implementation.

Results:
The Road Safety (Amendment) Act 2000 Act No. 14/2000 Parliament of Victoria Melbourne Australia established a new law of driving while impaired by a Drug and allowed for psychomotor Impairment testing by Police to decide on whether to take a blood sample from a driver. It also provided for laboratory chemical tests of the blood sample. The offence was proven when a positive drug result was obtained, subject to the drivers observed psychomotor impairment being consistent with the scientifically established impairment characteristics of the positive drug result. The prevalence of the drugs found and the characteristics of the positive drivers in the 1500 prosecutions are presented.
The 1996 Parliamentary Inquiry had also supported the development in Australia of random urine drug testing programs both at the place of employment
and at the roadside. However random roadside urine testing was not supported by the key stakeholders, but there was support for oral fluid testing and in 2004, Victoria implemented random oral fluid based per se legislation for illicit drugs methyl amphetamine and THC the active substance in cannabis. Then 2 years later added MDMA (ecstasy) to this group. The prevalence of the drugs found and the characteristics of the drug positive drivers after more than 100,000 tests are presented.

Conclusions:
The changes in the prevalence of drugs in drivers killed each year, during the last nine years of enforcement of the legislation shows a stabilising of the percentages of drivers killed testing positive to the legislated drugs. The overall numbers of drivers killed during the same period has decreased to a historic low in 2009.

ORAL ABSTRACT

An Evaluation of the Deterrent Value of Random Breath Testing (RBT) and Random Drug Testing (RDT) Across Australia

Boorman Martin, Victoria Police

Katherine Owens, Dr.

In 2009, the National Drug Law Enforcement Fund (NDLERF) funded a project to evaluate the deterrent value of random breath testing (RBT) and random drug testing (RDT) across Australia. The study involved n=60 depth interviews with drivers who drink alcohol and take drugs, asking them about their drug taking behaviours, what motivates them to drink and/or drug drive, how effective they perceive law enforcement to be in deterring drink and drug driving, and what strategies they use to avoid police detection. The interviews with drug takers were instrumental in developing a survey that was administered to over n=3,000 Australian drivers who drink alcohol and take drugs. The research evaluates which activities of RBT and RDT law enforcement practice have the greatest influence (deterrence value) on a drivers intention to drink/drug drive in the future. The results have significant implications for law enforcement best practice and may help guide interventions aimed at reducing the incidence of alcohol and drugs in traffic crashes

ORAL ABSTRACT

Ecstasy Effects on Actual Driving Before and After Sleep Deprivation

Bosker Wendy, Maastricht University

KPS Kuypers, ., ., .; Silke Conen, Maastricht university, Maastricht, Netherlands; Jan Ramaekers, Dr., Faculty of Psychology and Neuroscience, Maastricht University, Maastricht, Netherlands

Objectives:
It has been shown that the main psychoactive constituent of ecstasy, 3,4-methylenedioxymethamphetamine (MDMA or ecstasy), has impairing as well as stimulating effects on driving performance when tested during the day. Since most people who use MDMA take this drug at dance parties and drive home afterwards when they are sleep deprived, we investigated the effects of MDMA on psychomotor performance and driving during and after a night without sleep.

Methods:
Sixteen recreational MDMA users received single nocturnal doses of 25, 50 and 100 mg MDMA in a randomized double-blind placebo-controlled 4-way cross-over design. Driving performance was assessed at peak plasma levels and after a night of sleep deprivation using 2 standardized on-the-road driving tests: the road tracking task and the car-following task. The primary driving parameters were standard deviation of lateral position (SDLP) and time to speed adaptation respectively.

Results:
Results showed that sleep loss produced significant driving impairment as evinced by a large rise in SDLP. Driving performance during MDMA intoxication was not affected in the evening, but was grossly impaired in the morning after a nigh of sleep loss. Increments in SDLP were equal or larger than those observed after a BAC of 0.8 mg/ml. Driving performance as a function of MDMA concentrations in plasma yielded similar results. MDMA concentration ranging 0-100 ng/ml tended to improve road tracking performance in the evening, but the same concentration range was associated with impairment when measured in the morning.

Conclusion:
It is concluded that stimulant effects of MDMA are not sufficient to overcome the impairing effects of sleep loss on psychomotor performance and driving.

ORAL ABSTRACT

Methadone, benzodiazepines and traffic accident risk

Bramness Jørgen G., University of Oslo

Svetlana Skurtveit, professor, Norwegian Institute of Public Health, OSLO, Norway; Jørg Mørland, professor, Norwegian Institute of Public Health, OSLO, Norway; Anders Engeland, professor, Norwegian Institute of Public Health, BERGEN, Norway

Objectives:
Methadone is one of two major opioid maintenance treatment (OMT) drugs in Norway, and approximately 2000 patients are presently substituted with this drug. Methadone may, as other opioids, acutely result in psychomotor impairment, but tolerance to this effect appears with regular medication over time. Norwegian OMT patients are thus allowed to drive after a period of stable use over 6 months. Quite a few OMT patients will however also be co medicated with benzodiazepines, drugs that may cause impairment, without total tolerance to these effects over time. The aim of this study was to investigate whether methadone substituted OMT patients had an increased traffic accident risk and if so, whether this could be due to co prescribing of benzodiazepines.

Methods:
Information on prescriptions, road accidents, and emigrations/deaths was obtained from 3 registries 2004-6. Data on people between the ages 18-69 (N = 3.1 million) were linked. Exposure consisted of ever receiving a prescriptions for methadone. Standardized incidence ratios (SIRs) were calculated by comparing the incidence of accidents in patients receiving methadone with other patients. Among these OMT patients time exposed to benzodiazepines (clonazepam, diazepam, oxazepam, alprazolam, nitrazepam and flunitrazepam) was compared to time not exposed to benzodiazepines.

Results:
During the period, 20,494 road accidents with personal injuries occurred, including 26 in which the driver was ever exposed to methadone. Traffic accident risk was increased for these drivers (SIR = 2.4, 95% CI = 1.5 to 3.6). None of the accidents appeared in periods where the patients were also exposed to benzodiazepines, but quite a few among those ever receiving benzodiazepine treatment.

Conclusions:
There was an increased risk of being involved in a traffic accident among those receiving prescriptions for methadone. This increased risk did not seem to be related more to periods of benzodiazepine use.

ORAL ABSTRACT

The effects of MDMA (100 mg) and alcohol (0.5 0), alone and in combination, on

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J.L. Veldstra, phs student, University of Groningen, Groningen, Netherlands

Objectives :
Licit and illicit drug use, in particular multiple drug use and drug-alcohol combinations among drivers are important risk factors in traffic. Medicine and drug use are steadily increasing in traffic over the years, reason for the EU-project DRUID (Driving under the Influence of Drugs, Alcohol and Medicines) to give scientific support to the EU transport policy (White Paper, 2001) by establishing guidelines and measures to combat impaired driving caused by (combinations of) psycho-active substances.

Methods:
In the framework of the DRUID-project a study is conducted to assess the effects of 100 mg (±) 3, 4-Methylenedioxymethamphetamine (MDMA, "ecstasy") and alcohol (BAC of 0.5 0), and a combination of the two, on simulated driving performance. A group of 20 experienced, healthy MDMA-users are administered two doses of MDMA (0 and 100 mg) and two doses of alcohol (aiming at BACs of 0.0 and 0.5 0) according to a double-blind, repeated measures, two by two cross-over design.

Expected Results:
Driving performance is assessed at three levels: strategical level (general plans), manoeuvring level (controlled action patterns) and control level (automatic action patterns). As usually found, the alcohol affected performance mainly at the control level, expressed as an increase of the amount of swerving and a prolonged reaction time to manoeuvres of a car in front. The main negative effect of MDMA is at the manoeuvring level expressed as an increase in the risk a participant is willing to take. For the alcohol-MDMA combination it is found that the stimulating effects of MDMA moderated alcohol induced effects at the control level, however, at the same time has led to even greater impairment at the manoeuvring level by inducing increased risk taking as compared to the placebo conditions.

Conclusion:
Data from the present experiment confirm the common effects of alcohol and MDMA, as found in earlier experiments, and indicate the increased risk of the interaction by the two substances.

ORAL ABSTRACT

Sex and gender effects in DWI first time offenders: Neurocognitive differences

Brown Thomas, Douglas Hospital Research Center

Marie Claude Ouimet, Dr, University of Sherbrooke, Longueuil, Canada; LOUISE NADEAU; Martin Lepage, Dr., Douglas Hospital Research Centre, Verdun, Canada; Jens Pruessner, Dr., Douglas Hospital Research Centre, Verdun, Canada

Objectives:
With male drivers over-represented among DWI offenders, being male has been considered a risk factor for DWI. Nevertheless, the proportion of female drivers involved in DWI convictions and fatalities is increasing. Little is known concerning the underpinnings of female DWI. Previous research suggests that the trajectory to female DWI may be distinct. In this study, we pursue these strands of evidence by probing putative neurocognitive mediators of these distinct behavioural patterns. Main hypothesis Male offenders will show more impairment in executive functioning (e.g., planning, problem solving, impulse control) than female DWI offenders; female offenders will show a more distinct psychosocial pattern of maladjustment.

Methods:
92 male and 20 first-time female offenders, and 25 controls have been recruited to date, and over-sampling of females continues. Main measures were Connor s Continuous Performance Task (CPT), The Wisconsin Cart Sort (WCS), the Stroop Colour-Word Task, the Barratt Impulsivity Scale (BIS), and the Sensation Seeking Scale (SSS), alcohol abuse and psychosocial adjustment measures, and anatomic magnetic images of candidate brain structures.

Results :
Preliminary analyses on the available data indicate significantly greater impulsiveness and disinhibition in male vs. female offenders. Female offenders had greater difficulty in sustaining successful cognitive strategies vs. female non-offenders. Male offenders had more severe alcohol abuse history than female offenders, but current alcohol use differentiated between female offenders and non-offenders, but not in the males.

Conclusions :
These preliminary results suggest that executive functioning deficits play a more important role in male DWI behaviour, while current alcohol abuse is strongly tied to female DWI. Alcohol-based DWI risk assessment and intervention may be preferentially effective in female DWI, while more focus on self-regulation deficits and environmental restraint technologies (e.g., interlock) may be needed for male DWI offenders.

ORAL ABSTRACT

Readiness to change and help seeking as mediators of brief intervention action in DWI recidivists

Brown Thomas, Douglas Hospital Research Center

Background:
Understanding about how psychosocial therapeutics achieve their outcomes is generally wanting. In a previous randomized control trial (Brown et al., 2010), we established the superiority of Brief Motivational Interviewing (BMI) over an information and advice intervention (both one session, 30-40 min) in reducing problem drinking in alcohol abusing driving while impaired (DWI) recidivists over a 12-month follow-up. Both interventions were associated with improvement. Increasing motivation (or readiness to change) and the probability of additional help seeking are two integral objectives of Motivational Interviewing posited to contribute to its impact.

Objectives:
We investigate putative mediators to explain brief intervention outcome. Hypotheses 1) Exposure to BMI results in enhanced readiness and more help seeking over the information and advice intervention, and these differential changes mediate BMI s positive outcomes. 2) Initial readiness moderates meditational effects. Methods Participants are 182 DWI recidivists with current alcohol abuse problems recruited from the community and randomly assigned to receive BMI or the information/advice control intervention. They were followed over a 12-month period for outcome on self-reported and biological measures of excessive drinking. Readiness to change was measured using the Readiness to Change Questionnaire at baseline and 6-month follow-up. Frequency of psychosocial and health services consumed was measured at 6-month follow-up. We use both traditional multistep (Baron and Kenny, 1986) and more recent path analytic approaches (Edwards and Lambert, 2007) to test mediation and moderation models. Results Initial multistep analyses indicated that group assignment did not influence change in readiness from baseline to 6-month follow-up. In the control group alone, baseline readiness was significantly and inversely related frequency of risky drinking at 6- and 12-month follow-up. This preliminary result suggests that initial readiness to change is more important to outcome when intervention does not specifically seek to address it.

ORAL ABSTRACT

Affective disorders and antidepressants: Comparative effectiveness of newer antidepressants on fitness to drive

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Objectives:
Most antidepressants in use are comparable in their therapeutic efficacy but differ concerning their side effects. So far there is little research available about patients fitness to drive while receiving clinically relevant dosages of antidepressants.

Methods:
A sample of 40 depressive inpatients diagnosed according to DSM-IV criteria were randomly assigned to treatment with either escitalopram (n=20) or reboxetine (n=20). To control for retest effects 15 healthy controls were examined in the same time schedule. Participants were tested before pharmacologic treatment (t0), and on days 7 (t1) and 14 (t2) with computerized tests related to car driving skills. Data were collected with the Act and React Testsystem (ART 90) and the Wiener-Testsystem (WTS) measuring visual perception, reactivity, stress tolerance, concentration and vigilance. Additionally patients went through various risk simulations on a static driving simulator.

Results:
Patients showed significant improvements in most functional domains related to driving skills after 14 days of treatment with newer antidepressants. Especially in concentration, reactivity and stress tolerance distinct a clear advantage could be demonstrated in contrast to the untreated phase. Statistically significant differences between treatment groups could not be shown.

Conclusions:
Data point to an advantage of partly remitted depressive patients under escitalopram and reboxetine in contrast to untreated patients with respect to driving skills. Results have important implications for risk calculations within legal requirements. It seems that factors of the illness itself should be considered to a greater extent than pharmacologic effects, especially in the case of newer, selective antidepressants.

Prevalence Measurement Of Sleep Apnea Syndrome In Neurologic Patients - Prevention Of Traffic Risk

Buettner-Teleaga Antje, Woosuk University

Introduction:
Sleep apnea syndromes (SAS) are common disorders, which are characterized by repeated oropharyngeal occlusions repetitive transient reversible upper airway obstructions during the sleep time. Apart from a multitude of physical complaints, both obstructive sleep apnea syndrome (OSAS) patients and neurological patients suffer from excessive daytime sleepiness, reduced sustained attention, limited memory processes and cognitive functions. Among other aspects, such a decline in performance influences the persons affected in their ability to drive a car.
The objective of our study was to estimate the prevalence of OSAS and their comorbidities (cardiovascular diseases; adipositas) in neurological patients and to prevent further traffic risk.

Methods:
Our study was carried out involving neurologic patients (phases C and D at neurological rehabilitation). During admission to the clinic, these patients were examined neurologically and neuropsychologically and with a special SBAS Questionnaire. So far, data have been gathered for 89 neurologic patients (49 male; 39 female; mean age: 59.27+/-14.89; Barthel index: 87.76+/-21.33). Patients with negative questionnaire result were screened with MicroMesam (MAP).

Findings:
Among the 89 patients included in the study, the prevalence of patients with negative questionnaire result was 82.02% (73). The distribution of these patients was 3 nCPAP treated patient (4.1%), 43 patients with OSAS diagnosis (58.9%), 14 high risk patients (19.2%), 4 excluded patients (5.5%). 9 patients (12.3%) couldn ' t be evaluated.
79 of 89 examinated patients (88.76%) suffered additional under cardiovascular diseases and/or adipositas: 59 hypertension (66.29%), 2 coronary heart disease (2.25%), 5 myocardial infarction (5.62%), 18 arrhythmia (20.24%) and 50 adipositas (56.18%).

Conclusion:
Our data indicates that there is a causal relationship between OSAS and development of some neurological diseases (e.g. stroke, cerebrovascular diseases etc.) and cardiovascular status is an important factor to reveal OSAS in neurologic patients. So it is very important to research this prevalence for prevention of traffic and driving risk.

ORAL ABSTRACT

The Case for RBT in Canada: Balancing Traffic Safety and Civil Liberties in an Advanced Democracy

Chamberlain Erika, Faculty of Law, University of Western Ontario

Robert Solomon, Professor, The University of Western Ontario, London, Canada

Objective:
Despite significant legislative reforms (particularly in the provinces), increased penalties, expanded remedial programs, and awareness campaigns, Canada has one of the worst impaired driving records among comparable democracies. Millions of Canadians continue to drink and drive, because they can do so with little fear of being apprehended, let alone charged or convicted. The purpose of this paper is to examine the case for and challenges to implementing random breath testing (RBT) in Canada.

Methods:
This paper reviews Canada s recent impaired driving record, charge and conviction rates, and the persistence of impaired driving. It then reviews the impact that RBT programs have had in comparable countries. Finally, it examines whether the enactment of RBT would be upheld under Canada s Charter of Rights and Freedoms.

Results:
Canada has made little progress in reducing impaired driving deaths since the late-1990s. The technical, time-consuming nature of enforcement has discouraged police from laying criminal charges. This helps to explain why 2006 Canada s charge rate per 100,000 licensed drivers was less than 38% that of the United States.
Faced with similar challenges, Australia, New Zealand, Ireland and most EU countries have introduced RBT programs. RBT has been shown to significantly reduce impaired driving deaths and injuries.
Proposals to enact RBT will inevitably generate claims that it violates the rights of drivers under the Charter. Similar arguments have been raised in opposition to RBT in other countries. We will demonstrate that RBT is compatible with the existing Charter case law involving traffic legislation, and border and airline security.

Conclusion:
In the absence of RBT, Canada will continue to lag behind the world leaders in reducing impaired driving deaths and injuries. Experience in other countries indicates that RBT is a minimally intrusive, cost effective and publicly accepted impaired driving countermeasure. Moreover, RBT is compatible with the Charter.

ORAL ABSTRACT

Current Criminal and Administrative Vehicle Forfeiture Provisions in Canada: The Need for an Effective Program

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Robert Solomon, Professor, The University of Western Ontario, London, Canada

Objectives:
Canada s Criminal Code and various provincial statutes contain provisions that could theoretically allow for the forfeiture of vehicles driven by repeat impaired or unlicensed driving offenders. However, to date, those programs have been underused and relatively ineffective. The purpose of this paper is to identify the reasons why these forfeiture programs are not used on a more widespread basis, and to propose a more practical model.

Methods:
This paper reviews the relevant legislative provisions and identifies the legal and practical impediments to their effective implementation. It then proposes a model that is based on administrative, rather than court-based, procedures.

Results:
Currently, the various forfeiture programs in Canada largely depend on court-based procedures. For instance, Ontario s recent Civil Remedies Act, 2001 requires that procedures be commenced by the Attorney General in the Superior Court of Justice. These procedures are time-consuming and cumbersome, and provide judges the discretion to refuse forfeiture if it is not in the interests of justice. Accordingly, their use in impaired or unlicensed driving cases has and will likely continue to be very limited.
As an alternative, we propose a model that is based on administrative procedures, and implemented by police and licensing authorities. It would operate much more immediately than court-based programs, thereby minimizing the chance that the offender will sell or transfer title to the vehicle in the interim. The forfeiture program could be tied to the existing impoundment programs in the provinces, with forfeiture being used as a sanction against drivers with multiple vehicle impoundments.

Conclusion:
Drivers who commit multiple impaired or unlicensed driving offences have demonstrated that they are unwilling to be bound by existing licence provisions, and often have limited or no third-party liability insurance. Given the physical and financial risks posed by these drivers, a more widespread forfeiture program is justifiable.

Drugs and Driving in Spain

Colas Monica, DGT

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Javier Álvarez, Dr, Universidad de Valladolid, Valladolid, Spain

Aims:
Main aim: to calculate prevalence of driving after psychoactive substance use in vehicle drivers on Spanish roads. Secondary aims: to characterize socio-demographic profile of drivers who consume substances.
Spain is one of the participants in the DRUID project carrying out an epidemiological study through a road side survey.

Methodology:
Target population: motor vehicle drivers using public roads, both rural and urban. The sample population was made up of recruited drivers from 32 different areas (municipalities) chosen at random using a systematic random sampling in size-population strata (<20,000; 20,000-100,000; 100,001-500,000 and >500,000 inhabitants) and geographical criteria (Cantabria, North, Mediterranean and South).
Four control points were selected for each municipality (a total of 128 control points on a national level) in order to improve the studys representativeness and to reduce the controls predictability. Four daily and weekly periods were established for the control sessions. The selection of the case (driver) in each session was done at random in accordance with the inclusion and exclusion criteria established in the study. The police officers stopped drivers on a random basis, depending on the saturation of the control point. Controls were mandatory. Two biological saliva samples and one of breath were obtained from the participating drivers.

Results:
The field work was carried out from September 2008 to August 2009. 731 sessions were done and 3.407 cases were recruited with a rejected rate of 1.9% and a 97% of valid samples. Rejected cases didn t show any specific distribution for independent factors.
Sample has been adjusted with risk exposure (traffic volume in each of the 128 points selected). Two different cut offs have been taking into account: DRUID-agreement cut-off and laboratory cut-off.

Conclusions:
This study will contribute to improve knowledge about drugs and driving problem in Spain and could stimulate policymakers and politicians for develop enforcement strategies and public conscience about psychoactive drugs and traffic risks.

ORAL ABSTRACT

Multidimensional arousal-seeking model of first-time DWI offenders: a neurobiological mechanism explaining a high-risk behaviours pathway

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Our research team recently showed a negative association between hypothalamic-pituitary-adrenal (HPA) axis response to stress and driving-while-impaired (DWI) convictions frequency. The neurobiology of DWI recidivism has been neglected in the literature. This is unfortunate since HPA axis dysregulation is related to risk-taking behaviour, criminality and excessive drinking, all characteristics correlated to recidivism. The significant heterogeneity of first-time DWI (fDWI) population makes detection of high-risk offenders difficult. We investigated whether HPA axis dysregulation could underpin a multidimensional framework for distinguishing a high-risk subgroup. Arousal-seeking theory explains the association between low arousal and antisocial behaviours with two assumptions: sensation seeking and fearlessness. Objectives Accordingly, our first hypothesis is that HPA axis response will be negatively correlated to high-risk behaviours (i.e. traffic safety attitude, traffic infractions, criminal behaviours and standard drink consumed per day). Secondly, we expect to identify a mediational model, with HPA axis explaining experience seeking (ES) variance which then mediates high-risk behaviours. Methods 100 fDWI offenders will answer to the Sensation Seeking Scale form V, Questionnaire Analyse des Comportements Routiers, Addiction Severity Index, and Timeline Follow-Back procedure. Results Preliminary non-parametric analyses among 26 offenders showed that HPA axis response to stress was solely correlated (Spearman) to ES ($R2 = -0.28$, $p = 0.005$) and criminal behaviours ($R2 = -0.15$, $p = 0.050$). ES was correlated to traffic safety attitude ($R2 = 0.21$, $p = 0.02$) and number of standard drinks per day ($R2 = 0.28$, $p = 0.005$). Conclusion Our first hypothesis was partly supported as we uncovered a significant negative correlation between HPA axis response and criminal behaviours. For our second hypothesis, both direct and indirect meditational relationships between HPA axis, ES and the high-risk behaviours may be at work. Such preliminary analyses are promising, and our hypotheses will be more completely tested in the complete sample.

ORAL ABSTRACT

Road traffic accidents vis-à-vis substance use in India

Das Ashis, Public Health Specialist

Ashis Das, Dr, Public Health Specialist, India

Road traffic accident (RTA) is one of the emerging public health challenges in India contributing 10 deaths per 100,000 population. With only 1% of the world s motor vehicles, it is the leading country in the world accounting for 6% of the total global RTA deaths. Every 4.5 minutes a person dies due to RTA in India. During the decade 1995-2005, RTAs have increased by 25%, whereas there is an upsurge in injuries by 44% and deaths by 34%. RTAs contributed to 78% of deaths due to injury, major cause of mortality for young adults of less than 45 years, disability to 2 million people, and economic loss of USD 12.5 billion (3% of GDP) during the last two years. The burden varies from setting to setting depending on infrastructural capacity, law enforcement and behavioural pattern.

Major causes for RTA are speeding, drunk driving, and improper planning of highways and roads. Independent assessments attribute 11-40% of the accidents to alcohol influence. The per capita alcohol consumption is 1 litre with an increasing trend over then years. There have been no studies on the impact of other substances on road accidents so far. The legal limit for alcohol is 0.03 g/dl. Random assessments across the country show alcohol influence on both vehicle riders and pedestrians. However, the enforcement is sporadic and limited to random breath testing only in a few cities and nearby highways.

The information related to RTA are collected by the local police, which later on gets compiled at the crime records bureau and transferred to the transport department. The police do not have adequate training on traffic conditions or injury epidemiology leading to erroneous reporting.

India needs in-depth research to bring in the evidences and various dimensions of different substances on RTAs across the country. A separate policy is essential to ensure convergence among different departments and entities on substance use vis-a-vis RTAs. Law enforcements need to be context specific with the participation of community level organizations for awareness and compliance. The systematic collection of information and capacity building of the various agents involved should strengthen the surveillance system.

ORAL ABSTRACT

Empirical basis for adopting a theory-driven approach to preventing alcohol and other drug (AOD) impairment: implications for traffic safety

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Objectives:
Forty percent of all work place deaths are transport related. A State-based industry in Australia is in the process of developing a programme to prevent AOD impairment in the workplace. Preventing AOD impairment is important in this industry because the majority of its employees operate large machinery and or vehicles. The objective of this study was to determine whether the Theory of Planned Behaviour can help explain the mechanisms by which behaviour change occurs with regard to AOD impairment.

Method:
A survey of 1165 employees of a State-based industry in Australia was conducted, and a response rate of 98% was achieved. The survey included questions relevant to the Theory of Planned Behaviour: behaviour; behavioural intentions; attitude; perceptions of social pressure; and perceived behavioural control with regard to workplace AOD impairment.

Findings:
Less than 3% of participants reported coming to work impaired by AODs. Fewer than 2% of participants reported that they intended to come to work impaired by AODs. The majority of participants (over 80%) reported unfavourable attitudes toward AOD impairment at work. Logistic regression analyses suggest that, consistent with the theory of planned behaviour: attitudes, perceptions of social pressure, and perceived behavioural control with regard to workplace AOD impairment, all predict behavioural intentions ($P < .001$); and behavioural intentions predict (self-reported) behaviour regarding workplace AOD impairment ($P < .001$).

Conclusions:
The Theory of Planned Behaviour appears to assist with understanding the mechanisms by which behaviour change occurs with regard to AOD impairment in the workplace. An occupational AOD programme which targets those mechanisms for change may improve its impact in preventing workplace AOD impairment, and reduce AOD-related injury and road traffic crashes.

ORAL ABSTRACT

Deterring Drug Drivers: A Study into the Initial Impact of Oral Random Roadside Drug Testing in Queensland

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Objective:
The global implementation of oral random roadside drug testing is relatively limited, and correspondingly, the literature that focuses on the effectiveness of this intervention is scant. This study aims to provide a preliminary indication of the impact of roadside drug testing in Queensland.

Methods:
A sample of Queensland motorists (N= 922) completed a self-report questionnaire to investigate their drug driving behaviour, as well as examine the perceived affect of legal sanctions (certainty, severity and swiftness) and knowledge of the countermeasure on their subsequent offending behaviour.

Results:
Analysis of the collected data revealed that approximately 20% of participants reported drug driving at least once in the last six months. Overall, there was considerable variability in respondent s perceptions regarding the certainty, severity and swiftness of legal sanctions associated with the testing regime and a considerable proportion remained unaware of testing practices. In regards to predicting those who intended to drug driving again in the future, perceptions of apprehension certainty, more specifically low certainty of apprehension, were significantly associated with self-reported intentions to offend.
Additionally, self-reported recent drug driving activity and frequent drug consumption were also identified as significant predictors, which indicates that in the current context, past behaviour is a prominent predictor of future behaviour. To a lesser extent, awareness of testing practices was a significant predictor of intending not to drug drive in the future.

Conclusion:
The results indicate that drug driving is relatively prevalent on Queensland roads, and a number of factors may influence such behaviour. Additionally, while the roadside testing initiative is beginning to have a deterrent impact, its success will likely be linked with targeted intelligence-led implementation in order to increase apprehension levels as well as the general deterrent effect.

ORAL ABSTRACT

The introduction of saliva roadside drug testing in Belgium

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In June 2009 the Belgian parliament voted an amendment of the law of 1999 on driving under the influence of certain illegal drugs. The revision of the law was based on the increased scientific knowledge and progress of the last decade in the field of the detection of drugs of abuse in saliva. The former procedure consists of a time consuming test battery, which is possibly followed by a urine test and a subsequent blood test.
The revised procedure also contains three steps but is less time-consuming and more practical.
On the basis of a checklist it is examined whether there are signs that could indicate recent drug use. Tests like walking on a line and finger-to-nose are excluded. If the checklist indicates signs of recent drug use, an onsite saliva test is performed. A positive saliva test is continued by the collection of a saliva sample which is analyzed in the laboratory. Only if the analysis result of the collected sample demonstrates that the concentration of a certain drug exceeds a fixed concentration, the driver will be sanctioned for driving under the influence of drugs. Following substances are taken into account by mass spectrometric analyses: THC (10 ng/ml), amphetamine (25ng/ml), MDMA (25ng/ml), morphine or 6-acetylmorphine (5ng/ml) and cocaine or benzoylecgonine (10 ng/ml).
The revised legislation will be applicable in October 2010 and has an increase of the number of roadside tests as an objective.

Alcohol availability and DUI in a driver probabilistic sample from Porto Alegre, southern Brazil: preliminary findings

De Boni Raquel, UFRGS- HCPA

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Background:
Brazil has 35,000 traffic accidents (TA) deaths /year and almost 40% of fatal TA victims in Porto Alegre had positive Blood Alcohol Concentration (BAC). Literature shows that drinking at on-premises outlets may increase DUI chance.

Aim:
To compare DUI prevalence and risk factors in a sample of drivers who leave pubs from high and low alcohol outlets (AO) concentration areas of Porto Alegre.

Method:
Census enumeration areas (CEA) with high (S1) and low (S2) concentration of alcohol outlets were identified using geoprocesing and statistical spatial analysis. A driver probabilistic sample was selected in 3 phases: 1) CEA with probability proportional to size (PPS- AO number), stratified in S1 and S2; 2) AO and time period (PPS based on time lag); and 3) drivers (inverse sampling with the screening of every adult who left AO). Selected drivers were interviewed, breathalized, and had saliva tested for drugs when they left the premises.

Results:
3018 subjects were approached, and 2023 met inclusion criteria. S1 had more women (36% x 25%, $p<0.05$) and higher DUI prevalence (29% x 24%, $p<0.05$). Among those who were drinking (n=1070), we interviewed everyone who would drive in the next 60 min (n= 499, male 76%, 37.2 y) and one fourth of those who would not (n=183, male 64.2%, 37.7 y). Drivers who were drinking on S2 were less educated, had higher AUDIT scores and lower risk perception. There was no difference on BAC and drug use between S1 and S2.

Conclusions:
Geoprocessing is a key tool in the assessment of DUI risk factors and policymaking. There are significant differences between the characteristics of drivers from high and low AO density areas of the city, as well as in DUI prevalence. Law enforcement activities should prioritize specific areas of the city in order to better use limited resources

ORAL ABSTRACT

Misuse And Abuse Of Urine Sampling For Alcohol In The United Kingdom

Denney Ronald Colin, Dr. Ronald C. Denney & Co.

Objectives:
Drink-drive legislation in the United Kingdom includes provision of urine samples for alcohol analysis in certain circumstances. The purpose of this study has been to consider recent analytical results obtained in the UK from urine samples obtained from drink-drivers and to assess their validity in the light of the requirements of the various Acts of Parliament since 1962. Where urine is requested the law requires two separate urine samples to be provided within a set period of time. This paper considers the procedures used for obtaining these two samples and their suitability for analysis.

Methods:
An initial assessment is made of the criteria that are required in order to obtain reliable urine samples. This paper explains the procedures used and cites instances in which the integrity of urine samples and their analytical results have been undermined by procedures adopted by police officers which circumvent the scientific principles which underpin the basis of urine sampling for this purpose.
Urine alcohol values have been collected at random over twelve months from various police forces around the country and these have been examined to determine the procedures followed and the time factors involved in the provision of two urine samples.

Results:
The study has shown that police procedures for obtaining urine samples vary greatly and are often carried out in a manner intended to get the process over as rapidly as possible. Because of this prosecutions are sometimes discontinued due to short cuts having been taken. In other cases prosecutions are successful even if the time interval between the two urine samples is too short for truly separate urine samples to have been provided. Examples are given of these cases and of the limited time periods involved in the urine sampling.

Conclusions:
The results of this study show that the legal requirement for the provision of urine samples in the UK is badly expressed in law. As a result the law is open to abuse to the extent that it does not satisfy basic criteria for the provision of reliable urine samples suitable for analysis that are representative of the body alcohol content at the time the urine sample is provided. In this respect the law in the UK requires rewriting.

SPEED-02: On the efficiency of a psychological rehabilitation

DeVol Don, TÜV Thüringen Fahrzeug GmbH & Co. KG

Georg Rudinger, Prof. Dr., University of Bonn, Bonn, Germany; Norbert Hilger, Dr., University of Bonn, Bonn, Germany

In 1998 the RWTÜV developed the psychological rehabilitation program SPEED-02 (Safety by Prevention: Experience with and Engagement against Drugs) for drivers who have been identified as cannabis and/or amphetamine consumers (Sulzbach & DeVol, 2002). SPEED-02 is based on the concepts of cognitive behaviour therapy and aims at the reflection of the individual drug history. The goal is to develop and establish alternatives to drug consumption in everyday life in order to reduce the probability of a DWI-relapse.

Methods:
Within an initial Medical-Psychological Assessment (MPA) it is decided whether the driver is potentially able to assess his personal drug history and to eventually give up drug-consumption. The rehabilitation program takes place during a period of 28 weeks and consists of three phases. A trained psychologist supervises the whole course, which includes 8 sessions with 22 hours.
The evaluation study was conducted during 2002-2008 following the guidelines of the Bundesanstalt für Straßenwesen (BASt, 2002). Altogether 500 participants were tested by means of a questionnaire two times within the course and interviewed by telephone 3 years after the program. In addition, the psychologists were asked to evaluate the compliance and change-motivation. The relapse-quotient of the participants was calculated over a 3-year period and tested against a comparable group of clients who were evaluated positively within the initial MPA.

Results:
(1) The analyses of the questionnaire data revealed that the program was successful. (2) There was a high acceptance of the program and the rate of abstinent participants was reasonably high. (3) The psychologists evaluated their clients positively. (4) The relapse-quotient was almost as low as that of the control-group.

Conclusions:
Altogether the results support the assumption that SPEED-02 is highly efficient in reducing the probability of a DWI-relapse. But additionally the MPA can also be regarded as an important traffic safety measure within the German legal system.

The Role Of Psychoactive Drugs On High Way Safety

Ehikhamenor Edeaghe, UNIBEN/SAVAN

Hope Obianwu, Prof, University Of Benin, Benin City, Edo State

Introduction:
Publication by World Health Organization (WHO) in collaboration with World Bank and Harvard university as at 1999 on Global Burden of Disease revealed that out of 100 diseases globally, road traffic accident(RTA) ranked 9th in terms of mortality with forecast that by 2020 it would rise to 3rd position unless something is done urgently to remedy the trend. The role of screening road users for psychoactive substances is to act as deterrent and evident based scientific fact to prosecute offenders and legislate against impaired driving. Nigeria as one of the low motorized country with high rate of RTAs due to alcohol and psychoactive drugs based on anecdotal report will therefore benefit from screening of substance of abuse.

Methods:
An immunoassay digital oral screen portable machine was used along side that of multi-drugs urine screening tools for selected participants. Biological fluids such as blood, saliva and urine was screened. . Total population of 1725 were screened with the use of these digital screening tools. Confirmatory test was done with modified GC-MS-method.

Result:
The oral screen pre-crash results showed that participants that used cannabis, cocaine, amphetamine were present as follow; 23.65%, 4.50% and 2.45% respectively, while urine screening was positive as follow, cannabis, amphetamine, cocaine 19.56%, 2.65% and 2.15% respectively. Males were predominantly more prone to use psychoactive drugs than females in ratio of 6.5;1,while age incident showed that age group20-30 were the highest incidence of drug abuse that were more likely to drive under the influence of drugs. Post-crash results showed that cannabis is more implicated than other psychoactive drugs with&exception of alcohol .

Conclusion:
The findings here confirm incidence of impaired driving in Nigeria with use of several psychoactive drugs. The use of new digital screening will certainly enhance safety on the highways.

ORAL ABSTRACT

The use of alcohol interlocks in EU Member States and the role of EU as a regulator

Eksler Vojtech, European Transport Safety Council (ETSC)

Deaths from road crashes associated with the illegal BAC level have been decreasing at the same pace as non-alcohol related deaths in Europe since 2001 and still represents up to 25% of annual road toll in the EU. But great differences exist between EU countries in the rates the alcohol related road deaths have been decreasing in past years as shows the results from the recent ETSC study.
Beside traditional methods used to hinder drunk driving, some European countries have recently introduced a legislation paving a way towards the use of alcohol interlocks, as the ultimate measure to prevent drink driving. This paper provides an overview of the usage of alcohol interlocks in EU Member States. It further looks at the existing and future EU regulatory framework for hindering drunk driving. A special attention is given on the role of alcohol oriented regulations provided for in the new EU Road Safety Action Programme being published this summer.
A unique role of the EU in raising standards for alcohol interlocks across Europe and promoting their use in Member states is highlighted. Besides, a new light is shed on the role of employers, insurance companies and health sector in the implementation of alcolock offenders programmes.

ORAL ABSTRACT

Trends in impaired driving in Australia in 2010: A status report

Faulks Ian, Safety and Policy Analysis International and Department of Psychology, Macquarie University

Julia Irwin, Dr, Macquarie University, Macquarie University NSW , Australia; Barry Watson, Dr.; Mary Sheehan, Professor, CARRSQ, Australia

This paper reviews the status of alcohol, drugs and traffic safety in Australia, with particular emphasis on developments in the period 2008-2010. Australian jurisdictions have made impressive improvements in road safety since the early 1970s. Enforcement and public education campaigns that specifically target drink driving have been successful, with resultant long-term reduction in alcohol-related fatalities. There is a high level of community disapproval of drink driving and strong support for countermeasures. Many best-practice countermeasures targeting impaired driving are in place, including general prevention/ deterrence programs such as random breath testing (RBT), random roadside drug testing legal alcohol limits, responsible service of alcohol programs, public education and advertising campaigns and designated driver programs, and offender management programs such as driver licensing penalties and fines, alcohol ignition interlocks and vehicle impoundment for high risk drink drivers, and offender education programs. There continue to be enhancements occurring, particularly in the areas of drug-impaired driving and offender management, but also in addressing the fundamental policy and legislative framework to address impaired driving (e.g., a current national debate about lowering the permissible blood alcohol for all drivers from 0.05 to 0.02 or 0.00 gm/100 ml BAC). However, there are major challenges that may be impacting on programs targeting impaired driving, including the rapid development of a binge drinking culture among young Australians, the extension of trading hours of licensed premises, continued problems with secondary supply of alcohol to minors, and increases in the marketing of alcopops and ready-to-drink spirit-based beverages. This paper addresses the question: Are impaired driving countermeasures in Australia continuing to achieve reductions in road traumas and rates of offending, or are they plateauing? If they are plateauing, is this due to declining effectiveness of countermeasures or the need to hold the line against societal influences encouraging impaired driving?

ORAL ABSTRACT

Phosphatidylethanol molecular species in heavy and social drinkers

Favretto Donata, University of Padova

Guido Viel, Dr., Forensic Toxicology - University of Padova, Padova, Italy; Alessandro Nalesso; Giovanni Cecchetto, University of Padova, Italy; Massimo Montisci, Prof., Forensic Toxicology - University of Padova, Italy; Davide Mioni, Dr., Parco dei Tigli

Objectives:
Phosphatydilethanol (Peth) is a group of abnormal phospholipids formed in cell membranes, in the presence of ethanol, by the catalytic action of the enzyme phospholipase D on phosphatidylcholine. Recently published literature has demonstrated the existence of several molecular species of Peth in alcohol dependent subjects.
The aim of this study was to evaluate the concentration of Peth molecular species in blood collected from heavy and social drinkers through a liquid chromatography-high resolution mass spectrometry (LC-HRMS) method.

Methods:
Chromatography was performed on a C18 column using acetonitrile, ammonium acetate, and 2-propanol as mobile phases. HRMS experiments were performed on an LTQ-Orbitrap mass spectrometer equipped with an electrospray ionization (ESI) source operated in negative ion mode (resolution of 30000).
The identification of Peth species was performed by searching the expected theoretical masses of the targeted compounds (with a maximum mass tolerance of 3 ppm) in the acquired full-scan LC-HMRS chromatogram. The LC-HRMS method was utilized for the quantitative profiling of Peth homologues in blood samples of heavy (n = 11) and social drinkers (n = 11).

Results:
More than 20 different Peth molecular species were identified and quantified in blood collected from heavy drinkers (the mean concentration of each species ranging from 0.001 to 3.000 μM). For the first time, Peth 18:1/18:1 and 16:0/18:2 were quantified also in blood collected from social drinkers with a daily alcohol intake of about 20-30 g (mean Peth concentrations ranging from 0.001 to 0.100 μM).

Conclusions:
The identification of Peth homologues also in social drinkers raises the question on which molecules should be used to diagnose a harmful drinking and whether an interpretative cut-off might be utilized for each molecular species or for a combination of homologues.

ORAL ABSTRACT

Genetic susceptibility to alcohol drinking and abuse in drunk-drivers

Favretto Donata, University of Padova

Massimo Montisci, Prof., Forensic Toxicology - University of Padova, Italy

Objectives:
This study focuses on the identification of genetic characteristics involved with alcohol metabolism, as susceptibility factors to alcohol abuse and dependence. Our hypothesis is that genetic variants of key enzymes in alcohol metabolism may influence alcohol drinking behaviour and abuse. In particular the functional polymorphisms of alcohol dehydrogenase [ADH1B (rs1229984) and ADH1C (rs698)], and the mitochondrial aldehyde dehydrogenase [ALDH2 (rs671)] genes were examined.

Methods:
The study population, all Caucasian males living in North-East Italy, consisted of 150 drunk-driving traffic offenders recruited after an accurate evaluation of their "alcohol abuse/dependence" history with Alcohol Use Disorders Identification Test (CAGE and AUDIT) questionnaires, and 282 social drinkers as controls. For each of them a questionnaire on alcohol intake, on exposure to genotoxins with smoke, diet, indoor and outdoor conditions, and data of conventional biomarkers of alcohol [serum ?-glutamyltrasferase (GGT), carbohydrate-deficient transferring (CDT), aspartate and alanine aminotrasferase (AST and ALT) and mean corpuscular volume of erythrocytes (MCV)] were collected. Genotype analyses were performed by PCR on DNA from blood.

Results:
We found that the protective ADH1B*2 polymorphism, metabolizing ethanol up to 100 times quicker than the common ADH1B*1, was significantly more frequent in controls than drunk-driving traffic offenders (13% vs. 4% OR 0.29, 95% CI:0.14-0.56), alcohol intake being equal in the two groups. No differences for the other variants were detected. Moreover subjects (both drunken drivers and controls) with this functional polymorphism drank significantly less than those with the unfavourable ADH1B*1 ($p < 0.001$).

Conclusions:
The results indentify in ADH1B *1/*2 a polymorphism that influences both alcohol drinking and abuse. Moreover this study suggests that people exhibiting the presence of this variant ADH1B*1 could be at higher risk than controls for drinking and driving disability.

ORAL ABSTRACT

Minimum Legal Drinking Age 21 in the United States: Why It is an Effective Policy

Fell James, Pacific Institute for Research & Evaluation

The United States (US) Congress enacted the National Uniform Drinking Age 21 Act in 1984 to protect the health and safety of the public. The experience of other countries that have tried lowering the drinking age show that the federal government s decision was a wise one. In 1999, New Zealand lowered its drinking age from 20 to 18. The result, according to a recent study, was a dramatic increase in automobile crashes. The rate of traffic crashes and injuries to 18- and 19-year-old males increased 12 percent and increased 14 percent for males aged 15 to 17. For females, the effect was even greater rates increased 51 percent for 18- to 19-year-olds and 24 percent for 15- to 17-year-olds. If the minimum drinking age is lowered to 18 in the United States (U.S.), the result will be greater availability of alcohol not only to 18-20 year olds but also to those younger than 18. Studies in the U.S. have shown that lowering the drinking age to 18 also increases alcohol-related crashes for 15- to 17-year-olds.

European countries are often held up as examples of where liberal drinking age laws and attitudes result in responsible styles of drinking by young people. U.S. adolescents show a moderate rate of intoxication (18%) compared with their European peers, and one that is substantially lower than in most other countries. Minimum Legal Drinking Age (MLDA 21) laws save approximately 800-900 lives each year in reductions in traffic fatalities involving young drivers. Medical research shows that excessive drinking by youth aged 20 and younger may cause brain damage as well as reduce brain function. Early onset of drinking before age 21 increases the risk for future alcohol abuse, automobile crashes, and assaults, among other alcohol-related problems.

ORAL ABSTRACT

An Evaluation of Three Intensive Supervision Programs for Serious Driving-While-Intoxicated Offenders in the United States

Fell James, Pacific Institute for Research & Evaluation

A. Scott Tippetts, Senior Statistician, PIRE, Calverton, United States; A. Scott McKnight, Senior Program Manager, PIRE, Calverton, United States; Connie Wiliszowski, Research Scientist, Bedford Research, Bedford, United States

There are many variations of supervision and probation programs for convicted driving-while-intoxicated (DWI) offenders in the United States (US). Offenders who receive probation through intensive supervision programs (ISPs) have more contact with probation officers, a judge, or other designated authorities compared to standard probation programs. The objective of this study was to determine if three ISPs were effective in reducing the recidivism of offenders compared to similarly matched offenders not exposed to the ISP programs. The recidivism data for all offenders were analyzed using survival analyses, namely Cox regression models that account for varying exposure periods and swiftness to recidivate. The survival analyses contrast the ISP groups against comparison groups within the same state while adjusting for all relevant factors such as age, sex, and prior offenses as covariates.
The Minnesota Program had a significant 30.6 percent lower recidivism rate ($p=.017$) up to 4 years post-offense and prevented an estimated 15 to 23 re-arrests for DWI due to its effectiveness. The Westchester County program was effective in the short term (18.1% lower recidivism in 5 years post-offense [$p<.001$]) and resulted in an estimated 78 fewer re-arrests for DWI in the first 5 years. The Oregon DISP intervention group had 54.1 percent lower recidivism up to 8 years post-index offense and prevented 67 re-arrests for DWI in the first 8 years. The benefit/cost of ISPs appears to be very good for the prevention of re-arrests. Preventing re-arrest for DWI for multiple offenders saves thousands of dollars in sanctions (jail time) and rehabilitation.

ORAL ABSTRACT

An Evaluation of Three Driving-Under-the-Influence Courts in the United States

Fell James, Pacific Institute for Research & Evaluation

A. Scott Tippetts, Senior Statistician, PIRE, Calverton, United States

It is well known that many repeat driving-under-the-influence (DUI) offenders have serious alcohol problems that make it difficult to curb their drinking and driving behaviors. Following the model of Drug Courts in the United States (US), three DUI Courts in the State of Georgia were designed to address the underlying alcohol problems of repeat DUI offenders through continuous and frequent judicially supervised treatment, periodic alcohol and other drug testing, the use of graduated sanctions, and other appropriate rehabilitative services. The objective of this study was to determine if offenders assigned to these DUI courts had lower recidivism rates than similar matched offenders not exposed to the DUI court programs. Recidivism rates were determined using survival analyses, namely Cox Regression models and Kaplan-Meier models that take into account varying exposure periods and time to recidivate.
The DUI graduates had a significantly lower recidivism rate (63.5% lower) ($p<.001$) than the matched contemporary offenders from other counties who completed traditional programs and 79.3 percent lower ($p<.001$) than the retrospective offenders from the same counties who would have been eligible for the DUI Court had it been operating at the time. The recidivism rate for the Terminated Group was 26 percent. Even when the terminated offenders were combined with the DUI Court graduates, the DUI Court offenders had significantly lower recidivism rates: 38 percent lower ($p<.001$) than the Contemporary Group and 65 percent lower ($p<.001$) than the Retrospective Group. The recidivism rate for the combined DUI Court graduates with those terminated was 15 percent over 4year period. It is estimated that the DUI Courts prevented between 47 and 112 arrests for repeat DUI over the four year period of analysis which saved the State of Georgia a substantial amount of funding that would have been needed for jail confinement, treatment and probation.

ORAL ABSTRACT

Alcohol Involvement in Fatally Injured Drivers in the United States

Fell James, Pacific Institute for Research & Evaluation

A. Scott Tippetts, Senior Statistician, PIRE, Calverton, United States

The Fatality Analysis Reporting System (FARS) is a census of all fatal crashes (defined as a death of a participant within 30 days of the crash event) occurring on United States (US) public roadways and reported to the police. Alcohol involvement is documented through blood alcohol concentration (BAC) test results collected by police or coroners. Where such data are not available, the BACs of drivers, pedestrians, and cyclists are statistically imputed using crash characteristics (such as a police report of driver impairment) to obtain more complete and accurate alcohol data.

In many countries around the world, it is policy to test drivers killed in traffic crashes for alcohol involvement. In 1982, 54% of fatally injured drivers were tested for a BAC in the US. In 2008, 71% of fatally injured drivers were tested for a BAC. Eighteen states tested 85% or more fatally injured drivers for a BAC in 2008. Using the imputation methodology on the 29% of fatal drivers where no BAC test was taken, it was determined that 38% of fatally injured drivers in 2008 had some alcohol in their system (BAC >=.01 g/dL). Thirty-three percent (33%) of US fatally injured drivers were at or above the illegal BAC limit (BAC>=.08g/dL) in 2008. Fifteen percent (15%) had very high BACs (>=.20g/dL). These percentages are a vast improvement over 1982 when 55% of fatally injured drivers had some alcohol, 49% were at or above the illegal level (.08) and 22% had very high BACs (>=.20g/dL). However, since 1994, these percentages have not changed substantially and stagnation in any progress has occurred. Reasons for the decline between 1982 and 1994 will be discussed and strategies to further reduce impaired driving in the USA will be suggested.

ORAL ABSTRACT

Acute Disinhibiting Effects of Alcohol as a Factor in Risky Driving Behavior

Fillmore Mark, University of Kentucky

Automobile crash reports have shown that up to 40% of fatal crashes involve alcohol and that younger drivers are over-represented among these statistics. The impaired ability to drive under alcohol is usually attributed to the drug s disruptive effects on motor coordination and the ability to sustain attention. However, there is also growing evidence that alcohol use among young drivers is associated specifically with risky driving behaviors which likely contribute to the over-representation of these individuals in alcohol-related crashes. The ability of alcohol to impair cognitive mechanisms that normally serve to inhibit or suppress inappropriate actions could account for the association between alcohol use and risky driving behavior. The results of recent laboratory studies are reviewed that address this working hypothesis. Studies that model behavioral control are described to show how alcohol impairs the ability to inhibit prepotent (i.e., instigated) responses resulting in the display of impulsive and under-controlled behavior. The research is extended to the study of alcohol effects on simulated driving performance and evidence is presented to show that some driver impairments might be due to the acute disinhibiting effects of the drug, especially at low blood alcohol concentrations (i.e., below 0.08%) that are insufficient to disrupt motor coordination. Personal attributes, situational contexts, and pharmacokinetic influences are also examined as factors that might exacerbate the disinhibiting effects of alcohol to further disrupt driver performance. The presentation concludes with a discussion of how these results highlight the importance of examining the joint influence of multiple factors as contributing to impaired driver performance and its negative impact on traffic safety. Other factors, such as impulsivity and conduct disorder, might also be associated with the tendency to engage in risky driving behaviors while intoxicated and should be investigated in future studies. Research supported by grants R01 AA012895, R01 AA018274, and R21 DA021027 from the National Institutes of Health.

ORAL ABSTRACT

Driving under the influence of alcohol or narcotics: An in-depth study with convicted drivers

Forward Sonja, Swedish Road and Transport Research Institute

Objectives:
Through the use of in-depth interviews determine what motivates driver to drive under the influence of alcohol and psychoactive substances.

Methods:
In this interview study, thirty persons participated who had driven under the influence of alcohol or illegal drugs. All had been convicted and charged by the police. The interviews dealt with the perception of themselves and others, the risk of being sanctioned and interventions needed to stop the habit of drinking and driving

Results:
Most of the drivers had driven under the influence of alcohol or illegal drugs on several occasions and many had also previous convictions. However, the history of drug drivers and drunk drivers were very different, the latter group was living a more normal life, at least on the surface with work and family. For them losing the license because of DD was seen as something very shameful. Losing the license many times started a process when they became more aware of their drinking problems and pushed them to ask for help. In contrast drug drivers had from an early age failed to conform. Many of them had served long sentences for crimes not necessarily related to driving. Both groups were constantly aware of the police and had developed strategies to avoid being caught. However, drug drivers were more afraid of being charged with possessing drugs than drug driving or indeed driving without a licence. They did not perceive any pressure from others not to drive. The car was important for getting to places and bringing home stolen goods.

Conclusion:
Previously convicted drug drivers and drink drivers exhibited a problem behaviour not easily dealt with and it is suggested that sanctions by the police will not prevent future offences. Instead a more long term form of treatment is needed.

ORAL ABSTRACT

Psychiatric and Substance Abuse Comorbidity among a Large Sample of DUI Texas Offenders

Freeman James, CARRS-Q Queensland University of Technology

Jeremy Davey, Professor, CARRS-Q, QUT, BRISBANE, Australia; Jane Maxwell, Dr, University of Texas at Austin, austin, TX, United States

Objective:
Research is indicating that individuals who present for DUI treatment may have competing substance abuse and mental health needs. This study aimed to examine the extent of such comorbidity issues among a sample of Texas DUI offenders.

Method:
Records of 36,372 DUI clients and 308,695 non-DUI clients admitted to Texas treatment programs between 2005 and 2008 were obtained from the State's administrative dataset. The data were analysed to identify the relationship between substance use, psychiatric problems, program completion and recidivism rates.

Results:
Analysis indicated that while non-DUI clients were more likely to present with more severe illicit substance use problems, DUI clients were more likely to have a primary problem with alcohol. Additionally, a cannabis use problem was also found to be significantly associated with DUI recidivism in the last year. In regards to mental health needs, a major finding was that depression was the most common psychiatric condition reported by DUI clients, including those with more than one DUI offence in the past year. This group were also more at risk of being diagnosed with Bipolar Disorder compared to the general population, and such a diagnosis was also associated with an increased likelihood of not completing treatment. Interestingly, female DUI and non-DUI clients were also more likely to be diagnosed with mental health problems compared to males, as well as more likely to be placed on medications at admission and have problems with methamphetamine, cocaine, and opiates.

Conclusion:
The findings highlight the complex competing needs of some DUI offenders who enter treatment. The results also suggest that there is a need to utilise mental health and substance abuse screening methods to ensure DUI offenders are directed towards appropriate treatment pathways as well as ensure that such interventions adequately cater for complex substance abuse and psychiatric needs.

Accident-Proneness Of Dui Offenders In Treatment With Medications

Giorgetti Raffaele, Institute of Legal Medicine, Polytechnic University

Raffaele Giorgetti, Professor, Section Of Legal Medicine, Department Of Neurosciences, Marche Polytechnic University, Ancona, Italy; Franscesco Brandimarti, Doctor, Section Of Legal Medicine, Department Of Neurosciences, Marche Polytechnic University, Anc

Objectives:
To study the risk factors for recurrent drunk driving and the generic and specific risk factors for accidents, with special reference to the role of psychoactive prescription drugs, in subjects whose driving licence has been suspended for driving under the influence of ethyl alcohol (DUI).

Methods:
A sample of 4634 subjects (91% males, 9% females) aged 16 to 84 years, seeking regranting of their driving license, was examined at the Legal Medicine Section of the Polytechnic University of Ancona, Italy, between April 2005 and October 2009. Besides demographic data, information was collected on the number of previous domestic and work accidents, sports injuries, traffic crashes, current use of psychoactive prescription drugs, and number of DUI suspensions. Blood and urine were analysed for current alcohol abuse.

Results:
The risk of DUI recidivism seemed to be mainly related to male gender (multivariate adjusted odds ratio [OR] 2.683); use of antidepressants (OR 1.968); number of every kind of accidents (OR 1.785); marital status (separated-divorced-widower: OR 1.694; single: OR 1.347); and serum carbohydrate-deficient transferrin above threshold (CDT: OR 1.303).
The risk of generic adverse events is correlated mainly with use of antiepileptic drugs (OR 2.740) or tranquillizers (OR 1.976), and to the number of recidivism in drunk driving (OR 1.726).

Conclusions:
An association was found between use of psychotropic drugs and number of accidents, in line with the impaired psychomotor performance known to result from the synergistic action of alcohol and psychoactive prescription drugs. Interestingly, the association was with specific types of psychoactive prescription drugs. Analysis of the abundant data collected also provided insights into the main factors for DUI recurrence, which should be taken into account when examining DUI offenders seeking regranting of their license.

Impact of cannabis inhalation on driving skills in occasional smokers

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Objectives:
Our aim was to study the brain regions involved in a divided attention tracking task related to driving in occasional cannabis smokers. In addition we assessed the relationship between THC levels in whole blood and changes in brain activity, behavioural and psychomotor performances.

Methods:
Twenty-one smokers participated to two independent cross-over fMRI experiments before and after smoking cannabis and a placebo. The paradigm was based on a visuo-motor tracking task, alternating active tracking blocks with passive tracking viewing and rest condition. Half of the active tracking conditions included randomly presented traffic lights as distractors.
Blood samples were taken at regular intervals to determine the time-profiles of the major cannabinoids. Their levels during the fMRI experiments were interpolated from concentrations measured by GC-MS/MS just before and after brain imaging.

Results:
Behavioural data, such as the discard between target and cursor, the time of correct tracking and the reaction time during traffic lights appearance showed a statistical significant impairment of subject s skills due to THC intoxication.
Highest THC blood concentrations were measured soon after smoking and ranged between 28.8 and 167.9 ng/ml. These concentrations reached values of a few ng/ml during the fMRI.
fMRI results pointed out that under the effect of THC, high order visual areas (V3d) and Intraparietal sulcus (IPS) showed an higher activation compared to the control condition. The opposite comparison showed a decrease of activation during the THC condition in the anterior cingulate gyrus and orbitofrontal areas. In these locations, the BOLD showed a negative correlation with the THC level.

Conclusion:
Acute cannabis smoking significantly impairs performances and brain activity during active tracking tasks, partly reorganizing the recruitment of brain areas of the attention network. Neural activity in the anterior cingulate might be responsible of the changes in the cognitive controls required in our divided attention task.

The use of zopiclone among random drivers, arrested drivers and fatally injured drivers in Norway

Gjerde Hallvard, Norwegian Institute of Public Health

Ingebjørg Gustavsen, Norwegian Institute of Public Health, OSLO, Norway; Per T. Normann, Dr., Norwegian Institute of Public Health, OSLO, Norway

Objectives:
Zopiclone is the most frequently prescribed hypnotic drug in Norway. The aim of this study was to compare the use of zopiclone among random drivers with arrested drugged drivers and drivers killed in traffic accidents.

Methods:
Oral fluid was collected from random drivers by using the Intercept® Collection Device. Blood samples were collected from arrested drugged drivers and killed drivers. Samples were analysed by LCMS. Analytical cutoffs: 0.3 ng/ml in oral fluid-buffer mixture and 10 ng/ml in blood.

Results:
Zopiclone was detected in samples from 2.1% of random drivers, 4.6% of arrested drugged drivers and 3.4% of drivers killed in road traffic accidents. The use of different cutoff thresholds in oral fluid and blood made comparison of prevalences difficult.
The mean oral fluid/blood concentration ratio was found to be 3.8. A cutoff in blood of 10 ng/ml therefore corresponded to about 38 ng/ml in undiluted oral fluid, or 10 ng/ml in oral-fluid buffer mixtures (i.e. 30 times higher than the limit for the roadside study) assuming an average volume of oral fluid collected.
Zopiclone concentrations in samples of oral fluid from a population may be used to roughly estimate the distribution of zopiclone concentrations in blood. When using two estimation procedures, we found it plausible that about 0.7% of the random drivers had blood zopiclone concentrations >10 ng/ml.
We assume that a zopiclone concentration >25 ng/ml is incompatible with safe driving, and estimated that about 10% of the zopiclone-positive drivers found in the roadside survey had blood zopiclone concentrations above this limit, corresponding to 0.2% of all drivers.

Conclusion:
A small proportion of random zopiclone-positive drivers were impaired. The proportion of impairment was higher among arrested drivers and drivers killed in traffic accidents.

Pharmacokinetic models of performance impairment as assessed in experimental studies

Grellner Wolfgang,

G Sticht, ., ., .; Günter Berghaus, Dr.

Objectives:
Assessment of performance impairment by medicaments by means of a meta-analytic approach using published experimental studies and kinetics. Depiction of dose-dependent and concentration-dependent dynamics.

Methods:
A search in data bases concerning experimental studies (hypnotics and sedatives, anxiolytic benzodiazepines, antidepressants, neuroleptics, antihistamines) with at least one performance test under the effect of a medicament and kinetic experiments was conducted. According to defined criteria about 1,500 studies with about 34,000 test results were statistically evaluated.

Results:
The meta-analytic approach had to be restricted to studies with single oral applications in healthy subjects. Including the calculation of kinetics for each substance a pharmacokinetic profile could be established: the dose- and time-dependent dynamics in terms of percentage of significantly impaired performance results. After a curve fitting, the results were compared with the equivalent impairment by known concentrations of alcohol. Thus, it was possible to present curves on the concentration-dependent dynamics of a substance (correlation between concentration and percentage of performance impairment).
The performance results after multiple applications in healthy subjects and studies with ill persons were assessed by reviews. The results seem to demonstrate less severe impairment.

Conclusion:
It is possible to give dose-dependent recommendations regarding the duration of impairment in patients. The danger of agents can be compared with defined alcohol levels. Concerning reality it must be considered that the traffic-related danger of a medicament depends on more influencing variables than only on its performance impairment. In addition, the possible improvement of the underlying disease by the medication should be kept in mind.

ORAL ABSTRACT

Psychomotor impairment on three levels of behaviour after intake of zopiclone or ethanol

Gustavsen Ingebjørg, Norwegian Institute of Public Health

Knut Hjelmeland; Jean-Paul Bernard; Jørg Mørland, Prof MD, Norwegian Institute of Public Health, OSLO, Norway

Objective:
A recent study found that use of zopiclone (Z) composes increased traffic accident risk. It has further been demonstrated that Z is the most common drug detected in oral fluid among regular Norwegian drivers. In the present study we wanted to test the effects of Z in comparison with ethanol (E) on driving related behaviours.

Methods:
We performed a controlled randomized double blinded trial on 16 healthy male volunteers who attended 4 sessions separated by 10 days and were given placebo, 5 mg Z, 10 mg Z or 50 g E in a cross-over design. E served as a standard reference to quantify impairment by Z. The volunteers performed computerized tests at baseline, 1, 3.5 and 6.5 hours after intake, accompanied by blood sampling. The psychomotor tests included the three recommended core levels to predict traffic accident risk; Automotive behaviour (A), Control behaviour (B) and Executive planning (C).

Results:
The mean blood drug concentrations 1 hour after intake of 5 mg Z, 10 mg Z or 50 g E were respectively 19.0 µg/l (SEM 1.8), 39.1 µg/l (SEM 4.4), and 0.074 g/l (SEM 0.003). At this point of time significant impairment was found in 6, 6 and 5 of the 7 A-tests; in 1, 6 and 3 of the 9 B-tests, and in 2, 3 and 5 of the 10 C-tests, respectively. The psychomotor performance for placebo did not differ from baseline for any tests.

Conclusion:
10 mg Z impaired the A and B-tests most severely. The higher Z-dose, the more performance decrements were observed. E impaired the C-tests more than Z. For performance in the A- and B-tests 1 hour after intake, 5 mg Z caused impairment roughly comparable to that observed at a BAC of approximately 0.07 g/l.

ORAL ABSTRACT

Converting drug effects on experimental performance measures to odds ratios

Hargutt Volker, Center for Traffic Sciences at the University of Wuerzburg

HP Krüger, ., ., .; E Schnabel, ., ., .

Objectives:
The aim of DRUID is to gain new insights into the real degree of impairment caused by psychoactive drugs and their actual impact on road safety. An important issue within WP 1 is the recommendation of thresholds for psychoactive substances in traffic based on the different data pools within DRUID.

Methods:
Within DRUID all sources of information are used to estimate the traffic risk for different substances. Odds ratios are calculated from epidemiological data as the golden standard of risk estimations. Moreover experimental driving studies and meta-analyses are conducted. Unfortunately neither the results from experimental studies nor from meta-analyses are directly comparable to risk measures like odds ratios. In order to facilitate the comparison of different data pools a pragmatic method is developed, which converts the results from experimental data in odds ratios. For this aim an alcohol calibration study at 0.05% BAC was implemented in the different experimental studies in DRUID, which is conducted e.g. in different driving simulators.

Results:
The results of the converted experimental data in odds ratios show, that the odds ratio of the alcohol calibration study at a BAC of 0.05% results in comparable odds ratios for different studies (i.e. different settings). Moreover the odds ratios calculated from the experiments for different BACs reflect approximately the odds ratios from well-known epidemiological alcohol surveys.

Conclusion:
This pragmatic method of converting drug effects on experimental performance measures to odds ratios proofs to be valid in terms of describing approximately the actual risk from epidemiological studies.

ORAL ABSTRACT

Should we be concerned about alcohol in bicycle crashes?

Haworth Narelle, CARRS-Q

Amy Schramm, Ms, CARRS-Q, Kelvin Grove, Australia

Objectives:
This paper sets out to examine from published literature and crash data analyses whether alcohol in bicycle crashes is an issue about which we should be concerned. It discusses factors that have the potential to increase the number of bicycle crashes in which alcohol is involved (such growth in the size and diversity of the cyclist population, and balance and coordination demands) and factors which may reduce the importance of alcohol in bicycle crashes (such as time of data factors and child riders). It also examines data availability issues that contribute to difficulties in determining the true magnitude of the issue.

Methods:
This paper reviews previous research and reports analyses of data from Queensland, Australia, that examine the role of alcohol in Police-reported road crashes. In Queensland it is an offence to ride a bicycle or drive a motor vehicle with a BAC exceeding 0.05% (or lower for novice and professional drivers).

Results:
In the five years 2003-2007, alcohol was reported as involved in 165 bicycle crashes (4%). The bicycle rider was coded as under the influence or over the prescribed BAC limit in 15 were single unit crashes (12%). In multi-vehicle bicycle crashes, alcohol involvement was reported for 16 cyclists (0.4%) and 110 operators of other vehicles (3%). Additional analyses including characteristics of the cyclist crashes involving alcohol and the importance of missing data will be discussed in the paper.

Conclusion:
The increase in participation in cycling and the vulnerability of cyclists to injuries support the need to examine the role of alcohol in bicycle crashes. Current data suggest that alcohol on the part of the vehicle driver is a larger concern than alcohol on the part of the cyclist, but improvements in data collection are needed before more precise conclusions can be drawn.

ORAL ABSTRACT

Prevalence of impaired drivers in the general driving population in Europe

Hels Tove, DTU

Inger Marie Bernhoft, Senior Research Scientist, Department of Transport, Technical University of Denmark, Kgs. Lyngby, Denmark; Kira Janstrup, ., ., .

Objectives:
To estimate and explain the prevalence of alcohol and drugs in the driving population in European countries.

Methods:
In 13 countries across Europe (DK, S, N, FI, NL, BE, ES, PT, IT, PL, LT, HU, CZ), sampling of saliva and/or blood from the driving population has taken place from 2006 to 2009. The sampling has been stratified in country regions, time of the day and week, seasons and road types (urban roads/rural roads). Within each stratum, sampling has been random. Samples and data from about 50,000 drivers have been collected. All samples have been analysed for: ethanol, amphetamines, cocaine, cannabis, illicit opiates, benzodiazepines/z-drugs and medicinal opiates/opioids. Logistic regression models have been constructed for the highly prevalent substances alcohol, cannabis and benzos, with countries, age groups, genders and time periods as explanatory variables. Prevalences have then been weighted according to traffic volume.

Results:
Significant differences in prevalence of alcohol and cannabis were found between countries. Italy had the highest and Hungary the lowest alcohol prevalence. Spain had the highest and Finland, Lithuania and Sweden the lowest cannabis prevalence. Significant differences in alcohol and cannabis prevalence between age groups were found across study countries. Alcohol was most prevalent in the group of 25-34 and cannabis in the group of 18-24, whereas both substances were least prevalent in the 50+ group. Finally, a significant time difference in alcohol and benzo prevalence was found across study countries. Alcohol was most prevalent on weekend nights, least prevalent on weekdays. Benzos were most prevalent on weekdays, least prevalent on weeknights.

Conclusion:
The results reveal big differences in substance prevalence, not only between countries, but also between age groups and time periods.

ORAL ABSTRACT

Road Traffic Injuries And Alcohol In México

Hijar Martha, Instituto Nacional de Salud Pública

Low- and middle-income countries own only a third of the world s motor vehicles but they account for over 85% of deaths and 90% of the disability-adjusted life years lost due to road traffic injuries. Road traffic Injuries in Mexico are the most important cause of death among the population from 5-49 years old in México. The mortality due to Road Traffic Injuries in México during the period 2000-2008 shows a slight trend to increase and Pedestrian Injuries are the most important cause among this group. Adjusted Mortality rates varies from 18.3/100,000 inhabitants in 2000, to 20.5 in 2008.Related to motorcyclists, the mortality trend is to increase. Young men are the most affected age groups.
Alcohol Intake is reported as the risk factor associated with 30-50% of the deaths by RTI, from 15 al 35% of severe injuries and 10% of the minor injuries cases. A study done in México showed the specific weight of alcohol intake like risk factor for injury severity, and its association with others risk factors like: non-use of seat belt and speed, ORa for alcohol 5.35 CI 2.35-12.24 for minor injuries, and ORa 8.43 CI 3.10-23.0 for severe injuries.The risk of to be involved in a RTI after 6 hours of alcohol consumption shows a OR 3.9 and CI (95%) 2.6-8.0.

Discussion:
Law of not drinking alcohol if you are a car driver is mandatory in Mexico, but there is not enforcement. There is not any interventions evaluation done on this issue. Drinking and driving varies considerably around the country. There is not a comprehensive policy to regulate patterns of alcohol consumption. Interventions like increase taxes and prices, to alcohol sales like: day time, Kind of store and not sale to young population, has been implemented but not enforced and even included into an integral intervention.

Alcohol and Drug Use in Fatally Injured Drivers in States that Test over 80% for Both Alcohol and Drugs

Hingson Ralph, ICADTS

Michael Winter, Boston University School of Public Health, Boston, United States; Timothy Heeren, Boston University School of Public Health, Boston, United States

Objective:
To examine personal and crash characteristics of fatally injured drivers who tested positive for alcohol, alcohol and other drugs, other drugs but not alcohol, and neither.

Methods:
U.S. Fatality Analysis Reporting System data for 2008 were examined in 10 states where 80%+ of fatally injured drivers were tested for both alcohol and other drugs.

Results:
Of 2,604 driver fatalities, 29% tested positive for alcohol but not drugs, 9% for both alcohol and drugs, 11% for drugs but not alcohol, and 51% negative. The personal and crash characteristics were quite similar for drivers who tested positive for alcohol only and for alcohol and drugs, but differed significantly from those who tested negative for both. Compared to drivers negative for alcohol and drugs, a significantly higher percentage who tested positive for alcohol or alcohol and drugs were involved in nighttime, weekend, and single-vehicle crashes with fixed objects. They were more often younger, male, and less likely to wear seat belts. Two-thirds had BACs at 0.15%+. Drivers who tested positive for drugs but not alcohol were much more similar in their driver and crash characteristics to those who tested negative for alcohol or drugs. These two groups did not significantly differ on whether their crashes occurred at night, on weekends, involved single vehicles, and involved a collision with a fixed object. Compared to drivers who tested positive for both alcohol and drugs, those who tested positive for drugs only were slightly more often male and younger and were more likely to have used cannabis (32% vs. 19%) and stimulants (22% vs. 9%) but less likely to have used narcotics (14% vs. 30%). Similar percentages used depressants (17%), hallucinogens (<1%), and PCP (=1%).

Conclusion:
Case-control studies are needed to determine whether drug use by itself or in combination with alcohol heightens crash risk.

ORAL ABSTRACT

Alcohol effects on driving performance: Compensation may protect controlled actions

Huemer Anja Katharina, Department of Traffic and Engineering Psychology

Alcohol is clearly detrimental to driving-related performance and increases the risk of an accident. Meta-analyses found that alcohol effects for automatic behavior begin at about 0.05g/dl. Performance decrements in controlled actions are found earlier at about 0.03g/dl BAC. Thus, controlled actions seem more susceptible to alcohol effects than automatic behavior. However, this notion has not yet been directly tested for different sub-tasks within a driving situation. Based on task analyses of driving one basic automatic behavior (lane keeping) and one basic controlled action (a lane change maneuver) were compared in a driving simulator study. Twenty-one participants were tested under alcohol (target BAC of 0.08 g/dl) and placebo in a cross-over within-subjects design measuring different performance indicators. First of all it was interesting to note that alcohol effects were significant but so small that from the test results a clear impairment could not be demonstrated. Contrary to expectations, automatic behavior in lane keeping phases turned out to be the most sensitive measure to the impact of alcohol demonstrating alcohol effects at below 0.04 g/dl. The lane change sub-task including controlled actions was only affected at the highest BAC of 0.08 g/dl. Compensatory behavior of the drivers may explain this result. The performance level in controlled actions can be better self-monitored by the drivers and there are more possibilities to counteract these changes. If drivers are motivated to drive safely they will try to counteract perceived detrimental effects focusing on controlled actions neglecting the automatic behavior. Thus, in driving controlled actions may be to some extent protected against alcohol. It would be interesting to examine whether a similar pattern can also be found in alcohol accidents.

Paired Oral Fluid and Whole Blood Cannabinoids From the National Roadside Study

Huestis Marilyn, Chemistry and Drug Metabolism, NIDA, NIH

John Lacey, Mr., PIRE, Calverton, MD, United States; Tara Kelley-Baker, Senior Research Scientist, PIRE, Calverton, MD, United States; Eduardo Romero, Pire, Calverton; Allan Barnes, National Institute on Drug Abuse, Baltimore, United States; Cynthia Coult

Objective:
Oral fluid is the specimen of choice for roadside evaluation of impaired drivers, but the relationship between oral fluid and blood ?9-tetrahydrocannabinol (THC) is not yet clear. Specimens from the 2007 US National Roadside Survey were utilized to evaluate cannabinoid concentrations and ratios in paired oral fluid and blood specimens.

Methods:
Data were from 556 matched oral fluid and blood specimens obtained from nighttime weekend drivers in which either oral fluid, blood or both were positive for one or more drugs. Specimens were initially screened by Immunalysis cannabinoid ELISA, with positive specimens confirmed by GCMS (THC only in oral fluid, 2 ng/mL) and LCMSMS (THC, 11-hydroxy-THC (11-OH-THC), and 11-nor-9-carboxy-THC (THCCOOH) in blood, 1 ng/mL).

Results:
THC was detected in 201 OF specimens (36.2% of drug positive specimens), with concentrations up to 1183 ng/mL; in blood, 229 specimens (41.2%) were positive for one or more cannabinoid biomarkers, with THC, 11-OH-THC, and THCCOOH maximum concentrations of 61, 12 and 233 ng/mL, respectively. 129 paired OF and blood specimens contained THC, with concentrations from 2-995 ng/mL (oral fluid) and 1-61 ng/mL (blood). Oral fluid to blood THC ratios varied greatly (0.68-360.0), with a weak correlation between the matrices (r=0.362). 11-OH-THC was never the only cannabinoid detected. THC was found in oral fluid but not blood in 72 cases; however, THCCOOH in blood documented prior cannabis exposure in 43 of these specimens. Furthermore, there were 57 cases where one or more biomarkers were present in blood, but only THC was quantified in oral fluid.

Conclusion:
These data document that oral fluid is an important alternative matrix for documenting cannabis use in roadside screening for DUID. Analyses of the variability in saliva/blood ratios in 129-paired specimens suggests that prediction of THC whole blood concentrations from oral fluid levels is not currently recommended.

ORAL ABSTRACT

The effect of socio-demographic determinants on drinking and driving. Retrospective analysis of 80 000 drunk drivers

Impinen Antti, Institute of health and welfare

Karoliina Karjalainen, National Institute for Health and Welfare, Helsinki, Finland; Pia Mäkelä, Dr., Institute of health and welfare, Helsinki, Finland; Jari Haukka, University of Helsinki, Department of Public Health, Helsinki, Finland; Aini Ostamo, Nat

Objectives:
Social background is known to affect many types of health behaviours. The main objective of this study was to examine how social factors predict drunk driving.

Methods:
Data on suspected drunk driving were combined with a register of socio-demographic factors including education, marital status, employment status, income, socio-economic status and other information. This exceptionally large data contained 83 630 drivers with first drunk driving arrest and 88 718 references with no history of driving under the influence between the years 1993 and 2007. Logistic regression models were fitted to compute odds ratios and 95% confidence intervals separately for men and women and different age groups. Drugged driving was excluded from the study.

Results:
Unemployment, low and medium education, not being married, blue collar work or being entrepreneur, living alone or in a single-parent family and car ownership predicted drunk driving. Respectively high education, being married, upper white collar position, studying or being in military service and living in family with parents and children were protective factors. The effect of socio-demographic factors was mainly similar between different groups of age and sex.

Discussion:
Socio-demographic factors contribute to in drunk driving. In general, people in lower socio-demographic position are more prone to drive after drinking. As drunk driving might often be a signal of more serious substance abuse problems more effort should be put on early recognizing of such problems. More support should be provided to those in lower or vulnerable social position.

ORAL ABSTRACT

Development of a driving simulator test battery for assessing drug influence on driving performance

Jenssen Gunnar, SINTEF

Objectives:
Using ethanol as test substance, we conducted a study in order to assess the predictive value of a driving simulator on driving ability. The purpose was to develop a validated driving simulator tool for future assessment of drugs with unknown effects on driving performance.

Methods:
We recruited 20 healthy male volunteers. After screening and test driving, the subjects underwent a total of six driving trials of 1 hour s duration each; three in an instrumented vehicle on a closed-circuit test track and three in an advanced driving simulator with a driving scenario modelled after the test track. Test subjects were titrated to BAC levels of approx. zero, 0,50 and 0,90. The study was conducted in a randomised, cross-over, single-blind fashion, using placebo drinks and placebo pills as confounders. The outcome measures were standard deviation of lateral position (SDLP), mean speed, speed fluctuations, steering wheel movements, braking/acceleration, and reaction time to unexpected events.

Results:
18 test subjects completed all six driving trials. Mean measured BAC levels were slightly lower than intended, at 0,380 and 0,860 for the proposed levels of 0,50 and 0,90, respectively.
Outcome data analyses are not available at abstract deadline, but will be presented at the time of the conference.

Conclusions:
To our knowledge, this is the first reported experiment using ethanol as a test substance to validate a driving simulator by comparing driving on a test track with simulator driving in a virtual copy of the scenario. By this, we purport to confirm that test track and simulator data correlate. This will allow us to utilize the driving simulator for the future assessment of other drugs.

ORAL ABSTRACT

A Field Experiment on the Effect of Norms Correction on Alcohol Consumption

Johnson Mark, PIRE

Objectives:
Social norms marketing strategies have been widely used to combat risky drinking, to mixed effects. The research described herein employed a field experiment to examine the impact on alcohol consumption of providing drinkers with accurate normative information. Potential moderators of the norms intervention were experimentally manipulated as well.

Methods:
Participants were sampled from a natural, high-risk drinking environment and randomly assigned to one of nine experimental conditions. The experimental manipulations consisted of whether participants received accurate drinking norms, the salience of the normative information, the believability of the information, and whether the norms were based on a general or specific reference group. The participant s level of alcohol consumption (as measured by a calibrated breathalyzer) after receiving the experimental manipulations served as the primary dependent measure.

Results:
The vast majority of drinkers overestimated the actual level of alcohol consumption in the natural drinking environment. Over the course of the study, participants who received accurate normative information, relative to controls, tended to change their normative beliefs to be more accurate. Furthermore, changes in perceived drinking norms (towards greater accuracy) were associated with reductions in alcohol consumption. However, the direct effect of the experimental manipulations on drinking was mixed and varied considerably as a function of participant sex and ethnicity.

Conclusion:
The results provided some direct evidence consistent with the hypothesis that correcting inaccurate norms can change behaviour. Normative information and instructions that were simpler appeared to be more effective than complicated normative messages.

ORAL ABSTRACT

What non-alcohol drugs are used by drinking drivers in Sweden? Toxicological results from 10-years of forensic blood samples

Jones Wayne, Forensic Toxicology

Introduction:
The punishable blood-alcohol concentration (BAC) for driving in Sweden is 0.20 mg/g (~0.02 g%) and since 1999 there is a zero-limit law for scheduled drugs in the blood of drivers. Here we report the demographics of traffic delinquents in Sweden apprehended by the police for driving under the influence of alcohol with and without another licit or illicit substance in the blood samples.

Methods:
We identified 116,324 cases of driving under the influence of alcohol or drugs (DUI/DUID) over a 10-year period (1998-2007). In 40,905 cases the driver had a punishable BAC (> 0.2 mg/g).

Results:
There were N = 35,700 cases with alcohol as the only drug (mean age 40 ± 15 y, 89% men) and the mean BAC was 1.60 mg/g. There were N = 3149 cases with alcohol + an illicit drug in blood (mean age 36 ± 11 y, 92% men) at a mean BAC of 1.06 mg/g. We found N = 1255 cases of alcohol combined with a prescription (licit) drug (mean age 38 ± 13 y, 85% men) and the mean BAC was 1.31 mg/g. Finally there were N = 801 drivers with a punishable BAC an illicit and a licit drug in blood. For these poly-drug users (mean age 34 ± 10 y, 92% men) the mean BAC was 1.04 mg/g. The results show a strong predominance of male offenders in all sub-groups. The alcohol-only cases were 4-6 y older than those with alcohol + other drugs ($p<0.01$). The mean BAC was significantly higher in the alcohol-only cases compared with drug-alcohol combinations ($p<0.001$). The major illicit drugs identified in blood together with alcohol were THC (median conc. 0.001 mg/L), amphetamine (0.2 mg/L), cocaine metabolite benzoylecognine (0.2 mg/L) and the heroin metabolite morphine (0.02 mg/L). The major prescription drugs were sedative-hypnotics, exemplified by diazepam (0.2 mg/L), alprazolam (0.05 mg/L), flunitrazepam (0.001 mg/L), zolpidem (0.15 mg/L) and zopiclone (0.07 mg/L) as well as other benzodiazepines. The opiate tramadol (0.4 mg/L) was also a common finding.

Conclusions:
Those who drive under the influence of alcohol in combination with other psychoactive substances, whether licit or illicit, are likely to pose a greater danger for traffic safety compared with people having a similar BAC but without the drug.

ORAL ABSTRACT

Occurrence of alcohol and other drugs in femoral blood samples from drivers killed in road-traffic crashes in Sweden

Jones Wayne, Forensic Toxicology

Introduction:
This presentation concerns the prevalence of alcohol and other drugs (licit, illicit or both) in femoral blood obtained at autopsy from drivers killed in road-traffic crashes in Sweden over a 5 y period (2003-2007).

Methods: We identified 1,403 traffic crashes in which the driver was killed. In over 97% of these deaths a forensic autopsy was performed as well as a complete toxicological analysis for alcohol and other drugs in femoral blood samples.

Results:
In 60% of cases (N = 835, 83% men and 17% women) the toxicological results were negative. The blood-alcohol concentration (BAC) of drivers killed was above the legal limit (> 0.2 g/L in Sweden) in 22% of cases (N = 315). The mean, median and highest BAC were 1.7 g/L, 1.7 g/L and 4.9 g/L, respectively. The alcohol-positive drivers were mainly men (93%) and alcohol as well as another drug was identified in 73 cases. In single vehicle crashes (N = 575) the driver s BAC was above the legal limit in 55% of cases. In 253 cases (18%) drugs other than alcohol were identified; illicit drugs only in 39 cases (2.8%), an illicit drug and a prescription drug in 28 cases (2.0%) and in 186 cases (13.3%) one or more licit drugs. Amphetamine was the major illicit drug at mean, median and highest concentrations of 2.1 mg/L, 1.3 mg/L and 12.1 mg/L, respectively (N = 53). The major prescription drugs were sedative-hypnotics (N = 93), opiates/opioids (N = 69) as well non-scheduled substances, such as paracetamol (N = 78) and antidepressants (N = 93).

Conclusions:
Alcohol is the dominant psychoactive substance identified in the blood of drivers killed in road-traffic crashes in Sweden. Because 55% of drivers were above the legal alcohol limit in single vehicle crashes compared with 22% in all types of crashes, this suggests culpability on the part of the alcohol-impaired driver in causing the crash.

ORAL ABSTRACT

Physiological and usability aspects of breath alcohol estimation

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Bertil Hök, Hök Instrument AB, Västerås, Sweden; Håkan Pettersson, Autoliv Development AB, Vårgårda, Sweden

In many screening applications, including alcolocks, it would be useful to reduce the time and effort to provide a valid breath alcohol test, especially for the vast majority of sober persons. State of the art instruments require forced and prolonged expiration into a tight-fitting mouthpiece which is troublesome for persons with reduced lung capacity. We have performed a series of investigations to explore the possible advantages of using CO2 as tracer gas, to indicate the degree of sample dilution by normalizing to the normal end tidal concentration.
The investigations include the following tests: 1) Analysis of expirograms of alcohol (EtOH), CO2 and H2O from 30 test persons with highly varying lung capacity 2) Analysis of expirograms from 30 healthy test persons with respect to provocative breathing manoeuvres 3) Tests with handheld prototypes enabling breath tests without a mouthpiece, performed on 153 test persons. The expirograms were recorded using a modified evidential breath analyser (Evidenzer, Nanopuls AB, Uppsala, Sweden), and the prototypes were designed and fabricated in our laboratories.
The results of studies 1) and 2) show that deadspace expiration is invariably completed within two seconds, followed by steadily increasing CO2, EtOH and H2O concentrations, mentioned in the order of decreasing slope. Hyperventilation and breath holding has relatively strong and similar effect on early estimation of EtOH and CO2 concentration, whereas the H2O vapour is less affected. Sampling in freely expired breath with prototypes 3) gave an average CO2 concentration of 3.7 kPa with a standard deviation of 0.6 kPa.
The observed CO2 variability is surprisingly low, considering the range of usability and physiological factors. Multiplying early readings of alcohol with the ratio between end tidal and instantaneous CO2 concentrations provides a conservative estimate of breath alcohol concentration, enabling more shallow expirations to be performed without increasing the rate of false negatives.

ORAL ABSTRACT

Individual psychological rehabilitation programmes and their effectiveness on DUI-offenders

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Brigitte Krohn, Dr., AFN, Köln, Germany

Driving under the influence (DUI) of alcohol or drugs is still a very serious problem for traffic safety. Over 30 years ago the AFN began implementing the focal lifestyle analysis method (Lebensstilanalyse) into rehabilitation programmes for different groups of DUI-offenders. Our lecture summarises the experience we have gained whilst working with this method and we will pay particular attention to its efficacy and therefore its contribution towards improving road safety.

Methods:
The focal lifestyle analysis is based on the individual psychology of Alfred Adler. A specially-trained, qualified psychologist acquires the personal background of each individual road traffic offence from groups of four to twelve participants and thus derived possible ways to change behaviour for effective re-offence prevention.
The four rehabilitation programmes, IRaK (DUI-offenders/alcohol), DRUGS (DUI-offenders/drugs), ALFA (for new drivers as DUI-offenders) and IRaK-S (first-time drunk drivers who are currently banned from driving), were presented whilst taking into consideration target group-specific characteristics such as didactic aspects, information distribution and materials.
All four rehabilitation programmes have now been evaluated, with the results of the latest study due in summer 2010. The main focus is on the likelihood of participants re-offending in the years following the course. Questionnaires show how the participants perceived and evaluated the courses.

Results:
The focal lifestyle analysis method proved to be an effective approach for driver rehabilitation. In the participant questionnaires the courses were rated positively and were described as being useful. The results regarding re-offence show an extremely low relapse rate amongst participants (around 10% depending on the course programme).

Conclusions:
This depth-psychological approach to the rehabilitation of DUI-offenders provides access to the problem with the promise of success. The tool focal lifestyle analysis is to be used in the future for road safety work and should be tested on other target groups as well.

ORAL ABSTRACT

Socio-economic determinants of drugged riving a register-based case-control study

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Tomi Lintonen, Police College of Finland, Tampere, Finland; Antti Impinen, National Institute for Health and Welfare, Helsinki, Finland; Pirjo Lillsunde, Dr, National Institute for Helth and Welfare, Helsinki, Finland; Pia Mäkelä, National Institute for H

Objectives:
There is a very little information about the social background of drivers suspected of driving under the influence of drugs (DUID). We aimed to describe the associations between socio-economic characteristics and drugged driving, and to elaborate possible determining factors of drugged driving in Finland.

Methods:
A register-based case-control study was conducted. The group of cases consisted of 2,631 DUID suspects apprehended by the police during 1993-2006. The control group of 74,809 individuals was drawn from the general Finnish population not suspected of DUI. The information about socio-economic background was traced from the Employment register of Statistics Finland. Socio-economic factors predicting driving under the influence of benzodiazepines and alcohol (BZDA) or amphetamines among under 45-year-old men were estimated by using logistic regression model.

Results:
In the basic model DUID with BZDA was predicted by parents and own lower education, urban municipality, lower white-collar and blue-collar work, unemployment, disability pension, lower income, being single, divorced or widowed, and living alone. After adjusting for other socio-economic variables, parents and own lower education, semi-urban environment, blue-collar work, unemployment, disability pension, being divorced or widowed, and living alone had an independent effect on DUID with BZDA.
DUID with amphetamines was predicted by all the characteristics mentioned above and in addition by being entrepreneur. With the exception of parents basic education and lower white-collar work, these also were independent predictors of DUID with amphetamines after adjusting for other socio-economic variables. Being a student was a significant protective factor of DUID with amphetamines after controlling for other factors.

Conclusions:
Disadvantaged social background was a significant predictor of DUID. This information is vital in the preventive work targeted on drugged driving. Especially young men who are at risk of social exclusion should be identified and actions be made before they need police and remedial services.

Incorporation of Ethyl Glucuronide into rat hair: influence of hair pigmentation and ethanol dose

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Objectives:
The aims of the present study were to evaluate the relationship between the administered ethanol doses and the measured ethyl glucuronide (EtG) concentrations in rat hair and to investigate the influence of hair pigmentation on EtG hair incorporation. The time courses of ethanol and EtG in blood after a single dose administration were also evaluated.

Methods:
Ethanol was administered by intragastric route to Long Evans rats at three doses (1, 2 and 3 g ethanol/kg body weight for the G1, G2 and G3 groups, respectively). Rats received ethanol on 4 consecutive days per week for 3 weeks. Twenty-eight days after the ethanol administration, the newly pigmented and nonpigmented grown hair was collected and separately analyzed by gas chromatography tandem mass spectrometry for EtG. Blood samples were collected within 12-h after the ethanol administration. Blood EtG and ethanol concentrations were measured by liquid chromatography tandem mass spectrometry and headspace gas chromatography with flame ionization detection, respectively.

Results:
No statistically significant difference was observed in EtG concentrations between pigmented and nonpigmented hair (Spearman s rho= 0.95, $p<0.001$). Higher doses of ethanol resulted in greater blood ethanol AUC and in greater EtG AUC. A positive correlation was found between blood ethanol AUC and blood EtG AUC (Spearman s rho=0.84, $p<0.001$). The median hair EtG concentration in groups G3 and G2 was significantly higher than the one in groups G2 and G1, respectively (Wilcoxon Mann Whitney test, $p<0.01$ and $p<0.001$, respectively). There was a significant positive correlation between EtG concentrations in hair and EtG AUC in blood ($r=0.89$, $P < 0.001$).

Conclusion:
The EtG incorporation into rat hair was not influenced by hair pigmentation. The EtG concentration in hair increased with the administered ethanol. The EtG concentration in hair appeared to reflect the EtG concentration in blood.

ORAL ABSTRACT

Trends in road traffic crashes and associated injury and fatality in Pakistan, 1956-2008

Khoso Ajmal Khan, National Highways & Motorways Police

Objectives:
To carry out comprehensive analysis of available Road Traffic Crash data from National Transport Research Centre and Statistics Bureau of Pakistan for the period 1956- 2008 and to estimate magnitude of Road Traffic Crashes and associated injuries and fatalities in Pakistan and judge its trends with respect to population and number of vehicles in Pakistan.

Method:
Data from National Transport Research Centre and Statistics Bureau of Pakistan from 1956 to 2008 was analysed; absolute number of crashes, fatalities and injuries as well as fatality Risk and fatality Rate were used as indices to measure the trends.

Result:
There is considerable increase of 13 fold in RTCs in Pakistan, from796 in 1956 and 10466 in 2008. The injury increased by more than 13 fold, from 882 to 11865, and fatalities increased by 15 fold from 302 to 4754, over the same period. Likewise, Fatality Risk has increased five fold, with 1 in 1961 and 5 in 2008.However; Fatality Rate has decreased considerably from 58 in 1956 to 16 in 2007. The data shows inconsistent trends and considerable variations between the two data sources, which suggests that data collected by different sources are incomplete and not coordinated with other sources.

Conclusion:
The RTC data collection process in Pakistan is not efficient to measure the true magnitude of the problem. It is imperative that injury surveillance should be improved to gauge actual severity of the problem efficiently in order to make road safety priority agenda of national development and for developing effective road safety policies.

Analysis of National Highways & Motorway Police Injury Surveillance System with respect to WHO Injury Surveillance Guidelines

Khoso Ajmal Khan, National Highways & Motorways Police

Objectives:
To analyze the components of the injury surveillance system being used by National Highways & Motorway Police, and determine if this system meets standard criteria for ISSs as described in WHO Injury Surveillance Guidelines.

Methods:
The Injury Surveillance System of National Highways & Motorway Police of Pakistan is analyzed on three different criteria; firstly on the basis of eight processes as mentioned in WHO Injury Surveillance Guidelines; secondly ,on the basis of twelve steps which are involved in designing and building a injury surveillance systems that are recommended by WHO; thirdly and lastly, the injury surveillance systems will be analyzed with respect to nine attributes of a good surveillance systems as mentioned in Injury Surveillance Guide published by WHO.

Result:
The results were collected in three categories as per Injury Surveillance Guidelines.
(1) The ISS follows all the steps necessary for establishing an Injury Surveillance System except two last steps of using the results to plan interventions and evaluation of a surveillance system. Due to such deficiencies, the faults of the injury surveillance system have not been identified and it also fails to produce desired results of cost effective injury prevention.
(2) The ISS fulfills only three steps involved in designing and building and it partially fulfills remaining nine steps. Therefore, the system fails to meet the criteria mentioned in Injury Surveillance Guidelines.
(3) The ISS fulfils only two attributes of an ideal injury surveillance system and fails to meet remaining seven attributes, which suggests that the system did not meet criteria of an ideal surveillance system.

Conclusion:
The ISS of NH&MP fails to meet all the criteria as mentioned in WHO Injury Surveillance Guidelines. Therefore, there is need of a lot of modifications and improvements to make this system useful.

Goals and current status of experimental work in DRUID

Knoche Anja, Bundesanstalt fuer Strassenwesen

Objective:
The goal of the experimental work in DRUID is to receive risk estimates from driving under the influence of alcohol, drugs and medicines. The experimental results will be incorporated into the finding of epidemiological case-control studies which present risk estimates of impaired driving, also.

Methods:
- Conduction of 15 experimental studies referring to different psychoactive substances.
- Development of an integration methodology for experimental and epidemiological risk estimations.

Results:
A comparable set of study results could be established by the determination of a uniform study protocol for epidemiological and experimental studies.
For experimental studies a standard set of parameters and instructions to calculate the associate measures were established.
To integrate experimental and epidemiological risk estimates three major challenges need to be met:

- Epidemiological studies deliver risk estimates (odds ratios) based on case control studies. On the other hand, no method to calculate odds ratios in case of experimental studies is known. Therefore, a new method was established to calculate such odds ratios.

- In order to determine the crucial level of impairment a reference data base on alcohol was established to be used in experimental and epidemiological studies. It allows to directly comparing drug influenced driving performance with alcohol impaired driving.

- Experimental studies determine driving impairment in regard to dosages (amount of substance consumed) whereas epidemiological studies measure substance concentrations in body fluids. A pharmacokinetic model was developed to calculate substance dosages into blood concentration.

Conclusion:
Risk thresholds (comparable to BAC levels) will be defined for most prominent substances and analytical thresholds (in case of zero tolerance) will be determined for all substances.

ORAL ABSTRACT

An introduction to hair analysis in driving license regranting

Kronstrand Robert, RMV

The society s standpoint against driving under the influence of alcohol or drugs has resulted in effective legislation to enable the investigation and prosecution of this offence. However, the means to regrant those individuals their revoked license are not sufficient. Most countries have laws, recommendations or practise to control abstinence from illegal drugs using urine samples and blood samples are used to control abstinence from alcohol. During a surveillance period of several months so few urine samples are obtained that they provide little evidence of abstinence. Over the recent years, the interest in hair in driving license regranting has increased and there are some publications that address this. Their main conclusion is that the analysis of hair samples reveals more drug use than does urine samples. This is due to the increased detection window. Therefore, hair has been included in some countries recommendations on how to control abstinence.
The objective of this talk is to give the audience an overview of hair as a matrix for the assessment of drug abstinence regarding illegal drugs in particular but will also address alcohol overconsumption. Both theoretical and practical aspects will be covered and data from the existing literature will be reviewed.

ORAL ABSTRACT

Simulator driving performance after oral dextroamphetamine

Kronstrand Robert, RMV

Gunnel Ceder; Johan Ahlner; Magnus Hjälmdahl, VTI, Linköping, Sweden

Objectives:
The main objective of the study was to investigate driving performance, but we also studied how different doses of dextroamphetamine affected the subjects sleepiness.

Methods:
Twenty experienced drivers were recruited and randomized into a double blind testing scheme with three overnight driving occassions one week apart. At each occasion there were three driving sessions: one in the late afternoon, one at night and one in the early morning, meaning that the test subjects drove under three levels of sleep deprivation: alert, slightly sleep deprived, and sleep deprived. Blood samples were drawn before and after driving sessions and analyzed for amphetamine. Sleepiness was measured by the Karolinska Sleepiness Scale. Driving performance was investigated by 12 variables regarding speed and reaction time.

Results:
ANOVA showed a significant difference in sleepiness between doses and between driving sessions. Higher doses lead to increased alertness (from 5.47 to 4.07 on the KSS-scale). Only the driving performance variable crossing car reaction time showed significant effect of dose. The reaction time for the event of crossing car was 2.17 s when placebo was given and 1.9 s when 40 mg was given. However, the two other reaction time variables were not significant.
The driver performance was also analysed with respect to changes in blood concentration instead of dose to compensate for different drug uptake. However, the results did not improve even though blood amphetamine concentrations varied within dosing groups. As before, only crossing car reaction time was significant.

Conclusion:
We conclude that the small doses given to the subjects resulted in only few effects on driving performance. Driving performance was neither improved nor made worse, however the drivers felt more alert after having taken a small dose dextroamphetamine.

National Roadside Survey 2007: Results from paired Specimens of Oral Fluid and Whole Blood

Lacey John, PIRE

The National Roadside Survey conducted in 2007 provided a large amount of data regarding the prevalence of drugs in drivers. Overall, 5,869 oral fluid samples (OF) and 3,276 blood samples were collected from night-time drivers. Of the paired specimens, 559 pairs showed at least one matrix as drug positive; 326 pairs were positive in both matrices.

Both positive: Of the 326 pairs, 75.7% were exact drug matches in both OF and blood; 21.4% had at least one drug in common; 2.7% of the specimens were a mismatch.

Most common exact matches	Number of pairs
Cannabinoids	130
Cocaine & metabolites	19
Amphetamines	11
Alprazolam	8
Hydrocodone	6
Oxycodone	5
Dextromethorphan	5
Cocaine metabolites and cannabinoids	5

One matrix negative the other positive: Either blood or OF was negative in 233 cases. In 129 cases, OF was negative with a corresponding positive blood; in 104 cases, the blood was negative with a corresponding positive OF. A breakdown shows blood to be superior to OF for sertraline, phentermine and benzodiazepine analysis; OF was superior for cocaine as well as several pain medications.

There were numerous combinations of drugs detected; many pain medications found in combination with THC. The interpretation of concentrations where multiple drugs are present, some at therapeutic levels, is problematic.

2007 U.S. National Roadside Survey: Drug Results

Lacey John, PIRE

John Lacey, Mr., PIRE, Calverton, MD, United States; Tara Kelley-Baker, Senior Research Scientist, PIRE, Calverton, MD, United States; Robert Voas, Dr., PIRE, Calverton, MD, United States; Eduardo Romano, Research Scientist, PIRE, Calverton, MD, United St

Objective:
New to the 2007 U.S. National Roadside Survey was the collection of additional types of biological samples (oral fluid and blood) to determine the presence of drugs other than alcohol in the driving population.

Methods:
Oral fluid and blood samples were collected from survey participants and were analyzed in a laboratory using enzyme-linked immunosorbent assay (ELISA) screening, followed by a confirmatory analysis by Liquid Chromatography-Tandem Mass Spectrometry (LC/MS-MS) or Gas Chromatography/Mass Spectrometry (GC/MS). Analyses of the oral fluid and blood samples were conducted to identify the presence of some 75 drugs and metabolites, including illegal, prescription, and over-the-counter drugs. Further, to make the results most useful, we identified three broad categories of drugs: illegal, prescription, and over-the-counter.

Results:
Comparison of overall drug prevalence by time of day indicates that 11 percent of drivers in the daytime sample were drug-positive. This level was significantly lower than the 14.4 percent of night-time drivers who tested positive for drugs ($p < .01$). Comparison of drug categories by time of day revealed that, based on oral fluid analyses, almost 6 percent of daytime drivers tested positive for drugs in the Illegal category (primarily marijuana and cocaine), as opposed to over 10 percent of night-time drivers. There was a statistically significant difference between daytime and night-time drivers ($p < .01$). Overall, 16.3% of survey night-time drivers were positive for at least one drug.

Conclusion:
This 2007 NRS is more extensive than any previous NRS study and provides a much broader perspective on alcohol and drug use in the driving population than previously available. These data are essential to developing more precise estimates of the presence of alcohol and other drugs in drivers, and in measuring the prevalence of alcohol- and drug-involved driving.

Keywords: Alcohol- and drug-involved driving

ORAL ABSTRACT

2007 U.S. National Roadside Survey: Alcohol Results

Lacey John, PIRE

Tara Kelley-Baker, Senior Research Scientist, PIRE, Calverton, MD, United States; John Lacey, Mr., PIRE, Calverton, MD, United States; Robert Voas, Dr., PIRE, Calverton, MD, United States; Eduardo Romano, Research Scientist, PIRE, Calverton, MD, United St

Objective:
This presentation will report the prevalence estimates for alcohol-involved driving derived from the recently completed fourth U.S. National Roadside Survey (NRS) of night-time weekend drivers.

Method:
The 2007 National Roadside Survey involved randomly stopping drivers at 300 locations across the 48 contiguous states in the United States. Data were collected during four 2-hour night-time periods (10 p.m. - 12 a.m. and 1 a.m. - 3 a.m. on Fridays and Saturdays) at 240 locations. A unique feature of the 2007 survey was that data were also collected during two 2-hour Friday daytime sessions (9:30 a.m. - 12:30 p.m. and 1:30 p.m. - 3:30 p.m.) at 60 locations. Breath samples were obtained from 9,413 drivers.

Results:
Compared to the 1996 survey, there was a significant reduction in 2007 in the percentage of night-time drivers on the road with positive BACs in the low range, between .005 and .049 g/dL. There were also statistically significant reductions in drivers with BACs in the .05 to .079 g/dL range, and .08 to .149 g/dL range. Reductions at BAC levels of .15 g/dL or higher were recorded in each successive survey, although due in part to the small sample size at these BACs, these reductions were not statistically significant.

Conclusions:
The comparison of the BAC test results from the four NRS studies suggests that there continues to be a downward trend in the proportion of drivers with positive BACs on U.S. roads on weekend nights.

Keywords: Alcohol- and drug-involved driving

ORAL ABSTRACT

2007 U.S. National Roadside Survey: Methodology

Lacey John, PIRE

Richard P. Compton; John Lacey, Mr., PIRE, Calverton, MD, United States; Tara Kelley-Baker, Senior Research Scientist, PIRE, Calverton, MD, United States; Robert Voas, Dr., PIRE, Calverton, MD, United States; Eduardo Romano, Research Scientist, PIRE, Calv

Objective:
This presentation will describe the methodology for the 2007 U.S. national field study to estimate the prevalence of alcohol-, drug-, and alcohol-and-drug-involved driving, primarily among night-time weekend drivers, but also daytime Friday drivers.

Methods:
This study involved randomly stopping drivers at 300 locations across the continental United States; sites were selected through a stratified random sampling procedure. Data were collected during a 2-hour Friday daytime session at 60 locations and during four 2-hour nighttime periods (10 p.m. 12 a.m. and 1 a.m. - 3 a.m. on both Friday and Saturday nights) at 240 locations. Both self-report and biological measures were taken. An objective was to obtain at least 7,500 oral fluid samples for analysis.

Results:
Biological measures included breath alcohol measurements on 9,413 respondents, oral fluid samples from 7,719 respondents, and blood samples from 3,276 respondents. Oral fluid and blood samples were subjected to laboratory screening and LC/MS-MS and GC/MS confirmation respectively for both alcohol and 20 categories of drugs. These data were analyzed to develop the first national prevalence estimate of alcohol- and drug-involved driving.

Conclusion:
The 2007 NRS data collection procedures represent a breakthrough in roadside survey techniques. These data extend our knowledge of the prevalence of alcohol- and drug-involved driving on our Nation s roads. Participation rates for the 2007 NRS were fairly high (83.4% for the total sample of eligible drivers) and the number of drivers who were selected to participate approximately doubled from 1986 to 1996 and again from 1996 to 2007.

Keywords: Alcohol- and drug-involved driving

ORAL ABSTRACT

Enforcing drug drivers by the Norwegian Police Service

Larsen Roar Skjelbred, National Mobile Police Service

Objective:
The purpose of the lecture is give an introduction to how the NPS are planning and carrying out control to expose drivers affected by drugs. The current Road Traffic Act § 22 states that it is illegal to drive under the influence of all intoxicating and anaesthetic agents. Drug driving is an impairment law. That means the police must prove through a blood sample and a specialist statement that the driver is under the influence when driving.
To make a control of a driver suspected of the influence of drugs, the police must have reasonable grounds for suspicion of an offence. That is, the suspicion must be justified on the basis of visual observation e.g large pupils, pale and stressed behaviour.
It is the Medicines Act that regulates what is considered to be drugs (illicit) and medicines. The most comments drugs when drug driving in Norway are Benzodiasepam, Cannabis (THC), Amphetamine, Cocaine and Morphine (Heroin, Methadone). The illicit drugs are not divided into difference classes.

Methods:
If the police suspect a driver for the reasonable grounds to be under the influence of drugs, the driver will be asked to conduct a clinical trial by the police officer. The test is called the sign and symptoms of drugs or other medicines. Norwegian police officers have been trained in the methods since the 1990s. To use the methods the sign and symptoms of drugs or other medicines a police officer had to go to a three-day theoretical course at the Norwegian Police University College.

Results:
The results of using the method of Signs and symptoms have led to many drivers prosecuted for driving under the influence of drugs or misuse of medicine. Annually reviewed the police report approximately 4500 drivers for driving under the influence of drugs or medicines.

Conclusion
In 2010, the Norwegian Parliament presumably adopts a change of the Road traffic law that gives police the power to test the drivers saliva without reasonable grounds for suspicion. This will increase the detection risk. In addition, a regulation providing instruction for limits of sentence for drug driving similar to the BAC limits. This will free up police resources for investigation and reduce the need for expert opinions. The goal is to reduce the fatal accidents caused by drug or drink driving.
Today, blood from the suspended driver is approved as evidence in cases where the driver is suspected of driving under the influence of drugs. As screening and a temporarily test we would like to use oral fluid testing before taking blood as evidence. We do not use urine as screening roadside, because a positive urine test can just be used as suspicion of use of drugs but not influence according to the Road Traffic Act.

Successful Implmentation of New Legislation

Leonard Anne, arrive alive DRIVE SOBER

Purpose:
To maximize the deterrent effect of new provincial and federal legislation intended to:
- prevent impaired and distracted driving;
- reinstate convicted drivers with restrictions and education that changes their behavior;
- address repeat offenders/drivers who fail to comply with driving restrictions/prohibitions

To reach fully licensed drivers including professional drivers and employers and refresh their knowledge of consequences for impaired and distracted driving.

Method:
Provide employers with current information on latest legislation/consequences around impaired driving and other transit-related issues including short-term licence suspensions and vehicle impoundment; share suggestions and resources to establish and facilitate policies for same. Create and promote a package of information for employers/human resource departments.

Results :
Drinking Driving 101: What you need to know about latest provincial and federal legislation has been shared with municipalities, public health, police, and other professionals via workshops and conferences. The resource has required frequent updating because of continuous changes to Ontario s HTA legislation; changes have been made regarding short term suspensions, escalating sanctions, vehicle impoundments, and more. Drinking and Driving 101 has been shared at conferences, for taxi driver training, and with public health. The concept of a province-wide version that can be identified and officially adapted has been discussed with the Minister of Community Safety and Correctional Services and members of the policing industry.

Conclusion:
Having and enforcing tough measures has been acknowledged by Traffic Injury Research Foundation as fundamental in preventing impaired driving. Drivers need to know the legislation with all its current consequences and the many changes that have been brought in over the last few years. Employers are equally well-advised to know what s at stake in terms of their fleet s exposure and employers should have policies in place for drivers who may come to work without a valid driver licence.

Road Stories for Young Drivers

Leonard Anne, arrive alive DRIVE SOBER

Purpose:
To address the disproportionate numbers of young people involved in serious and fatal collisions: Ontario drivers aged 16-24 are four times more likely to be in a fatal crash while speeding and three times more likely to be in a fatal collision while drinking and driving (ORSAR). Traffic Injury Research Foundation identified teenagers as being at a high level of risk on our roads with 40% of all teenage fatalities resulting from road crashes. Our purpose was to create an educational product for youth that includes drivers and passengers and addresses all forms of risky driving: drunk, drug-impaired, distracted, aggressive, and fatigue.

Method:
arrive alive DRIVE SOBER®, Ontario Students Against Impaired Driving, Student Life Education Company and Ontario s Ministry of Transportation collaborated on the production of iDRIVE: Road Stories. The video reflects most current legislation. Road Stories was filmed in reality style with an entertaining, interactive, social norming approach. Even promotional materials engage viewers by asking: 3 seconds x 60 km/h = ? meters the same question forms the basis for a Road Stories POP Quiz .

Results :
Road Stories was launched at OSAID s annual conference in Oakville on May 8th 2009. Almost 1,900 copies were shared within the first six months; a further 2,000 copies were purchased by Ontario Public Health Educators Association for inclusion in Ontario s high school curriculum. Road Stories is part of Ontario s approved driver education curriculum. The video has been shared with youth through conferences and workshops, tour dates with motivational speakers, at professional sporting events, and on-line. Road Stories is available in French.

Conclusion:
iDRIVE: Road Stories is well received at every level and has become a valuable tool in raising awareness of new legislation and strategies for prevention. Road Stories is currently being evaluated by a Queen s University Bachelor of Education student.

ORAL ABSTRACT

Effects of insomnia and chronic use of hypnotics on driving performance

Leufkens Tim, Maastricht University

Jan Ramaekers, Prof. Dr., Maastricht University, Maastricht, Netherlands; Al de Weerd, Dr., Sleep Centre SEIN, Zwolle, Netherlands; Wim Riedel, Prof. Dr., Maastricht University, Maastricht, Netherlands; Annemiek Vermeeren, Dr., Maastricht University, Maas

Objectives:
The severity of residual effects of hypnotics on driving performance has been mainly determined in studies using healthy volunteers. Responses to these effects may differ, however, between insomniacs and healthy volunteers due to the underlying sleep disorder. Insomniacs performance is expected to improve due to the sleep improving effects of hypnotics and, consequently, the net effects of hypnotics on daytime performance may be less in patients than in healthy volunteers. In addition, a majority of insomniacs uses hypnotics chronically resulting in the development of tolerance to the impairing effects. Impaired driving performance in healthy volunteers may then be an overestimation of the effects in patients.

Methods:
The study consisted of two parts. Part 1 compared driving performance between 22 insomniacs chronically using hypnotics, 20 unmedicated insomniacs and 21 healthy, age-matched good sleepers. Driving performance was assessed by a standardized driving test on a primary highway in normal traffic.
Part 2 compared driving performance following evening administration of zopiclone 7.5 mg between 16 insomniacs chronically using hypnotics, 16 unmedicated insomniacs and 16 healthy, age-matched good sleepers in a 3x2, double-blind, placebo controlled crossover design.

Results:
Results of the first part showed that driving performance was not affected in insomniacs, irrespective of use of hypnotics.
In the second part it was shown that zopiclone 7.5 mg significantly impaired driving performance in both insomnia groups and healthy controls. The magnitude of impairment was, however, significantly less in patients chronically using hypnotics.

Conclusion:
Insomniacs appear to be able to successfully perform a one hour driving task that requires prolonged attentional demands. Chronic use of hypnotics does not seem to change driving performance. The residual effects of zopiclone 7.5 mg on driving performance are attenuated in patients chronically using hypnotics. Yet, this does not result in an absence of impairing effects in these patients.

ORAL ABSTRACT

The life course of Dui Offenders

Lillsunde Pirjo, National Institute for Helth and Welfare

Objectives:
The main questions in The life course of DUI offenders study were: 1) what are the factors that lead to driving under influence of alcohol and/or drugs? 2) what happens to DUI offenders during their subsequent life span in terms of health and social position? 3) what kind of preventive conclusions can be drawn? The project is part of the Addiction Research Programme of the Academy of Finland in 2007-2010.

Methods:
As the principal data set, the study employed the register of all suspected DUI cases in Finland during 1977 2007 The data included over 450 000 DUI offenders apprehended by the police with positive finding for alcohol and/or illicit/licit drugs. The DUI register was linked with other national registers, e.g. Census files of Statistics Finland, Police Statistics, Motor Vehicles Registration Centre, National Prescription Register, Hospital Discharge Register, Pension Statistics and Causes of Death Register.

Results:
The changes in the number of drink driving cases during 1989 2007 followed changes in trends of economic development and changes in overall alcohol consumption. Young men aged 18 19 years were at the highest risk of committing drink-driving offences. The incidence of suspected drugged driving cases increased 18-fold during 1977 2007. The most frequently found drugs were benzodiazepines, amphetamines, cannabinoids and opioids. Poly-drug findings were common (77%). Drivers with amphetamines only had the highest re-arrest rates. Also young age, male sex, high blood alcohol level, arrest during the night time and during weekdays were the factors that constituted the risk for re-arrest.

DUI suspects had an increased risk for premature death overall, and for all observed causes of death. Disadvantaged social background was a significant predictor of DUI.

Conclusion:
A comparison of results would be interesting with other countries where these kinds of linked, register-based studies are possible.

Analysis of Opiates, Amphetamines and Buprenorphine in Oral Fluid by Rapid Screen Device, GC-MS, and LC-MSMS

Liu Ray, Fooyin University

Ray H. Liu; Hsiu-Chuan Liu; Dong-Liang Lin, Institute of Forensic Medicine, Taipei , Taiwan; Yu-Shan Wang, Institute of Forensic Medicine, Ministry of Justice, Taipei, Taiwan; Meng-Yan Wu, Fooyin University, Kaohsiung Hsien 831, Taiwan, Kaohsiung Hsien,

Objective:
Study using oral fluid as the diagnostic and performance-related test specimen has increased significantly in recent years. In this preliminary study, three categories of analytical methodologies were assessed to explore their potential for the analysis of abused drugs using oral fluid as the test specimen.

Method:
SYNTRON Saliva Screen Drug Test (Method I), Agilent LC-(triple quadrupole) tandem MS (Method II), and Agilent GC-MS (Method III) methodologies were used to analyze two sets of oral fluid specimens collected from patients under a substitution therapy program. Specimens were analyzed directly, with centrifugation, and with extraction-derivatization for the analysis by Methods I, II, and III, respectively.

Results:
Compared to Method II, Method I was found to exhibit less favourable detection limits for the analysis of opiates and amphetamines. On the other hand, Method III was found to achieve lower detection limits, than Method II, when applied to the analysis of buprenorphines. The detection limits of Method II were around 1, 1, and 3 ng/mL, respectively, when applied to the analysis of amphetamines, opiates, and buprenorphines.

Conclusion:
Direct analysis of oral fluid by LC-tandem MS, without using extensive specimen pre-treatment protocols, was found to achieve reasonably favourable detection limit and quantitation data. GC-MS methods require extensive sample preparation steps and larger size of specimen that may not be available, while the rapid screen approach does not provide quantitative data and may not reach the desired level of detection limit.

Oral fluid, Drug of abuse, Liquid chromatography-tandem mass spectrometry

Approaches to Estimating Measurement Uncertainty in Forensic Breath Alcohol Analysis

Logan Barry, NMS Labs

Objective:
Present an empirical approach to estimating measurement uncertainty in forensic breath alcohol analysis. There is am emerging demand for calculations of uncertainty in legal metrology of blood and breath alcohol concentrations. This is being driven by the recent National Academies of Science Report as well as requirements of accrediting organizations. In jurisdictions where per se thresholds have been set for alcohol, and the potential difference in sanctions for being above or below a set administrative threshold, the decision maker should be provided with the measurement results along with a clear statement of the uncertainty. Reporting forensic breath alcohol results along with an estimate of their measurement uncertainty will demonstrate their fitness-for-purpose as well as enhance the confidence of the courts and other decision makers in accepting them. While understood conceptually by forensic toxicologists, the computation and interpretation of measurement uncertainty is often daunting, and is currently performed only rarely.

Methods:
This presentation illustrates a well established empirical approach for estimating the combined uncertainty for breath alcohol determinations. The estimations combine the uncertainty from major contributors including: 1) Traceability, 2) Bias, 3) Simulator, 4) Breath test instrument and 5) the Breath Sampling component.

Results:
For assumed breath alcohol results of 0.085 and 0.089 g/210L, the combined uncertainty is estimated to be 0.0022 g/210L with and expanded uncertainty (k=2) of 0.0044 g/210L. The 95% confidence interval would be 0.0785 to 0.0924 g/210L. Other approaches to estimating uncertainty include: 1) applying inter-laboratory or proficiency test results, 2) subtracting a constant value such as 0.006 or 6%, 3) ensuring the lower 99.9% confidence limit exceeds the critical legal value.

Conclusions:
Computing measurement uncertainty will become a more common practice in forensic toxicology. We have presented a straightforward and well established empirical method for computing such uncertainties in breath alcohol analysis, and compared it to other approaches. These methods can also be automated in spreadsheet programs such as Microsoft Excel. The 99% expanded uncertainty for breath alcohol analysis amounts to approximately the mean measurement result +/- 9%. These results are fit-for-purpose in DUI litigation.

Case Reports of Impaired Driving Resulting from Butalbital Use

Logan Barry, NMS Labs

Objective:
Butalbital (Fiorinal, Fioricet) is a barbiturate commonly used in the treatment of tension headaches. The sedative hypnotic effects of the drug make it a potentially high-risk medication for drivers, and it is frequently reported as being the most commonly encountered barbiturate in driving populations. This presentation will describe a series of DUI arrests where the impairment was attributed to butalbital.

Methods:
Twenty-one drivers arrested for driving under the influence, who later tested positive for butalbital were evaluated by drug recognition expert (DRE) officers, and their driving pattern, field sobriety test performance, DRE evaluations scores, and toxicology results evaluated.

Results:
Driving behaviors included erratic lane travel, no headlights, weaving, driving on the shoulder or curb, striking parked vehicle, hits and rub, slow speeds, stopping in intersection, driving off the road, collisions and near collisions, striking fixed objects, driving into oncoming traffic, failing to stop at traffic signals. Overall the driving patterns were consistent with marked psychomotor intoxication, with obvious problems in gross motor vehicle control. Subjects commonly could not perform or performed very poorly on field sobriety tests having marked balance problems, and sway. Subjects also displayed horizontal gaze nystagmus, and at concentrations above therapeutic routinely displayed vertical gaze nystagmus also.
Butalbital concentrations ranged from 1 to 30.3mg/L, with a mean and median of 16mg/L. Eight of the 21 subjects had concentrations within the recognized therapeutic range of 1-10mg/L, although these frequently had other drugs present including codeine, and nortriptyline, the concentrations were low or therapeutic. Alcohol was present in only two cases at low concentrations (0.02g/100mL).

Conclusions:
Butalbital has a side effect profile of drowsiness, sedation, dizziness, and feelings of intoxication. Consequently, it should be used with caution by drivers, or others in safety sensitive occupations.

ORAL ABSTRACT

State of the drugs problem in Europe: Innovations in the drug market challenge routine detection

Lopez Dominique, EMCDDA (European Monitoring Centerfor Drugs and Drug Addiction)

Objective and methods:
The EMCDDA publishes an annual report on the state of the drugs problem in Europe, based on information provided by the EU Member States, candidate countries and Norway. The report provides an overview of the drug phenomenon in 30 countries, and contains facts, figures and analysis for Europe as a whole and by country.

Results:
The 2009 report shows that although levels of use of the more established drugs remain high, Europe appears to be entering a relatively stable phase regarding these substances. No major increases were noticed and, in some areas, trends appear to be downward. Indicators for amphetamine and ecstasy use, for example, suggest an overall steady or declining trend. New data confirm a continued fall in cannabis use, particularly among young people. Despite such positive developments, the dynamic nature of the drug problem presents ongoing concerns and future challenges. Among the issues underscored is Europe s increasingly complex and volatile synthetic drug market, where highly innovative suppliers circumvent drug controls by offering unregulated alternatives to controlled drugs. While this practice is not new, what is new is the wide range of substances now on offer; the growing use of the Internet and the rapidity with which the market reacts to controls.

Conclusion:
The appearance of new substances (Spice-like products, mephedrone etc.), alternatives to controlled drugs, and their increased use may pose more challenges for interventions and detection, monitoring and risk appraisal. Indeed, some users declared using legal alternatives to circumvent drug testing. While the range of available substances grows and polydrug use increases, detection becomes more complex; the implications on the European roads might be almost immediate.

ORAL ABSTRACT

Multiple DWI Offenders Show Poorer Decision-making Performance than Healthy Controls

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Thomas Brown, Dr., Douglas Hospital Research Center, Montreal, Canada; LOUISE NADEAU

Objectives:
A deficient somatic marker of the emotional signalling system may lead to poor decision-making in ambiguous high-risk situations, such as driving while impaired (DWI) by alcohol. In this pilot study, we test the hypothesis that DWI recidivists will exhibit a poorer decision-making performance on the Iowa Gambling Task (IGT) and weaker somatic activation (using anticipatory skin conductance response as index) than healthy controls (HC). As a preliminary step, we present here the results from our decision-making data.

Methods:
Two groups were recruited, [DWI (n=25) and HC (n=16), mean (± SE) ages 45.4 (1.87) for DWI and 37.3 (2.9) years for HC]. Selection criteria included being 18 years old or older and two or more DWI convictions (for DWI), or lifetime zero DWI convictions and a driver s license (for HC). The dependent variable was the mean number of cards chosen from bad decks throughout a 100-cards IGT task (divided into five blocks for analysis). Analyses were conducted on blocks 1-3 only due to blocks 4 & 5 response anomalies.

Results:
ANOVA repeated measures on blocks 1 to 3 with age as a covariate produced a significant effect of group by block interaction ($F[2, 78]=3.64$, $p<.05$, $?2 = .06$). Dunn Sidak alpha adjusted two-sample post hoc t-tests revealed the significant effect at block 3, indicating that recidivists ($M=11.12$, $SD=4.32$) chose significantly more cards from the bad decks than controls ($M=7.23$, $SD=4.57$) in block 3 ($t[40]=2.79$, $p<.05$).

Conclusion:
DWI recidivists performed more poorly than controls on the IGT, failing to learn over time, and persistently making decisions based on potential immediate gains rather than long-term outcome, neglecting associated loss risks. This suggests they may have neurocognitive decision-making deficits distinguishable from the general population. While DWI recidivists behaviour appears as impulsive, these results suggest that it is more specifically decision-making that is impaired.

Mass screening for drug abuse in traffic

Mansson Per, Biosensor Applications Sweden AB

Bengt Hagander, Biosensor Applications Sweden AB, solna, Sweden

Biosensor Applications has developed a novel rapid on-site drug screening method. The method has been evaluated in traffic situations as well as in several controlled studies.

The objective in the studies was to determine the performance of the method to collect and analyse oral and sweat samples in two minutes for use in mass screening, especially in traffic situations.

Methods:
Volunteers were given a single dose of either around 30mg of D-methamphetamine (30 study persons), 100mg MDMA (29 study persons) placebo (30 persons) or one cannabis joint (5 study persons). Sweat samples and oral samples from the tongue were collected and analysed by using a Biosens instrument. We also conducted studies in drug rehabilitation centre (two studies) and in collaboration with the traffic police.

Results:
The results from the controlled studies show a significant positive response in 16 of the study persons in the sweat samples from both the D-methamphetamine group (n=30) as well as in the MDMA group (n=29). The cannabis study showed that THC could be detected in oral samples more than three hours after smoking.
Separate studies in a naïve cohorts show a false alarm rate on <5%.
The results from the studies conducted at drug rehabilitation centre show an agreement between urine analysis and sweat analysis between 60-95% depending on type of drug.

Conclusions:
The Biosens on-site mass screening method opens up for a completely new possibility to detect driving under the influence of drugs. Both the oral as well as sweat can be used to probe use of drugs. The detection window is generally shorter than urine analysis. Until today available on-site screening devices are expensive and have capacity constraints particularly in limited personnel situations.

The whole procedure including collecting and analysis of the oral or sweat samples takes around two minutes

ORAL ABSTRACT

Changes in alcohol biomarkers during an average 8 months of interlock controlled driving

Marques Paul, PIRE

Objective:
To use a panel of alcohol biomarkers to evaluate change in drinking (as distinct from drinking-driving) during a period of ignition interlock installation. We know interlocks reduce drinking-driving. Much evidence shows during the months of interlock use, DWI recidivism decreases, the rate of failed interlock BAC tests decline, even while total driving remains unchanged. But do interlocks reduce drinking per se?

Methods:
Convicted DUI offenders, who installed alcohol ignition interlocks as a path to license reinstatement, signed informed consent and agreed to participate in a research study. From among 302 individuals who provided a baseline biological samples (blood, urine, and/or hair), 169 were also willing to provide a subsequent set of samples at an average 8 months after the initial sample. Blood was analyzed for the markers GGT, PEth, %CDT as well as conventional markers (ALT, AST, MCV).

Results:
Among 169 participants providing paired blood samples there was no significant change in levels of the medium and high sensitivity alcohol biomarkers (GGT, %CDT, PEth, gamma-CDT) from initial to followup blood samples an average of 8 months apart. However, if the analysis is restricted to the 68 subjects (40%) having %CDT> 2.5 IU at the first measurement, or the 58 (34%) having PEth >.7 µmol/L, or the 45 (27%) having GGT>50, then after log normalizing the data series to reduce skew there is a significant drop (P=.001, .003, .001 respectively) in blood marker levels an average of 8 months later. The same is true for gamma-CDT, a combination of GGT and CDT.

Conclusion:
For the average user, interlocks do not appear to alter drinking, but when the analysis is restricted to those with higher program entry alcohol biomarkers, levels decline significantly during the interlock period. Whether this is true change or simply regression to the mean is not clear. Support NIAAA5R01AA014206

ORAL ABSTRACT

Comparison of First and Repeat Offenders on Independent Drinking Indicators: Interlock BAC Test Positives and Alcohol Biomarker Levels

Marques Paul, PIRE

Objective:
To compare independent risk estimates of first- relative to repeat-offender drinking using alcohol biomarker and the BAC results from interlock breath tests.

Method:
Convicted DUI offenders (346 first time and 183 repeat offenders), who installed an alcohol interlocks as a path to license reinstatement, signed informed consent and agreed to participate in a research study. Not all participants provided biological specimens but among those who did, blood, hair and urine samples for GGT, PEth, %CDT, ALT, AST, MCV, EtS, EtG, and FAEE were measured in up to 302 offenders for blood markers and at least 91 for hair derived alcohol markers. BAC tests, calculated as a rate of tests above .02 g/dL or .04 g/dL from the interlock served as a parallel source of information. All participants also filled in psychometric assessments.

Results:
First time offenders had alcohol biomarkers levels significantly lower for three of four blood markers (PEth, gamma CDT, GGT) and urine EtG and EtS relative to those found in the biological materials of repeat offenders. This was the case whether analyzed with log normalized parametric or rank order non-parametric statistics. ALT, AST, MCV, hair FAEE and hair EtG did not differ. Beyond biomarkers, the rate of failed BAC tests much more strongly and significantly discriminated the first time offenders from the repeat offenders in this sample. Repeat offenders had a higher density of failed BAC tests, both the overall rate of fails and the failed morning BAC tests.

Conclusions:
First offenders are known to be a significant public safety risk, but they appear to drink less than repeat offenders as indicated by two independent measures: high sensitivity alcohol biomarkers and rates of total positive interlock BAC tests and positive morning BAC tests, a proxy for heavy evening drinking.
Support NIAAA 5R01AA014206

ORAL ABSTRACT

Effects of dexamphetamine with and without alcohol on simulated driving

Martens Marieke, TNO Defense, Security, and Safety dept. of Traffic Behaviour

Ries Simons, MD, ., .

Objectives:
The aim of the present study was to assess the effects of dexamphetamine (d-AMP) with and without alcohol (EtOH) on simulated driving and driving-related cognitive performance.

Method:
In a randomized, within-subject, placebo-controlled study, 18 participants were included in each of the following treatments: 10 mg d-AMP + 0.8 g/kg EtOH, 10 mg d-AMP + EtOH-free drink, 0.8 g/kg EtOH + placebo, and placebo + EtOH-free drink. The study was double-blind for dexamphetamine, whereas alcohol was not administered in a blinded fashion. Performance was assessed using cognitive tasks (critical tracking and divided attention (CTT-DAT), Psychomotor Vigilance Task (PVT), and Vigilance and Tracking Task (VigTrack)) and a driving task in a simulator, studying driving performance indicators, risk taking behaviour and situation awareness.

Results:
BAC-levels were 0.090 % at the start and 0.064 % at the end of the simulated driving test. VigTrack, PVT, and CTT-DAT scores were significantly impaired in the EtOH condition and impaired to a lesser degree in the d-AMP+EtOH condition. Best performance of these tests was found in the d-AMP+placebo condition. Results of the driving test are presently analysed with specific reference to indices of risk taking behaviour.

Conclusion:
Cognitive performance was significantly impaired by 0.09-0.06 % EtOH, while a single dose of 10 mg amphetamine was associated with improved performance. Data concerning the simulated driving test, as presently under analysis, may learn whether or not the combination of d-AMP with EtOH may confirm the hypothesis that such combination may lead to increased risk taking.

ORAL ABSTRACT

Drinking and other traffic accident risk factors in Africa: Data from the World Health Surveys

Martinez Priscilla, Norwegian Center for Addiction Research

Priscilla Martinez, Norwegian Center for Addiction Research, OSLO, Norway; Jørgen Bramness, Norwegian Center for Addiction Research, OSLO, Norway; Thomas Clausen, Norwegian Center for Addiction Research, OSLO, Norway

Objectives:
Traffic accidents are an important cause of death in Africa. This study aims to determine risk factors for traffic accidents at the population level among 18 African countries.

Methods:
Data were collected during the World Health Survey between 2002 and 2004 in 18 Sub-Saharan African countries, 65,712 adults aged 18 and older were included. Standardized questionnaires via face-to-face interviews collected data. Risk factors considered were alcohol use, smoking, and depression. Smokers were defined as current, daily smokers. Alcohol measures were based on daily consumption over the previous 7 days. Depression was based on ICD-10 and involvement in a traffic accident over the previous 12 months recorded. Bivariate associations between risk factors and traffic accidents were examined, and multivariate logistic regression was used to determine the relation of these factors to traffic accidents.

Results:
Overall, 2.1% had been involved in a traffic accident, 6.5% met criteria for depression, 13.1% were smokers, and 19.9% were current drinkers. All drinking patterns had higher rates of current smoking ($p<0.01$), and depression was more common among current drinkers ($p<0.01$) and smokers ($p<0.05$) than their abstaining counterparts. In bivariate analysis, current drinking ($p<0.05$) was associated with traffic accidents. Controlling for significantly associated covariates (gender, education, marital status, working for pay, smoking, depression, drinking), traffic accidents were associated with male gender (OR 1.6, 95% CI 1.1-2.4), education (1.2, 1.1-1.3), depression (1.6, 1.2-2.2), and smoking (2.5, 1.4-4.2)

Conclusion:
Smoking and depression as independently associated with traffic accidents could represent risk factors for and consequences of traffic accidents in Africa. The lack of an association between current drinking and traffic accidents could be due to the frequency based measure of alcohol use instead of a measure of alcohol exposure while driving. Nonetheless, the overall model suggests understanding how risk factors interact is important for traffic accident research.

ORAL ABSTRACT

Guidelines for DRIUD roadside surveys, and the resulting design for the Netherlands

Mathijssen René, SWOV Institute for Road Safety Research

Sjoerd Houwing, Mr., SWOV Institute for Road Safety Research, Leidschendam, Netherlands

Objectives:
To guarantee representative and comparable survey results for each of the 13 participating countries.

Methods:
Stratification of the roadside driver sample by place (region, research area, road type and research location) and time (division of the whole week into eight DRUID day/time categories). During the survey sessions, drivers had to be selected at random from moving traffic.
Since some prevalence data were intended to be used as control data in a case-control study, where blood samples were collected from injured drivers, the preferential body fluid to be collected at the roadside was also blood.

Results:
In the Netherlands, six research areas have been selected, covering the various regions of the country. Within each research area, twelve survey sessions have been conducted, each covering four research locations. In each research area, all eight DRUID day/time categories were covered.
Out of a total of 5,064 randomly selected drivers, 242 (4.8%) refused to cooperate. Among the remaining 4,822 valid subjects, 77.9% delivered a blood sample and 22.1% a saliva sample.

Conclusions:
After adjustment for differences between the traffic and sample distributions by time and place, the resulting distribution of psychoactive substances among the survey sample was probably fairly representative of the substance distribution among the general driving population in the Netherlands. Non-response bias was probably small.

This abstract has been produced under the research project "DRUID", funded by the European Commission within the framework of the EU 6th Framework Programme.

ORAL ABSTRACT

Evaluation of a checklist of clinical signs of impairment (CSI) during drug

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Sjoerd Houwing, Mr., SWOV Institute for Road Safety Research, Leidschendam, Netherlands

Objectives:
To evaluate a preselection method for the detection of drugged drivers, aimed at promoting roadside drug testing efficiency.

Methods:
- In the framework of EU research project IMMORTAL, SWOV developed a CSI checklist, supplemented with a short questionnaire regarding recent use of psychoactive medicines and illicit drugs. All signs and symptoms could be observed without performing complicated tests. The checklist was based on several existing checklists, among others one developed for the German police.
- The checklist was evaluated analytically in the framework of both the IMMORTAL project and the subsequent DRUID project. Based on comparison of the checklist outcomes with the results of toxicological analyses, sensitivity and specificity of the checklist have been assessed.

Results:
- In the framework of DRUID, a sample of 4082 drivers were evaluated using the checklist. Sensitivity turned out to be rather low (32%), while specificity was rather high (98%).
- A similar evaluation among a sample of 954 drivers in the framework of IMMORTAL produced better results: 61% sensitivity and 99% specificity.
- Two factors may have caused the differences between DRUID and IMMORTAL results. In IMMORTAL, urine and blood were analysed, against blood and oral fluid in DRUID. Additionally, in IMMORTAL most evaluations were conducted by only one police officer, who got more and more experienced throughout the project, whereas in DRUID many different police officers conducted the evaluations.

Conclusions:
Outcomes of the CSI checklist may improve by training police officers. Enforcement activities at times and places with high drug driving incidence may also positively influence the reliability of the checklist.

This abstract has been produced under the project DRUID, funded by the European Commission within the framework of the EU 6th Framework Programme.

ORAL ABSTRACT

Drink-driving trend 2000-2008 and the actual alcohol-related road toll in the Netherlands

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Sjoerd Houwing, Mr., SWOV Institute for Road Safety Research, Leidschendam, Netherlands

Objectives:
To assess the drink-driving trend, the actual state of drink driving and the resulting road toll.

Methods:
- Roadside surveys of drink driving. Between 2000 and 2008, a national roadside survey was conducted by the Ministry of Transport.
- Case-control study of drink driving. In the Netherlands, fatally injured drivers, for various reasons, are not tested for alcohol and drugs. In order to estimate the road toll resulting from drink driving, a case-control study was conducted by SWOV, between May 2000 and March 2004.
- Prevalence study of drink-driving. Between January 2007 and July 2009, SWOV conducted a representative roadside survey of drink driving, covering the whole year, all days of the week and all times of the day.

Results:
- Between 2000 and 2008, the proportion of drivers with BAC = 0.5 g/L decreased from 4.4 to 2.9%. The proportion of drivers with BAC = 1.3 g/L, however, remained stable around 0.5% during the whole period.
- Based on the 2000-2004 case control study by SWOV, one quarter of the severe and fatal road injuries were estimated to be alcohol-related. Approximately three qarters of these injuries were caused by intoxicated drivers with BAC =1.3 g/L.
- Results of the 2007-2009 prevalence study, like the results of the Ministry's roadside surveys, indicate that the proportion of high-BAC drivers hardly changed between 2000 and 2009. Consequently, neither did the proportion of alcohol-related injuries. The absolute number of alcohol-related fatalities, however, decreased significantly due to a general reduction of road fatalities. High-BAC drivers are especially over-represented during Saturday and Sunday mornings (4-10 AM) and during Friday, Saturday and Sunday nights (10 PM-4 AM).

ORAL ABSTRACT

LEGISLATION PACKAGE - regarding law and enforcement for driving under the influence of other drugs than alcohol.

Mathisrud Grete, Norwegian Ministry of Transport and Communications

Garnes Lennart

LEGISLATION PACKAGE - regarding law and enforcement for driving under the influence of other drugs than alcohol.

Through the last 10-20 years Norway has seen an increase in driving under the influence of other drugs than alcohol.

Although Norwegian police is rated as very competent in the detection of impaired drivers (e.g. through road side drug recognition expert-testing), Norwegian legislation addressing driving under the influence of other drugs than alcohol has been considered to have weaknesses.

It may be argued that current legislation represents an imbalance between the rules on alcohol related to impaired driving (per se based 0,2 BAC limit and legal authority for the police to conduct random road side breathalyzer testing) and the rules regarding drug-impaired driving (no per se based limits, individual impairment assessment conducted by the court based inter alia on a medical doctors clinical examination, blood sample analysis and opinion of expert toxicologist. At present there is no legal basis for the Police to conduct random roadside testing, e.g. salvia based tests).

As an answer to these shortcomings, and with the objective to improve road safety and facilitate a more effective use of resources, the Norwegian government will thus propose a legislation package foreseen several amendments to the Norwegian Road Traffic Act introducing, inter alia:

" Very low zero-tolerance based per se limits for when a driver is considered legally impaired.
" Limits for other drugs than alcohol (e.g. THC and benzodiazepines) corresponding to BAC levels 0,5 and 1,2, which if exceed may lead to considerably stricter sentencing, i.e. imprisonment.
" Legal competence for the police to conduct random road side salvia based testing (non-evidential screening).
" Lower threshold for driving license withdrawal for novice drivers.
" Legal basis for the police to impose drivers with a suspected alcohol or drug abuse-problem to undergo medical examination.

ORAL ABSTRACT

Trends in the Alcohol-Fatal Crash Problem in Canada

Mayhew Daniel, Traffic Injury Research Foundation

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Objectives:
This paper examines trends in the magnitude of the alcohol-fatal crash problem in Canada overall and for different groups of fatally injured drivers defined in terms of age, gender, and type of vehicle driven e.g., automobile, motorcycle, truck.

Methods:
Information on the presence of alcohol in fatally injured drivers is used in this paper as an index of the alcohol fatal-crash problem in Canada. In this regard, the overall rate of testing for alcohol in fatally injured drivers in Canada exceeds 80% annually. The results of alcohol tests on fatally injured drivers are examined by blood alcohol concentration (BAC) levels (e.g., 0 mg%, 1-49 mg%, 50-80 mg%, 81-160 mg%, 161 mg% and over) over a 21-year period from 1987 to 2007.

Results:
The magnitude of the alcohol-fatal crash problem in Canada declined dramatically in the 1980s, increased during the early 1990s, and then declined again between 1992 and 1999. In 1992, 48% of fatally injured drivers were positive for alcohol compared to 33% in 1999, the lowest point in the past three decades. In 2000 and 2001, however, there have been increases in the alcohol-fatal crash problem and since then there has been little change with 35% to 38% of fatally injured drivers positive for alcohol. A similar trend is apparent for fatally injured legally impaired drivers with BACs over 80 mg%.

Conclusion:
The paper considers the factors that could have contributed to these trends and the reasons for the lack of progress recently.

ORAL ABSTRACT

Effects of Washington State's First-Offender Alcohol Ignition Interlock Law

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William Leaf, Preusser Research Group, Inc., Trumbull, United States; Mark Solomon, Preusser Research Group, Trumbull, United States

Objectives:
In 1999, Washington State began to require courts to order alcohol ignition interlock installation for repeat DUI offenders and first-time offenders who refused the alcohol test or had a high BAC >0.15%. Important subsequent law changes included moving the program from the courts to the Department of Licensing in July 2003 and requiring interlocks for all people convicted of DUI in June 2004. The study examines how these law changes affected case adjudications, the number of interlocks assigned and installed, and rates of recidivism among first-time offenders.

Methods:
Based on driver license records, first-time offenders were classified by type of adjudication (e.g., high-BAC DUI conviction). Trends were examined during 1999-June 2009 for overall adjudication and adjudication types, interlock assignment and installation, and recidivism.

Results:
During 1999-June 2009 274,127 people received adjudications related to first-time alcohol-impaired driving offenses, including deferred prosecutions (11%), reductions to non-alcohol charges (27%), high-BAC DUIs (10%), DUIs with BAC<0.15% (45%), and DUIs with test refusal (7%). Over the study period two-year recidivism rates varied by adjudication, ranging from 3.6% for deferred prosecution to 14.6% for high-BAC DUIs. Adjudication types were tracked over time. Counts of orders requiring interlocks increased over time but were far fewer than the numbers of offenders who appeared to qualify for orders; interlock installations recorded on the driver record lagged even more. Recidivism rates were tracked overall and by adjudication type in relation to law changes, trends in interlock orders and installations, and whether offenders installed interlocks.

Conclusions:
US states increasingly require interlocks of all DUI offenders, and it is important to examine how these requirements affect the actual imposition of an interlock requirement and drivers decisions to install interlocks. The final report will include analysis of law effects on recidivism.

ORAL ABSTRACT

Signs of impairment: Clinical or behavioral ? From medicine to field evaluation

Mercier-Guyon Charles, cermt

Michel Mallaret, cermt, Anency, France

Objectives:
If some countries have implemented procedures for clinical evaluation of impaired drivers many other countries focus on biological evidence.
The countries where detection needs a suspicion of impairment have trained police force to use behaviour tests in place of required medical doctors.
The countries where biological detection is allowed have left their procedures of behavioural evaluation, and replaced them by biological evidence.
today, the complexity of the causes of impairment in drivers lead to many questions about which procedure has to be used and by who

Methods:
The purpose of this paper is to open the discussion in the working group session on clinical signs of impairment through comparisons between countries and police or justice procedure,

Results:
Some signs like hearth rate, blood pressure, should offend the public opinion in certain countries as belonging only to medical personals.
Detection of clinical signs of drugs use is also considered as a medical field. Even an interview by a policeman about medical diseases is also considered, in many countries, as something that would be refused in justice courts.
On the other hand, traditional impairment test batteries have reached their limits with the new drugs and combination of multiple drugs.

Conclusions:
Medicine has developed new clinical tools to explore the use of psychotropic substances.
New tests or new batteries could be proposed to detect their use.

ORAL ABSTRACT

Evaluation of 3 levels pictograms on medicines boxes in drivers and health professionals in France

Mercier-Guyon Charles, cermt

D.Carra, M.Mallaret, I. de Beauchamp, C.Mercier-Guyon

Following a request from the French Road Safety Council (Prevention Routiere), CERMT gave in 2000 a report on the categorisation of medicinal drugs regarding to driving fitness. This report was the base of a regulation implemented in France by the French medical Agency (AFSSAPS) in 2005.
The 3 level pictogram is based on a four level categorisation
The Class 0 concerns the drugs which have no demonstrated effects on driving ability.
The Class I requires caution from the driver
The Class II requires the advice of a health professional
The Class III requires the authorization of a medical doctor before driving.
Such categorisation seems to be a necessary first step for some changes in the prescriptions of drugs, taking more into account the side effects on driving, and proposing to the practitioners to use the safer drugs for driving patients.

This study was led in 3 populations:
Pharmacists and pharmacy s employees (81)
Medical doctors (38)
Patients driving (32)
Concerning the pharmacists and pharmacy s employees, the questionnaires concerned their knowledge about the pictogram and the categorisation of drugs, the advices they use to give while delivering the medicines and the usual questions from patients.
Concerning the medical doctors, the questionnaires concerned their knowledge about the pictogram and the categorisation of drugs, the advices they use to give while prescribing the medicines and the usual questions from patients.
Concerning the patients, the questionnaires concerned driving situation, opinion on driving risk, knowledge about effects of medicines on driving, and questions about the impact of the different pictograms on their driving behaviour.

The study demonstrate the interest from booth population for more information about driving risk and medicines, for more readable information in the package insert, and, from professionals, for more information and training to inform and educate the patients.

Positive effects of Red Bull® Energy Drink on driving performance during prolonged driving

Mets Monique, Utrecht University

Monique Mets, MSc, Utrecht University, Utrecht, Netherlands; Sander Ketzer, Utrecht University, Utrecht, Netherlands; Camilla Blom, Utrecht University, Utrecht, Netherlands; Maartje van Gerven, Utrecht University, Utrecht, Netherlands; Gitta van Willigenb

Introduction:
Prolonged highway driving can be affected by sleepiness. The purpose of this study was to examine the effects of Red Bull® Energy Drink versus placebo.

Methods:
24 healthy volunteers participated in this double-blind placebo controlled crossover study. After 2 hours of driving in the STISIM driving simulator subjects had a 15-minute break in which they consumed Red Bull® Energy Drink (250 ml) or placebo (Red Bull® Energy Drink without the functional ingredients) before driving 2 additional hours. A third condition comprised 4 hours of uninterrupted driving. Primary parameter of the highway driving simulator test was the Standard Deviation of Lateral Position (SDLP), i.e. the weaving of the car. Secondary parameters included the standard deviation of Speed, subjective driving quality, mental effort to perform the test, and subjective sleepiness.

Results:
In the first two hours, no significant differences between the treatments were observed on any parameter. Relative to placebo, Red Bull® Energy Drink significantly improved driving: SDLP values were significantly reduced during the 3rd ($p<0.046$) and 4th hour of driving ($p<0.011$). During the 3rd hours, Red Bull® Energy Drink significantly reduced the standard deviation of Speed ($p<0.004$). In line, for the 3rd hour of driving after consumption of Red Bull® Energy Drink subjects reported significantly improved driving quality ($p<0.0001$) and reduced mental effort to perform the test ($p<0.024$). During both the 3rd and 4th hour of driving, subjective sleepiness was significantly less pronounced after Red Bull® Energy Drink when compared to placebo ($p<0.001$ and $p<0.009$, respectively). Relative to prolonged driving, the effects of Red Bull® Energy Drink were significant for each parameter during both the 3rd and 4th hour of driving, except for mental effort during the 4th hour of driving.

Conclusion:
Red Bull® Energy Drink significantly improves driving performance during prolonged driving.

ORAL ABSTRACT

Evaluating new ways to communicate risk: how patients perceive pictograms about medicines and driving ability

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Objectives: To evaluate the effectiveness of a pictogram in communicating risk associated with driving impairing medicines to patients. To assess patients level of understanding, and intention to change behaviour when looking at various pictograms.

Methods: A structured interview involving 270 patients visiting 1 of 3 Dutch community pharmacies, in the city of Groningen, where two studies using a 2x3 design were conducted. In the first study, the respondents (patients with a driving license visiting a community pharmacy) were exposed to a condition in which the pictogram (DRUID* or homologue French pictogram) and the risk category (category I, II or III) were manipulated. In this study, both pictograms were accompanied by the same side-text. In the second study, the added value of the side-text was examined. Here, the respondents were exposed to a DRUID pictogram with or without side-text and again one of the three risk categories.

Results: 50.7% of the respondents were male with a mean age of 48.4 years-old and with a high education level (45.6%). After observing either the DRUID and the French pictograms, respondents recognized the risk of driving while taking driving impairing medicines. 78.8% of the respondents stated being likely to change their behaviour in the presence of a medicine with such pictograms. 36.3% of the respondents said they would drive less frequently and 40.7% wouldn t drive anymore. 81.5% of the respondents stated it would be unlikely to change the intake of their medicines. Patients showed preference for the 3 categories presented in the DRUID pictogram and 73.3% of the respondents felt that the side-text of the DRUID pictogram was helpful.

Discussion/Conclusion: Both the DRUID and the French pictograms appeared to be effective in communicating risk. The majority of the respondents recognized the risk of driving while taking driving impairing medicines and were willing to change their driving behaviour by driving less frequently. The pictogram didn t influence respondents way of taking their medicines.
When comparing the DRUID and the French pictograms, respondents preferred the DRUID one. It was also clear that the side-text in the DRUID pictogram was perceived as added value when compared to the other DRUID pictogram, without any side-text.
* Driving Under the Influence of Drugs, alcohol and medicines is financed by the European Community within the framework of the EU 6th Framework Program. This abstract reflects only the authors views. The European Community is not liable for any use that may be made of the information contained therein.

ORAL ABSTRACT

Detection time of direct alcohol markers, ethyl glucuronide (EtG) and ethyl sulfate (EtS), in oral fluid and urine after dosing to 0.08%

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Objective:
To determine if the surveillance window for detection of EtG and EtS in oral fluid compares favorably to their time course in urine, following consumption of ethanol. Both alcohol markers are known to be recoverable from urine for 2-6 times longer than ethanol can be measured in blood.

Methods:
Nine adult research subjects (4 female, 5 male) provided informed consent and agreed to self-dose with an amount of alcohol calculated to raise blood alcohol content (BAC) to approximately 0.08% in 60-90 minutes. BAC from breath was estimated with fuel cell breath test devices from zero baseline to zero return. Urine samples and oral fluid (via Quantisal" devices) were collected at 8 hour intervals for 2 days beginning at dosing. EtG and EtS were measured by liquid chromatography with tandem mass spectral detection (LC-MS/MS). Ethanol in both urine and oral fluid were measured by EIA and headspace gas chromatography.

Results:
As expected, both EtG and EtS were detected in urine up to 41 hours after the start of drinking; 32 hours after the BAC had returned to zero. Surprisingly, EtG was not detected in any oral fluid samples; however, EtS was detected up to 18 hours after the start of drinking and eight hours after the BAC was zero. Ethanol was present only in the samples taken approximately 6 hours after drinking commenced.

Conclusions:
The presence of EtS in oral fluid is reported for the first time. EtS was detected in oral fluid specimens for an average of 9.2 hours following alcohol dosing calculated to reach 0.08% within 60 90 minutes.

ORAL ABSTRACT

Random drug tests among public vehicle drivers of Iran

Motevalian Seyed Abbas, Iran University of Medical Sciences

Introduction:
The national burden of disease study showed that road traffic injuries and opioid use-related mental disorders were the first and fifth cause of burden of disease in Iran accordingly in 2003. International evidence; which is mostly based on data related to patients using prescribed opioids; shows that opioid use is not a risk factor for traffic injuries. Recent studies conducted in Iran; which is based on data related to drivers who are either opioid abuser or opioid dependent; indicates that opioid use is a major risk factor of traffic injures. To reduce this risk factor, a media campaign followed by random drug tests of public vehicle drivers in roads of the country was started in 2007. The objective of this study was to assess the results of random drug test among large vehicle drivers before and after this campaign.

Methods:
Two different national roadside surveys were conducted on 1168 and 680 drivers in 2002 and 2008 respectively. In both studies, the subjects were bus and truck drivers and their urine samples were tested by a rapid morphine test at study sites and positive samples were transferred for Thin Layer Chromatography (TLC).

Results:
In 2002, 168 drivers out of 1168 (14.4% CI95%: 12.4-16.4) were found to have positive morphine test. The second roadside survey which was conducted after media campaign showed that this proportion has decreased to 9.0% (CI95%: 7.0-11.4).

Discussion:
Opioid use among large vehicle drivers is a major public health and road safety issue in Iran which needs more attention. Random drug test supported by a media campaign seems to have promising effects on reducing driving under influence of drugs.

Women driving while intoxicated

Müller Karin, ABV Gesellschaft für Angewandte Betriebspsychologie und Verkehrssicherhei mbH

Lena Czupalla, c/o Impuls GmbH, Köln, Germany

Objectives:
In Germany 83441 driving licences have been withdrawn during the year of 2008 because of driving while intoxicated (DWI). If there is determined a blood alcohol concentration amounting to 0,16% or more while driving, a medical-psychological assessment (MPA) is necessary before the driving licence can be regranted. The MPA consists of a psychological interview, a psychophysical assessment as well as a medical examination. More than 90 % among the approx. 60000 persons, which had to participate in a MPA in 2008 because of DWI were male. However, the portion of female clients rises continuously, so it has to be asked whether and to which extent gender-specific aspects have to be considered in the MPA. The present study is based on current results about the behaviour differences between female and male drivers as well as gender-specific alcohol drinking and abuse.

Method:
The documents of 111 female and 106 male MPA clients were retrospectively analyzed under the following aspects: demographic characteristics, data about their behaviour in traffic, drinking habits, medical findings. The results were presented to experts for evaluation.

Results:
Concerning the demography and behaviour in traffic, no significant gender-specifics could be determined. Female MPA clients rather seem to tend to a male self concept. Differences between women and men can be ascertained regarding their drinking habits as well as the induced changes of behaviour.

Conclusions:
Implications for the investigation of women in the MPA are discussed. It has to be asked, whether and to what extent gender tendencies are reflected in a MPA and which relevance they have for the evaluation of especially women s driving aptitude.

ORAL ABSTRACT

Non-alcohol drugs and driving

Mørland Jørg, Norwegian Institute of Public Health

The impact of drugs of abuse and medicinal drugs on traffic safety is subject to increasing concern. Various roadside studies have revealed that a substantial percentage of drivers has used psychoactive drugs shortly before driving. The number of drivers with drug findings in epidemiological studies will depend on where and when sampling is performed (time of the day, day of the week), and on age and gender of the driver. In a recent Norwegian roadside study of a representative driving population, we found that 4.5 per cent of the drivers had non-alcohol drugs (3.4 % psychoactive medicinal drugs, 1.0 % illegal drugs) and 0.4 alcohol, in oral fluid samples. It could be estimated that approximately, 10-20 % of those with drugs present, probably drove impaired by these drugs.

Among drivers killed in vehicle crashes, data from various countries have shown that non-alcohol drugs as a group, are found as frequent as alcohol, and that various combinations of non-alcohol drugs are often observed. The most commonly detected non-alcohol drugs in such studies are THC, CNS-stimulants, benzodiazepines and opioids. Various analytical epidemiological studies have indicated that these drug classes are also associated with increased risk of involvement in crashes. This evidence is not as firm as existing evidence for alcohol, and there are also very few studies on risk related to the blood non-alcohol drug concentrations.

Experimental studies of traffic relevant impairment after intake of non-alcohol drugs are many, although not as comprehensive as for alcohol, but as for alcohol the studies indicate increasing impairment with increasing drug dose (and concentration in blood). However, the most important CNS-effects of any psychoactive drug (including alcohol) behind the increased risk of traffic accidents, have not been clearly defined, and accordingly the relevance of various experimental tests can be discussed.

The epidemiological literature on drivers with non-alcohol drug use demonstrating dangerous driving, has indicated differences from ordinary drivers as overrepresentation of young age, male gender, regular and multiple drug use, and driver psychopathology. It seems therefore appropriate to look further into the interactions between drug use (pattern of use) and the driver (personality) to better understand the mechanisms underlying the dangers of non-alcohol drug use and driving.

ORAL ABSTRACT

60 years of ICADTS the past, present and future

Nickel Wolf-Rüdiger, ICADTS

Ten years ago the International Council i.e. ICADTS members celebrated their 50 years anniversary not far from our current location. We had selected Stockholm, Sweden, because it was there the ICADTS forerunner, the International Committee on Alcohol and Traffic had held its first four days conference with discussions on the role of alcohol and traffic safety. Today we have put another 10 years on top of that and we are celebrating our 60th birthday in Oslo. Happy birthday ICADTS!

The history of ICADS will be covered briefly, highlights, conferences, awards, satellite conferences, working groups, development of the Foundation, use of money, stipends for young scientists in the field. The scientific development in the field will be elaborated and future needs fro research pointed out.

Further attention will be paid to the development of the membership within the past 60 years and its future through attracting more young scientists and increase the number of members from transitional and developing as well as low income countries.

Proposals for further improvement will be made as to ICADTS rules and communication between ICADTS members on all topics in the field. The specific role of our quarterly newsletter, The Reporter, will be described and emphasized.

Finally as ICADTS has begun to develop closer relationships with other organizations in combating driving under the influence of alcohol and drugs chances of cooperation for the sake of reducing harm caused by drink and drug driving will be outlined. The current conference with more than 200 presentations on epidemiology, impairment issues, rehabilitation etc. will again be a milestone on the way ahead.

ORAL ABSTRACT

How to get high inclusion rates in prevalence studies

Normann Per Trygve, Norwegian Institute of Public Health

Hallvard Gjerde, Dr, Norwegian Institute of Public Health, Oslo, Norway; Ilah Le Nygaard, Norwegian Institute of Public Health, Oslo, Norway

Objectives:
About 20.000 ordinary vehicle drivers participated voluntary in two road-side surveys in Norway to investigate the use of alcohol, psychoactive medicines and narcotic drugs, with a participation rate of 88% - 94%. The aim of this study was to examine the success factors for the highest participation rate.

Methods:
The data collection was performed in close collaboration with The National Police Mobile Force in Norway. The research team met all the individual policeman/woman at seminars where key collaborating tasks were agreed on. The police stopped the cars and one specially trained and motivated research team informed the drivers, got an informed consent and collected saliva samples. Each driver spent less than 5 min on the participation.

Results:
The drives had two possibilities to refuse participation, when they were stopped by the police and by the research team. In the first study the refusal rate was 8% when the drivers were approached by the police and 4% when the drivers secondly met the research team. The total refusal rate in that study was 12%. In the second study the police were instructed only to stop the cars and assign the drivers to go to the research team. In that study the total refusal rate was 6%.

Conclusion:
The most important success factor to get low refusal rate in road-side surveys in Norway was obtained when the police only stopped cars and a dedicated research team gave brief and adequate information before receiving informed consent.

Alcohol and Road Traffic Crashes in Kenya

Odero Wilson, Maseno University

Wilson Odero, Professor, Maseno University, Maseno, Kenya

This presentation discusses trends and causes of the growing problem of road traffic crashes in Kenya with special reference to driving under the influence of alcohol. The data are derived from traffic police accident statistics, published articles and unpublished reports.

Road traffic injuries are a major public health problem and a leading cause of death and injuries worldwide. Each year 1.2 million people are killed and up to 50 million injured from road crashes. In Kenya, more than 3,000 people are killed on the roads annually and many more injured or disabled. Over the last 10 years, road carnage has increased by 22.5% from 2819 deaths in 2000 to 3633 in 2009. According to traffic police reports, the main cause of road crashes is human error accounting for 82% of all causes, of which 43% is attributed to drivers, pedestrians 22%, pedal cyclists 14% and passengers 4%. Driving under the influence of alcohol is common and plays a significant role in traffic crashes. However, alcohol use is not usually looked for, and there is no legislation on Blood Alcohol Concentration (BAC) limit for drivers. At the same time, traffic police have no equipment and facilities for detecting alcohol. Efforts to establish BAC limit legislation and enforcement measures have not succeeded, partly due to lack of sufficient data. Few studies have reported alcohol use in more than 23% of accident-involved casualties, with the highest incidence among males, weekend and night-time drivers. Similarly, in a roadside survey in western Kenya, 20% of non-accident involved drivers were positive for alcohol by breathalyzer, with 8.4% having BAC in excess of 0.05gm/100ml. There are no studies examining drugs and traffic safety in Kenya.

This review concludes that inadequate data on the contribution of alcohol and drugs on traffic crashes, absence of legislation on BAC limit, together with lack of capacity for enforcement are major impediments to preventing alcohol-related crashes in Kenya. International collaboration is needed to stimulate and support research on the problem, and to advocate for adoption of effective interventions that will contribute to overall reduction of road traffic crashes and their consequences.

The relationship between responsibility for vehicle accident and presence of drugs in blood of injured drivers in Victoria, Australia

Ogden Edward, Victoria Police

Carla Morris, Victoria Police, Melbourne, Australia; Tania Frederiksen, Victoria Police, Melbourne, Australia; Martin Boorman, Inspector, Victoria Police, Brunswick, Australia; Con Stough, Professor, Swinburne University of Technology, Hawthorn, Australia

ISSUE: To what extent are drivers who have drugs detected in blood samples taken after collision, more likely to have been responsible for the collision in which they were injured compared with drivers who are drug free? The responsibility method has been well established for fatality collisions, but there has been little work matching toxicology results with collision data for non-fatal collisions.
OBJECTIVES: The ongoing study examines the incidence of a range of licit and illicit drugs in drivers involved in non-fatal collisions, and the responsibility of drivers for accident causation.
METHODS: In Victoria, Australia, drivers taken to hospital after a collision have a legal obligation to provide blood for analysis (Victorian Road Safety Act 1986). Routine screening for drugs other than alcohol commenced in July 2009, and detected a wide range of drugs including cannabis, benzodiazepines, opiates, amphetamines, antidepressants and antipsychotics. The current study began as a pilot in December 2008 to match the toxicology results to an analysis of the police collision reports and assign the driver a degree of responsibility. The hypothesis was that the odds ratio of responsible to not responsible for causing a collision would identify drugs that cause impairment.
RESULTS: At the time of submission, 881 samples had been analysed and matched with collisions. Of the injured drivers that tested positive for alcohol, 94.7% were responsible for the collision in which they were injured. The odds ratio of responsibility for collision showed the expected exponential relationship with blood alcohol concentration > 0.10%. There was a small increased in culpability with blood alcohol concentration <0.10% associated with inexperienced and elderly drivers.
Benzodiazepines were detected in 14% of samples. There was a strong dose relationship between the level of drug detected and responsibility for collision. Alprazolam appeared particularly hazardous perhaps reflecting misuse rather than inherent toxicity. Stimulants were detected in 5.7% of drivers with no increase in responsibility for collision unless combined with another drug. THC was present in 14.1% of samples at levels suggesting recent use (average 7.5µg/lL). Opiates are detected in 21.6% of samples with the majority being morphine administered by paramedics or hospital staff prior to obtaining the blood sample. Antidepressants were found alone, or in combination with other substances, in 11.4% of injured drivers.
Combinations of drugs increased the likelihood of being responsible for collision. With no drugs or alcohol 53% of drivers are responsible for the collision, with one or two drugs 75% are responsible, with three drugs 93% are responsible and with 4 drugs all drivers were responsible.
CONCLUSIONS: This first 18 months of this study have demonstrated the relative risk of collision and the risk of collision associated with specific drugs. Alcohol was responsible for increased responsibility for collision even at low levels for inexperienced and elderly drivers. The ongoing work will determine the relative importance of specific drugs which will inform development of counter-measures.
KEYWORDS: drugs, alcohol, non-fatal collision, responsibility analysis, toxicology

An integrated software model for alcohol absorption and metabolism

Ogden Edward, Victoria Police

Henry Swofford, BAC Tracker International, Atlanta, Georgia, United States

ISSUE: Toxicologists are often asked "How much alcohol was consumed to reach this B.A.C.?" "What was the level of alcohol intoxication at the time of an incident?" or more challenging "What would the blood alcohol concentration have been if this individual consumed that amount of alcohol?" The court expects evidence about uncertainty and error which is tedious, requires using several different methods of calculation, and can be awkward to explain.

OBJECTIVES: The pioneering work of Erik Widmark showed that blood alcohol concentration is related to the amount of alcohol consumed, the time involved and the volume into which the alcohol was distributed. Widmark assumed that the volume of distribution as a proportion of body weight could be estimated as 0.55 ± 0.11 for women and 0.68 ± 0.17 for men. Various regression formulae have been developed to refine the ability of predict body water from anthropomorphic data like age, gender, height, weight and age. No single formula is more precise than the others. Posey and Mozayani (2007) suggested integrating the various methods of estimating body water to give a balanced picture of the variability in blood alcohol concentration calculations.

RESULTS: A software package has been developed that integrates the six published models for estimating blood alcohol concentration. The user can set the range of absorption and elimination rates, the subject data and times of interest. The program estimates the amount of alcohol required to reach a particular blood alcohol concentration, the range of likely blood alcohol concentrations reached from given consumption and displays the results in graphs and tables making it easy to demonstrate the range of possible interpretations of the facts at hand. This has application in providing expert evidence and education.

KEYWORDS: alcohol, metabolism, blood alcohol concentration , software
Disclaimer: Edward Ogden is on the Faculty Advisory with no pecuniary interest; Henry Swofford is a Director of BAC-Tracker International Inc.

Girls take action

Ophus Carina, The Norwegian Council for Road Safety

The Norwegian Council for Road Safety (Trygg Trafikk) is responsible for promoting traffic education in kindergarten and school, and to provide information about road safety to the public in general. About 25 % of fatal road-traffic accidents are involving young drivers and passengers in the age group 15-25. Promoting road safety for this group is an important task for Trygg Trafikk.

One of Trygg Trafikks main projects is Girls take action . It is a campaign for girls age 16-19. The campaign combines old and new methods of communication, trying to change bad traffical behavior like drinking and driving. To communicate with the campaign s members, we use both personally addressed letters (postage mail), and internet-based social medias as chatting rooms and sms. The goal of the campaign is to give girls more knowledge, to increase their awareness of risk factors and encourages them to make safer choices as car passengers. At the same time, the campaign wants the girls to promote road safety to their friends.

The campaign started in 2007. The first year 13 600 girls, age 16, were invited to participate. 16 % of the girls joined. These girls have for the last three years received a letter four times per year, with different subjects about traffic safety. The girls are given tasks that involve talking about this subject with their friends. The exclusive chatting room provides an arena where they can chat, ask questions and advise each other. The activity has been high.

The girls who were invited in 2007 are ending their 3-year membership during spring 2010. An evaluation of the campaign is conducted by The Institute of Transport Economics and will be presented in May 2010. The results of this study are therefore not yet known but will be by the time of ICADTS2010.

ORAL ABSTRACT

The neuroscience of recidivism in DWI offenders: implications for prevention and intervention

Ouimet Marie Claude, University of Sherbrooke

Thomas Brown, Dr., Douglas Hospital Research Center, Montreal, Canada; Robyn Robertson, Ms., Traffic Injury Research Foundation, Ottawa, Canada; Farah Averill, Douglas Hospital Research Center, Montreal, Canada

Objectives:
The last decades have witnessed constant evolution in laws pertaining to driving while impaired (DWI) and significant decreases in DWI-related morbidity and mortality. These gains have stalled in many countries. Findings from our team and others suggest that neural factors may limit the effectiveness of current laws and relicensing programs in curbing DWI behavior in high-risk offenders. This presentation summarizes findings and considers their implications for prevention and intervention.

Methods:
The role of memory, visuospatial capacities, and other executive functions in DWI was explored in 100 recidivists using tests such as the Rey Complex Figure Test and the Trail Making Test (Ouimet et al., 2007). Offenders delaying engagement in relicensing programs (n=46) were compared to non-delayers (n=74) (Brown et al., 2008). The role of decision-making impairments in DWI behavior was explored in 20 recidivists and 20 controls using the Iowa Gambling Task (Maldonado-Bouchard et al., 2010). Finally, two studies (N=62 and N=41) explored putative epigenetic underpinnings of DWI behavior, specifically hypothalamic-pituitary-adrenal axis (HPA) dysregulation, using salivary cortisol (Brown et al., 2005; Couture et al., 2008).

Results:
Two thirds of recidivists suffered from neuropsychological deficits. Offenders delaying engagement in relicensing programs had more deficits than non-delayers. Recidivists were found to exercise decision-making favoring immediate reward. Attenuated cortisol response was the best predictor of recidivism status over and above self-reported and biological measures of alcohol misuse. Finally, HPA-axis activity was linked to experience-seeking and other risky behaviors.

Conclusions:
A web of neural factors influences DWI risk beyond alcohol misuse. Elsewhere, these factors have been associated with persistent risk behavior, poor judgment, lack of intervention compliance, and poorer outcomes. As findings run contrary to many assumptions of current DWI prevention strategies, ideological and pragmatic challenges posed by alternate strategies (e.g, immediate, positive incentives for participation in prevention programs) are discussed.

ORAL ABSTRACT

What neurobiological deficits in DWI recidivists may mean for current and future approaches to prevention

Ouimet Marie Claude, University of Sherbrooke

Thomas Brown, Dr., Douglas Hospital Research Center, Montreal, Canada; Robyn Robertson, Ms., Traffic Injury Research Foundation, Ottawa, Canada; Farah Averill, Douglas Hospital Research Center, Montreal, Canada

The past decades have witnessed constant evolution in laws pertaining to driving while impaired (DWI). The most notable changes include an increase in the number of possible sanctions and the severity of sentences, larger fines following conviction, longer look back periods for counting prior offences for the purposes of recidivism, and greater use of preventative methods such as the installation of interlock devices and evaluation and treatment for substance misuse. While these initiatives have likely contributed to the significant decreases observed in DWI-related morbidity and mortality since the 1980 s, more recently the rate of gains has levelled off in many countries. Recent research conducted by our team suggests the potential for important neurobiological deficits in some DWI recidivists. In the alcohol research domain, these deficits have been associated with the persistence of problem behavior, lack of intervention compliance, and poorer intervention outcome. These findings raise questions about what current and future DWI-preventative legal strategies can achieve with this high-risk population, and what innovations may be needed to make further headway. The main objectives of this presentation are twofold: 1) to consider the rationales neurobiology provide for deploying innovations such as more immediate installation of restraint devices following a second DWI arrest and provision of incentives to do so; and 2) the conceptual and pragmatic challenges related to these innovative approaches.

ORAL ABSTRACT

Preliminary efforts to strengthen prevention of drinking and driving in Vietnam

Passmore Jonathon, World Health Organization

Objectives:
Road traffic injuries are a leading cause of death and disability in Vietnam. Official reports cite more than 11,000 deaths each year on Vietnam's roads. Despite the significant burden of road traffic injuries, little is known of the impact of specific risk factors, particularly drinking and driving.

Methods:
Through collaborative efforts between WHO and road safety authorities in the Government of Vietnam, a range of multidisciplinary good practice activities were implemented nationally and in three project provinces including:
1. Legislative review and revision
2. Enhanced enforcement training and operations using procured breathalysers
3. Mass media social marketing campaigns
4. Alcohol blood testing for road traffic injured patients presenting at hospitals

Results:
1. Legislative revision reduced BAC thresholds from 0.08 to 0.05g/dl for drivers of four wheel vehicles and ZERO for motorcycle riders. A partition ratio error between BrAC and BAC was corrected and prescribed penalties effectively doubled.
2. 40 fuel cell breathalysers were procured and distributed to traffic police in three provinces where they were used for enhanced enforcement operations that breath tested more than 2,700 drivers and riders, penalising 20% for exceeding the legal limit.
3. The risks and dangers of drinking and driving were communicated through TV, radio, posters, newspaper and billboards distributed nationally.
4. Hospital BAC testing of more than 7,500 consenting road traffic injury patients from 5 hospitals found that BAC results ranged from 0-0.606g/dl. On average, 44% of injured motorcycle riders tested was found to exceed the legal limit.

Conclusion:
Preliminary information suggests drink driving is a major risk factor for road traffic injury in Vietnam. While further work is required, this introductory program highlighted the magnitude of the role of alcohol in road traffic injuries as well as the willingness of the Government to take action to combat this problem.

Summary of presentation about the Brazilian situation for the ICATDS workshop

Pechansky Flavio, Center for Drug and Alcohol Research, UFRGS

Fernanda Kreische, MD, .; Anne Orgler Sordi, MD, ., .; Raquel De Boni, UFRGS- HCPA, Porto Alegre, Brazil

Brazil had 653.000 traffic accidents (TA) victims in 2008, with approximately 38,000.fatal victims. TAs are the second leading cause of death in the Brazilian young adult population, second only to homicides. TAs have a high economic impact in the country, since an accident with a victim costs 11 times more than an accident with no victim, and 44 times more if it is fatal. The causal role of alcohol in this scenario is still undefined, since there are no nationwide data on DUI-related accidents. The first national effort was conducted by our research group, on a roadside survey with 3,400 drivers crossing highways near all Brazilian state capitals; 25% of these drivers reported bingeing two to eight times/month, and the overall positive BAC rate found was 4.8%. Studies conducted in Porto Alegre found that 32% of fatal victims of TAs had positive alcohol results, 51% of drivers leaving bars after drinking would drive in the next hour, and 47% of the economic costs of fatal accidents were due to alcohol in 2009. Alcohol is the most consumed legal substance in the country after tobacco, and alcohol dependence seems to be increasing (12.3% according to the last statistics). A new Dry Law was passed in 2008. According to the Brazilian Ministry of Health, there was a 23% reduction in the number of hospitalizations and a 22.5% reduction in the number of deaths related to TAs between 2007 and 2008. Even though surveys suggest reduction in the overall rate of TAs in emergency rooms, our data suggest that alcohol related TAs are still a public health problem in the country, probably because of lack of enforcement, since the original reactions to the new law seem to have faded with time, particularly in urban settings.

ORAL ABSTRACT

Alcohol and Drugs in Fatal Road Crashes in Western Switzerland in 2009

Plaut Olivier, CURML Médecine légale

Olivier Plaut, Dr, CURML Médecine légale, Genève 4, Switzerland; Marc Augsburger, Dr, CURML - UTCF, Lausanne, Switzerland

Objectives:
Alcohol and drugs found in fatal crashes that occurred in western Switzerland in 2009 are reported.

Methods:
Most victims of fatal road crashes in the cantons of Geneva and Vaud are undergoing medical examination including autopsy and BAC determination, and for some of them comprehensive toxicological analysis. In those cases, urine screening is performed using immunological and chromatographical methods, followed by quantitation of relevant substances in blood. Relevant substances are primarily drugs of abuse, followed by drugs that may have an influence on driving ability. Quantitation is done either by gas or liquid chromatography coupled to mass spectrometry. Some drugs were analyzed by GC/ECD and GC/NPD.

Results:
Geneva and Vaud have about 1 million inhabitants, accounting for 13% of Switzerland residents. They had in 2009 861732 registered vehicles. 8937 traffic accidents occurred, for a total of 65 fatal crashes. Age ranged from 19 to 93 (mean 42). 85% were men. Out of these 65 accidents, 49 were investigated. 28 cases were negative. 16 cases had a positive BAC (above 0.50 g/kg). Half those 16 cases had alcohol combined with drugs, whereas 4 cases were positive for drugs only. Among the drugs, cannabis accounted for 5 cases and benzodiazepines were present in 4 cases. Detailed results will be presented in comparison with living drivers.

Conclusion:
Although the first cause of accidents, as reported by the police, is speeding, the problem of driving under the influence remains significant. About one quarter of deceased drivers had not fastened their seat belt. This may contribute to transform an accident into a lethal accident independently of a consumption of alcohol or drugs. Although such data will be more difficult to collect, comprehensive figures including dead and wounded drivers may contribute to better evaluate this issue.

ORAL ABSTRACT

Simplifying the Process for Identifying Drugs by Drug Recognition Experts

Porath-Waller Amy, Canadian Centre on Substance Abuse

Douglas Beirness, Dr., Canadian Centre on Substance Abuse, Ottawa, Canada

Objective:
The purpose of this study is to statistically identify the set of drug-related cues from Drug Evaluation and Classification (DEC) evaluations that significantly predict the categories of drugs used by suspected drug-impaired drivers.

Methods:
Data from 819 completed Canadian DEC evaluations of central nervous system (CNS) stimulants/cannabis, CNS stimulants/narcotic analgesics, cannabis/alcohol and no-drug cases were analyzed using a multinomial logistic regression procedure.

Results:
Eleven clinical indicators from the DEC evaluations significantly enhanced the prediction of drugs used by suspected drug-impaired drivers, including condition of the eyes, lack of convergence, rebound dilation, reaction to light, presence of visible injection sites, performance on the Horizontal Gaze Nystagmus Test, pupil size in darkness, performance on the One Leg Stand Test, muscle tone, and performance on the Walk and Turn Test.

Conclusions:
The findings from this study will facilitate the process of identifying the correct categories of drugs ingested by suspected drug-impaired drivers by focusing on critical signs and symptoms of drug influence. This work will have direct and immediate relevance to the training of Drug Recognition Experts (DREs) by providing the foundation for an innovative, statistically based approach to drug classification decisions by DREs. This research will also facilitate the enforcement of drug-impaired driving laws in Canada to help make Canadian roadways safer for all.

ORAL ABSTRACT

Predicting DUI recidivism: A study of the impact of alcohol markers and previous drunken driving

Portman Maria, National Institute for Health and Welfare

The aim of the study was to determine whether the alcohol biomarkers CDT, GGT, the biomarker gamma-CDT index and previous drunken driving contributed significantly to the prediction of DUI recidivism. The subjects consisted of two different samples of drivers, viz. drivers convicted during random breath testing surveys (RBT-drivers, n=237), and drunken drivers who were apprehended during ordinary police work (n=193). The drunken driving events were monitored using a data-base both retrospectively (1990) and prospectively (2006).

It was found that the biomarker index, gamma-CDT, emerged as a notable predictor of recidivism in the group of random breath tested drivers. Measurement of gamma-CDT and its impact on DUI recidivism has not to our knowledge been applied to random breath tested drivers before. The apprehended drunken drivers did not show a significant relationship between gamma-CDT and DUI recidivism. It was also found that the risk for recidivism increased 2.5 times for RBT-drivers with a blood alcohol concentration (BAC) =1.20 0 compared with a lower BAC (HR=2.5, 95% confidence level 1.7-3.7). However, the BAC was not a significant predictor of outcome among apprehended drunken drivers. In both groups of drivers it was found that a previous conviction for drunken driving strongly predicted DUI recidivism.

The results show that the two groups of drivers represent different populations of drunken drivers. Thus, results based on apprehended drunken drivers cannot as such be generalized to concern all drunken drivers. Random breath testing is the method of choice for effectively studying the prevalence of drunken driving. This method is also an effective deterrent. The facts that a raised level of alcohol biomarkers and a BAC =1.20 0 at the time of conviction are associated with a greater risk of DUI recidivism, could easily be implemented in the traffic safety work to combat drunken driving.

ORAL ABSTRACT

Residual effects of esmirtazapine on actual driving performance : overall findings and an exploratory analysis into the role of CYP2D6 phenotype

Ramaekers Jan, Faculty of Psychology and Neuroscience, Maastricht University

Silke Conen, Maastricht university, Maastricht, Netherlands; Eef Theunissen, Ms., Maastricht university, Maastricht, Netherlands

Objective:
Esmirtazapine is evaluated as a novel hypnotic drug. Esmirtazapine binds with high affinity to 5HT2 and H1 receptors, where it acts as an antagonist. H1 antagonists are well known for their sedating properties and may increase sleep when taken in the evening. However, as with other sedating drugs, the risk of driving impairment increases if sedation persists during daytime.

Method:
The study was designed to assess the effects of single and repeated doses of esmirtazapine 1.5 mg and 4.5 mg on actual driving performance in 32 healthy volunteers in a double blind, placebo controlled study. Treatment with single doses of zopiclone 7.5 mg was included as active control. Driving performance was assessed by means of a standardized on-the-road highway driving test. The primary parameter was standard deviation of lateral position (SDLP), a measure of weaving . All subjects were subjected to CYP2D6 phenotyping in order to distinguish poor metabolizers from extensive metabolizers of esmirtazapine.

Results:
Overall, esmirtazapine 1.5 mg did not produce any change in SDLP after single and repeated dosing compared to placebo. Driving impairment did occur after a single-dose of esmirtazapine 4.5 mg but was resolved after repeated doses. Acute driving impairment was more pronounced after both doses of esmirtazapine in a select group of poor metabolizers (N=7). In these individuals, impairment lasted after repeated administration of the highest dose. A single dose zopiclone 7.5 mg also increased SDLP as expected.

Conclusion:
Treatment with 1.5 mg esmirtazapine was not associated with residual impairment. A single dose of 4.5 mg esmirtazapine produced residual impairment that resolved after repeated administration. Poor CYP2D6 metabolizers were more sensitive to the impairing effects of esmirtazapine. These results underscore the need to take inter-individual variability in either treatment response or drug metabolism into account when designing studies that investigate drug effects on car driving.

ORAL ABSTRACT

Prevalence of drugs in the general population in Europe

Ravera Silvia, University of Groningen

Han de Gier

Objectives:
To describe the consumption of driving impairing psychoactive substances, both medicinal and illicit drugs, in the general population, in Europe.

Methods:
Thirty European countries were invited to provide data on the use of driving impairing medicines for the period 2000-2005, aggregated at the level of the active substance and presented in Defined Daily Doses per 1000 inhabitants per day. The data on the use of illicit drugs were provided by European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) and referred to the years 1990-2006.

Results:
Twelve countries delivered national data on medicinal drug use for the years 2000-2005. Based on these data, an increased consumption was only seen for the antidepressants. A slight increase, decrease or no increase was seen for the rest of the study groups. Limitations were encountered when utilization data were compared between countries, and, therefore, a cross-national comparison could not be performed. Despite the fact that tracking trends in illicit drug use was difficult, the EMCDDA data showed that cannabis was the most frequently used illicit substance, followed by cocaine. In some European countries the use of some synthetically produced drugs raised and almost reached the cocaine levels while the prevalence of opioid use was relatively stable.

Conclusion:
Our study showed a stable use of both medicinal and illicit drugs, with the exception of antidepressants, amphetamines, and cocaine. Further research is needed to gain a better understanding of the scale of medicinal and illicit drug utilization in the driving population and the relation between drug use and traffic safety.

ORAL ABSTRACT

Three editions of the Belgian drink driving roadside survey: results and lessons learned

Riguelle François, Belgian Road Safety Institute (IBSR)

Since 2003, a biannual drink driving roadside survey is organised in Belgium by the Belgian Road Safety Institute. It aims at estimating the rate of driving under the influence of alcohol and the characteristics of people doing so. With the help of the police forces, at least 11000 drivers were tested during every survey. The purpose of this paper is to discuss the methodology and the results from these surveys.

The survey consists of a two-stage clustered sample. In the first stage, control locations and time spans are randomly selected by the Belgian Road Safety Institute and validated by the police. The time spans cover all the days of the week and all hours of the day. In the second stage, drivers are randomly picked from traffic for a compulsory measure of their breath alcohol concentration (BrAC). Every driver fills out a questionnaire about his or her personal characteristics. The data are analysed using the odds ratio technique in order to identify the factors that significantly influence drink driving.

The global percentage of drivers under the influence (defined as the legal limit of BrAC = 0.22mg/l) was 2% in 2007, but this percentage rose up to 10% during weekend nights. The categories of drivers with the higher rates of drink driving were the men and the drivers between 40 and 54 year old. No major evolution was observed in 2007 compared to the previous surveys. The situation during weekend nights even seems to be worsening.

The prevalence of drink driving is still worrying in Belgium and efforts should be increased to tackle this problem. The Belgian drink driving survey has proven its usefulness as a tool to monitor the drink driving problem and to identify the target groups. It is thus an important element to help building the strategy against drink driving.

ORAL ABSTRACT

A Case Study on the Implementation of First Offender Alcohol Interlock Programs

Robertson Robyn, Traffic Injury Research Foundation

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Objectives:
A trend toward mandatory participation in interlock programs for all offenders has recently emerged in the United States. The objectives of this study were to: assess the breadth and scope of activities involved in translating first offender interlock legislation into Administrative Rules, operational practices and procedures; to determine what level of program effectiveness was achieved; and, to provide guidance to other jurisdictions either considering or undertaking the implementation of a first offender initiative.

Method:
This case study research began with the collection and review of relevant implementation materials in Illinois to create the foundation for a detailed overview of the implementation process and a timeline of all relevant activities and milestones that took place from the passage of the law to the time it took effect.

The detailed overview of the implementation and timeline provided structure and guidance for key informant interviews with staff to further augment and expand these documents and measure the process. A Delphi panel was subsequently organized to collect additional input from key stakeholders and to compare experiences in other first offender jurisdictions. Additional follow up information was also gathered from key informants throughout 2009 to gauge the impact of the implementation process and its outcomes.

Results:
Results are reported according to the type of implementation strategy selected, the scope and breadth of tasks completed, the number of agencies and staff involved, the level of resources required and the outcomes achieved.

Conclusion:
The debate regarding first offender interlock programs is complex and both sides are based on compelling research and facts. The question is not whether first offender interlock laws should be implemented, but in fact how these laws can best be implemented and executed. These are questions that jurisdictions will have to address as the trend towards mandatory first offender programs grows.

ORAL ABSTRACT

Indication for the examination of drivers fitness after problematic alcohol consumption

Schubert Wolfgang, DEKRA Automobil GmbH

Caroline Stewin, cand. Dipl.-Psych., Humboldt University of Berlin, Department of Psychology, Berlin, Germany

Objectives:
The present study examines the relationship between alcohol consumption and fitness to drive. The legal basis for establishing the fitness to drive by means of a medical-psychological fitness assessment (0,16 g/100ml or 1,6 0) in Germany will be empirically analyzed. Finally, precise recommendations for the improvement of the current legal situation and administrative practice will be presented.

Methods:
103 published articles have been analyzed for this study. They had to meet the following criteria: completeness, comprehensibility, and experimental manipulation of the blood alcohol concentration (BAC). The number of studies that demonstrate alcohol-induced impairments is to be shown in a quantitative analysis. The qualitative analyses of the studies will reveal the areas of psychological and medical functioning that are impaired by alcohol.

Results:
On the quantitative level, it appears that the majority of 97% of the documented impairments occur at a maximum BAC of 0,105 g/100ml. Numerous skills are impaired by low doses of alcohol: attention, electrophysiological and brain activity, driving skills, memory, cognitive and intellectual skills, psychomotor skills, simple and choice reaction time, visual functions, tracking, inhibitory control and perception.

Conclusion:
Alcohol-induced impairments arise at a BAC far below 1,6 promille, which marks the legal limit for a ruling of a medical-psychological fitness assessment for drunk driving in Germany (§13 Fahrerlaubnis-Verordnung/drivers license ordinance). The BAC limit in the current ordinance of 1,6 promille for assigning a medical-psychological fitness assessment is too high and cannot be confirmed empirically. A reduction of this BAC limit to a value that corresponds with scientific research and literature is proposed.

Druid: Review And Perspectives

Schulze Horst, BAST

Objective:
To present achievements of the RFP 6 IP DRUID, to explain challenges met and responses given.

Methods:
DRUID addresses the danger of all psychoactive substances - alcohol, medicines and illicit drugs - in traffic. The objective is to understand all facets of the problem: consumption, impairing effects, accident risk, detection, rehabilitation and prevention. BASt, as the Project Coordinator, coordinates joint research efforts of 37 partners from 18 European states working within seven Working Packages who implement state-of-the-art research and analysis, experimental and epidemiological studies.

Results:
- Methodological framework for integrating results of experimental and epidemiological studies
- International database of samples collected Europe-wide from 50.000 drivers and 3.000 injured drivers using uniform study design
- Recommendations concerning the practical use of oral fluid screening devices
"- Consensus on 4-level-classification system for medicines (more than 600 medicines reviewed and classified)
- Overview of European rehabilitation schemes, including recidivism reasons analysis, quality assurance measures and best practices recommendations
- Overview of withdrawal/ licencing legislation in Europe (30 countries included)
- Recommendations for improving medical guidelines (assessing fitness to drive for patients using psychotropic medicines)

Conclusion:
Project objectives are highly relevant and compatible with EU agenda on the road safety. The Project is on the good track and will achieve its objectives. Due to the difficulties with comparing substance concentration in saliva, whole blood and plasma, it will be impossible to embrace all psychoactive substances.

ORAL ABSTRACT

Alcohol Related Road Accidents in Germany - Status Till 2008

Schönebeck Susanne, Federal Highway Research Institute (BASt)

Objectives:
In Germany 83441 driving licences have been withdrawn during the year of 2008 because of driving while intoxicated (DWI). If there is determined a blood alcohol concentration amounting to 0,16% or more while driving, a medical-psychological assessment (MPA) is necessary before the driving licence can be regranted. The MPA consists of a psychological interview, a psychophysical assessment as well as a medical examination. More than 90 % among the approx. 60000 persons, which had to participate in a MPA in 2008 because of DWI were male. However, the portion of female clients rises continuously, so it has to be asked whether and to which extent gender-specific aspects have to be considered in the MPA. The present study is based on current results about the behaviour differences between female and male drivers as well as gender-specific alcohol drinking and abuse.

Method:
The documents of 111 female and 106 male MPA clients were retrospectively analyzed under the following aspects: demographic characteristics, data about their behaviour in traffic, drinking habits, medical findings. The results were presented to experts for evaluation.

Results:
Concerning the demography and behaviour in traffic, no significant gender-specifics could be determined. Female MPA clients rather seem to tend to a male self concept. Differences between women and men can be ascertained regarding their drinking habits as well as the induced changes of behaviour.

Conclusions:
Implications for the investigation of women in the MPA are discussed. It has to be asked, whether and to what extent gender tendencies are reflected in a MPA and which relevance they have for the evaluation of especially women s driving aptitude.

ORAL ABSTRACT

Drug Involvement in Road Traffic Offences and Fatalities in Scotland (1998-2009)

Scott Karen, University of Glasgow

Objective:
This paper will provide a review of the Road Traffic data from Scotland between 1998 and 2007 and an overview of the findings of the BRITE and IMMORTAL projects.

Methods:
Between 1990 and 2007, the Department of Forensic Medicine and Science, University of Glasgow, analysed blood and urine samples from drivers suspected of Road Traffic Offences in Scotland (with the exception of one region). This work was in addition to the toxicological analyses for all post mortem cases in the West of Scotland. DUID offences in Scotland have also been widely studied within the Department through projects such as ROSITA (2001), BRITE (2003) and IMMORTAL (2005). Observed trends between the data sets will be presented. This review will also consider the involvement of drivers, passengers and pedestrians in road traffic fatalities (RTF).

Results:
With regards to DUID cases the prevalence of cannabis remained relatively stable over the study period, however the involvement of benzodiazepines and opioids has substantially increased. In addition, in the period 2008 to 2009, there were 115 road traffic fatalities recorded. Of these, 112 (97%) were analysed for alcohol of which 38% were positive. Drug testing was requested in only 17 (15%) of the cases. When drugs of abuse screening was carried out, 59% of the cases were positive for one or more drug groups, suggesting that the involvement of drugs in RTF cases in Scotland has been significantly underestimated.

Conclusions:
The results have shown a change in the pattern of drug use in DUID cases in Scotland. In the West of Scotland there is a need for full toxicological investigation in RTF cases, as historically pathologists have tended to request alcohol analysis only, leading to a lack of drug toxicology data in these cases.

ORAL ABSTRACT

Rapid, Simple, High Perfomance Testing for Dangerous Substances

Self Colin, Selective Antibodies Ltd

Objectives:
There is a need for a new generation of rapid road-side tests to improve on those available. The majority of existing tests are based on competitive-immunoassay-formats bringing well known limitations of this format to bear: Reverse signal; Limited sensitivity; Control line needed to measure test against; Non-reagent-excess methodology - producing compromises in speed, precision and shelf-life. These problems have stimulated interest into finding ways around the competitive-format, (in which the absence of analyte is measured) to non-competitive formats (in which the presence of analyte is directly measured). While a number of formats have been developed, a need has remained for a system that achieves direct measurement in a simple format that is not only easy to use but also manufacture and put into practice. Our Selective Antibody system has been developed to meet this need.

Methods:
Anti-drug (primary) antibody is conjugated to gold-sol and located at the base of a dipstick; sample is added, allowing drug binding to antibody binding sites; remaining, unbound primary antibody is then blocked by binding a specific blocking material that blocks it from later being able to bind a secondary anti-primary antibody against it. The mixture is allowed to migrate up a dipstick through a detector-zone of secondary antibody. Gold-labeled primary antibody that has bound the drug is able to bind in the detector zone whereas that bound by blocker is not. Thus the amount of red gold binding in the detector zone is proportional to the amount of drug in the sample.

Results:
Zero samples produce no line whereas presence of drug is seen as a clearly observable red line (e.g. methamphetamine at 10ng/ml). Visualisation by eye, or measurement by a simple hand-held reader is very simple, sensitive and accurate.

Conclusion:
This new selective system allows the rapid sensitive detection of illicit drugs.

ORAL ABSTRACT

Social Control of the Drinking Driver

Sheehan Mary, CARRSQ

It is more that 20 years since the Social Control of the Drink Driver edited by Laurence, Snortum and Zimring (1988) were published. It was, and remains a major examination of the issue involving 17 scientists from all relevant disciplines and policy centres and represents the current practice and experience at the time. While much of, but by no means all, the content is centred on the North American experience the scholarship and range of research data explored through the investigative lens of lawyers, pharmacologists, psychologists, sociologists, criminologists and economists covers all the major issues being examined in Europe, and Australia at the time. More importantly, it presents the policy aspirations and goals of nine countries and includes a comparison of deterrence and the legal context in six countries; emerging technologies for control and the potential contributions of education and rehabilitation.
The experience of promoting evidence based policies and practices are generally experienced in all countries as both laborious and painfully slow. However, this ICADTS meeting in Norway provides an opportunity to challenge these feelings by re-examining the current situation compared with that documented over 20yrs ago. This presentation will undertake a reality check on just what we have achieved within that time and try to attribute success and failure towards recommendations for our future endeavours.

An Analysis Of Alcohol Breath Tests Results With Portable And Desktop Breath Testers As Surrogates Of Blood Alcohol Levels

Shinar David, Ben Gurion University of the Negev

Edna Schechtman, Prof, Ben Gurion University of the Negev, Beer Sheva, Israel

Background:
There is a perceived tradeoff between the ease of measuring alcohol in the body and the accuracy of the result. Direct tests of blood alcohol concentrations (BAC) are considered most accurate, desktop stationary breath testers (DBT) based on electro-chemical infra-red technology are slightly less accurate, but generally acceptable for evidentiary purposes, and portable breath testers (PBT) based on fuel-cell technology are easiest to administer but unacceptable in many courts.

Objective:
To compare the accuracies of DBT and PBT relative to BAC and to develop a model that would allow the use of breath tests without compromising their validity. Method: 61 volunteers were tested for alcohol in their blood and breath before drinking, and 20m, 40m, and 60m after drinking. Inverse regressions were used to obtain confidence limits for the alcohol levels as read by the breath testers that would provide tradeoffs of false positives and false negatives (relative to the accepted limits by blood tests). A decision tree model was developed for the optimal use of the three measures sequentially.

Results:
The correlations among the methods are r(PBT,DBT)= 0.92, r(PBT,BAC)= 0.88, r(DBT,BAC)= 0.91. PBT BrAC > 316 mcg/l (used as a first screener) or DBT BrAC > 321 mcg/l indicate that the BAC level exceeds 50 mg/dl with a confidence level of 98%. For example, using this DBT threshold in our sample would yield sensitivity 70.2, specificity 92.3, false alarms 7.7 and misses 29.8.

Conclusions:
Direct measurement of BAC is the most accurate method. However, it is possible to limit the testing to less accurate devices with a similar level of confidence when the devices register high BrAC levels relative to the legal limit. The PBT can be sufficient for high BrAC, DBT can be sufficient for medium level BrAC, and blood tests are recommended for still lower BrACs.

Death Trip

Skretteberg Henriette, MA

Objectives:
Death Trip is a non-scientific project. The objectives are:
- Create awareness and affect youths attitudes to drunk driving
- Create and use innovative methods and campaigns to prevent drunk driving

Method:
Death Trip is a competition for youths in high school. They compete in making the best campaign against drunk driving. Every year there is a final in Oslo where 10 finalists present their campaign. The school with the best campaign wins 30.000kr. Trough Death Trip MA gets new campaigns to use every year made by teenagers to prevent drunk driving!

We are visiting every school that is participating in the competition. At the Kick Off we give information about the competition and we engage the students in discussions on how to make a good campaign. The Kick Off is crucial for the youths understanding of the competition and of the seriousness of drunk driving.

Result:
This year 22 schools participate in the competition. We are expecting approximately 60 different campaigns to be submitted and 10 of these will go to the final. The final will be hold at Filmens Hus in Oslo 28. April. At the ICADTS conference in August we will be able to present the winner of Death Trip 2010.

Every year we ask the students to evaluate the project. A lot of the students tell us that participating in the competition and reflecting on their own attitudes towards dunk driving has changed and affected their attitudes in a positive matter.

Conclusion:
Every year Death Trip gets different campaigns against drunk driving made by youths for youths. By engaging youth to participate in the competition they reflect, do research and make campaigns about drunk driving. Among other things Death Trip change and affect their attitudes to drunk driving.

ORAL ABSTRACT

EtG as a possible indicator of hangover in crash trauma patients with BAC=0

Smith Gordon,

Paul Marques, Dr., PIRE, Calverton, MD, United States

Objective:
To determine if the alcohol consumption biomarkers, ethyl glucuronide (EtG) and ethyl sulfate (EtS) can be used as a possible indicator of hangover or residual effects of alcohol in trauma patients with a blood alcohol level of zero. Elevation of blood alcohol concentration (BAC) is a well-recognized risk factor for motor vehicle crashes (MVCs) but little is known regarding hangovers and crash risk. Experimental evidence suggests that the residual effects of alcohol impair performance in simulated tasks such as maritime and driving simulators but it is unknown if residual effects increase the risk of automobile crashes in the real world. A major limitation in evaluating the effects of hangovers in non-experimental situations is the reliance on self reports of heavy drinking the night before with no objective marker available to detect residual effects when the BAC is zero. This workshop seeks expert opinions and advice from participants on how we can use biomarkers to study alcohol s residual effects and MV crash risk.

Methods:
We propose to quantify the role of alcohol s residual effects in MVCs by assessing these biomarkers in urine among drivers admitted to our trauma center and deaths from the medical examiner. Culpability studies determining the extent to which injured zero BAC drivers with biomarker evidence of residual effects are responsible for causing their crash, compared with drivers without hangover biomarkers will be used as an estimate of risk. We evaluated previous studies of EtG and EtS to determine what levels of the biomarkers in urine taken some time after heavy drinking could be used to identify individuals at risk of residual effects 12 to 20 hours later.

Results:
Most EtG studies were restricted to controlled dosing studies, and only BAC levels up to 100 mg/dl were evaluated because of ethical concerns. We identified only 2 studies that evaluated biomarker levels sequentially in patients admitted for detoxification with much higher BACs. These provide the data necessary to suggest a defined biomarker criterion to identify the residual effects of heavy alcohol consumption after the blood alcohol concentration (BAC) has returned to zero. We suggest that those persons with biomarker evidence of residual effects but a zero BAC are those with an EtG level of 45 mg/l (45,000 ng/ml) or higher; 450 times greater than the minimum detectable levels.

Conclusion:
We anticipate that participants in this workshop will be able to assist us in defining if we can use EtG and EtS levels to identify BAC negative individuals who recently had a high BAC. We also seek advice on the biomarker levels related to time since last drink that can be used to identify individuals at high risk of hangovers.

ORAL ABSTRACT

Medication Warnings About Driving: Risk Perceptions Among French And Australian Communities

Smyth Tanya, CARRS-Q

Increased crash risk is associated with sedative medications and researchers and health-professionals have called for improvements to medication warnings about driving. The tiered warning system in France since 2005 indicates risk level, uses a color-coded pictogram, and advises the user to seek the advice of a doctor before driving. In Queensland, Australia, the mandatory warning on medications that may cause drowsiness advises the user not to drive or operate machinery if they self-assess that they are affected, and calls attention to possible increased impairment when combined with alcohol.

Objectives:
The reported aims of the study were to establish and compare risk perceptions associated with the Queensland and French warnings among medication users. It was conducted to complement the work of DRUID in reviewing the effectiveness of existing campaigns and practice guidelines.

Methods:
Medication users in France and Queensland were surveyed using warnings about driving from both contexts to compare risk perceptions associated with each label. Both samples were assessed for perceptions of the warning that carried the strongest message of risk. The Queensland study also included perceptions of the likelihood of crash and level of impairment associated with the warning.

Results:
Findings from the French study (N = 75) indicate that when all labels were compared, the majority of respondents perceived the French Level-3 label as the strongest warning about risk concerning driving. Respondents in Queensland had significantly stronger perceptions of potential impairment to driving ability, $z = -13.26$, $p < .000$ ($n = 325$), and potential chance of having a crash, $z = -11.87$, $p < .000$ ($n = 322$), after taking a medication that displayed the strongest French warning, compared with the strongest Queensland warning.

Conclusions:
Evidence suggests that warnings about driving displayed on medications can influence risk perceptions associated with use of medication. Further analyses will determine whether risk perceptions influence compliance with the warnings.

ORAL ABSTRACT

Effectiveness of Alcohol-Oriented Road Safety Measures in Selected EU Countries

Stastna Lenka, Charles University in Prague / Co author Matus Sucha

Background:
Objectives: Presented study seeks to identify the effectiveness of different road safety interventions across the countries under investigation using road safety indicators.

Methods:
The road safety measures under study include: a) The permitted level of blood alcohol in drivers; b) The classification of driving under the influence of alcohol as a misdemeanour or an offence with a view to sanctions; c) The number of penalty points assigned, or deducted, for impaired driving. The following road safety indicators were selected: the number of road accidents under the influence of alcohol; the number of fatalities under the influence of alcohol.

Results:
A summary of countries, divided according to their levels of road safety and the numbers of road safety measures being implemented, is presented. In addition, specific road safety measures and their effectiveness, expressed by the degree of closeness of their relationship with road safety indicators across the countries under study, are provided. The results suggest that the permitted level of blood alcohol in drivers has no major effect on the safety indicators (the numbers of alcohol-related accidents and fatalities) as set. It was shown, however, that there is a relationship between the law enforcement measures (fine, prohibition of a specific activity, suspended/unsuspended sentence; system of penalty points) and the selected indicators (the numbers of accidents and fatalities under the influence of alcohol): the longer/more severe sentences for drink-driving (in terms of all the measures under study), the lower indicator levels.

Conclusion:
The closest relationships between measures and indicators, as well as the correlations between the implementation of different measures (the degree to which one measure may be influenced by another) are identified. We may conclude that the measures generally oriented at enforcement appear effective in reducing the accident and fatality rates in relation to the driving under the influence of alcohol. The question which remains unanswered is the preventive effect of the measures.

ORAL ABSTRACT

Social Media and Its Impact on Introducing Legislation Affecting Young Drivers

Stewart Katherine, arrive alive DRIVE SOBER

Objective:
To examine opportunities and challenges within the realm of social media that influences the introduction of new legislation affecting young drivers.

Method:
Conduct a critical review and analysis of various social media and how youth interact with new legislation through them. Case studies include the 2008 Facebook incident in Ontario when legislation was announced, affecting young drivers, extending existing G2 licence restriction (midnight - 5:00 a.m.) to 24/7. In four days, a Facebook page Young Drivers Against New Ontario Laws gained support of 95,000 users. This caused the withdrawal of the proposal despite supportive research.

Results:
Social media platforms are a demonstrated meeting ground for rapid exchange of information and are an influential force amongst youth. The information and opinions being exchanged and disseminated are rarely fact based, resulting in frantic, inaccurate discussion leading to a misinformed public. Information posted on YouTube and specific websites is a growing priority for youth awareness and dissemination of information. These sites serve as a cyber forum for opinions, inadvertently or intentionally misleading and misinforming their audience. Government has not kept pace with this shift towards the Internet for information and dialogue.

Conclusion:
New mediums of social media potentially can educate young drivers, however governments should consider strategies that take into account the potential for social media to hijack legislation or contradict road safety research through baseless opinion. Strategies should include alliances with youth to better support and manage on-line dialogue regarding legislation impacting young drivers, such as Ontario Students Against Impaired Driving (400 chapters; interactive website; alumni of 20,000 student leaders). Such partnerships would allow real time, on-line response from informed youth leaders to misinformation regarding legislation and preclude a repeat of the 2008 incident.

ORAL ABSTRACT

A Profile of Stunt Drivers in Ontario

Stewart Sheilagh, Ministry of the Attorney General

J MacPherson, *

Objectives:
To profile drivers issued immediate driver licence suspensions for speeding at 50 kilometres per hour or more over the limit in Toronto, Ontario, in the first two years of the law, to determine alcohol or drug involvement.

Methods:
Criminal and provincial records of the 875 drivers were reviewed to profile drivers prior to and after the incident as well as to determine what other actions were taken at the time of the incident.

Results:
Criminal records were found for almost 30% of drivers, with 20% of these having entries for drug offences and 25% for criminal driving offences, including alcohol-related offences. Nine drivers had both criminal driving and drug offences on record. At the time of the stunt driving only 1% had been drinking, with 2 drivers issued an ADL S suspension (over 80mgs) and 9 issued a warn range suspension (over 50 mgs). Almost 90% of the drivers had entries on the provincial record in addition to the stunt driving, but only 4% had alcohol- related suspensions on record. The predominant offences amongst this population were insurance and permit- related, with convictions for seat belt offences representing 10% of other convictions. Five percent of the population had multiple stunt suspensions in the two years.

Conclusion:
Drivers committing stunt driving merit further study to determine if these results are consistent in a larger population. Based on a 3-year record, over 80% are experienced violators yet the combination of driving and alcohol occurred in only 1% of the population with no reports of drug involvement. Although preliminary, these drivers appear to engage in distinctive high risk driving behaviour not associated with alcohol or drugs. The population has little regard for provincial driving laws and licencing requirements yet few have crossed the threshold of alcohol or drug involvement while driving. Further study is needed to determine if this result is consistent in a larger population so that enforcement and education can be better targeted.

ORAL ABSTRACT

A Preliminary Profile of Warn Range Suspended Drivers in Ontario

Stewart Sheilagh, Ministry of the Attorney General

Objectives:
To conduct a preliminary profile of drivers in Ontario issued a warn range driver licence suspension (blood alcohol concentration of 50mgs 80mgs); to determine if further study of these drivers is warranted.

Methods:
The criminal and provincial records of almost 900 drivers issued a warn range suspension in four months post-implementation, in three cities, were reviewed to profile driver behaviour prior to and after the suspension.

Results:
The population was relatively experienced, with 27% having prior licence suspensions. Almost one-quarter of the population had a criminal record, including alcohol-related driving, with 2% having multiple such entries. In one centre, almost 20% of the drivers had criminal driving entries. Only 6% had entries for drugs. Prior to this suspension, 3% had ADLS suspensions (over 80 mgs). Within four months, 2% of the population had multiple warn range suspensions and 7% had incurred another suspension of some type. At time of search, 10% were not licenced. Just over 13% were G2 licence drivers, in violation of the zero BAC requirement. Time of day is now available and data shows very different patterns emerging for time as well as age of the drivers depending on location. Examples include almost 50% (overall 20%) of drivers in the smallest centre were under 25 years of age; in the mid-sized centre almost 25% (overall 11%) and 40% (overall 60%) were detected between 9:00p.m. and midnight and midnight and 3:00a.m. respectively. Overall, 10% were detected during daytime hours.

Conclusion:
Although preliminary, certain patterns are already emerging despite the limited data. The percentage of drivers who have engaged in the same or similar behaviour is higher than anticipated. Suspensions may not create a sufficient deterrent for these drivers. Further study is needed to determine if the preliminary results are consistent in a larger population; to enhance enforcement and education efforts based on time of day and centre size and support the development of a risk assessment model for these drivers.

ORAL ABSTRACT

The Young Impaired Driver Problem: A Status Report and Plan for the Future

Stewart Kathryn, Safety and Policy Analysis International

Objectives:
Young drivers pose particular risks in traffic safety. Until they reach their mid to late twenties, drivers have a higher crash risk in general. Lack of experience in driving coupled with immature judgment make impairment by alcohol and drugs particularly dangerous. This paper summarizes current research on the risks posed by impairment among young drivers and the strategies that ameliorate these risks. An analysis of this research suggests how future progress may be made.

Methods:
Epidemiological research on traffic crashes indicates that, compared to older drivers, drivers in their teens drink and drive less often, but when they do drive after drinking, they are at considerably greater risk of being involved in a crash. Drugs also play a role in crashes among young drivers. This paper reviews this research and links level of risk to the variety of factors that influence the problem. The review includes research on the characteristics of typical crashes.

The paper also reviews research about the education, enforcement and policy strategies that have been shown to reduce impaired driving and crashes among young drivers. These strategies have been widely implemented and studied. The review also moves into less well researched areas, including technologies that have the potential to improve traffic safety among young drivers. These strategies are in development and have not been extensively tested but may prove to be crucial to future progress in enhancing safety among young drivers.

Results:
The nature of the crash risk posed by young impaired drivers is described and the most effective and promising strategies for reducing impaired driving among young drivers are identified.

Conclusions:
Impaired driving by young drivers is a continuing problem. A variety of very effective strategies have been developed and promising technology based strategies are in development. Significant progress can be made in improving traffic safety if these strategies are adopted.

Psychomotor and cognitive functions in subjects receiving methadone and buprenorphine

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Aims:
The main purpose of the study was to perform a systematic review of the scientific literature on effects of methadone and buprenorphine intake in experimental studies of psychomotor and cognitive function of relevance to driving. The review also included the influence of acute intake of methadone and buprenorphine. The review was performed as part of the DRUID project.

Methods:
Literature search were conducted in MEDLINE, EMBASE and PSYCINFO. The search strategy consisted of several words representing psychomotor and cognitive tasks related to driving combined with the drug of interest. A total of 35 studies were included, and summarized in a standardized way in evidence tables

Results:
Single doses of methadone and buprenorphine appeared to be followed by impairment in drug naïve subjects. Less pronounced impairment was observed after single doses to current users of opiates/opioids and in methadone and buprenorphine maintained patients. Impairment was observed in methadone and buprenorphine maintained patients compared to controls. It seemed that buprenorphine maintained patients were less impaired that methadone maintained patients.
There were several limitations and problems when assessing the results: Few studies included, no pharmacokinetic data or blood drug concentration measurements, effects on group level while there was large dose span within groups, lack of comparator drug (alcohol), use of other (un)reported drugs in subjects tested, effects observed could be due to previous drug history and/or individual factors and/or present use of maintenance drug use.

Conclusions:
The literature in this field is too limited to draw clear conclusions regarding maintenance use of methadone/buprenorphine and driving, but it cannot be excluded that maintained patients can have only slight drug effects of relevance to driving. It seems, however, quite clear that low doses of both methadone and buprenorphine cause impairment in performance tasks related to driving in drug naïve.

ORAL ABSTRACT

Effectiveness of Breath Testing of Drivers for Alcohol at Road Checks

Sucha Matus, Charles University in Prague

Stastna Lenka, Charles University in Prague, Prague, Czech Republic

Background:
As of 1 January 2010, mandatory screening breath testing of drivers for alcohol during all road checks was introduced in the Czech Republic by virtue of a binding guideline of the Czech Traffic Police Directorate. Until then tests for alcohol had been carried out as part of specific one-off campaigns or, as required practice, after accidents. As a result, the Czech Republic has become the first country in the EU to introduce such rigorous checks for drink-driving.

Objectives:
To test the effectiveness of the new measure in terms of a reduction in the rate of road accidents caused by drink-driving, the number of alcohol-related road fatalities, and the number of traffic law violations and criminal offences committed in relation to drink-driving. We assume that a higher number of traffic law violations and criminal offences will be detected (as a result of the higher number of checks), while the number of road accidents caused by impaired drivers and the number of fatalities (as a result of the preventive effect of the newly introduced measure) will decline.

Methods:
The above-specified indicators for 2009 (prior to the mandatory testing being introduced) are compared to the indicator levels for the first six months of 2010 (after the testing was introduced) using statistical analysis. The data were obtained from the statistics of the Czech police.

Results:
The results confirm our hypotheses in all the months under study (January-March) there was a year-on-year (2009-2010) reduction in the rate of road accidents caused by drivers under the influence of alcohol and a decline in the number of road fatalities in relation to drink-driving.

Conclusions:
The above data support our assumption of a preventive effect of the otherwise enforcement-oriented measure: the growing proportion of the detection of all violations and criminal offences involving driving under the influence of alcohol and drivers thinking that their illegal conduct is more likely to be disclosed make them act more responsibly and contribute to reductions in accident and mortality rates.

ORAL ABSTRACT

Acute and subchronic effects of bilastine (20 and 40mg) and hydroxyzine 50mg on actual driving performance in healthy volunteers

Theunissen Eef, Maastricht university

Silke Conen, Maastricht university, Maastricht, Netherlands; Johannes Ramaekers, Dr, Maastricht university, Maastricht, Netherlands; Roman Valiente, Faes Farma S.A., Vizcaya, Spain

Bilastine is a new second generation antihistamine indicated for the treatment of allergic rhinitis and chronic urticaria. Although bilastine has been demonstrated to produce no or little performance impairment on laboratory performance tests, it cannot be excluded that the drug produces performance impairments in driving. Objectives - The present study was designed to assess the effects of single and repeated administration of bilastine in two doses (20 and 40 mg) on actual driving. Hydroxyzine 50 mg, a highly sedative first generation antihistamine, was included as a control treatment. Methods - The study was conducted according to a placebo-controlled, randomized, double blind, 4 way cross-over design in 22 healthy volunteers (11 males, 11 females). Participants were treated with once daily doses for 8 consecutive days. On day 1 and 8 of each treatment period participants conducted an actual highway driving test. Results - On day 1 and 8 of treatment, hydroxizine significantly impaired driving as demonstrated by an increased standard deviation of lateral position (SDLP). Bilastine had no effect on SDLP. Conclusion - It is concluded that hydroxizine produces severe driving impairment after acute dosing and that this impairment only partly mitigates over time due to a lack of complete tolerance. Bilastine on the other hand did not produce any driving impairment after single or repeated doses and can be safely used in traffic in doses up to 40 mg.

ORAL ABSTRACT

Tolerance and cross-tolerance to neuro-cognitive effects of THC and alcohol in heavy cannabis users

Theunissen Eef, Maastricht university

Johannes Ramaekers, Dr, Maastricht university, Maastricht, Netherlands; Stefan Toennes, Dr, Goethe University of Frankfurt, Frankfurt, Germany; Manfred Moeller, Professor; Gerold Kauert, Dr, Goethe University of Frankfurt, Frankfurt, Germany

Previous research has shown that heavy cannabis users develop tolerance to the impairing effects of THC on neurocognitive functions. Animal studies suggest that chronic cannabis consumption may also produce cross-tolerance for the impairing effects of alcohol, but supportive data in humans is scarce. Objectives - The present study was designed to assess tolerance and cross-tolerance to the neurocognitive effects of THC and alcohol in heavy cannabis users. Methods - Twenty-one heavy cannabis users participated in a double-blind, placebo-controlled, 3 way study. Subject received 3 alcohol dosing conditions that were designed to achieve a steady blood alcohol concentration (BAC) of about 0, 0.5 and 0.7 mg/ml during a 5 h time window. In addition, subjects smoked a THC cigarette (400 µg/kg) at 3 hrs post onset of alcohol dosing during every alcohol condition. Performance tests were conducted repeatedly between 0-7 hrs after onset of drinking and included measures of perceptual motor control (Critical tracking task), dual task processing (Divided attention task), motor inhibition (Stop signal task) and cognition (Tower of London). Results - Alcohol significantly impaired critical tracking, divided attention and stop signal performance. THC generally did not affect task performance. However, combined effects of THC and alcohol on divided attention were bigger than those by alcohol alone. Conclusion - The present study generally confirms that heavy cannabis users develop tolerance to the impairing effects of THC on neurocognitive task performance. Yet, heavy cannabis users did not develop cross-tolerance to the impairing effects of alcohol, and the presence of the latter even selectively potentiated THC effects on measures of divided attention.

ORAL ABSTRACT

Driver Drug Testing - The South Australian Enforcement Model

Thompson Peter, South Australia Police

The objective is to present the success of the driver drug testing regime established in SA.

Driver drug testing in SA using saliva or blood became operative 1 July, 2006. A dedicated group of 13 traffic members was formed and conducted driver drug testing full time over a 12 month trial. The success saw the Government commit $11.1 million over 4 yrs for the expansion of the regime.

The expansion was based on 260 traffic officers across SA performing drug testing. It moved away from the centralised model established in SA & other Jurisdictions in Australia where all operations were under the one command. This enabled drug testing to be conducted in a similar fashion to RBT in that tests could be conducted in multiple locations at any one time & coordinated independently of each other.
The model retained the existing 13 officers in the full-time centralised group.
The trained officers have been independently testing drivers for drugs since April, 2008 across SA.

SAPOL screens 40,000 drivers for drugs each year. With a population base of 1.68 million, SAPOL screens drivers for drugs 5 times greater than other Australian Jurisdictions. State average of drivers positive to drugs is 2.3% with trained officers operating drug testing full time detecting at a positive rate of 4.7%. A breakdown on the regime & the results will be provided.

The drug testing regime and expansion across SA is helping to achieve goals set in the SA Police Road Safety Strategy 2006-2010 & the SA Road Safety Action Plan 2008-2010.

Expansions of the regime have also seen an enforcement model introduced in 2008 for the testing of rail safety workers for drugs pursuant to the Rail Safety Act and in February 2010, for the testing of operators and crew of marine vessels for drugs pursuant to the Harbors and Navigation Act.

ORAL ABSTRACT

Patterns of DWI Recidivism by Different Court Adjudications

Tison Julie, Preusser Research Group

Julie Tison, Dr, Preusser Research Group, Hamden, United States; Neil Chaudhary, Dr.; Anne McCartt, Dr., Insurance Institute for Highway Safety, Arlington, VA, United States

Objective:
First offenders recidivism rates in Maryland were examined to explore how these re-arrests rates vary as a function of adjudication.

Methods:
Ten years of alcohol-impaired driving arrest and adjudication data were obtained from the Maryland court data system. Drivers whose first arrest occurred in the period 1998-2000 were selected for analysis (N=46,449). Four groups were formed based on adjudication: 1) Guilty/Probation before Judgement (PBJ), 2) Nolle Prosequi, (Nol Prossed) 3) Not Guilty, and 4) Other. Recidivism was assessed by compiling instances of re-arrest for an alcohol-related driving offense in the three years following adjudication. Recidivism rates were compared across groups.

Results:
Ten percent of all first offenders were re-arrested within three years. The Not Guilty group showed the highest recidivism rate (14%) followed by the Nolle Prossed group (12%), Guilty/PBJ (9%), and Other group (8%). Survival analyses indicated that the Not Guilty and Nolle Prossed groups were significantly more likely to recidivate than the Guilty/PBJ group. Compared to their Guilty/PBJ counterparts, drivers found Not Guilty were 66% more likely to be re-arrested for an alcohol-related driving offense; those Nolle Prossed were 31% more likely to recidivate than those having received a Guilty/PBJ adjudication. Among those re-arrested, individuals judged Not Guilty, Nolle Prossed, and Other recidivated significantly sooner than those who received a Guilty/PBJ judgement.

Conclusion:
The large majority of alcohol-impaired driving arrests in Maryland lead to a Guilty/PBJ judgement (82%). The small minority (2%) found Not Guilty is more likely to recidivate and recidivates faster than those found Guilty/PBJ. Possible legal and behavioral reasons for these high re-arrest rates are discussed.

ORAL ABSTRACT

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Tørring Terje, MA

Catharina Frostad, MA-Ungdom, Oslo, Norway

Objectives:
I CAN ` T AFFORD TO LOOSE ANY FRIENDS - DON ` T DRINK AND DRIVE is a non-scientific project. The objectives are:
- Create awareness and affect youths attitudes towards drunk driving

Method:
Use social media to reach the youth in their own arena. The idea behind this is that the youth can share their stories and opinions, and by reading this, create awareness. By taking a stand against drinking and driving, and by showing other youths their stand, spread further awareness.
Our wish is that the users of these social Medias should create the correct attitude against this cause and take the right stand without us pointing any moralizing fingers.
To make these changes in attitude towards drinking and driving we need to establish awareness about the problem. In addition to this we need to make sure that the users have the knowledge needed to take a stand, a stand that they will live by and share with others.

Result:
This project has created one of the biggest Norwegian Facebook pages to this date with rapidly increasing numbers of users. After one day there were 2000 and after one week there were 120 000 people who had taken a stand. In addition it has created a lot of media interest which has resulted in bringing the cause into the spotlight.
The success of this project can be measured by the focus it has created and by the way that the project has been getting people to actively discuss the cause.

Conclusion:
By reaching the youth at their own arena, we can communicate and discuss important issues like this with a likely outcome of increased awareness and a broader understanding of the problem. This will also trigger the discussion between the youths themselves. The act of taking a stand will not only be for themselves, but also shown to their mates and fellow youths for inspiration.

ORAL ABSTRACT

An illustration of knowledge utilization to inform implementation and delivery of an alcohol interlock program

Vanlaar Ward, Traffic Injury Research Foundation

Robyn Robertson, Ms., Traffic Injury Research Foundation, Ottawa, Canada; Desirée Schaap, Dutch Ministry of Transport, Den Haag, Netherlands; Jan Vissers, DHV, Amersfoort, Netherlands

Objectives:
In a growing number of jurisdictions around the world an increased demand for the use of alcohol interlocks is evident. In order to inform decision-making regarding the use of interlocks it is crucial that program administrators and practitioners understand behavioural patterns of offenders on an interlock. The objectives of this study are to provide insight into compliance rates of interlocked offenders throughout their time on the interlock. Such information can guide administrators with regard to program development and implementation, particularly in relation to logistical aspects of programs and the requisite resources to support it. This study was conducted to provide empirical information needed to inform the implementation of the Dutch interlock program.

Methods:
Data used in this study come from a random sample of 7,743 interlocked offenders from over 30 jurisdictions in the U.S. Over 15 million events generated by the interlock devices have been included in the analyses. A variety of indicators have been calculated including the percent of offenders who blow failed tests, the percent of failed tests, circumvention rates, and blood alcohol concentrations, as well as trends in these indicators over time.

Results:
The behavioural patterns emerging in this study reveal that offenders violate the conditions of the interlock program at a relatively high rate at the beginning of their participation and this behaviour quickly diminishes among most offenders as they become accustomed to the device. To illustrate, 54.0% (95%-CI: 52.9-55.1) of offenders blow fails during their first three months of participation in the program whereas this percent decreases to 22.2% (95%-CI: 19.0-25.7) during the last three months of participation (i.e., months 22 through 24).

Conclusions:
This study shows that utilization of knowledge coming from interlocks is useful to inform decision-making when preparing the implementation and delivery of an interlock program. More precisely, the behavioural pattern that emerges from this study supports the notion of a learning effect among offenders. Specifically with regard to the Dutch interlock program, this pattern has affected the allocation of resources and the development of a refined reinforcement scheme.

ORAL ABSTRACT

Risk taking in traffic: comparing simulated driving with on-road GPS measured driving behaviour

Veldstra J.L., University of Groningen

Karel Brookhuis, Prof.Dr., University of Groningen, Groningen, Netherlands; Dick De Waard, dr, University of Groningen, Groningen, Netherlands

Aim:
Despite the obvious advantages of the driving simulator, it has its shortcomings. One crucial question is: to what extent are results obtained in the driving simulator predictive of actual, on-road driving behaviour? Prior research focusing on the validity of the driving simulator has compared one artificial situation; driving in the simulator, to another artificial situation; driving in an instrumented car. This limits the scope of the validation research conducted so far. It is, for instance, still unclear how recorded behaviour in the driving simulator corresponds to naturalistic driving behaviour in participants own cars. In this study, we compared on-road driving records obtained through GPS in participants own cars with driving simulator data of the same participants.

Method:
Thirty-six participants participated in this study, eighteen violators e.g. drivers that were known to violate traffic rules and regulations and eighteen conservative drivers. Participants were selected based on their driving performance from the control group of a field study on insurance per kilometre. The focus of the analyses was exploring both relative and absolute correspondence between black-box and simulator data. Basic vehicle control (acceleration decelleration and speed) was assed in a driving simulator and in an on the road driving test.

Results:
Data are currently gathered and results will be presented at the conference.
It is expected that the driving simulator will differ from real driving in absolute terms; for example, participants are epected to speed more in the simulator, then in there own car because the feedback is different. However, it is also expected that participants that are violators in their own car also violate traffic rules in the simulator, establishing relative validity for the driving simulator.

Comparison of the concentrations of drugs in saliva collected by two sampling methods (Varian OraLab and Statsure Saliva?Sampler)

Verstraete Alain, Ghent University

An-Sofie Goessaert, Ghent University, Belgium; Jolien Veramme, Ghent University, Belgium

Objective:
To determine the influence of saliva sampling methods on drug concentrations.
Methods: Saliva was obtained from 249 subjects (who had given informed consent) by Varian OraLab and Statsure Saliva?Sampler. OraLab consists of foam-tipped saliva collector. The sponge contains an acid that stimulates salivation. Statsure consists of a collector with a blue indication when 1ml of saliva is collected. After sampling, the collector is transferred to a tube that contains 1ml of buffer. Saliva was analysed with UPLC-MSMS.

Results:
For all the drugs, the concentrations in the saliva collected with OraLab are 50-70% compared to Statsure, except for morphine (80%) and codeine (92%). Possible explanations are: a buffer could explain a better extraction recovery with Statsure (particularly THC); the stimulation of salivation by an acid in OraLab could also explain the lower concentrations.

Drug	COC	BE	THC	AMP	6-AM	MOR	COD
Median concentration Statsure (ng/ml)	44.3	81.5	27.4	252.9	67.8	178.8	58.7
Median concentration OraLab (ng/ml)	17.7	31.1	12.1	310.4	24.7	131.0	41.7

* Regression:

Slope	Intercept
0.54	- 2.41
0.51	- 5.91
0.68	- 2.38
0.68	2.85
0.50	- 1.02
0.80	- 6.17
0.92	- 11.08

ORAL ABSTRACT

R 0.62 0.83 0.90 0.83 0.80 0.82 0.61
COC: cocaine, BE: benzoylecgonine, THC: tetrahydrocannabinol, AMP: amphetamine, 6-AM: 6-acetylmorphine, MOR: morphine, COD: codeine

Conclusions:
The correlation coefficients are relatively low (0.61 0.90). For all drugs, the concentrations measured in the saliva collected by OraLab are lower. This could have consequences for the determination of legal cut-offs.

Disclaimer:
This abstract has been produced under the project Driving Under the Influence of Drugs, Alcohol and Medicines (DRUID) financed by the European Community within the framework of the EU 6th Framework Program.

This abstract reflects only the author's view. The European Community is not liable for any use that may be made of the information contained therein.

External quality assessment of multi-analyte chromatographic methods in oral fluid

Verstraete Alain, Ghent University

Kristof Pil, Waters, Zellik, Belgium; Francis Esposito

Objectives:
DRUID (Driving Under the Inflluence of Drugs, Alcohol and Medicines) is a research project funded by the European Commission in which oral fluid is analysed by eleven laboratories. A common collection and analysis methodology has been used: collection with Statsure Saliva Sampler and LC-MS/MS or GC-MS analysis of 22 substances. Four rounds of proficiency testing (PT) were organized between March 2008 and September 2009.

Methods:
Qualitative results were evaluated using sensitivity and specificity. Quantitative results were evaluated using z-scores and the standard deviation of Horwitz.
Results: Specificity was above 99% for all analytes; sensitivity per analyte varied between 81.7 and 100%, 20 out of 22 analytes had a sensitivity >90%. The percentage of satisfactory z-scores increased from 79.4% to 89.2% over the test period. This trend was seen for all drugs, except zopiclone. Results were discussed with participating laboratories and problems were addressed.

Conclusions:
Because of these corrective actions, DRUID laboratories have a lower variation in results than previously published PT schemes in oral fluid.

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ORAL ABSTRACT

Survey of prevention and information campaigns on psychoactive drugs and driving

Verstraete Alain, Ghent University

Sara-Ann Legrand, Ghent University, Gent, Belgium

Objectives:
One of the objectives of the DRUID project is to develop guidelines for spreading information regarding driving under the influence of drugs and medicines, and this aiming at different target groups, including young drivers, patients, physicians, pharmacists,& We reviewed the state-of-the-art of existing information campaigns regarding psychoactive drugs and driving, as well as the documented effectiveness of those campaigns.

Methods:
In total 55 institutes were contacted, of which 17 (31%) responded and 12 (22%) were able to give information. Information was also gathered through the Internet by means of websites of relevant organizations, Google and YouTube.

Results:
A total of 75 campaigns were found, from 13 different countries. Twenty-four were launched to inform the general public on the risks associated with driving under the influence of drugs, medicines and/or alcohol. Twenty-nine campaigns were launched to inform young people and 16 campaigns to inform physicians and/or pharmacists. Nine campaigns were designed for teachers, seven campaigns for patients and five campaigns for other target populations. Some campaigns were designed for more than one target group. Information on impact evaluation was available only for seven campaigns. All evaluations showed a positive impact of the campaigns.

Conclusions:
The majority of the retrieved campaigns concerning driving under the influence of drugs were aiming at young people. The type of medium that is used the most is brochures. Most campaigns are organized by governmental organizations and road safety organizations.
As only a few evaluations were found, and these campaigns and their evaluations were performed in many different ways, it is not possible to draw conclusions concerning the association between the design of the campaigns and their effectiveness.

Key-words: information campaigns, psychoactive drugs, effectiveness

ORAL ABSTRACT

Comparison of a checklist for clinical signs of impairment and detection of drugs in saliva

Verstraete Alain, Ghent University

Sara-Ann Legrand, Ghent University, Gent, Belgium; An-Sofie Goessaert, Ghent University, Belgium; Jolien Veramme, Ghent University, Belgium; Alain Verstraete, Professor, Ghent University, Gent, Belgium

Objectives:
In Belgium and some other countries, the police performs on-site drug screening when a driver is suspected of being drug impaired, since the test procedure is time consuming and the screening devices are relatively expensive. The objective of the study is to compare the results of a checklist with drug concentrations in saliva.

Method:
The checklist used in the DRUID study in the Netherlands was used. Two fifth-year medical students performed the tests on 250 subjects, 50 drivers and 200 subjects attending a methadone clinic. Saliva analysis was performed by UPLC-MS/MS. As several signs were rarely observed, the parameters were reduced to those that were positive in at least 3 out of 250 test subjects. This selection led to a reduction to 13 (out of 28) parameters. A statistical test (Fisher s exact test) was used to test for correlations between the checklist parameters and the presence of substances in oral fluid.

Results:
Most parameters did not correlate significantly with drug intake. The pupil tests seemed to be the best predicting parameters, especially for amphetamine and THC. Remarkably, some correlations were found between parameters and drugs where no correlation was expected, e.g. sleepiness and amphetamines. This can possibly be caused by the presence of combination use of drugs in a lot of subjects. The signs were often observed when high drug concentrations were seen in saliva, but in many cases with high saliva drug concentrations, no signs were observed.

Conclusions:
In general, the checklist correlated badly with drug presence in this population of chronic drug users, but our results also confirm other studies that found that checklists are not very sensitive.

Key-words: checklist parameters, correlation, presence of substances in oral fluid.

ORAL ABSTRACT

The problem of collecting different body fluids from drivers in the surveys

Verstraete Alain, Ghent University

Objectives:
It is not easy to obtain a blood sample from drivers at the roadside for use in epidemiological studies. Therefore, use of saliva samples has become popular. On the other hand, in studies in injured drivers, obtaining a saliva sample can be problematic, e.g. because of injuries. When drug concentrations in blood and saliva need to be compared e.g. in risk calculations, results from different matrices need to be comparable. Because of the different recoveries with saliva collection devices, saliva:blood ratios should be determined for each collection device.

Methods:
Drug concentrations in blood and saliva samples from different studies (Rosita-2, roadside surveys) were analysed by GC-MS and UPLC-MS/MS and the results were compared for different drugs.

Results:
While for some drugs like diazepam, relatively good correlation can be observed ($r2 = 0.98$, n=23, Saliva blood ratio 0.033), for most other drugs there is a very wide scatter when comparing saliva and blood concentrations. These findings confirm those of other published studies. One of the possible explanations is the trapping of basic drugs in saliva because of the pH effects.

Conclusion:
The correlation between drug concentrations in saliva and whole blood is poor for most drugs. It might be advisable to use whole blood also in a roadside surveys.

Disclaimer:
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ORAL ABSTRACT

Gamma-hydroxybutyrate (GHB), pregabalin and driving impairment

Vevelstad Merete, Norwegian Institute of Public Health, Division of forensic toxicology and drug abuse

Sandra Rinne Dahl, Norwegian Institute of Public Health, Division of forensic toxicology and drug abuse, OSLO, Norway; Gerrit Middelkoop, Senior Engineer, Norwegian Institute of Public Health, Oslo, Norway

Objectives:
To evaluate the occurrence of the psychoactive substances gamma-hydroxybutyrate (GHB) and pregabalin in blood samples from drivers suspected of driving under the influence of drugs or alcohol in Norway, after the introduction in January 2010 of routine blood analysis for these increasingly used/abused substances. Further, the aim was to evaluate the relationship between blood concentration and impairment, as measured by the clinical test of impairment (CTI).

Methods:
The Division of Forensic Toxicology and Drug Abuse (DFTDA) at the Norwegian Institute of Public Health analyses blood samples from all drivers suspected of driving under the influence of drugs nation-wide. Cases with positive results for pregabalin and/or GHB from January to August 2010 will be selected and results presented at the ICADTS meeting. UPLC-MS/MS is used for analysis of GHB, GBL (gamma-butyrolactone), 1,4-butanediol (1,4-BD) and pregabalin. A sample volume of 100 µl whole blood is required. The use of 96-well extraction plates has reduced the sample preparation time and increased the number of simultaneous analyses. Separation is obtained on a C18 column, using a linear gradient with 0.2% formic acid (A) and methanol (B). The following transitions are monitored: GHB 105.06 > 87.05, 43.05, 69.03, 42.3; pregabalin: 160.13 > 142.12, 55.05, 97.1; GBL: 87.04 > 44.95, 69.03; 1,4BD: 91.08 > 73.07, 55.05, 97.1. The method will be presented in detail at the meeting.

Results and conclusion:
As this is an ongoing study, the results and conclusions will be presented and discussed at the meeting.

Keywords: Drugs of abuse - GHB - Forensic - Impaired driving Toxicology

ORAL ABSTRACT

Alcohol, Drugs and Street Racing: Results from the Ontario Student Drug Use and Health Survey

Vingilis Evelyn, University of Western Ontario

Reginald Smart, Dr., Centre for Addiction and Mental Health, Toronto, Canada; ROBERT MANN, MR.; Angela Paglia-Boak, Centre for Addiction and Mental Health, Toronto, Canada; Gina Stoduto, Ms

Objectives:
Various risky driving behaviours, such as street racing and impaired driving, have long been identified as public health problems because of their potential negative consequences of motor vehicle crashes. Although much research has focussed on individual problematic behaviours, evidence exists on the interrelatedness of these behaviours. This study examines the interrelationships of alcohol use, drug use, drinking driving and street racing among a representative Ontario sample of secondary school students.

Method:
The Ontario Student Drug Use and Health Survey is a population-based survey of Ontario students in grades 7 to 12. This self-administered, anonymous survey, conducted across the province every two years with the purpose of identifying epidemiological trends in student alcohol and drug use, mental health, physical activity, illegal activities, risk and protective factors, was examined for prevalence of self-reported street racing and correlates, as in 2009 a new question on street racing was added to the survey.

Results:
The total sample of students in grades 9-12 that completed the questionnaire with the street racing question was 3,053. Overall, 5.6% of students in grades 9-12, reported driving a car, truck or SUV in a street race in the last 12 months. Alcohol and drug users were more likely to street race: 18% of weekly or more drinkers reported street racing compared to 1.4% of non-drinkers. Almost 37% of students who reported that they had driven after drinking within the last year reported that they had engaged in street racing in the last year compared to 3.6% who had not driven after drinking.

Conclusions:
This study is the first in Canada to examine self-reported alcohol, drug use and drinking driving in relation to street racing among students. It suggests that drinkers, drug users and drinking drivers are more likely to report street racing, a worrisome combination.

ORAL ABSTRACT

Is monitoring drinking an effective alternative to the interlock?

Voas Robert, PIRE

Objective:
Experience demonstrates that offenders convicted of driving while impaired (DWI) tend to drive illicitly rather than install an alcohol interlock on their vehicles. The power of the courts to force the installation of interlocks is limited by the requirement that the offender have a vehicle. The result has been that, to date, only 10% to at the most 50% of DWI offenders install the devices. The objective of this paper is to examine the potential for imposing an alcohol-monitoring program on offenders who claim not to have access to a vehicle.

Methods:
This paper reviews previous studies designed to pressure DWI offenders to install interlocks by making the alternative less desirable than the interlock. Research has shown that such requirements do increase the percentage of offenders installing interlocks. The paper also reviews current technologies and programs for remotely monitoring drinking.

Results:
Systems for monitoring drinking are sufficiently developed that they appear to offer an effective method for ensuring that a driver is not drinking, which makes them a potential substitute for the interlock. It appears that they could be required as an alternative to installing the interlock with the advantage that they could not be subverted by driving a non-interlock-equipped vehicle.

Conclusion:
Making devices that remotely monitor drinking a mandatory alternative to the interlock offers the possibility of increasing the percentage of offenders who install interlocks or who are protected from impaired driving by forced abstinence. If program providers can support both monitoring methods, offenders could be given the choice of which sanction program to accept.

ORAL ABSTRACT

Toward a National Model for Impaired Driver Treatment and Monitoring Programs

Voas Robert, PIRE

Robert Voas, Dr., PIRE, Calverton, MD, United States; Robert DuPont, The Institute for Behaviiour and Health Inc., Rockville, MD, United States; Stephen Talpins

Objective:
To describe a proposed national model for controlling the risk presented by offenders convicted of driving while impaired and promoting behavioural change to reduce future recidivism.

Methods:
A review of the current policies for controlling the risk of drivers convicted of driving while impaired (DWI) indicates that the 1.4 million drivers who are arrested for that offence each year are 4.1 times more likely than the average driver to be the drinking driver in a fatal crash. Current methods of controlling the risk they present to the driving public are not adequate, as indicated by the fact that the crashes in which they are involved result in 1,000 alcohol-related fatalities each year. There appears to be a trend toward a comprehensive system applicable to first and multiple offenders focused on monitoring offender drinking or monitoring driving with an interlock in which the ultimate sanction is based on offender performance in meeting monitoring requirements.

Results:
The specialized DWI and drug courts, which have been shown to be successful in reducing offender recidivism, have used close monitoring of alcohol and drug consumption as a key part of their program. Based on their success, monitoring has become the central feature of DWI sanction programs in South and North Dakota. New technologies are making it easier to remotely monitor drinking. Evidence indicates that even dependent drinkers can conform to these monitoring programs and avoid the short-term jail consequence for failure.

Conclusions:
Based on the apparent success of current monitoring systems and emerging technologies, it appears that monitoring programs will play an increasingly important role in the future and will stimulate the need for new and more flexible court-mandated treatment programs.

ORAL ABSTRACT

Monitored Drinking: An Alternative to the Interlock for Offenders Without Cars?

Voas Robert, PIRE

Objective:
Determine whether monitoring abstinence can be an effective alternative for preventing recidivism among drivers convicted of driving while impaired (DWI) who avoid a court order to install an alcohol ignition interlock. Experience in the U.S. indicates that, even in states with mandatory interlock laws, half or more of the DWI offenders avoid installing the devices by claiming not to have a car or pleading not to drive.

Method:
Research has shown that imposing home confinement as an alternative to the interlock substantially increases the proportion of all offenders who install the devices. This study reviews current trends in the criminal justice system in the use of alcohol monitoring as a sanction for DWI.

Results:
Random BAC testing and newer technologies, such as transdermal alcohol sensors attached to the leg of the offender, are being widely used by the courts for controlling multiple DWI offenders, and there appears to be a trend to apply those procedures to some first DWI offenders. New technologies just coming into use by the courts will make monitoring drinking less intrusive and less expensive.

Conclusions:
AC monitoring can be implemented at roughly the same cost as the interlock and should be equally as or more effective than the interlock in reducing recidivism because offenders can illicitly drive a non-interlock-equipped vehicle. The threat of being forced to be abstinent through tight monitoring of drinking may increase the proportion of offenders installing interlocks. The extent to which the public and the courts will accept abstinence monitoring for first offenders who do not demonstrate an alcohol use problem is unknown.

ORAL ABSTRACT

Is it really alcohol-induced impairment of cognitive functions that leads to crashes?

Vollrath Mark, Department of Traffic and Engineering Psychology

A multitude of experimental studies in the laboratory and driving simulators has demonstrated that alcohol impairs cognitive functions. Controlled actions which are under conscious cognitive control are impaired at a lower BAC than well-learned automatic functions. Thus, alcohol seems to impair performance the more, the more complex the task at hand is. From this research one would assume that alcohol leads to more crashes in complex traffic situations as compared to simple, well-known situations. A 50% sample of all German accidents from 2002 were examined with regard to different accident types comparing accident with and without alcohol. The results are contrary to the hypothesis described with less alcohol-related accidents in complex situations like intersections. Different explanations for this discrepancy between experimental research and accident studies are discussed.

Situational Aspects of Drug-Driving Incidences Results of the German Cell Phone Survey

Walter Martina, IZVW (Center for Traffic Sciences) / Department of Psychology / University of Würzburg

Florian Fischer, IZVW, University of Wurzburg, Germany; Volker Hargutt, IZVW, University of Wurzburg, Germany; Hans-Petter Krüger, IZVW, University of Wurzburg, Germany

Objectives:
The study intended to obtain information about the frequency of drug driving and to specify characteristics of drug impaired drivers for rehabilitation and prevention purposes.

Methods:
The sample consists of 200 drug users and 100 controls out of the normal driving population stratified for sex, age (18-39 years) and residence (rural, city and metropolitan area). The questionnaire was installed on Smartphones and was daily filled in for 28 consecutive days. All activities were listed in chronological order with the focus on drug consumption and driving. Encrypted data were transmitted via GPRS and the internet. Immediately after reception, data were checked for consistency by study assistants, in case of inconsistencies or pecularities discussed by phone and corrected if necessary. To enhance compliance a monetary reward system was developed. The credits were communicated via the Smartphone text messaging system.

Results:
The synchronisation of the reported driving and drug consumption patterns offers to assess the frequency of drug driving and the situational aspects of such incidences. Data were comparable to existing mobility and drug prevalence data of the general German population. Without announcement one urine sample was collected within the study period. The toxicological results correspond to the reported drug consumption. The dropout rate was low and the subjects responses to the study were very positive.

Conclusion:
The study demonstrates a promising way of investigating drug driving and its preventive and promotive circumstances. The results serve as major input to the discussion on drug driving.

This report has been produced under the project Driving Under Influence of Drugs, Alcohol and Medicines (DRUID) financed by the European Community within the EU 6th Framework Program.
This report reflects only the author's view. The European Community is not liable for any use that may be made of the information contained therein.

ORAL ABSTRACT

Risk factors in car crashes: car, road, driver?

Wegman Fred, SWOV

When defining risk we usually distinguish the probability of an event (a crash given a certain exposure to risk) and the (negative) consequences of that event (injury, cost): risk = probability x consequence. A risk factor is a factor that influences the probability of a crash occurring or the severity of the consequences of a crash. In road safety research we try to establish and quantify risk factors. Results are often presented in terms of risk increasing factors. Researchers rarely express themselves in terms of too high a risk. Researchers compare different risks (risk factors, risk increasing factors) and try to understand differences between them. Their results are presented to decision makers (policymakers and/or politicians) and they arrive at conclusions about the acceptability of certain risks (and of risk differences) and their willingness to take risk reducing actions. For each of the three components of the road traffic system (human being, road, vehicle) we identified risk increasing factors. We identified road locations with relatively high risks (road types, specific locations) and specific users groups (age, gender, or crash prone drivers) running a relative high risk. Certain road user behaviour is associated with relatively high risk (speed, distraction, alcohol, drugs, fatigue, etc.). And, finally, risks are related to vehicle characteristics (vehicle types, vehicle defects). We learned over the years that different risks are sometimes linked. Several research results on risk increasing factors will be presented and compared as well as some results on how to reduce 'peaks' in risk distributions.

However, we learned that risk increasing factors describe only a part of the road safety problem. The problem also originates from three basic risk factors: speed, mass/protection (of/by vehicles) and physical vulnerability (of man). This represents the more generic character of risks in road traffic; reducing these generic risks requires a different approach. This new approach, based on the Dutch Sustainable Safety vision, will also be introduced in this presentation.

Who are the real first offenders ?

Wilson Hollie, Centre for Accident Research & Road Safety - Queensland (CARRS-Q), QUT

Mary Sheehan, Professor, CARRSQ, Australia; Gavan Palk, Dr, CARRS-Q, QUT, KELVIN GROVE, Australia

Objectives:
Drink driving causes more fatal crashes than any other single factor on Australian roads, with a third of crashes having alcohol as a contributing factor. In recent years there has been a plateau in the numbers of drink drivers apprehended by RBT, and around 12% of the general population in self report surveys admit to drinking and driving. There is limited information about the first offender group, particularly the sub-group of these offenders who admit to prior drink driving, the offence therefore being the first time caught . This research focuses on the differences between those who report drink driving prior to apprehension for the offence and those who don t.

Methods:
201 first time drink driving offenders were interviewed at the time of their court appearance. Information was collected on socio-demographic variables, driving behaviour, method of apprehension, offence information, alcohol use and self reported previous drink driving.

Results:
78% of respondents reported that they had driven over the legal alcohol limit in the 6 months prior to the offence. Analyses revealed that those offenders who had driven over the limit previously without being caught were more likely to be younger and have an issue with risky drinking. When all variables were taken into account in a multivariate model using logistic regression, only risky drinking emerged as significantly related to past drink driving. High risk drinkers were 4.8 times more likely to report having driven over the limit without being apprehended in the previous 6 months.

Conclusion:
The majority of first offenders are those who are first time apprehended rather than first time drink drivers . Having an understanding of the differences between these groups may alter the focus of educational or rehabilitation countermeasures. This research is part of a larger project aiming to target first time apprehended offenders for tailored intervention.

ORAL ABSTRACT

I-95 High-Risk Driver Program Analysis

Wood Katherine, Traffic Injury Research Foundation

Katherine Wood, Research Associate, Traffic Injury Research Foundation, Ottawa, Canada; Robyn Robertson, Ms., Traffic Injury Research Foundation, Ottawa, Canada; Ward Vanlaar, Dr., Traffic Injury Research Foundation, Ottawa, Canada; Kyla Marcoux, Research

Objectives:
The I-95 Corridor Coalition represents sixteen member states and the District of Columbia along the I-95 corridor with a goal of improving transportation system performance. The Traffic Injury Research Foundation (TIRF) conducted a project on high-risk drivers (HRDs) for this Coalition. HRDs are often described as a relatively small group of persistent traffic violators who are responsible for a significant portion of the serious injury and fatal collisions on the highways. This group of persistent offenders has not, until recently, received the attention needed, so data on the dimensions of the problem are limited. For the purposes of this study, HRDs were defined as drivers who are either a hard core drinking driver and/or have been involved in three distinct events (violations or crashes). The main objectives of this project are to quantify the magnitude and characteristics of the HRD problem along the Corridor and gather information from jurisdictions around the world to identify ways that the problem can be addressed.

Methods.
Bivariate analyses and logistic regression were conducted comparing the HRD group to a non-HRD group on various fatal collision characteristics using FARS data and State Driver Record data. An international survey was administered to gauge the types of programs and polices that are being applied to HRDs in various jurisdictions along the I-95 Corridor and elsewhere. The survey consisted of 32 questions that focused on HRDs, especially high-risk impaired drivers.

Results:
The magnitude and characteristics of the HRD problem along the Corridor varies depending on the dataset being used. These results will be discussed along with promising solutions to overcome the problem.

Conclusions:
This study provides recommendations as to the most promising practices and effective polices to assist jurisdictions in effectively dealing with persistent HRDs and improving the safety for the travelling public.

Differences in duplicate breath alcohol testing

Zuba Dariusz, Institute of Forensic Research

Objectives:
The procedure of sobriety testing requires duplicate measurements of breath alcohol concentrations (BrAC). If the difference is significant, the test must be repeated. The objective was to establish reliable values, which could be used by police officers to make the proper decision about when to repeat the test.

Methods:
Results were obtained from expert opinions developed at the Institute of Forensic Research. In 260 cases, the defendant was tested by electrochemical (Alcotest 7410, AlcoSensor IV) or infrared (Alcomat, Alkometr A2.0) breath analyzers, and the second measurement was performed within a 20min period. The absolute (ABS) and relative (REL) differences between these tests were subjected to statistical calculations.

Results:
In 6 of 260 tests (2.3%), the ABS was over ±0.2mg/L. The Grubbs test revealed that after their rejection no outliers were present. Differences for electrochemical and infrared instruments were statistically insignificant ($p>0.05$) both for ABS (0.011 vs. 0.004mg/l) and REL (2.5 vs. 0.9%), therefore the data were pooled. The combined ABS was 0.008±0.052mg/l (mean ± standard deviation, SD). The 5 95th percentiles ranged from -0.08 to 0.095mg/l. The scatter (expressed as SD) of ABS increased with BrAC [mg/L], from 0.032L for BrAC lower than 0.5 to 0.064 for BrAC higher than 1.5. The REL was 1.8±7.9%, with 5-95th percentiles being -9.9 and 16.0%. The scatter of REL decreased with BrAC, from SD=10.3% for BrAC lower than 0.5mg/l to 5.2% for the highest concentrations. When compared to ranges given in OIML R126 recommendations, the SD of ABS was 0.025mg/l for BrAC lower or equal to 0.40mg/l (595 percentiles being -0.03 and 0.04mg/l) and the SD of REL was 6.9% for higher concentrations (the corresponding percentiles were -8.5 and 13.9%).

Conclusion:
The study allowed us to establish the permissible limits for difference in duplicate tests: ABS=0.05mg/l for BrAC lower or equal to 0.40mg/l and REL=15% for higher concentrations, which corresponded roughly to 2SD and 5-95th percentiles.

Comparison of drug concentrations in whole blood and oral fluid collected with the StatSure collection device

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Objectives:
The objective of this study was to determine drug concentration ratios between oral fluid collected with the StatSure sampling device and whole blood.

Methods:
Oral fluid collected with the StatSure collection device from 100 drivers suspected of driving under the influence of drugs was analyzed with UPLC-MS-MS. Whole blood was screened with UPLC-MS-MS and confirmed with GC-MS, LC-MS(MS) or UPLC-MS-MS. The samples were screened for opioides, amphetamines, benzodiazepines, cocaine, ?-9-tetrahydrocannabinol, zopiclone, zolpidem, carisoprodol and meprobamate.

Results:
Positive results were found for 84 oral fluid and 77 whole blood samples. A total of 18 different compounds were found, and altogether 196 ratios were determined. Eight compounds had n>10. The following median ratio, number of sample pairs (n) and the coefficient of correlation (cc, R2) between oral fluid and whole blood were found: amphetamine 12.7, n=19, cc=0.669, metamphetamine 18.0, n=31, cc=0.594, alprazolam 0.46, n=15, cc=0.437, clonazepam 0.14, n=23, cc=0.147, diazepam 0.037, n=18, cc=0.554, nordiazepam 0.052, n=21, cc=0.766, morphine 14.8, n=16, cc=0.622 and THC 17.1, n=25, cc=0.122.

Conclusion:
Oral fluid/whole blood ratios have been determined for oral fluid collected with the StatSure collection device. High ratios were found for amphetamines, opiates and THC while low ratios were found for benzodiazepines, the correlation coefficients were low for most compounds.

POSTER NO 1

Correlation of ethanol concentrations in whole blood and eye vitreous humor collected in Cyprus: A four year study.

Afxentiou Maria, State General Laboratory-Cyprus

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M. Afxentiou*, Objectives: Many studies have been published comparing concentrations of ethanol in blood and vitreous humor concentrations. These studies have shown a range of 0.91-1.34 ratio of vitreous humor /blood. We conducted a similar study of routinely collected specimens from fatal road accidents and unnatural deaths. Samples from 218 forensic autopsies were collected during the period 2006-2009 analyzed and results evaluated. The purpose of this study was a) to determine whether the calculated ratio of vitreous humor /blood based on the national data bank that has built, falls within the reported in the literature range of 0.91-1.34 and b) this factor to be used in court cases involving the investigation of road accidents and unnatural deaths in Cyprus, based on national data.

Methods: All samples were analyzed using a Shimadzu Gas Chromatograph coupled with FID and Headspace Autosampler. The internal standard of the method was n-propanol. For the calibration curves spiked blood samples were used. The LOD of the method is 0.3mg/dL and the uncertainty is 3.43mg/dL. The evaluation of results was based on Pearson s correlation.

Results: The correlation coefficient between vitreous humor and blood was r=0.955 based on Pearson s correlation. Therefore, the average ratio of vitreous humor /blood was calculated to be 1.08.

Conclusion: The value of correlation coefficient (r) shows a strong correlation between concentrations of ethanol in blood and vitreous humor concentrations. The average ratio of vitreous humor /blood (1.08) is approximately in the middle of the above reported ranges and can be used in court cases involving the investigation of road accidents and unnatural deaths in Cyprus.

POSTER NO 2

Drug Effects on Driving Performance in Australia

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There has been increasing concern about the prevalence of drug driving in Australia. In fact, there has been a number of legislatory changes in the past 20 years in response to this. There is evidence that both illicit and licit drugs, through their impact on mood, cognition and psychomotor functioning, increase the risk of a motor vehicle accident. In New South Wales, it appears the main illicit drugs of concern are cannabis, methylamphetamine (speed , ice), morphine (heroin), MDMA (ecstasy) and cocaine. Whilst, with the licit drugs these are, alcohol, oxycodone (also known as hillbilly heroin) benzodiazepines (eg. diazepam, alprazolam, oxazepam), anti-histamines (eg. diphenhydramine, promethazine) and hypnotics (eg.zolpidem).Curiously, with the licit drugs they were all central nervous system (CNS) depressants, whilst with the illicit drug drivers both stimulants and CNS depressants were used. Changes in drug usage and prevalence in driving and effects on driving performance will be presented.

POSTER NO 3

DRUID prototypes of booklets, posters and messages for risk communication on substance use and driving

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Objectives:
This abstract presents one part of the research activities of Work Package 7 on Dissemination and Guidelines of the integrated EU DRUID project: the development of prototype booklets, posters and messages in order to disseminate the most relevant DRUID information to different target groups.

Methods:
The development of the prototype documents is based on (1) an international online survey among experts in various fields (policy makers, physicians, pharmacists, researchers, people working in the field of illicit drugs, etc) and (2) an overview of relevant communication aspects to be taken into account while developing information documents (derived from the EU project Campaigns and Awareness-raising Strategies in Traffic Safety (CAST)).

Results:
The following prototype documents will be presented by target group:
- General Public: (1) Medicines & driving, (2) Illicit drugs & driving.
- Driver as patients: (1) What to know about sleeping pills, (2) What to know about antidepressants and (3) What to know about medicines and driving in senior drivers.
-Young Drivers: (1) Illicit drugs & driving.
- Physicians and pharmacists: (1) Medicines & driving.

Conclusions:
The most relevant results of the DRUID project will only be available at the end of the project, when updated documents will be developed. Work Package 7 provides the general lines for elaboration and development of prototype information documents, taking background information on the different relevant target groups into account. It explains the developmental process and the proposed content of the prototype documents.

Keywords: Risk communication, DRUID, CAST

1. This abstract has been produced under the project Driving Under Influence of Drugs, Alcohol and Medicines (DRUID) financed by the European Community within the framework of the EU 6th Framework Program.

POSTER NO 4

The Culture of Older Women s Drinking in Australia

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Objectives:
The purpose of this investigation was to undertake pilot research to develop an understanding of the current culture of older Australian women s (35-50 years) drinking behaviour from a uniquely female perspective.

Methods:
Two separate focus group interviews were undertaken with women (N = 11) aged between 35 and 50 years living in South-East Queensland, Australia. Women were asked to openly discuss how and why they drink alcohol (ie., their regular drinking behaviour), how this has changed over time, and the attitudes and values that influence their behaviour.

Results:
Participants reported that their consumption of alcohol was more regulated and controlled and although some women drank more frequently, the quantity consumed at each drinking occasion had decreased significantly. Occasional consumption of large amounts of alcohol tended to be the result of incidental drinking as opposed to determined drinking . The reasons for alcohol consumption were found to be internal as well as social. Internal reasons included stress relief, increased relaxation and self reward. Further, alcohol was used as a social lubricant. This cohort also reported being influenced by the drinking patterns of their partners. Social group matching was however found to have a negative impact on alcohol consumption as social groups most commonly endorsed lesser levels of intoxication. Further, the women reported that they were of an age in which they felt excessive drinking to be undignified . Personal reasons such as vocational and family responsibilities further modified the levels of consumption for individual women. Finally, it was reported that perceived health risks that can result from excessive and/or repetitive drinking led to a decreased in consumption.

Conclusion:
It is proposed that the findings of this investigation could be used to improve current knowledge regarding more mature women s drinking culture, associated risks and risk prevention strategies.

POSTER NO 5

Ethanol among randomly controlled drivers

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Objectives:
Ethanol is well-known to impair driving ability. The major aim of this study was to evaluate the number of drivers driving under the influence of ethanol in a population of randomly controlled drivers.

Methods:
1016 drivers were randomly controlled at 27 different locations in Western Switzerland from October 2006 to April 2008. Drivers were controlled for alcohol consumption with a breathalyzer according to the Swiss Road traffic law. If the result was equal or higher than an equivalent of a blood alcohol concentration of 0.8 g/kg, a blood sample was taken; otherwise, a saliva sample was obtained.
Blood and saliva were analysed for ethanol by Head-space gas chromatography coupled with a FID detector.

Results:
Among the controlled drivers, men (69%) predominated over female (31%). The mean age was 41 (range: 16 90). For 968 drivers (95.3%) ethanol was not detected in blood or saliva. These drivers were not under the influence of ethanol. Ethanol was detected in saliva or blood of 48 drivers (4.7%). Among these drivers, blood alcohol concentration (BAC) was above the legal limit of 0.8 g/kg (serious offence) in 14 cases (1.4% of the total population). BAC were in the range of 0.91 to 2.43 g/kg (mean: 1.32 g/kg, median: 1.11 g/kg). Among these 14 cases, men (13 cases, 93%) were over represented. No ethanol was found in the population of truck drivers (17 cases). 986 drivers were car drivers and 46 of them have drunk ethanol (5%). 13 bikers were controlled and 2 of them have drunk ethanol (15%).

Conclusion:
Driving under the influence of ethanol concerned about 5% of a population of randomly controlled drivers, and 1,4% of the drivers had a blood alcohol concentration higer than 0.8 g/kg (legale limit for a serious offence).

POSTER NO 6

After the party: Why young adults drink and drive?

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Each year over than 35,000 Brazilians are killed due to traffic accidents. Alcohol can alter perception and behavior and is one of the many causes that contribute to a traffic accident. It is known that at least 33% of deaths in traffic are due to high measures of alcohol. Studies have demonstrated that drivers that drink and drive are from 28.9% to 63.5% of all drivers, most of them youngsters. Since 2008, Brazil has adopted zero tolerance policy but low level of enforcement and poor awareness of the risk, contributes to increase the mortality rates of drunk and driving in traffic. Although researches indicate that alcohol is a major cause of traffic accidents in Brazil, there is few scientific knowledge about drink and drive behaviour. Objective: The aim of this study was to investigate why some drivers insist to drive under effect of alcohol even knowing the danger and understanding how their behaviour can expose them to be injured in a traffic accident. Method: Two focus group and twenty semi-structured interviews were conducted with university students over 18 years who had driver's license. The material was recorded and transcribed. Two researchers conducted the focus groups and the interviews were conducted individually by one of the researchers. The data were analyzed qualitatively and the procedure used was content analysis. Results: Results shown that peer pressure to drive despite drinking is high. They can perceive risk and the consequences of drinking and driving, but the consequences are usually considered unlikely to happen. In the most common situations the ride happens are after social gatherings, mostly in bars and nightclubs. Conclusion: These results indicate the need of further intervention programs that promote the adoption of safe behavior in traffic environment especially among young adults that are a high-risk group.

POSTER NO 7

Benzodiazepines and sleeping-hypnotics in blood of drivers under the influence of drugs, and their association with other common illegal drug use and national sales figures

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Objectives:
One of the key drug groups encountered in Finnish driving under the influence (DUI) cases is benzodiazepines and related sleeping-hypnotics. The aim of this study was to examine positive DUI cases in this category in Finland from 1997-2008. The associated use of amphetamine and cannabis in these DUI cases was investigated and the relationship between DUI cases and Finnish sales for pharmaceuticals.

Methods:
Information about drug driving cases positive for such sedative drugs in the period 1997-2008 was obtained from the laboratory database of the Alcohol and Drugs Analytic Unit, THL. Sales figures for the years 1997 2008 were obtained from the Finnish National Agency for Medicine.

Results:
The drugs studied were present in the majority of all positive DUI cases in each year from 1997 to 2008, typically at rates of over 60%. Although this proportion has decreased the actual number of such positive cases continued to increase. Diazepam was the single most commonly detected benzodiazepine in each year of the study. The introduction of zero tolerance legislation in 2003 corresponded with a significant increase in the number of benzodiazepines DUI cases, as well as in the number of DUI cases in which associated use of sedative drugs and amphetamine was observed, which can be partially explained by the use of effective on-site screening devices for amphetamine, in conjunction with a more efficient DUI legislative framework. Ratios for DUI cases to pharmaceutical sales showed both yearly variation for individual benzodiazepines and variation between the individual pharmaceuticals. Clonazepam consistently exhibited the highest ratio, which increased sharply from 2003.

Conclusions:
Benzodiazepines and sleeping-hypnotics, often in combination with illicit drugs - particularly amphetamine, constitute a major hazard in Finnish DUI. The number of cases involving these compounds continues to rise. Enforcement for use of these legally available pharmaceuticals in Finnish traffic needs to be improved.
Key words: driving under the influence, benzodiazepines, sleeping-hypnotics, amphetamine, cannabis, drugs sales figures

POSTER NO 8

Combinations of psychoactive substances are equally common as alcohol in Norwegian road traffic accidents

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Objectives:
To determine the use of alcohol and other psychoactive substances among patients admitted to an emergency department after road traffic accidents (RTA).

Methods:
Cross-sectional data from patients admitted after car or motorbike accidents to the emergency department (ED) of Oslo University Hospital, Ullevaal were collected consecutively over a one year period. All patients 18 years or above admitted to the hospital because of traumas or other injuries were eligible for study inclusion. Drug and alcohol analyses were performed on blood samples from all the patients included after they had given their informed consent. A group of 132 patients who had been injured in road traffic either as drivers (n=97) or motor bike riders (n=35), was analyzed for prevalence of psychoactive substances. Twenty four percent of these patients were female.

Results:
The overall prevalence of any psychoactive substance was 26% for the whole group. Alcohol alone was the most common psychoactive single substance (8%), though combinations of therapeutic or illegal drugs or alcohol were equally common (8%). The most prevalent illegal drug group was amphetamines (21 % within all positive screens) second were THC (18% within all positive screens). The most prevalent therapeutic drug was diazepam (29 % within all positive screens) second was zopiclone (12% within all positive screens). Patients screening positive were not significantly younger (38 vs. 40 years of age, p =0.5) and were not more likely to be male (OR: 1.0, 95% CI 0.42- 2.6).

Conclusion:
About a third of all patients involved in RTA admitted to a ED during one year screened positive any psychoactive substance. A quarter of all car drivers screened positive for a psychoactive substance, though only 8 % for alcohol alone.

POSTER NO 9

The Challenges of Implementing Alcohol Ignition Interlock Best Practices in a Federal State

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Objectives:
Canada s Criminal Code provides authority for the provinces to use shortened licence suspensions as an incentive for federally-convicted impaired drivers to participate in an alcohol ignition interlock program. In addition, the provinces have broad legislative authority to create both mandatory and voluntary alcohol ignition interlock programs for offenders as a condition of licence reinstatement. However, to date, the provinces have enacted a patchwork of programs, and participation rates vary widely across the country. The purpose of this paper is to examine the barriers to effective implementation of alcohol ignition interlock best practices in a federal state, like Canada.

Methods:
This paper first outlines a model provincial program that incorporates all best practices for alcohol ignition interlocks. It then reviews and compares the alcohol ignition interlock programs that exist in Canadian provinces and territories, including conditions for entry and continued participation in the program. It also compares provincial participation rates in alcohol ignition interlock programs, and reviews the available studies on the effectiveness of Canadian alcohol ignition interlock programs.

Results:
Canada s provinces and territories have enacted a wide variety of mandatory and voluntary alcohol ignition interlock programs, with varying rates of success. This means that impaired drivers are treated quite differently depending on their province of residence. In spite of relative consensus on interlock best practices, they have not achieved their maximum effectiveness in Canada.

Conclusion:
Greater incentive is needed if alcohol ignition interlock best practices are to be implemented in all Canadian provinces and territories. The current Criminal Code provisions, which are permissive rather than mandatory, are not a sufficient motivator for provincial action. Consequently, Canada has largely failed to achieve the potential traffic safety benefits afforded by alcohol ignition interlock best practices.

POSTER NO 10

Diseases and drug interactions versus psychomotor abilities

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Wojciech Piekoszewski, Dr.

Objectives and Methods:
Literature review related to the impact of some diseases on the ability to drive mechanical vehicles.

Results:
Apart from obvious diseases such as serious mental diseases or mental retardation, also cardiovascular diseases in the case of which the sudden inefficiency of this system weakens brain functions, which may lead to a road hazard. Such diseases are, for instance, arrhythmia and angina pectoris during rest or in the case of emotions. Also, serious neurological diseases such as, for instance, progressive epilepsy, are a contraindication and the issuance of the driving license depends on its category and the decision of a physician. In general, the driving license is issued for an indefinite period of time, to persons aged 18-20, whereas most of the diseases that could lower the psychomotor abilities are developed much later. In the scientific literature, most information is devoted to the subject of an increased risk of road accidents caused by persons suffering from the Parkinson s or Alzheimer s diseases and epilepsy. The opinions on the subject of impact of diabetes are divided, the European driving license - COM(2003)621-19/03/1435 documents prohibits the issuance of a professional driving license to persons suffering from diabetes which requires administration of insulin. Most of the studies demonstrate, however, that diabetes has no impact on psychomotor abilities when certain principles of medical procedure are observed.
The problem which is still underestimated in road safety concerns interactions between drugs which do not affect directly the functioning of the central nervous system, but lead to the occurrence of symptoms of diseases that decrease the abilities to control and react appropriately during driving a mechanical vehicle.

Conclusions:
Not only the diseases concerning the central nervous system, but also the somatic disorders have an impact on psychomotor abilities, and thus, the possibility of driving mechanical vehicles.

POSTER NO 11

Effects Of Low Blood Alcohol Concentration On Visual Search

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Objectives:
To investigate the effects of low alcohol concentrations on visual search function using an automatic, non-invasive tool, and to test its suitability to the study of psychomotor performance alterations. Neural substrate of visual search is believed reside in an extensive network of cortical regions in the parietal, frontal, and occipital cortex and the cerebellum. The cognitive and psychomotor functions that can be investigate through this task are: visual ability and orienting, but also attentive function, reaction time, concentration and memory. They are high related to drive ability.

Methods:
Twenty-four healthy volunteers, aged 18-65 years, were recruited. A single dose of alcohol (0.5 g/Kg) or placebo was administered according to a double-blind, cross-over design. Volunteers received the treatment to which they had randomly been assigned and performed the test 0, 30 min, 90 min and 150 min from drinking the beverage. A Tobii 1750 automatic eye-tracker equipped with a proprietary management software was used. The following measures were considered in the task of visual search: gaze time , time of first fixation , fixation count and pupil diameter.

Results:
Analysis of visual search yielded differences between treatment groups in time of first fixation ($p > 0,0465$), and pupil diameter ($p > 0,0001$) at 150 min from drinking the alcoholic beverage.
Conclusion: Results indicated that low alcohol levels influence the visual search; the time of first fixation and pupil diameter (this later referable to accommodation effort) particularly. It is interest to note that impairment is significant at 150 min, when blood alcohol concentration is very low (BAC < 0,5 g/l). The device used is useful for psychomotor performance assessment and presents some great advantages: no need of instruction for subjects and no learning curve.

POSTER NO 12

The prevalence of alcohol and drugs in sampled oral fluid is related to sample volume

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Objectives:
Some drugs may reduce salivary flow. The aim of this study was to examine the relationship between the volume of collected oral fluid and analytical findings.

Methods:
Samples of oral fluid were collected in five population studies in Norway for analysis of alcohol and drugs. The samples were collected using either Intercept® Oral Specimen Collection Device or Statsure" Saliva Sampler; about 11 000 samples with each type of device.

Results:
The Intercept device collected a smaller average amount of oral fluid than the Statsure device (0.34 ml versus 0.90 ml, respectively); however, a fairly large amount of oral fluid-buffer mixture could not be recovered from the Statsure device due to absorption to the collection pad. Therefore, about 10 % of the samples collected with the Statsure device in Norway had volumes of less than 0.5 ml. A similar problem was not observed for the Intercept device.
The prevalence of alcohol and drugs was found to be higher in oral fluid samples with small volumes than in those with large volumes. For the Statsure device, the prevalence of amphetamines was 21 times higher in samples with less than 0.5 ml oral fluid compared to samples of 1.0 ml or more, for tetrahydrocannabinol (THC) 16 times higher, and for alcohol 15 times. For samples collected with the Intercept device, the prevalence of amphetamines in samples of less than 0.2 ml was twice as high as in samples of 0.4 ml or more, for THC 8 times higher, and for alcohol 4 times.

Conclusion:
We recommend that samples of oral fluid with smaller volume than required by the analytical methods should not be discarded but instead be analysed, if necessary after sample dilution. If not analysed, the total prevalence of alcohol and drugs in the studied population will be under-estimated.

POSTER NO 13

Alcohol and psychoactive substance related Road Traffic Injuries in Pakistan

Khoso Ajmal Khan, National Highways & Motorways Police

Objectives:
To carry out comprehensive analysis of available Road Traffic Crash data from various sources to estimate alcohol and psychoactive substance related Road Traffic Injuries in Pakistan and to analyse Police road traffic accident recording system to know constrains which lead to underreporting of alcohol and psychoactive substance related Road Traffic Injuries in Pakistan

Methods:
Road Traffic Accident Data of National Highways & Motorways Police and Road Traffic Injury Research and Prevention Centre was used for estimating alcohol and psychoactive substance related Road Traffic Injuries in Pakistan and injury surveillance system of National Highways & Motorways Police was analysed to know the constrains which result in underreporting of alcohol and psychoactive related road traffic crashes in Pakistan.

Result:
Surprising, alcohol or any psychoactive substance has not been attributed as a cause of road traffic crash in both the dataset, which shows high level of underreporting mainly due to absence of relevant field in the road accident reporting system, restrictions in prosecuting drunk and psychoactive drivers and deficient Police training and capability to check drunk or driving under influence of psychoactive substance.

Conclusion:
There is either little or no understanding of issue of alcohol or psychoactive active related road traffic injuries in Pakistan due to which drunk or drugged driving has not been reported by National Highways and Motorways Police or Road Traffic Injury Research and Prevention Centre.

POSTER NO 14

Designing Injury Surveillance System for National Highways & Motorway Police of Pakistan

Khoso Ajmal Khan, National Highways & Motorways Police

Objectives:
To design a comprehensive road traffic injury surveillance system for National Highways & Motorway Police of Pakistan on the basis of WHO Injury Surveillance Guidelines and keeping in view several Police Accident Databases.

Methods:
The Injury Surveillance System for National Highways & Motorway Police of Pakistan has been designed keeping in view the Injury Surveillance Guidelines published by World Health Organisation and several Police Accident Databases being used in different countries. Important variables have been included in the Injury Surveillance System as per WHO Injury Surveillance Guidelines and other Police Accident Databases.

Result:
The newly devised injury surveillance system for National Highways & Motorways Police of Pakistan has been designed based upon important variables such as use of alcohol or psychoactive substance have been adopted from WHO Injury Surveillance Guidelines and several Police Road Accident Databases which are helpful in carrying out comprehensive analysis of road traffic accidents and associated injury.

Conclusion:
A new injury surveillance system has been designed which will be helpful in estimating true magnitude of road traffic accidents and associated injury, and analyzing causes of road traffic accidents to devise effective preventive measures. It will also be helpful in establishing an effective coordination between National Highways & Motorways Police of Pakistan and other important stakeholders so that effective Road Traffic Injury Prevention policies can be devised to tackle the problem.

POSTER NO 15

New Designer Drug Of Abuse: 3,4-Methylene-dioxypyrovalerone (Mdpv). Findings From Apprehended Drivers In Finland

Kriikku Pirkko, Vita Health Care Services Ltd, Vita Laboratory

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Objectives:
To assess the incidence and impact of the use of MDPV, a psychoactive designer drug with stimulant effects, in drivers suspected of being under the influence of drugs (DUI) in Finland.

Methods:
Since autumn 2009, blood samples from drivers suspected of being under the influence of drugs in Finland have been analysed for the presence of MDVP. In MDPV positive cases, drug and alcohol findings were compared with data from the clinical examination carried out while the suspect was under arrest. The psycho-physical achievement deficiency information was used to evaluate the significance of the presence of MDPV.

Results:
Between September 2009 and May 2010 there were nearly 200 positive MDPV cases from apprehended drivers in Finland (nearly 6 % of all DUI cases), the trend being upward. In 76 % of the cases, in which MDPV was found, amphetamine was also present. Benzodiazepines were also frequently found together with MDPV. In many MDPV positive cases the concentrations of amphetamine or other drugs were comparatively low and it could be concluded that MDPV was the main reason for the psycho-physical achievement deficiency.

Conclusions:
These results show that MDPV use is a growing problem in DUI cases in Finland. Since the first seizure of MDPV in Finland in 2008 there have been some MDPV-related deaths and the police have reported that persons under the influence of the drug very often act violently and unpredictably. MDPV has not yet been classified as an illegal drug in most European countries. However, the Finnish government is currently preparing new legislation, which should be in force by summer 2010, which would allow for accelerated classification of future designer drugs.

POSTER NO 16

Quantitation of drugs in post mortem whole blood with a multi component UPLC-MS/MS method

Kronstrand Robert, RMV

Linda Brinkhagen, RMV, Linköping, Sweden; Gunnel Ceder; Martin Josefsson, Dr, RMV, Linköping, Sweden

Objectives:
In traffic fatalities it is important to investigate if the driver was impaired by any drugs. This is usually done by a combination of immunochemical methods and gas- and liquid chromatography. The purpose of this study was to develop a multi component UPLC-MS/MS method to reduce the workload. The method was tested retrospectively in 169 killed drivers.

Methods:
Twenty-nine drugs and metabolites were included. We aimed at achieving LOQs as proposed in the DRUID-project. Samples (0.2 g whole blood) were extracted on Bond Elute Certify cartridges using an ASPEC robot. A Quattro Premier XE combined with an Acquity UPLC was used. Matrix effects were studied by post column infusion. Linearity studies were performed as 6 replicates at 9 levels. Imprecision studies were performed at two levels as triplicates during 8 days.

Results:
Extraction recovery for the analytes ranged between 52-85% for 26 of the analytes. Morphine, THC, and THCCOOH had less than 50% recovery. Matrix effects were only seen for THC and THCCOOH. Low recovery and matrix effects resulted in poor performance for THC and THCCOOH and the 1 ng/g and 5 ng/g LOQ could not be achieved. Therefore, THC and THCCOOH were excluded from the method. For the remaining analytes the imprecision was lower than 20% for all but flunitrazepam (29 %), nitrazepam (33 %), 7-aminonitrazepam (29 %) and 7-amino-klonazepam (36 %). Of the 169 killed drivers, 41 positive findings were made by routine toxicology. Of those, 37 were found also with the LC-MS method. Instability during storage may explain these differences.

Conclusion:
Exchanging the existing battery of dedicated methods for one single method was not successful since cannabis showed poor performance. Further work with an additional injection with a different gradient to overcome ion suppression might improve the LOQ of THC and THCCOOH.

POSTER NO 17

First Driving While Impaired (DWI) by Alcohol Convictions and Repeat Offenses in Geneva (Switzerland)

Lambert Sylvie Joris, Centre Universitaire Romand de Médecine Légale

Objectives:
About one fifth of drivers first convicted for DWI by alcohol will repeat the same offense during the three following years. The goal of the study was to assess the predictors of DWI recidivism at 3 years for the first-time DWI alcohol offenders.

Methods:
All drivers convicted for a first-time DWI offence with a blood alcohol concentration (BAC) between 0.80 and 2.490 from May 2001 to February 2004 were recorded. The predictive variables were: sex, age, driving experience, time of the DWI, BAC.

Results:
We recruited 1588 first-time alcohol offenders with a mean age of 35-36 years. They were licensed since 14 to 15 years on average and they were mostly men (89%). The mean BAC was between 1.510 and 1.550. More than 800 convictions occurred between 2 to 6 am.
General repeat offense rate (ROR) at 3 years was 12.5%, but 5.5% for women. Repeat offenders were younger and less experienced drivers (5 years difference for both) than non repeat offenders. Half of repeat offenses occur 10 to 25 months after the first one.
First DWI offences occurring between 6 to 10 am had a ROR of 20%. First DWI occurring between 2 to 6 pm had a ROR of 22%. Initial BAC higher than 2.050 had a ROR of 17%.

Conclusion:
The BAC and the time of the first DWI are operational criteria to predict repeat offenses. When the BAC of a first DWI is higher than 2.00 and when a first DWI occurs during the day (6 am to 6 pm), the administrative authority should take measures to evaluate a possible alcohol problem before considering relicensing.

POSTER NO 18

Dried blood spot as a sample matrix in drug analysis a validated method for screening and quantitation of 23 drugs of abuse by gas chromatography-mass spectrometry

Langel Kaarina, National Institute for Health and Welfare

Objectives:
The stability of the analytes as well as the easy storage and handling of samples makes using dried blood spots (DBS) an interesting alternative to traditional blood sampling in drug analytics. Blood spot samples have been used in clinical settings for decades but very few applications have been published for drugs of abuse. The objective of this study was to develop a quantitative method for analysing several drugs of abuse from DBS samples with GC-MS. The drugs analysed include amphetamines, opiates, cocaine, cannabis, zopiclone, and benzodiazepines.

Methods:
DBS (100 µl) containing the analytes were cut into smaller pieces and 500 µl of saturated borate buffer (pH 10) and 2 ml of BuAc, with the deuterated internal standards, were added. The samples were mixed and centrifuged, and the solvent was separated into fraction A (benzodiazepines and zopiclone) and fraction B (other substances) and evaporated to dryness. Samples were reconstituted in 30 µl of BuAc:ACN 1:1 and derivatization was done with 10 µl of MTBSTFA/MSTFA (fraction A/B). Fraction A was analysed with GC-NCI/MS and fraction B with GC-EI/MS. Total run times for fractions A and B were 4.5 min and 7.8 min, respectively.

Results:
The linear concentration range (R2>0.98) in ng/ml was 5-100 for THC and buprenorphine, 5-250 for lorazepam, 5-500 for alprazolam, clonazepam and THC-COOH, 10-1000 for codeine, morphine, methadone, zopiclone, midazolam and nitrazepam, 20-2000 for amphetamine, methamphetamine, MDA, MDMA and nordiazepam, 20-1000 for phenazepam, 50-1000 for cocaine, 50-5000 for diazepam, temazepam and tramadol, and 50-1250 for oxazepam. The intra- and inter-day precision and accuracy was within the required limits (<15% and <20% at LOQ). Extraction recoveries were >75% for all but THC, THC-COOH, morphine, and buprenorphine.

Conclusion:
This sensitive and simple analysis method enables a quantitative determination of 23 drugs of abuse and medicinal drugs from a low volume DBS sample by GC-MS.

POSTER NO 19

Driving under drugs in Switzerland ; a descriptive cross-sectional study

Latino Anna, University Centre of Legal Medicine

Objectives:
Many drugs, both illicit or for medication, are known to influence driving abilities and increase risks of accidents. We explored the prevalence of psychoactive substances in a random sample of drivers in Switzerland.

Methods:
Saliva samples from 1078 random drivers were collected at 24 different locations in Western Switzerland from October 2006 to April 2008 for complete toxicological analysis using liquid chromatography/tandem mass spectrometry.

Results:
Provisional results are available for 437 drivers. 6.2% (CI95% 4.1 to 8.9) were under the influence of illicit drugs and 8.7% under psychoactive medication (CI95% 6.2 to 11.7). 37 drivers (8.5%) were under the influence of alcohol of which 14 (3.2%) were above 0.8 mg/L. 21 drivers (4.8%) were under the combined influence of more than one psychoactive substance; however only 4 drivers (0.9%) were under both the influence of medication and alcohol. Looking more specifically at illicit substances, 22 (5.0%) were positive to cocaine, 5 (1.1%) to cannabis, and 2 (0.5%) to amphetamines ; for psychoactive medication, 17 (3.9%) were positive to benzodiazepines, 16 (3.7%) to antidepressors, 7 (1.6%) to opiates, 7 (1.6%) to neuroleptics, and 3 (0.7%) to other substances influencing driving abilities. 17/21 drivers did not self-report their consumption of drugs whereas only 9/35 failed mentioning their medication. Men drivers were 3.2 times (CI95% 1.1 to 9.5) more likely to be under the influence of illicit drugs than women. Full results will be reported when laboratory data will be available in April.

Conclusions:
Driving under the influence of psychoactive substances is common. In Western Switzerland, prevention messages could focus on men, driving under medication or cocaine.

POSTER NO 20

Performance evaluation of the DrugWipe® 5/5+ on-site oral fluid drug test: comparison with confirmation results in whole blood

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Objectives:
Oral fluid (OF) is a preferable matrix for on-site testing of drugs in DUI cases. A number of devices have been developed for testing of drugs in OF, including. The aim of this study was to evaluate the reliability of the DrugWipe® 5/5+ device by comparing its results with confirmation results in whole blood by GC-MS as a reference method.

Methods:
The performance of the DrugWipe 5/5+ device was evaluated for amphetamines, cannabis, cocaine and opiates. Data were based on 1809 cases in which the Finnish police had conducted the DrugWipe® 5/5+ tests in suspected DUI cases. Only cases with at least one positive screening result were included. Based on the GC-MS confirmation results and cut-offs used in the laboratory, the cases have been classified as true positives (TP), true negatives (TN), false positives (FP) and false negatives (FN). Sensitivity, specificity and accuracy were calculated based on these classifications.

Results:
Amphetamines (amphetamine, methamphetamine, MDA, MDMA) were the most frequent findings in the studied population (1510 positive cases, 83%). By the DrugWipe® 5/5+ device, amphetamines were detected in 1610 cases. Calculated values for sensitivity, specificity and accuracy were 97 %, 50 % and 89 %, respectively. Specificity (the ability to pick up the true negatives from all the negatives) was low, because only DrugWipe positive findings were included in the study. For cannabis (197 confirmed cases), sensitivity, specificity and accuracy were 43 %, 87 % and 82 %, respectively. Evaluation of the cocaine and opiates tests resulted in low sensitivity values, but these substance groups were encountered quite infrequently.

Conclusions:
DrugWipe® 5/5+ performed quite well in the group of amphetamines while this is the most widespread group of illicit drugs in Finnish traffic. Sensitivity for cannabis needs to be improved.

POSTER NO 21

The use of water vapour as a reference allows distinction of mouth alcohol from deep airway alcohol

Lindberg Lars, Clinical Science, BUS, BIVA

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Mouth alcohol (MA) is derived from recently ingested alcohol or from regurgitation of stomach alcohol and is expired in the first volume of exhaled air, before or together with water vapour, in contrast to alcohol expired later from the deep airways, which is derived from blood alcohol (BA).

Objective:
To evaluate the relationship between expired water vapour and alcohol in the expired volume of air as a marker to distinguish between MA and deep airway alcohol.

Methods:
In eight volunteers who had ingested alcohol through a gastric tube, MA was introduced as a mouthwash. Water vapour, alcohol concentrations and air flow were measured using an infrared breath analyzer (Servotek AB) with a mouth piece attached. Volumetric expirograms revealing the simultaneously expired concentrations of alcohol and water vapour in a single breath plotted against the expired volume were constructed. A deviation area (DA) defined as the area between the alcohol and water vapour concentrations was determined by integrating area under curve analysis. The discriminatory power of DA to detect MA amounts = 0.010 mg/L was assessed by receiver operating characteristic (ROC) curve analysis.

Results:
The area under the ROC curve was significantly larger (0.91) than what would have been expected if the DA of the alcohol to water vapour plot had no discriminatory power. Using a DA of -0.094 as a cut-off value for detection of MA amounts = 0.010 mg/L resulted in a sensitivity of 91.4 % and a false positive rate of 4.8 %.

Conclusion:
The accuracy to detect MA using water vapour concentration as a reference gas in expired air is excellent according to the traditional grading of a ROC test result.

POSTER NO 22

Breath alcohol concentrations measured by a new alcohol breath analyzer in freely exhaled air: Impact of the distance from mouth to instrument

Lindberg Lars, Clinical Science, BUS, BIVA

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Objective:
An instrument to measure alcohol in freely exhaled air, i.e. without a mouth piece, has been developed and measurement includes standardization to alveolar saturated water vapor at 37°C to compensate for dilution by ambient air. We report on the influence of distance from the mouth to the inlet of the analyzer on the measurements.

Methods:
The breath alcohol concentration (BrAC) was determined using a new infrared breath analyzer (Servotek AB, Arlöv, Sweden). Exhaled BrAC is standardized to alveolar saturated water vapour at 37°C to compensate for the dilution by ambient air. Exhalations were performed at three different distances (5, 10 and 15 cm) between the mouth and the inlet of the analyzer in a randomized order in twelve healthy volunteers who had received 0.6 g ethanol/kg bodyweight. On the basis of measurements (e.g. CO2 concentration) a threshold value is determined for acceptance of measurements, and generally rejects exhalations from more than approximately 10 cm. This threshold value was lowered to allow greater distances for this experiment. The mean of breath alcohol concentrations at each distance and their standard deviations are reported. The BrAC at different distances were compared with t-test for dependent samples.

Results:
Table 1 Influence of distance on BrAC

	n	5 cm	10 cm	15 cm
BrAC (mg/L)	48	0.328 ? 0.075	0.324?0.074 *	0.313?0.072 ***

* p<0.05, *** p<0.001

Conclusion:
The distance had a minor impact on the BrAC at distances normally accepted by the analyzer. At greater distances the measurements produce lower values for BrAC.

POSTER NO 23

Measurement of breath alcohol in freel exhaled air is as precise as arterial blood-alcohol determination by headspace gas chromatography

Lindberg Lars, Clinical Science, BUS, BIVA

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The precision of venous blood alcohol concentration has traditionally been regarded as better than the precision of breath alcohol measurements. Breath alcohol concentration (BrAC) with a new infrared breath alcohol analyzer (Servotek AB) predicts the alcohol concentration in arterial blood (ABAC), which better reflects level of intoxication than that in venous blood.

Objectives:
To compare the precision of blood and breath alcohol analyses in simultaneously obtained duplicate arterial blood and exhaled breath samples taken throughout the absorption, distribution and elimination phases of alcohol metabolism.

Methods:
Twelve healthy volunteers received 0.6 g ethanol/kg bodyweight. Blood samples were obtained via an indwelling catheter in the left radial artery. The tubes were stored at 4-7°C until BACs were determined by head-space gas chromatography at the Department of Forensic Medicine. The breath alcohol concentration (BrAC) was determined using a new infrared breath analyzer (Servotek AB, Arlöv, Sweden), which allows free exhalation, with no mouth piece. Exhaled BrAC is standardized to alveolar saturated water vapour at 37°C to compensate for dilution by ambient air. Imprecision of the duplicate analyses were derived from the differences between duplicate determinations and expressed both as standard deviation (SD) of a single determination (sd) and as coefficient of variation (CV%).

Results:
Imprecision of duplicate measurements

	n	Mean conc	Mean difference	SD (sd)	CV%
BrAC(mg/L)	167	0,288	0,0006	0,00694	2,41
ABAC(mg/g)	168	0,576	0,0026	0,01381	2,40

Conclusion:
The new infrared breath analyzer measures BrAC as precisely as head space chromatography analyses ABAC.

POSTER NO 24

If measured correctly, the blood to breath alcohol ratio (BBR) is stable 30 minutes after intake

Lindberg Lars, Clinical Science, BUS, BIVA

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Objectives:
Breath alcohol corresponds to the alcohol concentration in the air phase of the deep lung, which equilibrates with the pulmonary capillary blood, which becomes arterial blood, subsequently influencing the brain. We were interested to determine how well breath alcohol concentration (BrAC) corresponds to arterial blood alcohol concentration (ABAC) throughout the absorption, distribution and elimination phases of alcohol metabolism. Traditional investigations on the subject of BBR refer to peripheral venous blood alcohol concentration (VBAC), which is never in contact with the air in the lung, or passes the blood-brain barrier. The purpose of this study was to determine the BBR from ABAC and BrAC.

Methods:
Alcohol (0.6 g/kg bodyweight) was administered to 12 healthy volunteers through a gastric tube to avoid deposition of mouth alcohol. Samples for ABAC and BrAC were simultaneously obtained at regular intervals 2 300 minutes after intake. Blood samples were obtained via an indwelling catheter in the left radial artery into 2-mL Vacutainer Tubes and stored at 4-7°C until ABACs were determined by head-space gas-chromatography at Section of Forensic Chemistry in Copenhagen. The BrAC was determined using a new infrared breath analyzer (Servotek AB, Arlöv, Sweden), which allows free exhalation, without the use of a mouth piece. Exhaled BrAC is standardized to alveolar saturated water vapour at 37°C to compensate for dilution by ambient air.

Results:
BBR is increased 2 ($p<0.001$) and 5 ($p<0.05$) minutes after alcohol intake compared with a stable level obtained from 30 - 300 minutes. In between, at 10 and 15 minutes, the BBR is slightly, but not significantly increased.

Conclusion:
The BBR is stable 30 minutes after alcohol intake and corresponds to the ABAC. BrAC predicts consequently level of intoxication with high precision.

POSTER NO 25

THC in Icelandic drivers. A 10 year study and possible influences of external factors

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Objectives:
The aim was to investigate the prevalence and concentration of THC in DUID-cases in Iceland 2000-2009 and possible external factors that may have contributed to the observed changes.

Methods:
Results from analysed blood samples from apprehended drivers and samples of seized cannabis were collected. Information on cannabis seizures were collected from police statistics and information on prevalence of cannabis users seeking treatment was obtained from Iceland s largest treatment facility.

Results:
In June 2006 the Icelandic Parliament passed new zero-tolerance laws on driving under the influence of illegal substances. This change made prosecution and judgement much more effective. At the same time the number of DUID-cases increased more than ten-fold and the prevalence of THC in blood rose from 25% to 33%. The average THC blood concentration increased slowly over time, from 2.4 ng/ml in 2000 to 3.7 ng/ml in 2009, and no sharp changes occurring around 2006. The number of samples received from seized cannabis varied between years. The average concentration of THC in hashish fell from 9.9% in 2000 to 3.4% in 2009. The proportion of herbal cannabis, representing local produce, increased considerably toward the end of the period. The estimated average THC content of cannabis products on the Icelandic drug market fell markedly at the same time. Statistics on prevalence of cannabis users seeking treatment show that the numbers increased until 2006, but has been constant or slightly decreasing since.

Conclusion:
Our results indicate that the primary external factor influencing increases in DUID cases and the prevalence of THC is the introduction of zero-tolerance laws in 2006. None of the variables tested correlated with the observed increase in the average THC blood concentration.

POSTER NO 26

Psychiatric Symptoms and Early Drinking and Driving Experiences

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William Wieczorek, Dr.

Objective:
Research on drinking-driving offenders has shown them to have high rates of psychiatric symptoms. However, this has rarely been examined in youthful samples. This study hypothesized that psychiatric symptoms would be associated with self- reported drinking and driving in a general population of 16-22 year old young men.

Methods:
A sample of 625 males initially aged 16-19 was recruited in the Buffalo, NY metropolitan area. The young men were interviewed three times, 18 months apart, from 1992-1996. Data collected included demographics, alcohol and drug use, measures of psychiatric symptoms (using the Brief Symptoms Inventory (BSI)), and having driven a motor vehicle while feeling the effects of alcohol (DWI). To test the hypothesis, the four BSI subscales (i.e., anxiety, psychoticism, obsessive-compulsivity (OC), and depression) were used as independent variables in analysis of variance to examine whether they were positively correlated with drinking and driving. Associations were measured both cross-sectionally (i.e., BSI measures at each wave with DWI during the 12-month period before the corresponding wave) and longitudinally (i.e., BSI measures at each wave with DWI during the 12-month period before the corresponding and subsequent waves).

Results:
There were no associations of any of the four BSI subscales at Wave 1 with DWI in the year previous to Wave 1. By Wave 2, however, anxiety, OC, and depression each correlated significantly with DWI during the year prior to Wave 2. By Wave 3, anxiety measured at Waves 1 and 2 were significantly related with DWI before Wave 3, as were OC measured at Waves 2 and 3, and depression measured at Wave 3.

Conclusion:
As these young men began to age, psychiatric symptoms started to show a significant relationship to DWI, cross-sectionally at Wave 2, and then longitudinally by Wave 3.

POSTER NO 27

Beyond sanctions: Is there a need to treat first-time offenders?

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Aims:
Driving Under the Influence (DUI) enforcement can be a broad screening mechanism for alcohol and other drug problems. The current response to DUI is focused on using mechanical means to prevent inebriated persons from driving, with little attention the underlying substance abuse problems.

Methods:
This is a secondary analysis of an administrative dataset of over 345,000 individuals who entered Texas substance abuse treatment between 2005 and 2008. Of these, 36,372 were either on DUI probation, referred to treatment by probation, or had a DUI arrest in the past year. The DUI offenders were compared on demographic characteristics, substance use patterns, and levels of impairment with those who were not DUI offenders and first DUI offenders were compared with those with more than one past-year offense. T tests and chi square tests were used to determine significance,
.
Results:
DUI offenders were more likely to be employed, to have a problem with alcohol, to report more past-year arrests for any offense, to be older, and to have used alcohol and drugs longer than the non-DUI clients who reported higher ASI scores and were more likely to use daily. Those with one past-year DUI arrest were more likely to have problems with drugs other than alcohol and were less impaired than those with two or more arrests based on their ASI scores and daily use. Non-DUI clients reported higher levels of mood disorders than DUIs but there was no difference in their diagnosis of anxiety. Similar findings were found between those with one or multiple DUI arrests.

Conclusion:
Although first-time DUIs were not as impaired as non-DUI clients, their levels of impairment were sufficient to cause treatment. Screening and brief interveniton at arrest for all DUI offenders and treatment in combination with abstinence monitoring could decrease future recidivism.

POSTER NO 28

Impaired drivers: The need to yoke treatment and sanctions

Maxwell Jane, University of Texas at Austin

James Freeman, Postdoctoral Research Fellow, Queensland University of Technology, Kelvin Grove QLD, Australia; Jeremy Davey, Professor, CARRS-Q, QUT, BRISBANE, Australia

Objective:
To understand the levels of substance abuse and dependence among impaired drivers by comparing the differences in patients in substance abuse treatment programs with and without a past-year DUI arrest based on their primary problem substance at admission (alcohol, cocaine, cannabis, or methamphetamine).

Method:
Records on 345,067 admissions to Texas treatment programs between 2005 and 2008 have been analyzed for differences in demographic characteristics, levels of severity, and mental health problems at admission, treatment completion, and 90-day follow-up. Methods will include t-tests,??, and multivariate logistic regression.

Results:
The analysis found that DUI arrestees with a primary problem with alcohol were less impaired than non-DUI alcohol patients, had fewer mental health problems, and were more likely to complete treatment. DUI arrestees with a primary problem with cannabis were more impaired than non-DUI cannabis patients and there was no difference in treatment completion. DUI arrestees with a primary problem with cocaine were less impaired and more likely to complete treatment than other cocaine patients, and there was little difference in levels of mental health problems. DUI arrestees with a primary problem with methamphetamine were more similar to methamphetamine non-arrestees, with no difference in mental health problems and treatment completion.

Conclusions:
This study provides evidence of the extent of abuse and dependence among DUI arrestees and their need for treatment for their alcohol and drug problems in order to decrease recidivism. Treatment patients with past-year DUI arrests had good treatment outcomes but closer supervision during 90 day follow-up after treatment can lead to even better long-term outcomes, including reduced recidivism. Information will be provided on the latest treatment methodologies, including medication assisted therapies and screening and brief interventions, and ways impaired driving programs and substance dependence programs can be integrated to benefit the driver and society.

POSTER NO 29

Development and validation of high-performance liquid chromatography diode array detector method for determination of tramadol in human saliva using liquid liquid extraction

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A high-performance liquid chromatography diode array detector method (HPLC-DAD) was developed and validated for the determination of tramadol in human saliva. Samples of Saliva were prepared utilizing liquid liquid extraction with hexane-ethyl acetate (4:1, v/v). The experimental conditions of the separation was achieved using a Zorbax SB-C18 (250 mm ×4.6 mm, 5 µm) column using acetonitrile-0.01M KH2HP04 buffer (40:60, v/v) as mobile phase (pH 5.0) at a flow rate 0.5 mL/min and UV detection at 218 nm. Propranolol was used as an internal standard (IS). The Linear range, limit of quantification and average recovery of tramadol were 250 4000 ng/mL, 250 ng/mL and 94.70%, respectively. The intra-assay precision for low, intermediate and high concentrations ranged between 1.38 9.79%. The inter-assay precision and the intra-day accuracy were 0.70-4.18% and 99.34% 107.16%, respectively. The proposed method was successfully applied to determine saliva concentrations of T in three healthy volunteers for 24 hours after administration of 100 mg oral doses of T.

Keywords: Tramadol; determination, Saliva; HPLC-DAD; Validation

POSTER NO 30

Simultaneous Determination Of Tramadol, O-Desmethyltramadol And N-Desmethyl-tramadol In Human Urine By Gas Chromato-graphy-Mass Spectrometry

Mohamed Khaled, Medico-Legal Department, Ministry of Justice

Khaled M. Mohamed

Tramadol is a widely prescribed analgesic used in the treatment of moderate to severe pain and as an alternative to opiates.

Objectives:
To develop and validate analytical procedures for the determination of tramadol (T) and its major metabolites, O-desmethyltramadol (ODT) and N-desmethyltramadol (NDT) in human urine using gas chromatography mass spectrometry (GC/MS).

Methods:
Sample preparation involved liquid liquid extraction with tert.-butylmethyl ether (MTBE) and back extraction with 0.1M hydrochloric acid. Proadifen (SKF525A) was selected as internal standard (IS). For quantitative analysis in SIM mode, selecting the ions m/z 58 for T and ODT, m/z 188 for NDT and m/z 86 for IS.

Results:
Extraction efficiencies of T, ODT and NDT were 101.88%, 98.51% and 108.65%, respectively. The calibration curves were linear (r2 > 0.997) in the concentration range 10 1000 ng/mL for all compounds. The lower limit of quantification was 10 ng/mL for T and ODT, and 20 ng/mL for NDT. The intra-assay precision ranged between 1.29 6.48% for low, intermediate, and high concentrations for all analytes; inter-assay precision was 1.28-6.84% for T, ODT and NDT; the intra-day accuracy was in the range 91.79% 106.89%. This method detected urine concentrations of T, ODT and NDT in six healthy volunteers for seven days after administration of 50 mg oral doses of T

Conclusions:
The method has suitable linearity, accuracy and precision with high analyte recoveries for the simultaneous quantification of T, ODT, and NDT in human urine.

POSTER NO 31

Drugs and driving campaign in the Netherlands: how general practitioners (GPs) and community pharmacists (CPs) prepared themselves

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Objectives:
Determine GPs and CPs knowledge about the influence of medicines on fitness to drive and how they rated the materials useful to inform patients.

Methods:
Two separate, but identical, questionnaires were sent to a representative sample of 759 Dutch GPs and 500 CPs. Non-responders received a shorter version of the same questionnaire. Data was analysed with SPSS 14 for windows.

Results:
After sending a reminder, 23.6% GPs and 32.6% CPs responded to the questionnaires. The majority of the respondents (69%) were well aware of the problems and risks of using driving impairing medicines (DIM) but 68.2% of the GPs (against 26.7% of the CPs) are not familiarized with the category system for indicating impairment potential of medicines.
58.6% of GPs and 75.8% of CPs remembered having received the information materials. However, 59.7% of GPs were not aware of the materials to share with CPs and 69.1% didn t recognize a tool exclusively addressed toGPs.
Both GPs (39.5%) and CPs (64.8%) were willing to provide specially designed patient brochures.

Discussion/Conclusion:
GPs and CPs have good knowledge on the risks of driving under the influence of medicines. CPs are more prone to read the information materials than GPs, who need more triggers to use the materials. The information is considered accessible, conveniently organized, clear and useful by the healthcare providers.
Both GPs and CPs felt they were better prepared to inform patients about DIM.

POSTER NO 32

Blood concentrations of alprazolam or clonazepam and state of clinical impairment among apprehended drivers suspected of drugged driving

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Objectives:
We investigated cases involving drivers suspected of driving under the influence of drugs in Norway, and examined the alprazolam or clonazepam blood concentrations in cases where only these drugs were detected. We compared the concentration of these drugs with the conclusion concerning impairment or not from the standardised clinical test of impairment (CTI).

Methods:
The Norwegian Institute of Public Health analyses blood samples from all suspected drugged drivers in Norway. Most of the drivers have been examined by a physician using a standardised CTI. Blood samples from suspected drugged drivers are screened, and positive results confirmed for common narcotics, ethanol and certain medicines at the Division of Forensic Toxicology and Drug Abuse (DFTDA). All results are stored together with the results of the CTI in the DFTDA s database. The database was searched for cases containing alprazolam or clonazepam in the blood samples of suspected drugged drivers in the period from December 1999 to March 2010. Samples containing alprazolam or clonazepam as the only drug present in blood were included in our study.

Results:
The detected blood alprazolam concentrations were generally high (n=59; median 0.30µmol/l; range 0.05-1.40µmol/l), and above what could be considered therapeutic use. For clonazepam the detected blood drug concentrations were more compatible with therapeutic use of the drug (n=99; median 0.13µmol/l; range 0.03-1.00µmol/l). Independent of the concentration level, 81% (48 out of 59) of the cases containing alprazolam alone and 84% (84 out of 99) of the cases containing clonazepam were judged as impaired. For both drugs there was a tendency that more drivers were judged as impaired at higher blood drug concentration levels.

Conclusions:
Our study showed that alprazolam was present mainly at supratherapeutic levels, whereas clonazepam was found mainly within the therapeutic range. More than 80% of the drivers where alprazolam or clonazepam alone was found in the blood sample were judged as impaired by the examining physician on the CTI. For both alprazolam and clonazepam we found a significant difference in the blood concentration between the non-impaired and impaired drivers.

POSTER NO 33

Psychiatric disorders, binge drinking and DUI in Brazilian drivers

Pechansky Flavio, Center for Drug and Alcohol Research, UFRGS

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Objectives:
There are no studies examining problems that may be related to driving under the influence (DUI) of drugs and alcohol in Brazil, making it difficult for the development of programs to address this issue. One potential problem is the presence of co-morbid psychiatric disorders. The aim of the study was to examine potential differences in psychiatric disorders between two groups of drivers those who had consumed alcohol and/or substances and those who had not.

Method:
A cross-sectional sample of 1,134 individuals driving on federal highways in Brazilian cities underwent alcohol breathalyzer tests, drug saliva tests, were asked about drugs consumption in the past 6 hours and completed the MINI questionnaire. Participants were divided into two groups (drivers who tested positive for substances (n=141) and those who did not (n=993)). Data were compared by the Chi-square test and with a logistic regression model using a set of independent variables derived from the literature (gender, age, educational level, has been a passenger of a DUI driver, psychiatric disorder, binge drinking in the past year).

Results:
According to the results of logistic regression analysis, there was a statistically significant association between psychiatric disorders, binge drinking and DUI. Even after variable adjustment, participants with any lifetime psychiatric symptom were 2.35 times more likely to DUI. Similarly, participants with binge drinking behavior in the last year were two times more likely to DUI.

Conclusion: Individuals who drive under the influence of drugs and alcohol may need assessments and interventions targeted to behaviors related to substance use and to specific psychiatric disorders. These results will inform the development of public policies in Brazil.

POSTER NO 34

Predictors of positive BAC in a nationwide sample of Brazilian drivers

Pechansky Flavio, Center for Drug and Alcohol Research, UFRGS

Background:
Recent statistics show that Brazil has 35,000 traffic accidents/year, but the true role of alcohol is still unknown. A dry law was passed in June 2008, which lowered BAC levels to zero. Aims: to identify factors associated with positive BAC among drivers in a nationwide cros-sectional study.

Method:
3,398 drivers were approached on highways crossing 27 Brazilian state capitals from 12pm to 12am (Fridays and Saturdays). They were breathalized, and data on driving characteristics and alcohol consumption were collected. A multivariate logistic regression followed a conceptual framework and allowed to adjust for potential confounding variables. In order to assess which variables were associated with alcoholemia, a hierarchical model was developed. This framework posits that characteristics of the external environment (socioeconomics and demographics characteristics), and the personal characteristics of the population influence the studied outcome.

Results:
The multivariate analysis showed that the schooling (up to 8 years: OR=2.0; 95% CI: 1.3-3.0), age (>30 years: OR=2.6; 95% CI:1.8-3.8), type of vehicle (driving a car: OR= 3.0; 95% CI: 1.8-5.2; driving a motorcycle: OR=3.8; 95% CI: 2.2-6.5), binge (OR=1.6; 95% CI: 1.2-2.3), been breathalized before (OR=2.6; 95% CI: 1.8-3.7), and purpose of the trip (coming from a party: OR=1.9; 95% CI:1.2-2.9; leisure trip: OR=1.7; 95% CI: 1.3-2.4, driving after 8 pm: OR= 1.8; 95% CI: 1.3-2.3) remained independently associated with alcoholemia.

Conclusion:
Findings of this study suggest that external environmental factors such as socioeconomic and demographic characteristics, as well as personal characteristics like alcohol consumption and the association between drinking and driving are associated with the positive BACs among Brazilian drivers after the dry law. Results will help shape country policymaking and preventive approaches in the Brazilian drinking and driving scenario.

POSTER NO 35

Relative accident risk of patients using psychotropic medicines in the Netherlands: A pharmacoepidemiological study.

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Lolkje T.W. de Jong - van den Berg, University of Groningen, Groningen, Netherlands; Han de Gier

Objectives:
To determine whether drivers who use psychoactive medications are more exposed to traffic accidents than those who do not use psychoactive medications.

Methods:
A record-linkage database will be used to conduct a case-control study, in the Netherlands, between 2000 and 2006. The data will come from three sources: pharmacy prescription data (database coverage: approximately 1 million residents), police traffic accident data, and driving license data. Cases will be defined as adults, who had a traffic accident between 2000 and 2006 and were driving, and received medical assistance. Controls will be defined as adults, who had a driving license and had no traffic accident during the study period. Four controls will be matched for each case; the matching will be by sex, age within five years, zip-code, and date of the accident. Various variables, such as age, drug dosage, drug half-life, mono- and combination-therapy, alcohol use will be considered for the analysis.

Results:
No results are currently available; however, available descriptive statistics and preliminary results will be presented during the conference.

Disclaimers:
1. This abstract has been produced under the project Driving Under Influence of Drugs, Alcohol and Medicines (DRUID) financed by the European Community within the framework of the EU 6th Framework Program.
2. This abstract reflects only the authors view. The European Community is not liable for any use that may be made of the information contained therein.

POSTER NO 36

Improving the Delivery of Alcohol Interlock Programs

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Objectives:
Alcohol interlock programs in North America have historically experienced low participation rates and low device installation rates due to gaps in implementation. The purpose of this study was to provide technical assistance and training to selected states to improve implementation, using a system improvement paradigm. The objectives were to: identify effective program features; determine where and why problems were occurring; and, provide recommendations for improvement.

Method:
Key agencies involved in each interlock program were identified. In each jurisdiction conference calls with key informants were conducted to gather preliminary program information and documentation for review. Meetings with program staff were organized to determine the types of problems that were occurring and why; and to gauge the level and type of support that was needed/requested. This information formed the basis to develop and execute a comprehensive strategy to deliver assistance.

Technical assistance included the review of and feedback on interlock program materials, the development of program flowcharts, expert input to guide the development of requests for information and/or proposals, the provision of good examples of program documents from other jurisdictions, the delivery of training initiatives and consultation on legislative efforts. Strategies applied in individual jurisdictions varied according to the needs.

Results:
An overview of some effective interlock program practices developed in some jurisdictions are presented in conjunction with findings about the main challenges that these interlock programs currently experience. Lessons learned and recommendations to improve the delivery of alcohol interlock programs are discussed.

Conclusion:
The effective implementation of interlock programs requires operational practices and procedures to support legislation and policy, the allocation of adequate resources to accomplish tasks, and communication and coordination of activities across multiple agencies and/or departments. As more jurisdictions strengthen program delivery the potential of alcohol interlock devices to reduce drunk driving can be realized.

POSTER NO 37

Blood GHB concentrations and results of medical examinations in 25 car drivers in Norway

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Objectives:
Knowledge of clinical effects, associated with whole blood GHB concentrations, is sparse. We investigated possible relationships between GHB blood concentrations and clinical effects in car drivers.

Methods:
In Norway, the police stop car drivers suspected of drug-driving. A physician performs a clinical test of impairment (CTI). Blood samples are screened for drugs/medicines by immunological, enzymatic and chromatographic methods at the Division of Forensic Toxicology and Drug Abuse. Results are stored in a database. This database was searched for car drivers positive only for GHB over the period 2000 to 2007. Over this period, GHB was a part of our extended drug testing program. We studied the available police reports and the clinical tests done by the physician in most of the cases. All data were treated anonymously.

Results:
Twenty-five car drivers had only GHB in blood. The police reported 78 % due to unsafe driving and seven car accidents, without serious injury, and 61 % of the drivers were found sleepy or in an even more reduced state of consciousness. The median GHB blood concentration was 1262 (592-2191) µmol/l, measured median 69 minutes after ended driving. Physician findings showed that there is a tendency for increased impairment and reduced consciousness with increasing GHB blood concentrations.

Conclusions:
The median GHB blood concentration of the 25 car drivers was high. Most drivers had clinical impairment, not explainable by injuries, with depressive effects on the CNS and sympathomimetic effects in the eyes. Effects on impairment and consciousness tended to be concentration-dependent. The drivers probably drove unsafely due to impairment by GHB.

POSTER NO 38

The necessity of evaluation of traffic psychological procedures - and its practicability

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The necessity of evaluation of traffic psychological procedures (for example courses, traffic psychological therapy) is indisputable. Seen from the political, judicial and scientifical dimension, it is indispensable to gain statements about the efficiency of the procedures.
This question is set in the area of conflict of claim for assured perceptions on the one hand, and the feasibility on the other.

Firstly, it is to be emanated from the aim of the procedure. Particular regard is demanded by the operationalisation of these aims.

In favour of concrete procedures, successive aims on various levels can be specified within the scope of efficiency control:
- roadworthy behaviour
- change of behaviour concerning alcohol consumption, abstinence from drugs
- driving without alcohol, driving without drugs, driving according to instructions (for example the abidance of speed limits)
- legal conformity : recordation of avenged traffic violations within a certain period of time (for example 3 years)
- (repeated) revocation of driving licence

Contrariwise, the following facts are applied within the scope of process evaluation:
- acquisition of settings
- accretion of knowledge
- self-assessment, external assessment of other group members
- assessment by the group leader

In favour of the scientifical judgement of the effect of the procedures, covariables are indispensable, for example:
- age, gender, occupation, participance in traffic, delict record of the participants
- therapists-variables
- duration and sequence of procedures

In Germany, the recordation of Legalbewährung (=probation), which is measured by entries in the Verkehrszentralregister (VZR) (it is a centrally organized register for traffic violations/delicts), is frequently used. This proved of value within the scope of various researches. However, a series of failings appears. For instance, the level of blood alcohol concentration is not captured in the notifications of the courts.

Feasible alternatives of evaluation of traffic psychological procedures are to be presented.

POSTER NO 39

Biological markers of alcohol consumption in alcoholised drivers: Comparison of capillary electrophoresis (CZE CDT) and a direct immunoassay (N Latex CDT) with the traditional method of anion-exchange chromatography-immunoturbidimetry (%CDT TIA).

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Biological markers of alcohol consumption in alcoholised drivers: Comparison of capillary electrophoresis (CZE CDT) and a direct immunoassay (N Latex CDT) with the traditional method of anion-exchange chromatography-immunoturbidimetry (%CDT TIA).
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Objectives:
The aim of this study was to compare specificity and sensitivity of different biological markers that can be used in a forensic field to identify potentially dangerous drivers because of their alcohol habits.

Methods:
We studied 280 Swiss drivers after driving while under the alcohol influence. 33 were excluded for not having CDT N results, 247 were included (218 men (88%) and 29 women (12%). Mean age was 42,4 (SD:12, min: 20 max: 76). The evaluation of the alcohol consumption concerned the month before the CDT test and was considered as such after the interview: Heavy drinkers (>3 drinks per day): 60 (32.7%), < 3 drinks per day and moderate: 127 (51.4%) 114 (46.5%), abstinent: 60 (24.3%) 51 (21%). Alcohol intake was monitored by structured interviews, self-reported drinking habits and the C-Audit questionnaire as well as information provided by their family and general practitioner. Consumption was quantified in terms of standard drinks, which contain approximately 10 grams of pure alcohol (Ref. WHO).

Results:
comparison between moderate (less or equal to 3 drinks per day) and excessive drinkers (more than 3 drinks)

POSTER NO 39

Marker ROC area 95% CI cut-off sensitivity specificity
CDT TIA 0.852 0.786-0917 2.6* 0.93
LR+1.43
0.35
LR-0.192
CDT N latex 0.875 0.821-0.930 2.5* 0.66
LR+ 6.93
0.90
LR- 0.369
Asialo+disialo-tf 0.881 0.826-0.936 1.2* 0.78
LR+4.07
0.80
LR-0.268
1.7° 0.66
LR+8.9
0.93
LR-0.360
GGT 0.659 0.580-0.737 85* 0.37
LR+2.14
0.83
LR-0.764
* cut-off point suggested by the manufacturer
° cut-off point suggested by our laboratory

Conclusion:
With the cut-off point established by the manufacturer, CDT TIA performed poorly in term of specificity. N latex CDT and CZE CDT were better, especially if a 1.7 cut-off is used with CZE

POSTER NO 40

Quantitative determination of tetrahydrocannabinol in whole blood by UPLC-MS/MS

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Objectives:
Tetrahydrocannabinol (THC) is widely abused in Denmark. Because of THC ` s psychoactive effect it can give rise to severe impairment when driving under influence.
In 2007 fixed limits for blood concentrations of drugs of abuse for drivers have been introduced into the Danish legislation. Thus to aid enforcement of these regulations, a fast and sensitive analytical method is required. In this context, we considered development of an UPLC-MS/MS method for THC. Examples of cases with THC will be presented.

Methods:
Whole blood samples (0.200 g) were spiked with internal standard (THC-D3) and extracted with pentan. After centrifugation, the organic phase was evaporated at room temperature under a stream of nitrogen and redissolved in 200 µL mobile phase.
Spiked blood samples in the range 0.0002 - 0.050 mg/kg were used for the calibration curve including a blank. The analyses were performed on an Acquity UPLC-Quattro Premier XE Tandem MS/MS system (Waters). The separation column was a Waters Acquity 2.1 x 50 mm, 1.7 micron. The solvent consists of 2 mM ammoniumacetate pH 6.2:methanol (9:1). The mass m/z 193.05 was used for quantification and the masses m/z 259.15 was used as qualifier ion for detecting the ion ratio. Run time was 3 min.

Results:
The quantification limit was 0.0002 mg/kg. The calibration curve was linear in the measuring interval (0.0002 - 0.050 mg/kg). The linearity was evaluated with polynomial regression. Mean extraction recovery for spiked blood samples was 37%. The laboratory participates in an external quality control program.

Conclusion:
A validated method has been described. The method is useful for quantification of THC.

Keywords: Tetrahydrocannabinol, UPLC-MS/MS (Premier), validation.

POSTER NO 41

Prevalence of chronic prescription medication utilization in road traffic crashes

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Prevalence of Chronic Prescription Medication Utilization in Road Traffic Crashes

Objective:
Numerous studies have addressed the role of alcohol and/or illicit drugs with respect to driving risks; however, the role of chronic prescription medications in RTC has not been sufficiently explored. The goal of this research is to document the overall prescription drug use among a U.S. population of injured drivers hospitalized in a Level I trauma center.

Methods:
For the years 2007-2008, all drivers hospitalized following a road traffic crash were identified. Their prescription drug use prior to hospitalization was obtained by medication reconciliation. Drug usage was analyzed in terms of the numbers of drugs as well as the categories, and pharmacotherapeutic classification.

Results:
A total of 3210 injured drivers were identified; 732 (22.8%) were using prescription drugs for a total of 1719 prescriptions. Drug usage increased with age, as did the numbers of prescriptions per driver. Among all age groups, top therapeutic classes were cardiovascular 373 (21.7%), antidepressants/antipsychotics 274 (15.9%), analgesics 248 (14.4%), and gastrointestinal 91 (5.3%). Of the drivers 25 years old and younger, 11 (4.9%) were on 3 or more chronic medications, whereas, 64 (69.6%) of drivers 65 years and older were on 3 or more drugs. Rankings of therapeutic classes varied by age group; e.g.; drivers 44 years and younger were mostly on antidepressants/antipsychotics, and narcotic analgesics, which are central nervous system depressants, and known to be linked to responsibility for a traffic crash. In contrast, the top most utilized therapeutic classes for drivers 65 years and older were cardiovascular, NSAIDs, and gastrointestinal agents.

Conclusion:
Prescription drug usage in the U.S. population continues to increase. The use of centrally acting prescription medications while driving should be considered to improve roadway safety, prevent injuries, and decrease health care costs for preventable injuries and

POSTER NO 42

Medication and Illicit drug use among Danish drivers from 1997-2006 with comparison to the situation in 2008 after the introduction of fixed concentration limits

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Objective:
Investigation of the prevalence of medication and illicit drug use among Danish drivers for the period 1997-2006 with comparison to the situation in 2008 after the introduction of fixed concentration limits in 2007.

Methods:
Results of blood samples from drivers suspected of being under the influence of medication and/or illicit drugs were considered.

Results:
A total of 2340 blood samples were analysed for the presence of medications and/or illicit drugs for the period 1997-2006. The average number of cases per year was 234 (213-283), and on average 87% of the investigated cases were positive for one or more drugs. For 2008 the number of investigated traffic cases was increased to 1176. 73% of the cases from 2008 were positive for one or more drugs. Benzodiazepines, cannabis (THC), amphetamine, heroin/morphine, methadone, cocaine, and ecstasy were the most frequently detected drugs for the period 1997-2006, and also in 2008. The number of these cases in which an ethanol level was detected above 0.5 mg/g (the Danish legal limit) was on average 18% (9-26%) for the period 1997-2006 and 19% for 2008. The average age of the drivers ranged from 31-34 years for the period 1997-2006 and was 31 years for 2008. The percentage of females per year ranged from 3 to 20%.

Conclusion:
The number of traffic cases investigated for substances other than ethanol were consistently low, in the range of 200 to 300 per year during the period from 1997 to 2006, but after the introduction of fixed concentration limits in 2007 a five-fold increase was seen already in 2008.

POSTER NO 43

THC detection in oral fluids: Can the challenge be overcome?

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Objectives:
The detection of cannabis use by oral fluid is a particular challenge for onsite tests due to low concentration of the parent drug Delta-9-Tetrahydrocannabinol (THC) present. With most of the commercially available POC systems providing THC cut-offs in the range of 30 to 100 ng/ml, it appears to be difficult to achieve a detection window of more than 1 to 2 hours after drug consumption. More meaningful THC cut-offs in the range of 4 to 10 ng/ml have been suggested by different groups and authorities.

The present investigation was performed in order to evaluate a new test-kit of Dräger DrugTest® 5000 POC system providing a THC cut-off of 5 ng/ml.

Methods:
Patients enrolled in methadone substitution programs were asked to provide voluntarily two oral fluid samples (n=90). The first sample was collected by means of Dräger DrugTest® 5000 and the second by means of Dräger DCD 5000 for confirmatory analysis by GC-MS.
In a roadside study oral fluid samples (n=200) from car drivers were analyzed by DrugTest® 5000 which was used in two cut-off versions (25 ng/ml vs. 5 ng/ml). Blood samples were drawn from drivers with a positive drug-screening and analyzed by GC-MS.

Results:
Based on confirmation analysis in oral fluids at two confirmation (GC-MS) cut-offs of 5 ng/ml and 10 ng/ml, in the methadone population the sensitivity and the specificity of the THC-assay was 71% (83%) and 100% (100%) respectively. The results from the roadside study showed that 95% of the positive THC screening results were confirmed in blood by GC-MS at a cut-off of 1 ng/ml. Using the 5 ng/ml version of DrugTest® 5000, the hit-rate was increased by a factor of 2.6.

Conclusion:
The new Dräger DrugTest® 5000 (THC cut-off: 5 ng/ml) demonstrated significantly enhanced sensitivity and a good correlation with blood THC levels.

POSTER NO 44

Traffic Environment and Demographic Factors Affecting Impaired Driving and Crashes

Voas Robert, PIRE

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Problem:
Data availability has forced researchers to examine separately crash and non-crash data. Such a separation makes it difficult to fully account for the transition from impaired driving to an alcohol-related crash. This study provides information about the role that traffic-environment and driver demographic/socioeconomic status (SES) factors play in shaping the likelihood of impaired driving whether crash related or not.

Method:
We used data from a recent case-control study that included a comprehensive sampling of the drivers in nonfatal crashes and a matched set of comparison drivers in two U.S. locations. We separated these data into four groups: impaired, crash and non-crash, and non-drinking, crash and non-crash. Multinomial logistic regression was applied to investigate the likelihood that a driver would crash or not, either with a BAC=0.00 or a BAC=.05.

Results:
This study confirms previous findings about the role of traffic-environment, demographic, and SES variables in traffic crashes. It also suggests the existence of interactions and complexities not yet fully understood. An interesting outcome from this study is the identification of variables playing a different role in shaping alcohol-related and alcohol-free crashes. The factors that separate sober (BAC=.00) crash-involved drivers from sober (BAC=.00) non-crash-involved drivers were largely demographics and SES. Drivers who are underage, male, and unemployed were more likely to be involved in those crashes. Thus, this study suggests that the occurrence of crashes among BAC=.00 drivers is not as associated with the environment (e.g., weather or road conditions) as much as it is with the drivers attitudes toward risk and safe driving.

Discussion:
This study is to our knowledge the first that examines how different driver characteristics and environmental factors simultaneously contribute to alcohol use by crash-involved and non-crash-involved drivers.

POSTER NO 45

Vehicle Impoundment Impacts on Crashes of Prohibited Drivers

Wilson Jean, Safety Metrics West

Objectives:
Vehicle impoundment (VI)programs are a proven countermeasure to control driving and therby reduce crashes among prohibited drivers, many of whom have a history of impaired driving. In 2005, British Columbia lengthened the mandated impoundment periods from 30 to 60 days and from 60 to 90 days for drivers convicted of driving while prohibited. This study measures the beneficial effect on crashes of these extended periods and attempts to determine what factors explain crash reduction during and following the end of the mandated impoundment period.

Method:
Drivers that received the extended VI sanction are compared to a cohort of drivers that received shorter impoundments for the same offence prior to the legislative change, statistically controlling for cohort differences. Crash frequencies are compared both during and for one year following the impoundment periods, using regression models. Crash involvement of drivers of abandoned vehicles are compared with drivers of recovered vehicles to determine what proportion of crashes are explained by this factor.

Results:
Crash frequencies of drivers were very low during the impoundment periods and they remained suppressed even after the mandated time had expired compared to pre-impoundment levels. Extending the impoundment periods has two major impacts: it extends the benefit period of reduced crashes and it increases the proportion of abandoned vehicles.

Conclusions:
Vehicle impoundment appears to be an effective means to control driving by prohibited drivers and thereby reduce crash risk. The bulk of the benefit is explained by removing vehicle access; however there may also be a specifc deterrent effect that is mediated through the punishment of vehicle removal and associated costs.

POSTER NO 46

Comparison of Stability of Drugs Collected with the Intercept and StatSure Collection Devices

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Objectives:
The result of drug testing in oral fluid can be affected by drug stability. Possible sample degradation during e.g. transport or in storage must therefore be evaluated. The objective of this study was to compare the stability of drugs of abuse and psychoactive medicinal drugs in oral fluid collected with two commercial collection devices, Intercept and StatSure.

Methods:
Oral fluid collected from patients admitted to an opiate maintenance treatment program (Intercept) or from drivers suspected of driving under the influence of drugs (StatSure) was pooled to get samples with multiple drugs in oral fluid. The samples were analysed after one week at ambient temperature or -4 °C, and at 3 months at -20 °C. The preserved oral fluid was extracted with liquid-liquid-extraction with ethylacetate:heptane (4:1), and analyzed with UPLC-MS-MS.

Results:
The compounds 6-monoacethylmorphine(6-MAM), morphine, codeine, amphetamine, metamphetamine, zopiclone, alprazolam, 7-aminoclonazepam, oxazepam, n.desmethyl diazepam, diazepam, methadone, and ?-9-tetrahydrocannabinol (THC), were evaluated for both collection devices, and for Intercept in addition buprenorphine and for StatSure in addition clonazepam, nitrazepam, benzoylecgonine and cocaine. Most compounds were stable at one week storage at -4 °C as well as ambient temperature for both sample sets. Zopiclone seemed to be less stable when collected by the Intercept device, but stability was improved by freezing the sample. For Intercept loss of 7-aminoclonazepam, codeine and 6-MAM with time was observed, THC was however stable (data for StatSure not yet available). Cocaine collected by the StatSure device degraded more rapidly to benzoylecgonine at ambient temperature than at -4 °C.

Conclusion:
For the majority of compounds investigated in this study transport at ambient temperature seemed acceptable, however both zopiclone and cocaine should preferentially be kept cool/frozen. Loss of compound during long term storage was observed for some compounds with Intercept; data for StatSure will be added.

POSTER NO 47

Correlation of 6-MAM in oral fluid and urine with morphine in whole blood for driving under the influence of drugs cases

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Objectives:
In cases of suspected driving under the influence of drugs (DUID-cases) it is important to determine if morphine detected in blood originates from heroin use or as a result of intake of morphine or other opiates. This is usually confirmed by determination of 6-monoacetyl morphine (6-MAM) in urine. The objective of this study was to evaluate whether oral fluid can replace urine in determination of the origin of morphine, as this could allow more acceptable and faster sampling and thereby save police resources.

Methods:
Oral fluid collected with the StatSure" collection device from 100 drivers suspected of driving under the influence of drugs was analyzed with UPLC-MS-MS. Urine was screened with EMIT® immunoassay, and confirmed with UPLC-MS-MS and CEDIA® immunoassay. Whole blood was screened and confirmed with UPLC-MS-MS. The correlations between 6-MAM in oral fluid and urine and morphine in whole blood were studied.

Results:
Of the 100 collected cases, 94 had all 3 matrix types, while urine was not included in six cases. Approximately 22 % of the samples were positive for morphine in whole blood and 30 % for 6-MAM in oral fluid. For the 27 6-MAM positive oral fluid samples with all 3 matrix types we found that all morphine positive samples had positive 6-MAM in both urine and oral fluid, one sample had positive 6-MAM in oral fluid and urine and negative morphine in whole blood, while for 6 cases 6-MAM was only detected in oral fluid.

Conclusion:
With the applied cut-off for 6-MAM in oral fluid, full correspondence with urine in confirmation of morphine origin in DUID-cases was found. The time window appears to be similar or better than urine, and oral fluid can therefore be a good alternative for 6-MAM determination in DUID-cases.

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Change of authors for oral or poster presentations

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Montisci, Massimo	Favaretto, Donata	Genetic susceptibility to alcohol drinking …	Symposium 9

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Layout and printing: www.presis.no