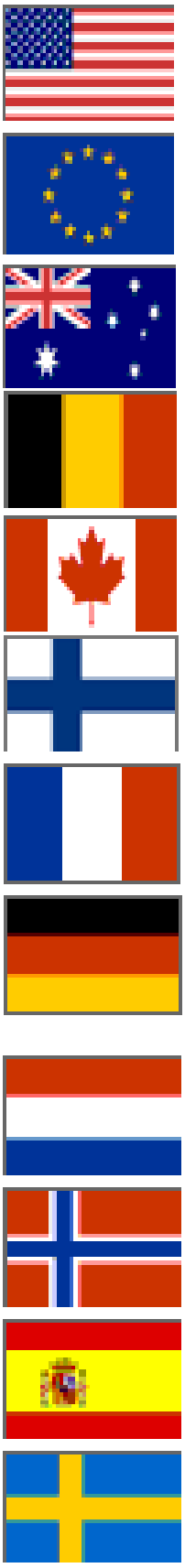

Developing Global Strategies for Identifying, Prosecuting, and Treating Drug-Impaired Drivers

Symposium Report

June 2004

Sponsored by:

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The International Council on Alcohol,
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DEVELOPING GLOBAL STRATEGIES FOR IDENTIFYING, PROSECUTING, AND TREATING DRUG-IMPAIRED DRIVERS

SYMPOSIUM REPORT

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INTRODUCTION

The Counterdrug Technology Assessment Center (CTAC) at the Office of National Drug Control Policy sponsored a two-day Symposium entitled "Developing Global Strategies for Identifying, Prosecuting, and Treating Drug-Impaired Drivers" in Tampa, FL February 23-24, 2004. The meeting was co-sponsored by The International Association of Forensic Toxicologists (TIAFT), the International Council on Alcohol, Drugs, and Traffic Safety (ICADTS), and the National Institute on Drug Abuse (NIDA).

Nearly 125 international experts in drugged-driving from 14 nations gathered to discuss how available technology for drug-detection can be used with DUI laws to support strategies to reduce drugged-driving, and to develop a better understanding of the current problems with identifying, prosecuting, and treating drugged-drivers.

Leading experts from various areas unique to drugged-driving made featured presentations during the first morning of the meeting. These presentations provided a backdrop for the issue setting and discussions of expert working-group panels during the remainder of the meeting. Summaries of the featured presentations are included in this document in Section III.

The symposium was organized as a working conference, and the agenda designed to produce this proceedings document to present the scope of the problem of drugged-driving, establish what we know and don't know, and document ongoing international efforts. A primary goal of the conference was to develop recommendations for future research, and propose specific strategic policy initiatives that the U.S. federal government as well as other governments of the world could consider to manage the problem of drugged-driving.

Expert groups formed panels to focus on three issue areas: (Panel I) – Identification of Drugged-Drivers; (Panel II) – Enforcement and Prosecution Issues; and (Panel III) – Treatment, Education and Prevention Issues. Each panel had four meeting sessions over two days chaired by two rapporteurs who facilitated the discussion. Each panel allowed audience participation and was charged with developing as many position papers as possible in the allotted time for inclusion in the proceedings document. Panel recommendations were presented in a final plenary session, and comments were included in the final position statements which are included in this document in Sections IV, V, and VI.

The complete list of participants and agenda are included in the Appendices.

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ACKNOWLEDGMENTS

The coordination and logistics for conducting an international symposium of this scope where all attendees were provided the opportunity to be involved in the working process of developing position statements required the assistance and involvement of many people. The editors would like to express sincere thanks to the featured speakers (Johan de Gier, Ph.D., Yale Caplan, Ph.D., Olaf Drummer, Ph.D., Barry Logan, Ph.D., Alain Verstraete, M.D., John Bobo, J.D., and Robert L. DuPont, M.D.) for their efforts and hard work in presenting the backdrop for the symposium proceedings. The editors would also especially like to express sincere appreciation to the panel rapporteurs (Drs. Verstraete and Huestis for Panel I, Barry Sweedler and Judge Linda Chezem for Panel II, and Kathy Stewart and Robert Stephenson for Panel III) for their diligence in assembling panelists to develop/discuss the pithy issues relating to drugged-driving, and their perseverance in capturing and recording their panel positions in a way that truly represented all interested participants.

Much appreciation is also due to the members of the working groups who brought their knowledge and expertise to the table to ensure that all elements of the issues were considered. The participants of this symposium also deserve special recognition. While we knew that the level of interest in the issues was keen, and that attendees wished to be involved in the program process, we were truly impressed by the level of commitment made by the special group of participants (See Appendix A) who attended this meeting.

The editors would also like to express their sincere appreciation to Ms. Nei-Hyun Park of The Walsh Group, who made the administrative processes involved with this meeting seamless. Without her involvement, the meeting would not have been nearly as successful as it was and we are truly grateful for her long hours above and beyond the call of duty.

Finally, we also appreciate the assistance of The International Association of Forensic Toxicologists (TIAFT), the International Council on Alcohol, Drugs, and Traffic Safety (ICADTS), and the National Institute on Drug Abuse (NIDA) who co-sponsored the meeting. Without their involvement, this would not have been truly an “international” effort.

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PREVALENCE OF ILLEGAL DRUGS IN DRIVERS

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Introduction

A complete understanding of the problem of illicit drugs and driving will only be achieved in two complementary approaches: experimentation and epidemiology (Simpson and Vingilis, 1992). Experimental studies focus on drug effects on psychomotor performance, in particular the types of skills affected and the dosages used. However, it is fairly impossible to translate these effects into road crashes. Questions on the extent or magnitude of this problem, as well as the determination of which drugs are risk factors for collision involvement, can be answered in sound epidemiological research

Descriptive epidemiology provides insight into the relative importance of different types of drugs. In other words, which drugs are detected that contribute to a significant traffic safety problem. If repeated evaluations are performed, in time, insight can be provided into changing patterns of drug use and driving within society.

Analytic epidemiology determines which drugs are over represented in persons involved in road accidents. Involvement of control groups allows researchers to provide relative risk data. The relationship established through the risk factors approach is one of association, not of causation. Experimental research into the causal links between drug levels and behavioral impairment remains necessary to draw conclusions on causation potentials of different drugs.

Generally speaking, the application of epidemiological research to drugs (other than alcohol) and driving can only permit meaningful cross-cultural comparisons if standardized data-gathering methods are used. However, several factors (political, legal, social, economic) determine the research capabilities of researchers in different countries and this will result in different approaches to sample selection and data collection. A review of investigations of prevalence of illicit drugs in road traffic in selected countries will therefore include studies in which numerous methodological problems are to be encountered.

Methodological issues

In general, most methodological problems encountered with epidemiological studies of drugs and driving can be categorized as problems with sample collection and data collection (Simpson and Vingilis, 1992).

Population under examination

The choice of population studied is critical and can give rise to problems in comparisons across countries. Epidemiological research of illicit drugs and driving can be classified according to the population under examination:

1. General population
2. Offender populations
3. User/addict populations
4. Collision-involved drivers

In surveys of illicit drug use in the *general population* data gathering is generally through the use of questionnaires or interviews. Two of the most commonly observed problems relate to representativeness and refusals. General population surveys include both drivers and non-drivers and do not allow extrapolation to the driver population.

In roadside surveys, drivers are randomly or systematically selected to obtain information through self-reports on demographics, drug use, driving, and drug use through toxicological analyses of body fluids. Since roadside surveys tend to be executed during late-night hours on weekends, drivers tested are not representative of the total driving population. Refusal rates can have profound effects on inferences about illicit drug use derived from roadside surveys because those substances are detected with less frequency than alcohol where refusal rates of 15% are observed. Refusal rates can actually exceed the proportion of drivers who score positive for illicit drugs. An additional problem exists with the collection of body fluid samples for drug testing, when invasive procedures are unacceptable because of legal liability.

In surveys of *offender populations* (charged with driving under the influence of alcohol or drugs), drug screens are carried out if the blood alcohol level is below the legal limit. This approach automatically excludes information on combinations of drugs with high levels of alcohol. Furthermore, the selection of drivers is initially determined by the arresting officer, which introduces a variety of biases.

In investigations of *user/addict populations* samples are generally drawn from treatment facilities. These surveys cannot be considered representative of the total user/addict population, since only a small proportion will seek formal treatment.

In surveys of *collision-involved populations* information is gathered on a wide range of variables (e.g. characteristics of crashes, psychological/behavioral characteristics, drug use problem). Documentation of drug impairment is based on different perceptions and decisions of officers, which can introduce biases. In accident fatalities data are most of the time incomplete due to the fact that drug screens are not carried out on fatally - injured drivers found to be impaired by alcohol.

Data collection

Sources of data and the methods by which they are collected can cause methodological problems. The first source of data is official records (police, coroner, medical, etc.) and has limitations because data on illicit drug use are not routinely collected. Even when drug tests are carried out a select number of drugs are tested. In official records, underreporting is a serious problem because they tend to contain only the most extreme cases. The second source of data is self-report instruments. Underreporting is also a problem in this approach, since deviants tend to underreport.

Different methods of data collection used in surveys have their own problems. The method of drug analyses in blood, sweat, saliva or urine has problems with respect to sample collection, handling and transportation, as well as toxicological assays used. Interpretation of drug levels detected is difficult; for example, cannabinoids can be detected in urine many days, even weeks, after use and the relevance of this to traffic safety is obscure. Blood specimens are considered to be essential for surveys of illicit drugs and driving. Another method for determining illicit drug use among drivers relies on the use of clinical and psychophysical tests. The usefulness of the last method is still unclear. Self-report tools for the assessment of drug use and driving show different problems with respect to accuracy (reliability of recall information).

Finally, comparisons across studies are often difficult because of the lack of conventions used in reporting findings. For example, there is no consistency in reporting percentages (all drivers in the sample or only those who were tested for drugs).

Illicit drug use in road traffic in different countries based on large scale studies

The **Belgian** Toxicology and Trauma Study (BTTS) was conducted as a prospective, multi-centre survey in six hospital emergency departments sufficiently spread over the country (Meulemans et al., 1997). Inclusion criteria were: all drivers, at least 14 years of age, of bicycles or motor vehicles involved in a traffic accident on a public road, directly admitted to one of the selected emergency departments for at least one day or dying upon or after admission. During the registration period (January 16th 1995 till June 15th 1996) blood and urine samples were taken from 2,143 patients.

Although a total of 2,143 patients were included during the collection period of the study, a final sample size of 2,053 patients could be used for analyses. This was due to inappropriate handling of the methodological protocol by two of the collaborative centers. In 1,959 cases from the final sample information on recent medication use could be obtained as reported by the patients. In 35% of those cases patients admitted having used some kind of medication during the week preceding the accident. If focus is given to psychotropic medication, it turned out that 10% of the study population reported the use of a medicine known to impair driving performance. The use of illicit drugs during the three months preceding the accident was admitted by 5.1% of the patients. The major classes reported were cannabis (3.7%) and amphetamines (1.4%).

The results on medication and illicit drugs were obtained in samples of patients who did not receive (potentially interfering) medication before sampling. In total, 391 cases (19%) were confirmed positive on one or more of the following substances: amphetamines, benzodiazepines (in blood), barbiturates (in blood), cannabis, cocaine, opiates, methadone, or propoxyphene. Of these, 107 (27%) also had a BAC exceeding the legal limit of 0.5 g/l, the latter being seen significantly more often in men (32% of the positives, versus 15% in women). The prevalence of the detected substances is summarized in Table 1.

TABLE 1 TOXICOLOGICAL RESULTS OBTAINED IN PATIENTS INCLUDED IN THE BTTS

Substance (sample)	N analyzed	Screening positive	Confirmation positive	Prevalence (%)
Amphetamines (urine)	1879	60	56	3.0
Barbiturates (urine)	1879	37	25	1.3
Benzodiazepines (blood)	1871	232	160	8.5
Benzodiazepines (urine)	1879	278	*	*
Cannabis (urine)	1879	114	113	6.0
Cocaine (urine)	1879	14	14	0.7
Methadone (urine)	1879	6	5	0.4
Opiates (urine)	1879	149	141**	7.5
Propoxyphene (urine)	1879	6	4	0.2

* Positive screening results were confirmed in blood only.
** 103 (73%) resulted from analgesics, antitussives, and 38 (27%) from the use of morphine/heroine.

The highest scores by far were noticed for benzodiazepines (8.5%), opiates (7.5%), and cannabis (6%), followed by the other substances (amphetamines 3%, barbiturates 1.3%, and cocaine, methadone, and propoxyphene each less than 1%). Of those found positive on amphetamines, only 22% had reported the use of this substance during admission. For cannabis and cocaine positive cases, these figures were 36% and 21%, respectively. For propoxyphene, one out of the four patients mentioned the use of this substance. None of the five patients who were found positive for use of methadone had mentioned this upon anamnesis on illicit drug use and only two had mentioned it on medication use.

Multiple drug use was observed in 80 patients, or in 20% of the positives (64 on two substances, 13 on three, 2 on four, and 1 on five). In 24 of these multi-substance (ab)users BAC levels exceeded 0.5 g/l.

The Belgian Toxicology and Trauma Study (BTTS) is one of the very few good examples of descriptive epidemiological research that provides insight into the relative importance of different types of drugs in collision involved drivers. By combining the data from self-reported drug use with data from toxicological analyses the relative usefulness of self-report instruments could be illustrated in a very comprehensive way.

In **Germany**, the most recent large scale study was conducted by Krüger et al. (1995, 1996) to determine the prevalence of psychotropic drugs (licit and illicit) among the German general driving population. During the German Roadside Survey from 1992 to 1994, breath alcohol measurements were collected from more than 21,000 drivers in two regions: Unterfranken and Thueringen. In addition, 13,122 drivers were asked for a saliva sample, and 12,213 (93.1%) agreed to participate. In 1992, 3,027 samples were obtained for drug analyses (cannabinoids,

amphetamines, opiates, cocaine, benzodiazepines, and barbiturates). Of the samples collected, 32,6% were essentially dry prior to analysis (volume less than 0.1 ml), therefore eventually 2,234 samples were actually analyzed.

TABLE 2 PREVALENCE OF ALCOHOL AND DRUGS IN A SAMPLE OF GERMAN DRIVERS

Substance	Positive cases (%)
BAC > 0%	5.50
BAC > 0.03%	2.01
BAC > 0.05%	1.20
BAC > 0.08%	0.56
BAC > 0.11%	0.43
Benzodiazepines 3 ng/ml cut-off	3.64
Benzodiazepines 5 ng/ml cut-off	2.60
Barbiturates 100 ng/ml cut-off	0.53
Cannabinoids 20 ng/ml cut-off	0.61
Opiates (including Codeine) 100 ng/ml cut-off	0.70
Opiates (excluding Codeine) 100 ng/ml cut-off	0.15
Amphetamines 100 ng/ml cut-off	0.08
Cocaine 200 ng/ml cut-off	0.01

After adjustments of the results to reflect a representative driving population, the following positives were found: benzodiazepines, 2.7%; opiates (including codeine), 0.7%; cannabinoids, 0.6%; barbiturates, 0.6%; amphetamines, 0.08%; cocaine, 0.01%. Alcohol was found in 5.5% of the saliva samples (Table 2).

A large **Italian** survey to determine drug usage of drivers, involving 5,910 injured drivers and pedestrians hospitalized in Padua from July 1978 - December 1988, was carried out by Ferrara et al. (1990). Patients under the age of 14, examined two hours after the accident, from whom no blood or urine samples were available or for whom a complete drug screening was not feasible were excluded from the survey. Urine and saliva samples from 4,350 drivers (3,002 males; 1,348 females) and 650 pedestrians (403 males; 247 females) included in the survey were used for screening on 72 different drugs.

Results indicate a total prevalence of drugs in plasma and urine in, respectively, 28.6% and 40.7% of all cases (Table 3). The total prevalence of alcohol was 49.0% and 53.3%, respectively. Anti - inflammatory drugs (9.8%) and benzodiazepines (8.5%) were the drugs most prominently found in blood plasma.

TABLE 3 PREVALENCE (%) OF ALCOHOL AND DRUGS IN PLASMA AND URINE

Substance	Plasma	Urine
Drugs alone	15.0	23.2
Alcohol and drugs	13.6	17.5
Alcohol alone	35.4	35.8
Total prevalence of drugs	28.6	40.7
Total prevalence of alcohol	49.0	53.3
No alcohol, no drugs	36.0	23.5

Cannabis was the most prominently found illicit drug in urine, in 5.5% of all cases. Narcotics were found in 3.5% and stimulants in 2.7% of all samples (n=5,000). Multiple drug use is presented as a result of analyses in a subset of 940 plasma and 1,534 urine samples. Consumption of a combination of psychoactive substances is more frequently observed if only urine samples are considered (17.4%). If plasma samples are taken into consideration single drug use is observed more frequently (11.6%).

In a **Norwegian** study published by Skurtveit et al. (1996), blood samples from 2,819 drivers for suspicion of driving under the influence of drugs received (as a subset of a total of 8,429 samples) by National Institute of Forensic Toxicology in 1994 were screened for the most commonly abused drugs. The screening was carried out if the BAC was below 0.15 percent (1.5 g/l). Samples with BACs above 0.15 percent, were analyzed for drugs other than alcohol only after special requests by the police. Hence, drug analyses were completed on 2,529 samples.

The results show that about 47% of the suspected drunken drivers had a BAC above 0.15 percent, being more than three times the legal limit in Norway of 0.5 g/l. This percentage was 25% for drugged-drivers. Drugs were found in 59% (n=1,495) of all cases. In 30% (n=753) alcohol was the only psychoactive substance found. In 11% of the cases neither alcohol nor drugs were detected. The most frequently detected drugs were benzodiazepines (n=775), cannabinoids (n=660), amphetamine (n=533), morphine (n=193), and codeine (n=104). Cocaine was found in only one case, whereas methylenedioxymetamphetamine (MDMA or Ecstasy) could not be detected. Benzodiazepines were most frequently detected in female drivers, whereas cannabinoids were less frequently detected in this group, compared to male drivers (Table 4).

TABLE 4 DISTRIBUTION OF DRUGS OTHER THAN ALCOHOL IN 267 FEMALE AND 2,262 MALE DRIVERS

Substance	Number of positives (f)	Percentage (f)	Number of positives (m)	Percentage (m)	Significance p<
Benzodiazepines	103	38.6	672	29.7	0.005
Cannabinoids	47	17.6	613	27.1	0.001
Amphetamines	50	18.7	483	21.4	NS
Morphine	28	10.5	165	7.3	NS

f = females; m = males

The authors emphasized that during the last ten years the number of drivers suspected for drugged-driving in Norway has shown a three-fold increase. The largest increase since 1990 has been found for amphetamines (more than 145%). The authors further indicated that Norway has a higher frequency of cases from suspected drugged-drivers compared to other Nordic countries. The ratio of frequencies varied from 3.9 (Finland) to 8.2 (Denmark). It is unclear whether this statement can be made in general, since the sample selection procedures by the police and road traffic laws might not be the same in the various Nordic countries.

This explanation was suggested by the authors, as well, since epidemiological studies revealed that the prevalence of drugs other than alcohol in fatal crashes in Norway was similar to that found in other countries. One possible explanation for the apparent high prevalence of drugged-driving in Norway may be that the Norwegian police force is more focused on detecting these problems. Some countries do not have legislation that that applies to drug control in drivers as easily as for alcohol control. The results further indicate a high prevalence of benzodiazepine use in drugged-drivers. It is unclear how the use of these drugs in the general population has changed over the last few years.

An update of the Norwegian data has been given by Christophersen and Mørland (1997). They report an increase in the total number of drivers suspected of driving under the influence of drugs other than alcohol, from 33% in 1994 to about 40% in 1995. The highest increase was noted for cannabinoids and amphetamines, the increase of the latter being recorded from 216 cases in 1991 to 937 cases in 1995 (more than 300%). Some other findings are of interest as trends in drug abuse. An increasing misuse of clonazepam (medicinal drug for the treatment of epilepsy) among drivers has been observed, often found in combination with other drugs and/or in concentrations above therapeutic levels. Only 3% (n=3) of the clonazepam positive samples (n=91) could be referred to medical treatment. A closer look at the samples analyzed in 1995 revealed that benzodiazepines were often not taken according to recommended therapeutic standards.

According to the authors' interpretation of the blood levels, they indicated that only 5% of the benzodiazepine positive samples could represent normal therapeutic use. A correlation has been documented between the number of prescriptions for benzodiazepines in the different provinces and the frequency of benzodiazepines detected in blood samples of drugged-drivers (Skurtveit et al. 1995). The normal prescribing and dispensing practices, therefore, are found responsible for the use of these drugs in the driver population.

As a concluding remark Christophersen and Mørland (1997) indicate that Norwegian authorities have decided that all blood samples from drivers suspected by the police of driving under the influence will be analyzed for both alcohol and drugs, independent of the primary suspicion from the police. This new routine started from October 1996.

Three more recent large scale studies in **Spain, Quebec and Australia** and a smaller scale study from **France**, show similar findings. The distribution of alcohol and other drugs among 5,931 drivers who participated in two roadside surveys in August 1999 and 2000 in Quebec and provided a urine sample showed that drugs other than alcohol were found in 11.8% of urine

samples. The proportions were are follows: cannabis 6.7%, cocaine 1.1%, benzodiazepines 3.6%, opiates 1.2%, PCP 0.03%, amphetamines 0.1% and barbiturates 0.5%. Alcohol was found in 5.9% of all drugs cases (Dussault et al., 2002).

A collaborative case-control study was conducted in **France** in order to determine the prevalence of alcohol, cannabinoids, opiates, cocaine metabolites, amphetamines and therapeutic psychoactive drugs in blood samples from 900 drivers not fatally injured in road accidents compared to 900 controls. All age groups confounded, delta-9-tetrahydrocannabinol (THC), the main active substance of cannabis, was found in 10% of all drivers and 5% of the controls. Morphine and benzodiazepines were detected in 2.7% and 9.4% of the injured drivers and in 0.03% and 5.8% of the controls, respectively. The number of positive cases for amphetamines and cocaine metabolites was too low for reaching any reliable interpretation (Mura et al., 2003).

In **Spain** cocaine has been detected in high prevalence (5%) of all 5,745 drivers fatally injured in road accidents in a two year period from January 1999 to December 2000, whereas opiates (3.2%), cannabis (2.2%), benzodiazepines (3.4%), antidepressants (0.6%) and narcotic analgesics (0.4%) were detected less frequently than in earlier studies conducted in Italy and Belgium (Del Rio and Alvarez, 2002).

The incidence of alcohol and drugs in fatally injured drivers were determined in three **Australian** states: Victoria, New South Wales and Western Australia for the period of 1990-1999 (Drummer et al., 2003). A total of 3,398 driver fatalities were investigated. Drugs other than alcohol were present in 26.7% of all cases and psychotropic medicinal drugs in 23.5%. The drugs comprised cannabis (13.5%), opioids (4.9), stimulants (4.1), benzodiazepines (4.1%) and other psychotropic drugs (2.7%). Eight and a half percent of all drivers tested positive for delta-9-tetrahydrocannabinol. Opioids consisted mainly of morphine (n=84), codeine (n=89) and methadone (n=33), while stimulants mainly consisted of methamphetamine (n=51), MDMA (n=6), cocaine (n=5), and ephedrines (n=61). The prevalence of drugs increased over the decade, particularly cannabis and opioids, while alcohol decreased

Finally, the prevalence of alcohol and drugs among 482 fatally injured drivers who deceased between April 1999 and November 2001 in Quebec was presented by Dussault et al., 2002. Drugs other than alcohol were found in 30.2% of urine samples in the following proportions: cannabis 19.5%, cocaine 6.8%, benzodiazepines 8.5%, opiates 1.4%, PCP 1.1%, amphetamines 0.8% and barbiturates 0.3%.

A recent review of **North American** studies that have examined the presence of drugs in crash-involved drivers, non-crashed on-the-road drivers and drivers stopped or arrested for traffic violations has been published by Jones et al., 2003.

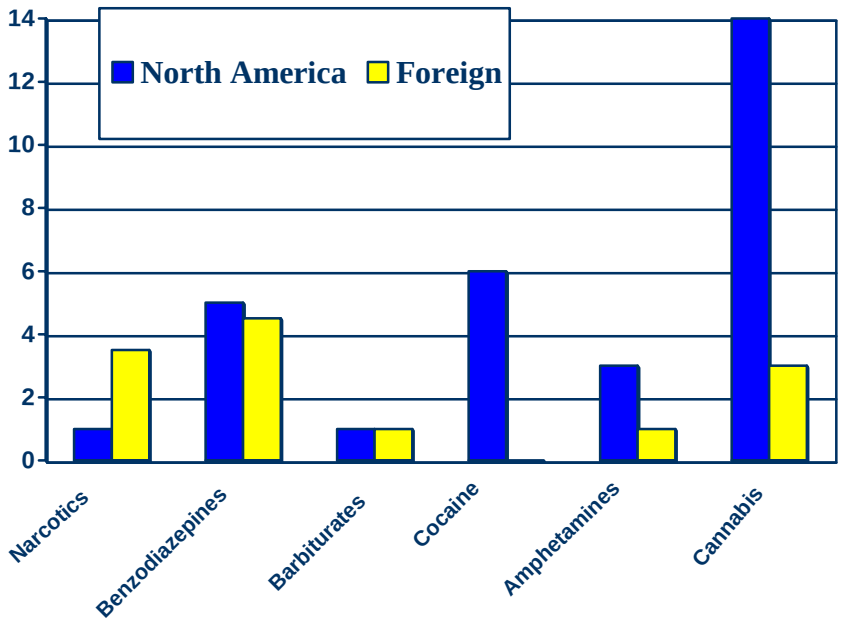

Figure 1. Mean percent of fatally injured drivers tested positive for various drugs (Jones et al, 2003)

The mean prevalences that have been presented and compared with the data from foreign studies do not reflect the significant variance in the data for the various drugs other than alcohol, and do not take into account the different methodological problems that have been described above. In particular the results form some recent studies in Canada and Australian show that cannabis and cocaine are detected more frequently in fatally injured drivers than suggested in the report on the comparison with North American studies.

Conclusions

In this survey, specific focus has been given to the prevalence of illicit drug use in road traffic in different countries based on large scale studies, one German study focusing on the general driving population, one Norwegian study involving drivers suspected of driving under the influence of drugs, and two studies (from Italy and Belgium) in which collision-involved drivers were screened for drugs. Furthermore, some recent large scale studies have been discussed that reflect data from time periods in the late nineties.

The results derived from these studies are not expected to reflect the situation in other countries with respect to the different driver populations mentioned above, especially if in those countries the drug use patterns (for illicit drugs), the prescribing practices of physicians with respect to licit drugs, and the impact of public campaigns are not known. However, if one wishes to describe the

magnitude of a problem, it is defensible to make reference to sound epidemiological investigations and discuss the contributions of societal and cultural differences that can have an effect on drug use in general in each individual country. If these aspects are considered to be significantly different to those in the various countries mentioned above, it will be a problem to apply the results presented in this survey.

The following conclusions are meant to be used as indicators for further discussion:

- Most studies on prevalence in drivers involved in traffic crashes and in drivers suspected of DUID, showing some trend that the prevalence of drugs other than alcohol increased over the decades, particularly cannabis, amphetamines and opioids in most parts of the world where large scale studies have been conducted, whereas the trend on the involvement of alcohol is stabilized.
- Studies on drug presence in on-the-road drivers are rare but are badly needed for determining the scope of the problem in the driver population, especially if crash risk estimates for the various drugs are to be given.
- Benzodiazepines are frequently detected as illegal or medicinal drug. Some studies suggest that the plasma concentrations for the various benzodiazepines are too high to be considered as the result of therapeutic use, and emphasize the illegal drug use. Other studies in which DUID suspected drivers are included mostly include young male drivers stopped or arrested in late weekend nights at hours that the average benzodiazepine drivers, mostly older drivers, are not included. These studies show a lower prevalence of these drugs.
- Lack of standardization (sample selection, toxicological and medical screening procedures and reporting) is the major reason for not being able to compare data derived from different countries, but even within one country this will be difficult as well, if various methodologies are being applied.
- Multiple drug use and alcohol/drug use are frequently detected. There is a need to know the impact of these combinations in determining the scope of the problem, since most illegal drugs are being used in combination with alcohol or other drugs and do not allow the determination of the problem for each individual drug.
- No comparisons across countries are allowed on the basis of the present knowledge!

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TECHNOLOGY FOR TESTING DRUGS OF ABUSE IN DUID CASES

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Testing for drug abuse in DUID cases is dependent on a number of factors. These include the method for processing the drugged driver, the biological specimen available for testing, the ease or difficulty associated with obtaining the specimen, the location of the testing (i.e. on-site or at a laboratory), and the ease or difficulty in conducting the analytical or chemical method used for the test. There has been significant recent advancement in the application of technology to testing on-site (at the point of collection) and increased understanding of the relationship between drugs in various specimens and impairment.

There is a fundamental consideration in applying drug testing to the police detection/arrest paradigm. Do we develop evidence of impairment prior to determining its cause (i.e. from drugs) or do we focus on detecting the drug and then develop evidentiary evidence of impairment? The current practices (particularly that of the DRE) follow the former, but the emergence of on-site testing shows promise for the latter. The current procedures suffer from higher cost in time and labor associated with DRE exams and consequently result in fewer drugged-drivers being detected. If the paradigm can be shifted to the use of on-site rapid screening tests, then a much larger number of drivers can be more efficiently evaluated for drug use and the problem of the drugged driver more effectively managed. A proposed best approach lies in using the skills of the DRE to define impairment in drivers who screen positive for drugs. New programs and laws should be directed towards this more efficient process.

The specimens available for testing include blood, urine, saliva (oral fluid), hair or sweat. All specimens can be tested in a laboratory setting but only urine and oral fluid can be tested on-site. Blood requires medical intervention for collection. Hair and sweat cannot be readily correlated with impairment. Urine can be collected at a police station, but not effectively at the point of the stop. Oral fluid, on the other hand, can be collected and tested at the point of the offense. Specimens including blood, urine, and oral fluid can be regularly utilized but must be related to the paradigm selected. The detection window for oral fluid and blood are similar (hours) and are closely associated with impairment. Urine detects drugs for days; hence, drugs may be present in urine long after the effects have diminished. All specimens effectively determine drug use, however, all need to be coupled with other evidence of clinical impairment to provide sufficient evidence for judicial use.

The three principal specimens are distinctly different in the ability of each to be collected. Blood requires venipuncture that necessitates medically trained personnel. Urine requires a bathroom facility and must be associated with a witnessed collection and the handling of a distasteful substance. Oral fluid can be collected with a sponge or swab, hence under direct observation with minimal intrusion and distaste. While laboratory testing is possible for all specimens, only urine and oral fluid are applicable to on-site testing.

Urine on-site collection testing has the following advantages: the period of detection is 2 – 3 days, so drugs are readily detected; drugs and metabolites are highly concentrated in urine; the specimen can be obtained without physical risk to the donor; testing can be performed with non-scientific personnel; minimal space and resources are required; and rapid turnaround time of test results is possible with products cleared by the FDA. Urine has the following disadvantages: the period of detection is 2 – 3 days, therefore, no dose-concentration relationship exists; the drug concentration is highly influenced by the amount of water intake; uniform criteria will need to be established; and the specimen is subject to adulteration if the collection is not fully observed.

Oral fluid has the following advantages: The technique is noninvasive and there is good accessibility in obtaining the specimen; it represents the "free" drug fraction that relates to drug effect; it has narrow detection window, 1-2 days or possibly longer and the parent drugs are detected; the specimen can be obtained without physical risk to the donor; testing can be performed with non-scientific personnel; minimal space and resources are required; and rapid turnaround time of test results is possible with products cleared by the FDA. Oral fluid has the following disadvantages: it may be subject to oral contamination; the saliva/plasma ratios can be pH dependent; collection methods may influence the concentration of drugs; the collection volume is device dependent; uniform criteria will need to be established; and the development of a THC assay with a clearly defined window of detection is still needed.

Oral fluid testing technology is evolving rapidly. Significant improvements have been demonstrated. There is reason to be optimistic about oral fluid drug testing as the principal means for the identification of the drugged driver. Therefore, the use of oral fluid to identify the drugs used coupled with a revised paradigm for demonstrating impairment represents a more efficient approach to identifying and prosecuting drugged-drivers in the future.

CRASH RISK OF DRIVERS USING DRUGS & DETECTION OF DRUGGED-DRIVERS

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INTRODUCTION

The contribution of drugs other than alcohol on road trauma is still under some debate. Drugs frequently detected in crash victims and impaired drivers include amphetamines, cocaine and other CNS stimulants, benzodiazepines, cannabis, and opiate-like drugs such as heroin, morphine and methadone. All of these drugs are capable of causing relevant impairment of driving skills, but there is still uncertainty as to how such drug use translates to an increased crash risk (1-6).

This presentation reviews the studies that have investigated illicit drug use and their impact on crash risk and provides a summary of the Victorian law that provides police powers to detect drivers using alcohol and/or drugs.

MEASURING CRASH RISK

Crash risk has been studied using one or a combination of the following: (a) case control designs by matching drug use in crashes with a control group or linkage studies of drug use through prescriptions; (b) responsibility studies by examining the effect of drug use on the proportion culpable; and (c) by use of surveys.

CASE CONTROL STUDIES

Epidemiological studies provide a powerful method to study the affect of drugs use and crash risk, however, the results have not always been consistent. A number of studies have shown that the use of minor tranquilizers, such as benzodiazepines, increase crash risk. A 5-fold higher risk of a serious road accident was seen with hospital admissions from road crashes in people who used these drugs in the past 3 months (7). A similar study showed the odds ratio was elevated for those persons taking benzodiazepines, particularly within a few weeks of the first prescription (8). However, a nested case-control design of over 200,000 drivers using driver's license files, police reports of injurious crashes, and health insurance records showed an increased risk of motor vehicle crash involvement in the elderly population using long acting benzodiazepines (9). This contrasted with another study that found the relative risk of injurious crash involvement for current users of any psychoactive drug was significantly elevated and was primarily due to benzodiazepines and sedating antidepressants (10).

In contrast, another study showed no increase in accident risk with the use of benzodiazepines and sedatives (11). A related case-control study on injured persons involved in road crashes showed that use of anti-depressants and opioid analgesics by older drivers was associated with increased risk of collisions, but not with benzodiazepines or sedating antihistamines (12).

A causal role of drugs (opiates, cannabinoids and amphetamines) was not found in a retrospective study when the incidence of drugs in drivers injured in road accidents and admitted to a hospital were compared to persons admitted to hospitals but were not involved in an accident (13). There is also some evidence of the over-involvement of amphetamine users in crash rates (14, 15).

Injured drivers also show a high prevalence of drugs. Cannabinoids were found in 13.9% of French injured drivers, while opioids, cocaine and amphetamines were found in 10.5%, 1.0% and 1.4%, respectively (16). A higher crash responsibility was only seen with alcohol and alcohol combination with other drugs in injured drivers presented to an urban emergency center in Colorado (17), however, since the active form of cannabis was not measured it is not possible to say if these drivers were likely to be impaired or not.

A recent French study investigating 900 drivers injured in road accidents admitted to trauma unit and comparing the incidence of drug with 900 patients (controls) who attended the same emergency units for a non-traumatic reason found that not only was alcohol use (BAC > 0.05 %) associated with a higher frequency in the driver group, but also drivers with positive tetrahydrocannabinol (THC) in blood (Odds ratio, OR = 2). They also found that drivers using morphine or heroin had an OR of 8.2, and benzodiazepine users an OR of 1.7 (18)

Crash investigations also provide evidence of likely causal factors. Logan (1996) showed that in a population of methamphetamine positive drivers, predominantly culpable for accident causation, the use of methamphetamine most likely contributed to risk-taking behavior or was a result of withdrawal related fatigue and hypersomnolence (19). An investigation of trucker fatalities pointed to an adverse effect of THC over 1 ng/mL, and other psychotropic drugs, on crash risk (20).

RESPONSIBILITY ANALYSES

Terhune et al. (1992) examined almost 2000 drivers fatally injured in the USA to assess the contribution of drugs to accidents and found that the responsibility rate for amphetamine-positive drivers was higher than the drug-free group (21). They also showed that the responsibility rate decreased compared to the drug-free control group, however, another study demonstrated that low doses of THC moderately impair driving performance (4). This impairment became severe in combination with low blood-alcohol concentrations (~0.04%).

Data presented by Warren and by Donelson in Simpson tend to "suggest that marijuana-users are more likely to be responsible for their crashes than drug-free drivers" (16, 22, 23). In contrast, Williams found little evidence for any causal role for cannabis, although numbers of drivers were small (24).

A 10-year study of fatally-injured drivers involving collaborating centers over three Australian States using a method of responsibility analysis devised by this group (25) found a significantly elevated odd's ratio for any drivers consuming impairing drugs, drivers consuming cannabis as defined as the presence of THC in blood and stimulant-using truck drivers (26). In total, almost 3400 drivers were thoroughly investigated using the drug-free driver as control. The possibility of statistically significant interactions was tested by using a logistic regression model that assessed possible interactions. When only those cases with THC concentrations of 5 ng/mL or higher were

considered, the OR was 6.6, which is a similar OR to that obtained for BAC-positive cases over 0.15%. Alcohol was a common substance found in cannabis positive cases (43% of THC cases). In these alcohol plus THC cases, the risk increased further over that caused the alcohol.

It was of interest that cases in which THC was not detected, but carboxy-THC was detected and those drivers with tetrahydrocannabinol concentrations less than 5 ng/mL had an OR no different to unity. It is likely that the cannabis effect on crash risk was high since the blood concentrations were high with a median of 10 ng/mL (range 1-100), much higher than a study which showed little adverse effect on crash risk (27).

One measure of assessing the involvement of drugs is to compare the prevalence of drugs in crash victims with general drug use obtained from surveys, or to survey drivers of their use of drugs while driving and their perception of possible impairment. However these methods while providing some useful information cannot objectively or causally link drug use and an adverse driving related event. These studies may not accurately predict the effects of drugs under actual driving conditions.

SURVEY DATA

Dussault et al., in a study attempting to mimic the classical Borkenstein model for alcohol, found that the prevalence of drugs in fatally injured drivers compared to roadside surveys conducted at same time in Quebec, gave an OR for alcohol, cannabis, cocaine, benzodiazepines of 39, 2.2, 4.9 and 2.5, respectively (28, 29).

Goodwin Gerberich et al (30) in a retrospective study of 64,657 people in a questionnaire on general health and cannabis use in Minnesota showed a 2.3-fold increase for male cannabis users suffering injuries from motor vehicles compared to 965 injury hospitalizations. Positive associations were also seen with self-inflicted harm and assaults.

Anonymous telephone surveys in nearly 6000 16-19 year old drivers (MA & NY) in 1979-81 found that cannabis users (7%) (>6 times per month) were 2.5 times more likely to have had a crash (95% 1.4-4.1). Those that used cannabis at least every other day were 2.9 times more likely to had a crash (95% CI 1.3-6.8) Alcohol (>6x per month) increased risk 2.0 times (10%) (31).

CONCLUSIONS ON CRASH RISK DATA

These findings are compatible with other research. The meta-analysis conducted by Berghaus show substantial performance decrements at plasma THC concentrations of about 5 ng/mL or higher, and by 10 ng/mL the majority had significant performance decrements (32). This equated to a blood THC concentration of about 5 ng/mL. Controlled driving studies have also shown significant impairment caused by use of cannabis both in the absence and presence of alcohol (4, 33, 34).

In conclusion, the majority of evidence points to drivers taking psychoactive drugs, particularly cannabis, benzodiazepines, strong stimulants and those taking two or more drugs, to be more likely involved in a serious road crash.

DETECTING DRUG AFFECTED DRIVERS

In the State of Victoria, a number of Government initiatives have occurred over many years to counter alcohol and drug caused road trauma. The law is defined in the Road Safety Act (1986) and its amendments. For example police can require a driver to undergo an alcohol preliminary breath test for no particular reason, i.e. randomly. Several "booze" buses operate in State and screen about 3.2 million motorists yearly from a population of some 4.6 million. The Blood Alcohol limit in Victoria and indeed around Australia is 0.05% for fully licensed drivers and zero for commercial drivers and probationary drivers (first three years of license).

In relation to drugs, the old law police were required to prove drivers were under the influence of intoxicating liquor or of any drug to such an extent as to be incapable of having proper control of the motor vehicle. However, until recently (2000) there was no provision to establish impairment and very few prosecutions occurred since the police were unable to satisfy this legal test. After several years of debate in the community, the report of a joint party Parliamentary Road Safety committee led to the enactment of new laws that defined an offense of driving whilst impaired and gave police the ability to determine impairment of a driver whom the police had reasonable cause to believe were impaired by a substance.

Police can now require a driver to undergo a drug impairment assessment if they were in charge of a motor vehicle within 3 hours of the assessment and the behavior or appearance may be impaired by reason other than alcohol. A preliminary assessment for sobriety is conducted at the roadside. Traffic police are trained to conduct this assessment. If the driver fails this roadside assessment they are taken to an appropriate police station for a standard field sobriety test (SFST). Specially selected police officers working in traffic division undergo a formal training in the recognition of drug effects and to conduct the SFST. The process includes a series of standard questions to determine name, address and if the driver has any medical conditions. Police conduct the one-leg stand test, walk and turn test and determine if any nystagmus is present. All procedures are video taped to show that the established protocol was used. If the driver fails these tests and the police office believes drug use was the cause of this impairment a medical practitioner or registered nurse is asked to collect blood and/or urine. The usual blood analyses for drugs takes place at a forensic laboratory.

It is a defense if legally prescribed drugs were used, as prescribed. For legal drugs prosecution must prove that drug concentration in blood is not consistent with prescribed therapeutic dose. If drivers refuse to undergo a drug assessment they are deemed to be impaired and face the maximum penalty. This is similar to the provision for refusing a breath test for alcohol. The brief of evidence includes the circumstances of driving behavior, initial road-side assessment, the formal SFST assessment, a structured documentation of signs and symptoms, the toxicology results (certificate from an approved analyst), video tape of the assessment and an expert report from approved expert on the usual effects of the drugs detected. In some cases drivers are required to undergo medical examination. This arises if medical conditions or other relevant factors are identified by the officer.

Recently the Victorian parliament approved legislation for random drug tests on saliva. This would operate similarly to breath tests for alcohol but would only focus on methamphetamine and cannabis (as tetrahydrocannabinol). It is a *per se* law that will not require impairment to be

established. It is intended that police will use "drug buses" to detect and detain drivers presumptively positive from drug screens for further evaluation. The details of the procedure are yet to be established, but it is planned to screen a significant number of Victorians drivers for possible drug use in the near future.

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SURVEY OF EUROPEAN DUID LEGISLATION

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In Europe, each country has its specific legislation on driving under the influence of drugs. This text will give a broad overview of the different types of legislation that exist, and illustrate them with examples.

DUID Legislation

Generally, one can say that there are two types of legislation on DUID: **impairment** and ***per se* or analytical** (sometimes also called zero-tolerance laws). Most countries (e.g. all the countries of the European Union) have legislation based on the demonstration of impairment, in short 'impairment laws.' Impaired driving must be demonstrated by the prosecution, and the analysis of drugs in body fluids (blood or urine) only provides corroborating evidence as to the cause of the impairment.

The EMCDDA published an overview of the legislation on drugs and driving in the 15 EU countries and Norway (1). Table 1 summarizes the findings.

Table 1: Survey of European DUID legislation.

Country	Type	Administrative/ Criminal	Fine (€)	Prison (days)	License withdrawal (months)
Austria	Impairment	Administrative	581-3633		1
Belgium	*Per se* Impairment	Criminal Criminal	1000-10000	15 180	Possible
Denmark	Impairment	Criminal	Fine	365	
Finland	*Per se* Impairment	Criminal Criminal	Fine 60 day fines	182 700	 Max 60
France	*Per se*	Criminal	4500	730	36
Germany	*Per se* Impairment	Administrative Criminal	250 Fine	 365-1825	1 1 – 3
Greece	?	Criminal	147	60	3-6
Ireland	Impairment	Criminal	1270	180	24
Italy	Impairment	Criminal	260-1030	30	0.5-3
Luxembourg	Impairment	Criminal	250-5000	8 - 1095	possible
Netherlands	Impairment	Criminal	Acc:11250 Fatal: 45000	1095 3285	60
Norway	Impairment	Criminal		365	12
Portugal	Impairment	Criminal	360-1800	365	2-24
Spain	*Per se* Impairment	Administrative Criminal	302-602	8-12 WE arrests	3 12-48
Sweden	*Per se*	Criminal	Day-fines	730	1-36
UK	Impairment	Criminal	7000	180	12-

Examples of impairment legislation:

- Norway: No one must drive or attempt to drive a motor vehicle when he is under the influence of alcohol or of other intoxicating or narcotic agent. If the breathalyzer test is negative, the police may take him to be examined by a medical practitioner who can take blood (and urine) tests or otherwise seek to ascertain the degree of influence.
- Denmark: A power-driven vehicle is not allowed to be driven or attempted to be driven by any person who is, because of illness, debility, strain, too little sleep, influence of drugs or for similar reasons, in such a condition that such person is incapable of driving such vehicle properly. In this case, the police may hold a person in order to have laboratory specimens of such person's blood and urine taken.
- UK: Section 3A/4 Road Traffic Act 1988 states that: A person who, when driving, attempting to drive, or in charge, of a mechanically propelled vehicle on a road or other public place is unfit to drive through drink or drugs is guilty of an offence.

Proving impairment requires the assessment of a medical doctor or a specially trained police officer (Drug Recognition Expert or DRE). Despite standardization efforts, this remains somewhat subjective, and many countries experience difficulty in obtaining convictions.

For this reason, and in analogy to alcohol, some countries have added new legislation that forbids driving if a drug is present in the body of a driver. These laws are called '*per se*-laws'. No proof of impairment is required any more. The demonstration of a drug in a body fluid (mostly blood, but sometimes also urine) is sufficient to bring a conviction.

With '*per se*' laws, the question arises whether, similarly to alcohol, legal limits can be determined. In 1985, a consensus panel concluded that "*per se*" levels could not be determined, because the blood concentration-impairment relation is more complex with illicit drugs than it is with ethanol (2). The presumed Gaussian distribution curve relating impaired driving ability at a given drug concentration against numbers of individuals is probably broad, flat and diffuse for most drugs. For this reason, the cut-offs used are analytical cut-offs, i.e. any detectable concentration of a drug is enough, and these laws are also called 'zero-tolerance laws'.

In Europe, Germany was the first country to introduce such a law: the §24a of the Road Traffic Act was amended in March 1998. Under this amendment, any person driving a vehicle in road traffic under the influence of cannabis, heroin, morphine, cocaine, amphetamine or designer amphetamines commits an offence. A person is deemed to be under the influence of a drug if the drug is detected in his blood. This does not apply if the substance originates from having taken prescribed medication as intended for a specific illness. In Germany these analytical cut-off limits have not been included as such in the law, but they are used by the forensic laboratories for implementation. In addition, Germany still has its impairment law (§316): if impairment is proven, it is a criminal offence. This law covers all psychoactive drugs. The sanctions can go to 1 year in prison, a fine of up to 360 daily rates and a license revocation for 6 months to 2 years

In Belgium a similar law was voted in March 1999. A driver can be stopped by the police and asked to perform a standardized test battery to establish the presence of external signs of influence by drugs. If this is positive, a urine sample is taken and an on-site immunoassay is performed. If this is positive, a medical doctor is called to examine the subject and take blood. The blood is than sent to a laboratory for GC-MS analysis with deuterated internal standards. If

drugs are present in the blood (the analytical cut-offs are mentioned in table 2), the driver can be condemned to fines and/or imprisonment similar to those for driving with a blood alcohol greater than 0.8 g/L. In case of a positive analysis, the driver must also pay for the costs of the analysis.

Sweden also introduced a *per se* law in 1999. It introduced zero-tolerance for narcotics (including benzodiazepines), except if the drugs are taken according to a medical prescription, the dose is not too high and no impairment is present. Practically the detection of driving under the influence is performed by an eye examination. If there is reasonable suspicion a further examination is carried out. If drugs are found in the blood, the driver is also sanctioned for drug use. After the introduction of this law in 1999, the number of prosecutions was multiplied by five.

France introduced *per se* legislation in February and June 2003. A driver is sanctioned if blood analysis shows prior exposure to illicit drugs. The law covers all illicit substances. There are no cut-offs. The penalties are severe:
Fatal accident: € 100,000 fine & 7y prison
Severe injury: € 75,000 fine & 5y prison
Light injury: € 45,000 fine & 3y prison
No accident: € 4,500 fine & 2y prison

Finland also introduced *per se* or zero tolerance legislation in 2003. The drugs covered are those listed in the UN conventions on narcotics. The law is not applicable if the drugs are used according to a physician's prescription. Finland also still has the impairment law. In this case impairment most be proven based on the documentation of police officer, a clinical sobriety test by a physician and the lab report with the drug findings and a pharmacological evaluation. A few examples illustrate how the different pieces of legislation are used:

- if benzodiazepines are positive in blood, with a medical prescription, but the driver is impaired, he will be sanctioned according to the impairment law
- if benzodiazepines are positive in blood, without a medical prescription, the driver will be sanctioned according to zero tolerance law
- if THC is present in blood, the zero tolerance law will apply
- if no THC is found in blood, but THCCOOH is present in the urine, there will be no sanction for DUID, but a sanction for drug consumption.

Based on these five examples, one can see that there are differences between the *per se* laws.

- the sample can be blood, serum or plasma
- the scope can be a limited list of illicit drugs or all narcotics
- in some countries, some medicinal drugs are included under certain conditions, while in others they are not included
- the cut-offs can either be included in the law, determined by a consensus of experts, or be based on the analytical capabilities of the laboratories (see table 2).
- the consequences can be administrative or penal

Table 2: Analytical cut-off limits in blood, serum or plasma for some drugs as agreed upon or proposed in different countries (all concentrations in ng/mL, except Sweden: ng/g) *

	Germany		Belgium	France	Sweden
	1998	2002(3)			
Amphetamine	50	25	50	LOQ	30
MDMA	50	25	50	LOQ	20
MDEA	50	25	50	LOQ	20
MDA				LOQ	20
MBDB			50	LOQ	20
Cocaine			50	LOQ	20
Benzoylecgonine	150	75	50	LOQ	20
Morphine (free)	20	10	20	LOQ	5
THC	2	1	2	LOQ	0.3

LOQ: limit of quantitation. The new cut-offs have not yet been approved by the Länder in Germany.

Legislation on obtaining samples and testing

In the last years, several countries have introduced legislation that allows roadside sampling and/or testing:

- Spain
- Austria: since Jan 2003 a blood sample can be taken if there is suspicion of DUID
- Italy: Highway code June 2003
- UK: July 10, 2003: Railways and Transport Safety Act
  The UK Railways and Transport Safety Act of 2003 became effective in November 2003. It gives a constable the power to administer preliminary tests if the constable reasonably suspects
  - that a person is driving, is attempting to drive or is in charge of a motor vehicle on a road or other public place, and has alcohol or a drug in his body or is under the influence of a drug;
  - that a person has been driving, attempting to drive or is in charge of a motor vehicle on a road or other public place while having alcohol or a drug in his body or while unfit to drive because of a drug, and still has alcohol or a drug in his body or is still under the influence of a drug;
  - that the person has committed a traffic offence while the vehicle was in motion;
  - if a constable reasonably believes that the person was driving, attempting to drive or in charge of the vehicle at the time of the accident.

Three types of preliminary tests are mentioned: a preliminary breath test, a preliminary impairment test and a preliminary drug test. The preliminary impairment test includes observation of performance of tasks and other observations of physical state to indicate whether person is unfit to drive. The preliminary drug test involves obtaining a specimen of sweat or saliva and the use of the specimen for the purpose of obtaining an indication whether a person has a drug in his body.

In Europe, random testing allowed in nine countries: Belgium, Denmark, Germany, Spain, Italy, Luxembourg, Portugal, Finland, Norway, while some suspicion needed in six countries: France, Ireland, Netherlands, Austria, Sweden and the UK

Regulations on driver's license

Annex III of Council Directive 91/439/EEC of 29 July 1991 on driving licenses states that "Driving licenses shall not be issued to or renewed for applicants or drivers who are dependent on psychotropic substances or who are not dependent on such substances but regularly abuse them". Recognizing that such substances may be medicines issued on a valid prescription, it also laid down that "Driving licenses shall not be issued to, or renewed for, applicants or drivers who regularly use psychotropic substances, in whatever form, which can hamper the ability to drive safely where the quantities absorbed are such as to have an adverse effect on driving. This shall apply to all other medicinal products or combinations of medicinal products which affect the ability to drive."

In some countries like Germany, Italy, France and Spain, **hair analysis** for drugs of abuse has become a routine test to demonstrate that a driver who had his driving license suspended is no more dependent.

Conclusions

Drugs and driving is a hot topic in Europe and in the last five years there have been many new laws and changes in legislation. There is clearly a move towards *per se* legislation, although some countries have decided to stay with impairment legislation. In addition, several countries have introduced legislative changes to allow testing.

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A SURVEY OF DRIVING UNDER THE INFLUENCE OF DRUG [DUID] LAWS IN THE UNITED STATES

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Driving under the influence of drugs is generally covered in existing legislation in all 50 state laws. DUID statutes are predominately found in the Transportation or Motor Vehicle Codes or Titles of the respective states' Codes or Statutes. In only three states (Idaho, Minnesota and Texas) do you find the state's DUID statutes in the Penal Code or Criminal Title (Walsh, Danziger, et. al. 2002).

In general practice, there are two approaches used to identify a drugged driver: a) Impairment (Behavioral approach) – which involves documenting the behavior of the driver; and b) The Analytical approach that involves the chemical testing of biological fluids for drugs. All DUID laws involve one or both of these approaches. There are three main types of DUID statutes: 1) Statutes requiring that drugs render a driver "incapable of driving safely"; 2) Statutes requiring that the drug **"**impair" the driver's ability to operate safely or require a driver to be "under the influence", "or affected by an intoxicating drug"; and 3) "Zero Tolerance" *per se* laws which make it a criminal offense to have a drug or metabolite in the body while operating a motor vehicle.

All of the states, save Texas and New York, use the phrase "under the influence" in their DUID statutes. A total of 14 states (Alabama, Arkansas, Illinois, Kansas, Nevada, Maryland, New Mexico, North Dakota, Oklahoma, Pennsylvania, South Dakota, Vermont, Wisconsin, and Wyoming) define the standard that constitutes "under the influence" within the body of the statute as "incapacity"; i.e., the influence of the drug "renders the driver incapable of safely driving." Incapacity to drive safely is thus linked to the drug ingested and the prosecutor must show a connection between drug ingestion and the incapacity of the driver.

Eight states (Arizona, Florida, Hawaii, Indiana, Kentucky, Montana, South Carolina, and Virginia) use the standard of impairment to define "under the influence" so that the influence is such that the driver's abilities are impaired. This suggests a requirement of proof that is less stringent than one that renders the driver "incapable" of safely driving; nevertheless, the prosecutor must still prove that the impairment is directly related to the drug ingested.

In contrast to alcohol, the interpretation of drug concentrations in biological fluids, especially with regard to behavioral effect, requires some knowledge about the dose, the route of administration, the pattern or frequency of drug use, and the dispositional kinetics (distribution, metabolism, and excretion) of the drug. Interpreting the meaning of either drug/metabolite concentration in a single biological specimen with reference to impaired driver performance is therefore an extremely difficult task for a scientist, and even more difficult for a prosecutor. The variables involved create a sufficiently great range of possible interpretations to render any specific interpretation questionable, other than to conclude the individual has used a specific drug in the immediate past (days) (Hawks and Chang, 1987). These complicated pharmacokinetic relationships have prevented the establishment of specific levels of drug concentrations, which could be interpreted as evidence of impairment either in blood, urine, or other bodily substance (Consensus Development, 1985). As a result, these factors make it very difficult for prosecutors to prove that a specific drug "caused" the driving impairment

which is required under most state laws. Consequently, there is limited enforcement of DUID laws that require prosecutors to prove that drug consumption caused the driving impairment.

An alternative approach is the *per se* or "zero tolerance" statute. Currently there are 18 states that have variations of zero tolerance type "*per se*" legislation with regard to DUID. Ten states (Arizona, Georgia, Indiana, Illinois, Iowa, Minnesota, Pennsylvania, Rhode Island, Utah, and Wisconsin) will not tolerate the presence of a prohibited drug or substance in a driver's body while he/she is driving. In these states, any amount of prohibited drug found in the blood or urine of drivers while operating a motor vehicle is a *per se* violation of those states' DUI statutes. Five states (California, Colorado, Idaho, Kansas, and West Virginia) make it illegal for any drug addict or habitual user of drugs to drive a vehicle in their states. Two states (North Carolina, South Dakota) make it illegal for any person under the age of twenty-one to drive with any amount of a prohibited drug or substance in their bodies. One state (Nevada) has determined that driving with specific cutoff levels of certain prohibited drugs or substances other than alcohol is a *per se* violation of its DUI statute.

In most of these "*per se*" states, the compelling argument for adoption of the *per se* statute was that a driver was far less likely to be prosecuted for impaired driving if he/she were under the influence of an illegal substance than if he/she were under the influence of a legal substance (alcohol). This dilemma existed because there was a *per se* level for alcohol but no practical or legal way to establish an impairment-linked *per se* level for controlled substances. The *per se* strategy creates an important legal distinction between having to prove a nexus between the observed driver impairment and drug use (causal relationship) and simply demonstrating that observed impaired driving behavior was associated with specified concentrations of drug/metabolite in the individuals body while operating the motor vehicle. In essence, the *per se* drug statute attempts to remedy the inequality of dealing with alcohol and other drugs by making the *per se* drug limit "any amount" of a controlled substance, and by making this offense equivalent to the *per se* alcohol offense. Officials from the states with *Per se* statutes indicate they are working well but to date there are no scientific studies to demonstrate effectiveness.

SUMMARY

It appears that drugged-driving is a significant problem in the United States. Current laws in most states make it difficult to prosecute and convict drugged-drivers and this had led to poor enforcement. There is a clear need for better data, more harmonization of data collection techniques, and a standardization of core data variables to establish a better epidemiological database to support more vigorous legislation. Efforts to support standardization or harmonization of laws through the development of "model" legislation should be encouraged. Efforts should also be targeted to training of police officers in recognizing driving under the influence of drugs.

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ENFORCEMENT & PROSECUTION OF DRUGGED-DRIVING LAWS: A CHALLENGE OF LEADERSHIP TO THE INTERNATIONAL TRAFFIC SAFETY COMMUNITY

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"The criminal trial today is…a kind of show-jumping contest in which the rider for the prosecution must clear every obstacle to succeed."
--Robert Mark, Commissioner, London Metropolitan Police. *The Washington Post*, November 1971

A common refrain heard among American prosecutors is that impaired driving cases are as difficult to try as a death penalty case. From a practical standpoint, this may be a valid claim. After all, impaired driving cases involve scientific evidence, expert testimony, complex legal issues and jurors who typically identify with offenders rather than law enforcement officers. Since impaired driving is a crime that cuts across all socio-economic lines, offenders also have resources to support a vigorous defense. These cases require nothing less than the highest level of advocacy skills from a prosecutor. Yet, prosecutors also know that the most difficult of all impaired driving cases to prove beyond a reasonable doubt is that of drug impaired driving. Illicit drugs can be illusive to detect, rapidly dissipate from an offenders blood and often difficult to quantify a level of impairment. That presents the international traffic safety community with the challenge of providing leadership on an issue that if left unchecked will command higher death tolls on the highways.

Criminal Justice System Realities
Impaired driving offenders crowd court dockets every day. As documented in the Traffic Injury Research Foundation's 2002 Report *DWI System Improvements for Dealing with Hard Core Drinking Drivers: Prosecution*, these are defendants familiar with the dark corners and back alleys of the legal system, often taking advantage of prosecutors ill-equipped with technical skills and knowledge needed to successfully prosecute offenders.

By analogy, for impaired driving cases, the American justice system often performs like a hand dryer in a convenient store restroom. Store owners believe the dryer is wonderful, worry-free appliance. No paper towels to buy, no one has to be paid to pick up the paper towels, and all local sanitation codes are met. Yet, people still leave the restroom with their hands damp from an appliance that really doesn't get their hands dry. This analogy is apt when examining the culture of many prosecutors' offices across the United States:

- Typically the newest, most inexperienced prosecutors are assigned to driving influence of drug (DUID) cases.
- Training is usually unavailable to prosecutors handling these cases.
- Retention of DUID prosecutors is difficult.

- DUID cases are generally misdemeanors and not treated as seriously as other felony cases.

Currently, much is being done to address these problems. The National Highway Traffic Safety Administration at the U.S. Department of Transportation is funding many national and state initiatives to provide prosecutors with information, training, research and technical assistance. Yet, the culture of prosecutors office's also needs to be changed to encourage elected District Attorneys to treat DUID cases with the same level of importance as child abuse, rape and armed robbery.

Prosecutors Role in Prevention & Intervention

According to the U.S. Department of Justice, 98% of all drug related crimes in the U.S. are prosecuted by state and local prosecutors, and in estimates of their dockets, prosecutors believe that 70% of all their cases are related to substance abuse. Prosecutors see first hand the devastation to human life, human potential, families, children and their communities.

As the gate-keepers to resources of the courts, the role of American prosecutors has expanded. Prosecutors are now the leaders in problem-solving courts, treatment courts and community based initiatives. Basically, the victory for a prosecutor is when a substance abusing offender never returns to court again. Research shows that treatment with accountability is the most effective way to make a difference, and prosecutors have a tremendous role in prevention and intervention in the lives of substance abusers to prevent future crimes from being committed. To date, this is potential that is not being utilized to its fullest.

Searching for the Tipping Point

Why did crime drop so suddenly in New York City subways in the early1990's? Leadership!

In 1990, William Bratton became chief of the New York Transit Police. At the time, New Yorkers believed the subway to be the most dangerous place in the city, but through the "Tipping Point Leadership" of Bratton, crime in the subway was reduced 22%. Robberies alone went down by 40%. (Kim & Mauborgne, *Tipping Point Leadership*, Harvard Business Review 2003). Braxton decided to look within his organization for a solution rather than losing his focus on pursuit of funding and legislative changes. As documented in Malcomb Gladwell's best-selling book *Tipping Point: How Little Things Can Make a Big Difference*, Bratton posted officers on the tolls to catch fair beaters. People thought he was crazy when so many felonies were occurring in the tunnels. But, this was Bratton's *tipping* point. By creating an atmosphere of not tolerating small infractions in the subway, he created an atmosphere where the big things didn't happen. In essence, he extended the broken windows theory of community policing and prosecution to a subway.

Authors W. Chan Kim and Renee Mauborgne define *tipping point leadership* in the Harvard Business Review as:

> "The theory of tipping points, which has its roots in epidemiology, hinges on the insight that in any organization, fundamental changes can occur quickly when the beliefs and energies of a critical mass of people create an epidemic movement toward an idea."

Of course, in an area with known and identified challenges and problems, the questions must be asked:

> **What can we do as individuals and within our own organizations in the area of drugged-driving to create an atmosphere that DUID will not be tolerated? How do you create an atmosphere that using drugs and driving will not be tolerated socially and legally? What is the tipping point for DUID?**

Like many, I can ask the needed questions but often fail to find a single solution. I look to greater minds for answers, but for the purposes of debating the above questions, I propose make a few modest suggestions:

1. **Train like we mean it**. Nothing communicates the seriousness of our mission to reduce traffic deaths than aggressive initiatives to train and build knowledge for everyone involved. A great amount of resources and effort from the traffic safety community has gone to detection and arrest of alcohol impaired driving. But, there are not enough officers trained in drug recognition evaluations (DRE). There are also not enough patrol officers who are trained to recognize enough drug signs to call in a DRE officer. Also, prosecutors need mentoring, training and immediate access to the knowledge and expertise necessary to try these cases. And, a growing concern is the lack of optometrists trained and experienced enough to testify about HGN.

2. **Criminalizing Implied Consent Laws with Steep Penalties for Refusal**. We send mixed messages to the public with implied consent laws when we allow a drugged driver to choose the lesser of two punishments for their crime. "*Yes, I will gladly give up my license for a year, so you will not find the cocaine in my blood and send me to jail."* The implicit message to an offender is that their behavior is "kinda okay" or their legislature would not have given them a choice. In the U.S., there is no constitutional right to operate a motor vehicle, but we continue to play hide and seek with the best evidence available in seeking justice.

3. ***Per se* Laws**. In no way am I suggesting that *per se* laws take away from impaired driving programs like DRE (see above), but as a post-probable cause tool, *per se* laws targeting illicit drugs is a great prosecutorial tool that removes the burden of having to show a certain level of an illicit drugs causes impairment.

When looking at a way to create an atmosphere where drug use and driving is impermissible, every state needs a law that says if you use an illicit drug and drive, you have broken the law. Arizona, for example, has passed such a law defining, in essence, a crime divorced from impairment. The State of Arizona does not care if a person was impaired or not –only that they were using cocaine and driving. This is a logical extension of *per se* blood alcohol content laws

that hold if some one has a blood alcohol content of 0.08 they are guilty of a crime –regardless of any other showing of impairment.

There is also a legal and intellectual integrity for *per se* drugged-driving laws. If it is illegal to buy, sell and possess drugs, it should be illegal to use them and get behind the wheel of a car.

But, what about marijuana? THC can remain in the system for days? Two things: A) there will most always be other evidence of impairment. Only in rare instances will you have only a positive drug tests. Remember most drug tests are administered after an arrest has been made. And, B) like Arizona, the offense itself may be divorced from impairment. The crime is that heroin is in your system as you operate a motor vehicle. And, why not? Can anyone suggest that there is an appropriate legal justification that someone should use LSD or methamphetamine and then drive?

4. **Problem-Solving / Treatment Courts**. Everyone can agree that not all types of treatment work for all types of people, yet in court, people are often provided cookie-cutter services dispensed under well-intentioned notions of treating everyone the same. But, the reality is that one offender will be successful with out-patient treatment, and another needs 90 days of residential treatment. Treatment courts provide opportunities for offenders whom traditional treatment efforts have failed. This is accomplished largely through a strong accountability component that provides immediate consequences for failure to comply with the treatment regimen.

5. **Fight Legalization Efforts**. In our live and let live society, too many people do not understand the impact of illicit drugs in their community. Many think back to college days and say, "You know, I smoked a joint and listened to Cheech & Chong albums, and I didn't become a felon." But, people are too quick to use nostalgia to form today's drug policy without understanding that marijuana is exponentially more potent and laced with drugs that had not even been invented. When they shrug their shoulders and say, "What's the big deal", we should be the first ones to step up and educate people in our communities to the bodies on the highways, the human devastation awash in our courtrooms and the over-flowing treatment centers in need of help.

Conclusions

Many of us are familiar with the scope and problems surrounding DUID, and that alone should spur all of us in the international traffic safety community to provide leadership in our own organizations and larger communities to the *tipping point* needed for DUID.

CONVICTION IS AN OPPORTUNITY FOR INTERVENTION BETTER DRUGGED-DRIVING LAW ENFORCEMENT CAN IMPROVE HIGHWAY SAFETY, REDUCE DRUG ABUSE, AND PROMOTE RECOVERY

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Drugged-driving is a global problem that has long been ignored by the traditional advocates of safe driving. Today, I will focus on one aspect of drug-impaired driving, an element that has received almost no attention: How should we respond when a person has been convicted of drugged-driving?

In answering this question, we have the chance to reduce drugged-driving, and to make important strides in reducing illegal drug use. With the right response to drugged-driving convictions, it is possible to triage large numbers of drug abusers, getting those who need it into treatment.

Drug-Impaired Driving and Alcohol-Impaired Driving

The fact that the non-medical use of drugs such as marijuana, cocaine, ecstasy and methamphetamine is illegal allows for much clearer post-arrest requirements than is possible in DUIA cases. Prohibition of any alcohol use for DUIA cases is often problematic because alcohol is not an illegal substance. It is much easier to justify a prohibition of any use of a purely illegal substance than of a legal substance. DUID offenders can be prohibited from any illegal drug use, regardless of whether that use involves driving.

Drugs and alcohol also differ in the length of time during which they can be detected through testing and the window of detection for drugs is much longer than for alcohol. As a result, there are applications for drug testing that are not possible with alcohol testing

This difference between drug testing and alcohol testing has profound implications for the way in which post-conviction follow-up is conducted in DUID cases. Unobserved urine drug testing is subject to cheating. Oral fluids, sweat and hair are resistant to cheating as are observed urine collections.

Lessons from Drunk Driving: Treatment Works

Although there is little relevant information on programs that reduce drugged-driving recidivism, we can learn from the national experience with drunk driving. There are several studies that demonstrate reduced recidivism for people convicted of driving while drunk.

The New Jersey Alcohol Countermeasures Program combines sanctions with mandatory education or treatment for anyone convicted of driving under the influence of alcohol. This program included education and treatment efforts that lasted from 16 weeks to over 52 weeks with stringent consequences for failure to comply, including license revocation. The recidivism

rates for participants showed significantly fewer additional drunk driving arrests for those who completed their education or treatment assignment.[1]

A larger study in Prince George's County, Maryland followed 8000 offenders over a two-year period. Results indicated that recidivism rates for offenders with no treatment at all were four times higher than those who had any kind of treatment.

This study also showed that treatment is especially important for first-time offenders. First-time offenders who did not participate in any treatment had recidivism rates up to six times higher than those in any of the other three conditions.[2]

Finally, a meta-analysis of 215 studies evaluating the effect of treatment programs on DUI recidivism also established that treatment makes a difference. The results indicated a reduction in recidivism for drunken driving offenders who were in a treatment program, as compared with those who did not participate in treatment.[3]

Suggested Approaches for Monitoring Drugged-Driving Offenders

In the United States we have no standardized national system for dealing with either alcohol or drug problems on the highway. We can use this as an opportunity to establish a comprehensive approach that will be useful to leaders at all levels of the government when they create the next generation of drugged-driving programs.

After conviction, drugged-driving offenders must be held to a no-drug-use standard and monitored by regular drug tests. Failure to comply with this standard should be met with increasingly close supervision and progressively greater restrictions. The monitoring is designed to ensure long-term compliance as a condition of retaining a driver's license.

The new drug tests now available are the backbone of this approach, making it realistic and viable. Law enforcement and drug treatment professionals can obtain reliable information on the nature, duration and type of drug use by drugged-driving offenders and use it to assess program effectiveness while monitoring participants' drug use.

It is important not to misuse scarce and expensive drug abuse treatment resources. The use of drug abuse treatment should be limited to offenders who have demonstrated sufficient need, such as those who have not responded to less expensive, less demanding interventions.

Hair-testing to determine recent drug use history is a good way to start post-conviction monitoring. After a period of clean drug tests, the frequency of testing may be decreased. For a first-time offender, monitoring should continue for at least one year but two years is the preferred length of time. Recidivist offenders will require up to 5 years of monitoring.

Offenders should bear the direct cost of drug testing as a condition of retaining their drivers' licenses. Those who test positive for continued drug use will be more closely monitored and referred to drug abuse treatment as needed. Failure to comply with monitoring or other requirements will result in license revocation.

Most first-time drugged-driving offenders will not need intensive treatment added to their ongoing monitoring. They should attend structured educational programs which include information on the dangers of combining drug use with driving and encouragement to end illegal drug use completely. The curriculum should discuss the use of alcohol and impairing prescription drugs, as well as the value of 12-step meetings and drug abuse treatment.

When drug treatment is needed, it should be linked to regular attendance at a 12-step meeting (Alcoholics Anonymous (AA) for alcohol offenders and Narcotics Anonymous (NA) for drug offenders. Individuals who fail in drug abuse treatment should have their drivers' licenses revoked. Reinstatement should be considered only after successful completion of a drugged-driving program and commencing on a one-two year period of active monitoring with drug testing.

Confounding Issues

In discussing a comprehensive response to DUID, there are two confounding issues that must be resolved. The first is that of how to address alcohol use by drugged-driving offenders. I recommend that, in addition to the routine drug testing described earlier, this group be tested for alcohol use. Evidence of alcohol use should be considered a punishable infraction.

Traditional alcohol testing has limits in this application, however, because it only provides information on use during the few hours prior to testing. Hair and sweat patch testing does not detect alcohol use, but both urine and oral fluids do. When a hair test or a sweat patch test is used, a supplementary breath test for alcohol should also be used.

The second issue relates to use of prescription drugs that can impair driving. Offenders should be prohibited from using controlled (potentially abused) substances without prior approval, regardless of whether they are legitimately prescribed. Without this prior approval, a positive drug test will be handled according to the guidelines that apply for routine violations of the major program requirements.

Conclusion

The drugged-driving problem is large and almost completely ignored, not only in the United States but throughout the world. There is an urgent need to develop effective, comprehensive highway safety programs that identify drug impaired drivers and ensure they do not continue to use drugs and drive.

One of the most encouraging outcomes of this approach to DUID convictions will be the identification and treatment of up to 500,000 additional drug abusers each year. A comprehensive DUID program will provide a powerful incentive to get offenders into needed treatment and will help them complete treatment successfully. Long term, this approach will mean improved highway safety and reduced illegal drug use.

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PANEL I: IDENTIFICATION OF DRUGGED-DRIVER ISSUES
POSITION STATEMENTS

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ISSUE ONE: Random testing for driving under the influence of drugs (DUID) should be possible.

Summary
Random tests for drug use in drivers could have a strong deterrent effect, as has been shown for alcohol. Unfortunately, there have been too few roadside surveys to estimate the prevalence of DUID in many areas. Random tests are sorely needed for roadside surveys to collect epidemiological data on the number of drivers who operate motor vehicles under the influence of drugs. These data are necessary for defining the scope of the problem, and are needed to convince the public and legislators of the importance of the problem of drugged-driving in their local jurisdictions. We recognize that it will be nearly impossible to perform random testing in some jurisdictions due to legislative barriers. As yet, we do not have objective data on the extent of the deterrent effect of testing for drugs and the number of lives that could be saved by random testing.

Recommendations for where we need to go from here:

1. More research is needed on the preventive effect of random tests; this research should include cost-effectiveness calculations.
2. Rapid and reliable roadside testing devices should be available for police.
3. Best practice examples of legislation and random testing should be collected and distributed to interested parties.

Related comments of interest
Ethanol sobriety checkpoints are allowed in many jurisdictions where testing for drugs might be carried out. This could provide a valid alternative for jurisdictions where random stops are not allowed

ISSUE TWO: There are multiple purposes for DUID testing:
- **To improve public safety by removing impaired drivers from the road;**
- **To deter illicit drug use;**
- **To provide a means for intervention and drug treatment.**

Summary

Routine testing for DUID can make enforcement of DUID legislation more credible. It is clear that traffic safety is improved by removing impaired drivers from the roadway. Focusing on the dangers of DUID reinforces the message that use of illicit drugs is dangerous. If problem drug users were detected earlier in their drug use trajectory, and perhaps before major accidents could occur, drug treatment might be more effective. Rescinding an individual's driving license could be a powerful motivation to stop DUID. Unfortunately, there are few if any studies that have documented objective outcomes for identification and removal of the drug impaired driver from the roadway.

Recommendations for where we need to go from here:

1. More research is needed on the effect of prevention campaigns on DUID and on reducing drug abuse.

ISSUE THREE: There are many complementary ways of identifying DUID i.e. observation of the vehicle in motion, driving performance, performance testing, cognition, motor skills, eye signs and physiological signs like pulse and blood pressure. There is also physical evidence such as paraphernalia, drugs, environmental cues (smell of smoked drug) and the results of on-site drug tests.

Summary

Police officers use different clues to identify drugged-drivers. In some countries, DUID findings are used for convictions related to drug possession or use, while in other countries this is not the case. With training, police officers can identify drivers who are under the influence of drugs.

Unfortunately at this juncture we don't know the relative sensitivity / specificity of the various detection methods of identifying DUID, including the relationship between observed driving behavior and DUID, and even the presence of physical evidence and DUID

Recommendations for where we need to go from here:

1. More studies are needed to understand the sensitivity and specificity of each of the methods for identifying DUID.
2. Each aspect of the identification method should be analyzed to determine which are the relevant factors that should be included in DUID detection.
3. The sensitivity and specificity of all on-site drug tests should be evaluated.

ISSUE FOUR: A behavioral test can be an efficient means of identifying a driver who is under the influence of drugs.

Summary

The DRC [Drug Recognition and Classification] system works and can be adapted to multiple jurisdictions. The ideal impairment test has not yet been developed, and it is clear that inter-individual variability is high on these tests. Measures of involuntary action seem to be more robust than cognitive or motor skills. With appropriate training, police officers can become proficient in administering these tests. Unfortunately, most of the behavioral tests commonly used today were specifically developed for detecting alcohol use; perhaps they can be improved to detect drug use. It may well be that certain subsets of these tests are more effective for detecting drugs, or that new tests must be devised. Some tests may be redundant, or unnecessary to identify DUID.

Recommendations for where we need to go from here:

1. More studies are needed on the sensitivity and specificity of each behavioral test parameter for the major drug categories.
2. An evidence-based best practice example could be established, that has good sensitivity for the major drugs, while remaining quick and easy to administer.

ISSUE FIVE: Roadside testing for drugs has a place in the detection process.

Summary

The choice of specimen is determined by legal statute and logistical considerations. A roadside test must be rapid, sensitive, reliable and easily performed. Currently, all roadside drug tests are based on immunoassays. Police officers must be trained to administer and interpret the tests. Currently available oral fluid tests have not been sufficiently evaluated. Roadside drug tests are preliminary tests; administrative and penal sanctions should not be based on unconfirmed screening tests. At present we don't know the reliability (including but not limited to the sensitivity, specificity, accuracy, precision, robustness) of the current generation of on-site oral fluid tests. Oral fluid specimen collection, efficient (both in terms of adequate drug recovery and specimen preparation time) extraction of drug from the oral fluid device, and a reliable on-site detection system are critical issues. The selection of cut-off concentration may depend on the efficiency of the sampling process. The influences of passive inhalation and passive contamination as yet have not been rigorously evaluated. The most appropriate collection device, detection system and cut-off concentrations have not yet been determined.

Recommendations for where we need to go from here:

1. There should be independent evaluations of the roadside drug test devices.
2. There should be more research in the recovery of drugs (in particular THC) from collection devices.
3. More research is needed on the windows of detection of drugs in the different body fluids.

4. More research is needed on the most appropriate cut-offs.
5. There should be more fundamental research on the use of other samples (e.g. breath) or other detection methodologies, for the detection of DUID.

ISSUE SIX: Evidentiary testing should be comprised of validated methods that have demonstrated sufficient sensitivity.

Summary

The following elements are needed for evidentiary testing: documentation (including chain of custody), quality assurance (quality control, proficiency testing), validated methods, accredited laboratory, and trained personnel.

There is still a lack of information on the correlation between impairment and drug concentrations in the different body fluids and there remains controversy concerning the analytical cut-offs that should be applied in *per se* legislation.

Recommendations for where we need to go from here:

1. Training should be offered to laboratories that want to perform evidentiary testing.
2. Cut-offs should not be mentioned in the statute to permit the acceptance of new technologies and new cut-off limits as they may come available.
3. Expert scientists should be consulted in establishing new DUID law. Expert knowledge and experience are needed to describe technological and analytical requirements.
4. While there is no consensus on the minimum concentrations of drugs in blood or oral fluid that correspond to increased accident risk, additional research is needed to try and establish these reference points.
5. There is a need to establish tests to distinguish between occasional and chronic users.

ISSUE SEVEN: The choice of specimen for DUID testing depends upon the purpose of testing.

Summary

Different specimens have specific characteristics that render them more or less appropriate in different circumstances. Controlled drug administration studies have not yet established the windows of drug detection in the different matrices. We do not clearly know the degree of intra- and inter-subject variability in drug concentrations in the different matrices after drug administration. The choice of specimen will be dependent upon whether the biological test results must establish drug use or drug impairment, and whether or not other evidence of driving impairment is available.

Recommendations for where we need to go from here:

The panel made these recommendations for the type of specimen in different legislative settings:

Legislation	Characteristics	Recommended fluid/analysis
Per se based on zero tolerance	Concentration does not represent impairment Toxicology becomes the primary evidence	Blood or Oral fluid
Impairment with documented behavior	Toxicology and impaired behavior provide evidence of DUID	Blood and oral fluid are the preferred specimens Urine may be acceptable
Post-accident and random traffic stops	Limited crash history No driving behavior	Quantitative blood
Other uses	Potential for treatment intervention, To determine type of court, e.g. drug court or reinstatement of driver's license	

The consensus of the group was that the following analytes should be the target analytes in the different fluids:

	Urine	Oral Fluid	Sweat
Cannabis	9-carboxy-THC	Tetrahydrocannabinol (THC)	THC
Cocaine	Benzoylecgonine (BE)	Cocaine & BE	Cocaine & BE
Amphetamines	Amphetamine, Methamphetamine, & MDMA	Amphetamine, Methamphetamine, & MDMA	Amphetamine, Methamphetamine, & MDMA
Opiates	6-Acetylmorphine, Morphine, Codeine, Hydromorphone, Hydrocodone, Oxycodone	6-Acetylmorphine, Morphine, Codeine, Hydromorphone, Hydrocodone, Oxycodone	6-Acetylmorphine, Morphine, Codeine, Hydromorphone, Hydrocodone, Oxycodone

In the other drug classes, the following were considered to be the most important:
Benzodiazepines: Alprazolam, Diazepam, Flunitrazepam, Lorazepam
Others: Buprenorphine, GHB, Methadone, Zolpidem, Zopiclone, and Carisoprodol

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PANEL II: ENFORCEMENT & PROSECUTION OF DRUGGED-DRIVING LAWS POSITION STATEMENTS

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ISSUE ONE: There should be definition of DUID by law to improve highway safety, reduce crash risks, and increase general deterrence.

Summary
We know that the Laws serve as teachers and, by making a clear statement of policy, reinforce societal norms. The law can instruct people that DUID is dangerous to those on the highway. We have learned over time that Laws that are clearly understood by the public effectively change behavior and penalties make a difference that can also change behavior. Clearly in today's environment enforcement is supported by public opinion more so for DUI than for DUID. We also know that fines are effective in deterring certain group of offenders and not with others. Those who cannot afford to pay fines need to be dealt with in creative ways. "Day" fines where DUID offenders are required to pay the fine in days of community service is a technique that is being used effectively in Europe.

Two issues emerge regarding what we do not know about DUID and the law:

1. How can sanctions and penalties be correlated to the offenders' crash risks?
2. Will campaigns against DUI be adaptable to DUID?

Recommendations:

1. Additional research is needed on what it will take to pass effective DUID laws. We need more data that will clearly demonstrate how well current *per se* laws are working in the 10 states that have enacted them. Also we need to identify what aspects of these *per se* laws should be replicated for adoption by other non-*per se* states.
2. Strategic Policy Recommendations
   a. We need to look at the possibility of placing Drug Recognition Experts at DUI checkpoints to increase the detection of drugged-drivers. Further, the use of DREs at these checkpoints should be publicized so that the public is aware of the increased

b. scrutiny for drug impaired drivers and thus increase the potential deterrence value of such efforts.
c. For those who cannot afford to pay fines there is a need to investigate the possibility of assigning offenders to "work crews" or other forms of community service to "pay" fines. There is also a need to establish other means to recover the costs for prosecution
d. There is a need to determine which penalties can serve as more effective deterrents to DUID, such as vehicle impoundment, forfeiture and innovative licensing penalties which can be adapted for DUID offenders.
e. We need to develop and use new technology for better awareness of a driver's license status.

ISSUE TWO: We need better public understanding and support for DUID enforcement and prosecution.

Summary
Data needs to be collected to demonstrate the need for enforcement and prosecution of DUID cases. The problem is that while we have a sense that we need to work on this, more definitive research should be done. Can we look at the ADAM data as a guide for the specific drugs that are on the roads? If not, can we work with the state toxicologists to see the blood tests results for some trending information? First, collecting evidence to successfully prosecute DUID is of primary importance. Second, and of significant long-term impact, is the need to be able to present convincing evidence in court. Third, these facts need to be presented to the public to create better understanding and support for DUID enforcement and prosecution.

We lack adequate public recognition of DUID as a problem. The lack of data results from the following:

1. Plea bargaining DUID cases for pleas to dealing and other felonies;
2. Lack of probative evidence to prosecute DUID;
3. Insurance (UPPL) provisions are barriers to medical blood and urine testing as they allow the third party payer to deny coverage for injuries sustained while impaired.

A second sub-issue is how to gather evidence that is admissible and then actually have the evidence admitted in court. This is a complex issue and the people who work with alcohol impaired driving can give some good advice on this. There is still a battle between defense and prosecutions over technology and sanctions; however, research is beginning to resolve many of the challenges.

1. There is an urgent need to determine where public understanding and support is on the issue of DUID. We currently do not know how to convincingly educate the public so that the problem receives attention. In addition we need better understanding of the detection science and the evidentiary issues so that the public can be better informed by showing that the science is accurate and has been perfected to the same extent that currently exists for breath-analysis for DUI alcohol.
2. We also need to determine which sanctions work and for which offender

Recommendations:

1. Additional research is needed to determine what it would take to garner public support.
2. We need to determine the incidence of DUID by jurisdiction
3. There is a need for new technology development
4. Public Information and Education campaigns need to be devised and put in place
5. We need more prosecutor and judicial training
6. There is a need for more Legislative initiatives
7. Courts need more clarity in the definition of offenses
8. We need more states to adopt *Per se* laws

ISSUE THREE: There is a need for a model code for DUID to assist legislative efforts to focus on DUID.

Summary

Current laws in most states make it difficult to prosecute and convict drugged-drivers and this has led to poor enforcement. There is a clear need for a model *per se* law that provides good definition of DUID, includes clear definitions of the drugs, substances (including inhalants), and the offense of DUID for each drug by *per se* or by impairment as the elements of the offense. Such legislation should provide for the development and admission of new technology. Human behavioral evidence and standards should be established by the administrative rules of the state agency. Implied Consent and Consequences of refusal to submit to testing and random testing should be addressed in the legislation.

As of this writing we do not know who or what groups might resist such model legislation nor do we know what information/education is needed to inform states of legislative action.

Recommendations:

There is an urgent need to have a single group that will draft, review and promulgate a model code that can be adopted by state legislatures. Such an effort should include suggested efforts that might be used to assist in getting legislatures to adopt such measures.

While a number of model codes are recommended across many subject matters, there is resistance at state legislatures to mandates. Some strategic thought should be given as to how to get buy in or avoid the refrain of "the feds do not live here".

There is also a need for certification and approval of detection technology. (This issue is covered extensively by Panel I.)

ISSUE FOUR: There is a need for education and training for police officers, prosecutors, and judges on the issues presented by the DUID offenses.

Summary

A long standing problem with police officers who are DRE trained is that experienced and effective personnel leave the area of DUID as a part of career development and systematic enticements to move on. This causes a constant loss of that experience as new personnel move into DUID work. Even with the current number of trained DRE officers they are just hitting the

tip of the iceberg regarding what our research is telling us about the numbers of DUID offenders that are on the streets. As a result we need to determine ways that we can train every patrol officer to detect drugs in the drivers on the streets

We also need to design career paths that allow the maintenance of the trained and educated personnel in the police and prosecutor units that deal with DUID. The Indiana prosecutor mentor program and the Arizona prosecutor training may be models that are ready for evaluation.

There is no comprehensive listing of what training is currently available or what training is needed for effective DUID detection and prosecution. We also need to determine how to evaluate the effectiveness of DUID training and education programs and further what are effective professional development models to increase the professionalism of the career DUID specialists?

Recommendations:

1. Additional research is needed to design training and career incentives that are most effective in improving responses to DUID.
2. Strategic Policy Recommendation: All personnel engaged in the DUID effort should receive consistent and continuing education about the DUID issues.

ISSUE FIVE: There is a need to develop a "Systems Approach" to dealing with DUID that is founded on sound principles and science based theories.

Summary

Bits and pieces of the justice system are challenged by communication and organizational issues. (See new studies about prosecutors from the American Prosecutors Research Institute website, www.apri.org, and Traffic Injury Research Fund Canada website, www.trafficinjuryresearch.com.) Judges present a very fragmented audience as well as one that does not want to risk any appearances of impropriety by consorting with police or prosecutors. This is a challenge in applying systems thinking to DUID. Any systems planning should include all components of the systems in an arena that is neutral and does not threaten nor compromise judicial ethics and independence from the executive branch.

We do not know who can convene and lead the development of a systems approach toward DUID. Those of us who have engaged in such work know that, until people really understand and engage in the processes, it appears to be expensive and time consuming. The lack of understanding of a good approach and the benefits of thinking systemically make a difficult sell in the governmental agencies. Perhaps a private foundation could undertake to support the initiation of this work.

Recommendations:

1. There is a need to find resources and a neutral convener to develop and carry out these important activities.
2. We need to develop legislative initiatives to support these activities as we gain more understanding of how the statutes can contribute to an effective system design.

PANEL III: TREATMENT, PREVENTION, AND EDUCATION POSITION STATEMENTS

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ISSUE ONE: DUI Courts - Judicial participation in treatment, intervention, and problem solving.

DUI and DUID offenders have a host of problems related to alcohol and other drug use as well as other social and psychological problems, low adherence to treatment, and a high probability of re-offense. Judicial involvement has been shown to improve treatment compliance and outcome

Summary
Where they are used, DUI courts seem to enhance the effectiveness of treatment and other legal and social intervention. DUI courts, modeled after drug courts, use judicial authority to devise a combination of penalties and therapeutic interventions appropriate to the offense and to the needs of the offender, based on screening and assessment. The judge monitors the offender's adherence to the prescribed activities, rewards offenders who make progress and punishes offenders who fail to carry out the activities.

Generally, the programs include a number of elements, such as treatment for substance abuse addiction or misuse, participation in 12-Step programs, limitations on driving and other activities, connection with community resources, requirements for employment, and other services and mandates based on the offender's individual needs and situation. Evaluations of these programs have generally shown higher retention rates and lower recidivism rates among offenders who complete the program.

A number of areas would benefit from further research and evaluation to strengthen the evidence of effectiveness of the DUI courts and to refine our understanding of how they can be implemented with greatest efficiency and efficacy. Most importantly, additional well-designed outcome studies are needed to measure the effectiveness of DUI Courts. Particular attention should be paid to developing and utilizing appropriate outcome measures. These studies should

also measure cost effectiveness as compared to other approaches (e.g., traditional DUI education programs and jail sentences) and determine what the critical elements of DUI courts are. NHTSA is currently carrying out a major evaluation of DUI courts and results should be available soon.

In the design of programs as well as of research, it should be kept in mind that one key characteristic of successful programs appears to be their adaptation to the individual characteristics and needs of offenders as well as to the local conditions and resources of the jurisdiction. Another key research area is the importance of individual differences among judges: How important is the experience, personality, and attitude of the judge? Can techniques be developed to train successful judges?

Recommendations:
Develop the political and public will to devote resources to DUI courts. These resources include not only the judicial time and effort required, but also the community services needed to provide the key elements of the intervention.

1. Explore the importance of screening for drugs even in the case of alcohol convictions (and vice versa) to ensure that the court deals with both alcohol and drug problems of offenders. Research indicates that many alcohol offenders were also under the influence of drugs and have ongoing drug problems.
2. Reduce the proportion of arrested offenders who refuse alcohol and drug testing. In this way, more offenders can benefit from participation in DUI courts.
3. Diversion programs allow offenders to avoid conviction for impaired driving and thus enable multiple offenses without a record. Policies should ensure that programs are implemented post-adjudication

ISSUE TWO: Treatment and Intervention for DUI/DUID Offenders

A high proportion of DUID offenders have serious abuse problems. In addition, a high proportion of offenders charged with driving under the influence of alcohol have both alcohol abuse problems and drug abuse problems. Treatment of alcohol and/or other drug abuse can be beneficial to these offenders as individuals and may have beneficial impact on traffic safety.

Summary
Research on the effectiveness of substance abuse treatment and intervention for impaired driving offenders indicates that it can be effective in reducing use levels, related problems, re-arrest, and traffic crashes. Research has indicted that even brief interventions in the emergency room can have a significant effect on alcohol use and problems for patients who present with an alcohol-related injury. Mandating and ensuring the availability of treatment for impaired driving offenders seems like a worthwhile activity.

While considerable research has been carried out on the use of treatment and intervention for offenders impaired by alcohol, less is known about offenders impaired by drugs or offenders who have abuse problems related to both drugs and alcohol. Additional research in this area would provide guidance for the expenditure of resources on treatment and intervention for DUID offenders. Research is particularly timely to establish the effectiveness of newly available chemical treatments for addiction to some drugs (e.g., heroine and cocaine).

Research is also needed to determine the effectiveness of low-cost treatment modalities (such as brief intervention and internet-based treatment) that can be made available to a broader population as well as modalities that can be made accessible to previously underserved populations (e.g., rural populations).

Recommendations:

1. Given that new DUID laws and enforcement techniques are likely to identify a increased number of offenders with serious drug as well as alcohol problems it is important to find ways to provide treatment services efficiently and effectively at reasonable cost to large and diverse populations.
2. When developing policies for making treatment available or mandating treatment, it is important to be aware of the fact that even first offenders may need intensive intervention, e.g., more stringent screening or mandatory treatment.

ISSUE THREE: Prevention

As a society, we have a duty to prevent DUID as much as possible, as we do with DUI alcohol – both to enhance traffic safety and to help drivers make better decisions and avoid violating the law. Some of the strategies available to prevent misuse of alcohol and alcohol impaired driving can be applied to DUID, including changing social norms about impaired driving. This has clearly played a major role in reducing drinking and driving in the US and around the world. It is less clear how social norms can be changed with regard to a behavior that is already illegal and socially unacceptable in the wider society, though clearly not among a large segment of the population.

Summary

The most important prevention strategy is enforcement (including the full criminal justice system through adjudication and punishment). Improved ways of carrying out visible, vigorous enforcement campaigns for DUID similar to sobriety checkpoints for alcohol could be very important for deterring DUID.

Research has shown that vigorous, well-designed, well-implemented media campaigns can have an impact on alcohol impaired driving. It is not known how similar campaigns may affect drug impaired driving.

While we have considerable knowledge about the prevention of alcohol impaired driving, we do not know how these prevention strategies can be applied to drug impaired driving and how

effective they will be. New strategies specific to drug impaired driving will also probably be necessary. Research is needed to develop and evaluate these new strategies.

Attention should be paid to young people – before they reach driving age. Research is needed to find effective primary prevention/early intervention strategies for youth that go beyond the ineffective programs of the past.

Recommendations:

1. As DUID laws receive more prominence, it is prudent to develop a coordinated and comprehensive prevention strategy that works in conjunction with anti DUID laws. This comprehensive strategy should include: 1) primary prevention to make drivers aware of the dangers of drug-impaired driving and of the laws and consequences; 2) deterrence, that is, well publicized enforcement campaigns; and 3) driver improvement programs that provide remediation for offenders.
2. We should also find ways as a society to develop clear, consistent, credible messages to prevent drugged-driving. Such messages go beyond specific media campaigns and represent a normative shift, similar to what has been seen in alcohol impaired driving.

ISSUE FOUR: Medicinal Drugs

Many prescription and over-the-counter medications can have an impairing effect on driving. While current package inserts and product labels include information about impairment, these labels are not very effective in preventing use while driving and do not distinguish between the most impairing drugs and those that have a much lower probability of causing impairment. A large population of potential impaired drivers can be removed from the road by improving prescribing and labeling practices.

Summary

The relative impairing effects of a variety of medicinal drugs are known, as are the circumstances under which the most impairment occurs (e.g., early in use, for elderly patients). In many cases, less impairing alternatives are available.

We do not know the best way to educate physicians about proper prescribing and patient education or patients about proper use of medications. Research can provide guidance about the best ways of conveying needed information.

Recommendations:

1. A large class of impaired driving can be greatly reduced if we develop a categorization system for medicinal drugs to allow physicians to prescribe less impairing drugs where possible and to instruct patients who take impairing drugs not to drive.

APPENDIX A

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APPENDIX B

SYMPOSIUM PROGRAMME

DAY 1 (FEBRUARY 23, 2004)

0730 – 0830 Registration – Outside *Snowy Egret*

Plenary Session – *Snowy Egret*

0830 – 0900 Opening Remarks and Welcome – ***Dr. Albert E. Brandenstein, Ph.D.***, Director, CTAC

0900 – 1030 ***Prevalence of Illegal Drugs in Drivers--Johan de Gier, Ph.D.***
President, International Council on Alcohol, Drugs, and Traffic Safety, Oosterhout, NL

State of the Art in Drug Detection Technology--Yale Caplan, Ph.D.
National Scientific Services, Baltimore, MD

Crash Risk of Drivers Using Drugs & Detecting Drugged-Drivers in Victoria, AU--Olaf Drummer, Ph.D.
Head, Scientific Services, Victorian Institute of Forensic Medicine, Australia

Toxicology, Technology and Drugged-Driving Laws--Barry Logan, Ph.D.
State Toxicologist, Washington State Patrol, Seattle, WA

1030 – 1050 Coffee Break / Visit Exhibits in *Cormorant*

1050 – 1230 ***Survey of European DUID Legislation--Alain Verstraete, M.D.***
University of Ghent, Ghent, Belgium

Survey of U.S. DUID Legislation--J. Michael Walsh, Ph.D.
President, The Walsh Group, Bethesda, MD

Enforcement and Prosecution of Drugged-Driving Laws--John Bobo, J.D.
Director, National Traffic Law Center, American Prosecutors Research Institute, Alexandria, VA

DUID Conviction is an Opportunity for Intervention--Robert L. DuPont, M.D.
President, Institute for Behavior and Health, Rockville, MD

1230 – 1345 **Lunch** with keynote speaker – *Armani's Rooftop Restaurant 14th Floor*

Scott Burns, J.D., Deputy Director, State and Local Affairs, Office of National Drug Control Policy Executive Office of the President of the United States

1345 – 1530 **Panel Presentations I --**

Snowy Egret North	*Snowy Egret South*	*Pelican*
I. Identification of Drugged-Driver Issues	II. Enforcement and Prosecution Issues	III. Treatment, Education and Prevention Issues

1530 – 1600 Coffee Break / Visit Exhibits in *Cormorant*

1600 – 1730 **Panel Presentations (Cont.) Followed by Panel Discussions II --**

Snowy Egret North	*Snowy Egret South*	*Pelican*
I. Identification of Drugged-Driver Issues	II. Enforcement and Prosecution Issues	III. Treatment, Education and Prevention Issues

DAY 2 (FEBRUARY 24, 2004)

0800 – 0850 **Plenary Session**

Breakfast (0800 – 0830) **–** *Armanis Rooftop Restaurant 14th Floor*

Plenary Meeting (0830 – 0850) Rapporteurs discussion of cross-cutting issues affecting all panels; program committee's direction for day's work.

0900 – 1030 **Panel Discussions III** – Panels continue discussion of critical issues and develop draft position statements addressing these issues.

Snowy Egret North	*Snowy Egret South*	*Pelican*
I. Identification of Drugged-Driver Issues	II. Enforcement and Prosecution Issues	III. Treatment, Education and Prevention Issues

1030 – 1045 Break/ Visit Exhibits in *Cormorant*

1045 – 1200 **Panel Discussions IV** – Panels finalize strategic solutions / initiatives in position statements to be presented in the afternoon session.

Snowy Egret North	*Snowy Egret South*	*Pelican*
I. Identification of Drugged-Driver Issues	II. Enforcement and Prosecution Issues	III. Treatment, Education and Prevention Issues

1200 – 1315 **Lunch** – *Armani's Rooftop Restaurant 14th Floor*

1315 – 1415 **Plenary Session** – *Snowy Egret* Report of Panel I followed by discussion – Drs. Verstraete and Huestis

1415 – 1515 **Plenary Session** – *Snowy Egret* Report of Panel II followed by discussion - L. Chezem and B.Sweedler

1515 – 1530 Break

1530 – 1630 **Plenary Session** – *Snowy Egret* Report of Panel III followed by discussion – K.Stewart and R.Stephenson

1630 – 1700 **Wrap up**