

# Library Watch on driving

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## **Relationship between blood alcohol concentration and carbohydrate-deficient transferrin among drivers.**

Appenzeller BMR; Schneider S; Maul A; Wennig R. *Drug and Alcohol Dependence* 79(2): 261-265, 2005. (19 refs.)

Carbohydrate-deficient transferrin (CDT) was quantified in 408 blood specimens, randomly selected from 1260 drivers apprehended and submitted to blood alcohol concentration (BAC) determination. The first step of the study was to observe whether a BAC based pre-evaluation was relevant for deciding to test drivers for chronic alcohol abuse. For this purpose, the diagnosis of chronic alcohol abuse was verified by CDT quantification, with a voluntary high positive cut-off fixed at 3% for high specificity. The results display a significant increase in the part of chronic alcohol abusers with respect to increasing BAC: a few alcohol abusers were present in the BAC category below 0.5 g/L, and their frequency increased to 47 and 67% when BAC was between 3 and 3.5 g/L and above 3.5 g/L, respectively. Secondly, the usefulness of the biomarker CDT in the traffic safety context was investigated by observing whether drivers with abnormally increased CDT value had also higher BAC. The average BAC was 1.32 g/L in drivers with CDT below 1 %, and increased to 2.28 g/L in drivers with CDT above 3%. Statistical analysis showed evidence of a monotone increasing link between BAC and CDT ( $P < 0.0001$ ). We confirmed here the relevance of BAC-based pre-evaluation before testing chronic alcohol abuse among drivers, and demonstrated that CDT is a biomarker suitable for traffic safety context, as drivers with increased CDT had significantly higher BAC. Copyright 2005, Elsevier Science Ltd.

## **Mortality among subjects previously apprehended for driving under the influence of traffic-hazardous medicinal drugs.**

Hausken AM; Skurtveit S; Christophersen AS. *Drug and Alcohol Dependence* 79(3): 423-429, 2005. (31 refs.)

Background: Most studies in the field of impaired driving have focused on the hazards represented by impaired drivers to the rest of society; there has been

little follow-up of the drivers themselves. The aim of this study was to establish mortality rates among subjects previously apprehended for driving under the influence of traffic-hazardous medicinal drugs, alone or in combination with alcohol. Methods: A prospective cohort study of all drivers aged 20–49 years, apprehended in Norway in 1992–1996 and testing positive for traffic-hazardous medicinal drugs in blood, outcome variable: death. Study population: 805 drivers (598 males, 207 females). Mean follow-up period: 6.8 years. Information on deaths was collected from Statistics Norway. Results: During the follow-up period, 139 of the previously apprehended drivers died (110 males, 29 females). The calculated standardised mortality ratio (SMR) was 15.8 (95% CI: 13.0–19.0) for male and 20.0 (95% CI: 13.4–28.7) for female drivers. Conclusions: Apprehension on suspicion of driving under the influence of drugs, combined with detection of traffic-hazardous medicinal drugs in the blood, seems to indicate an elevated risk of premature death in the age group 20–49 years. Secondary prevention of continued drug use could save lives in this drug user group. Copyright 2005, Elsevier Science.

## **Behaviour evaluation for risk-taking adolescents (BERTA): an easy to use and assess instrument to detect adolescent risky behaviours in a clinical setting.**

Suris JC; Nebot M; Parera N. *European Journal of Pediatrics* 164(6): 371-376, 2005. (40 refs.)

To create an instrument to be used in an outpatient clinic to detect adolescents prone to risk-taking behaviours. Based on previous research, five identified variables (relationship with parents and teachers, liking going to school, average grades, and level of religiosity) were used to create a screening tool to detect at least one of ten risky behaviours (tobacco, alcohol, cannabis and other illegal drugs use; sexual intercourse and sexual risky behaviour; driving while intoxicated, riding with an intoxicated driver, not always using a seat belt, and not always using a helmet). The instrument was tested using the Barcelona Adolescent Health Survey 1993. A Receiver Operating Characteristics curve was used to find the best cut-off point between high and low risk score. Odds ratios and 95% confidence intervals were

calculated to detect at least one risky behaviour and for each individual behaviour. In order to assess its predictive value, the analysis was repeated using the Barcelona Adolescent Health Survey 1999. In both cases, analyses were conducted for the whole sample and for younger and older adolescents. Adolescents with a high-risk score were more likely to take at least one risky behaviour both when the whole sample was analysed and by age groups. With very few exceptions, the Behaviour Evaluation for Risk-Taking Adolescents showed significant odds ratios for each individual variable. Conclusion: The Behaviour Evaluation for Risk-Taking Adolescents has shown its potential as an easy to use instrument to screen for risk-taking behaviours. Future research must aim towards assessing this instrument's predictive value in the clinical setting and its application to other populations. Copyright 2005, Springer.

#### **Drugs in injured drivers in Denmark.**

Bernhoft IM; Steentoft A; Johansen SS; Klitgaard NA; Larsen LB; Hansen LB. *Forensic Science International* 150(2-3): 181-189, 2005. (9 refs.)

As part of the project Impaired Motorists, Methods of Roadside Testing and Assessment for Licensing (IMMORTAL) under the European Commission's Transport RTD Programme of the 5th Framework Programme [I.M. Bernhoft, Drugs in accidents involved drivers in Denmark, D-R4.3 of the project Impaired Motorists, Methods Of Roadside Testing and Assessment for Licensing (IMMORTAL), a study regarding drugs in accident-involved drivers was carried out in Denmark <www.immortal.org>. The main objectives of this study were: (1) to collect and analyse samples from injured drivers for the presence of drugs; (2) to give an indication whether drugs may have contributed to traffic accidents; and (3) to get information on the drug-positive drivers and their drug use. This paper focuses on objective 1. Injured drivers who were treated in hospital were asked to give a saliva sample, a blood sample or both. The samples were screened for the following substances: opiates, amphetamines, methamphet-amines, incl. MDMA (ecstasy), cannabinoids and metabolites, cocaine and metabolites and benzodiazepines. Screenings were carried out by means of Cozart Microplate EIA kit. Positive screenings were confirmation analysed by gas chromatography-mass spectrometry (GC-MS) or liquid chromatography/tandem mass spectrometry (LC/MS/MS). In total, 26 out of 330 patients were confirmed positive for one or more of the six drug groups. However, three patients were excluded from the survey for various reasons. Of the remaining 23 drug-positive patients 15 were found positive for one

drug group, and in five of these cases alcohol was present in a concentration over the legal limit in Denmark (0.05%). The other eight patients were found positive for two drug groups, and in four of these cases, alcohol was also present in a concentration over the legal limit. Alcohol was found both in combinations with medicinal drugs, with illegal drugs and with both. Based on the saliva or blood concentrations, we estimate that there is a strong suspicion of impairment in 9 out of 23 cases, and in another six cases it was likely that the drivers were impaired. Copyright 2005, Elsevier Ireland.

#### **Drugs in oral fluid. Part II. Investigation of drugs in drivers.**

Wylie FM; Torrance H; Seymour A; Buttress S; Oliver JS. *Forensic Science International* 150(2-3): 199-204, 2005. (13 refs.)

As part of the European project, Impaired Motorists, Methods of Roadside Testing and Assessment for Licensing, otherwise known as IMMORTAL (Deliverable R4.2), the University of Glasgow was required to analyse 1396 oral fluid samples, collected from drivers, for a wide range of drugs. A previously described method to include 49 drugs and metabolites was used. To include cannabis in the study a separate extraction method was required because of interferences caused by the collection device. The study group included drivers who were stopped at random and participation was entirely voluntary. The results showed that out of the 1396 samples tested, 16.8% were positive for at least one drug. In the majority of positive cases (85%), monodrug use was found and the most commonly detected drug was 3,4-methylenedioxymethamphetamine. This study showed that a significant number of the driving population are positive for at least one drug. Copyright 2005, Elsevier Scientific Publishers Ireland, Ltd.

#### **Alcohol and drugs in drivers fatally injured in traffic accidents in Sweden during the years 2000-2002.**

Holmgren P; Holmgren A; Ahlner J. *Forensic Science International* 151(1): 11-17, 2005. (15 refs.)

During the years 2000-2002, alcohol, pharmaceuticals and illicit drugs were analysed in blood samples from fatally injured drivers in Sweden. The total number of drivers was 920 and in 855 of these, corresponding to 93%, a toxicological investigation was performed. About 85% of the drivers were men and 15% were women. All but three women (96%) were car drivers while the corresponding figure for men was about 78% and about 13% were motorcyclists. The number of positive cases increased from 38.9% in year 2000 to

45.9% in year 2002 and alcohol was the most common drug with frequencies of 19.8%, 25.0% and 21.8% for the studied years 2000, 2001 and 2002, respectively. The median blood alcohol concentration ranged from 1.6 to 2.0 mg/mL for men and from 1.2 to 1.8 mg/mL for women. There was a decrease in cases where alcohol was the only drug detected, from 52 out of 58 cases (90%) in year 2000 to 41 out of 61 cases (67%) in 2002. At the same time there was an increase, from 5.4% to 10.0% of illicit drugs, mainly amphetamine, and the cases with multiple drug intake increased from 10% to 26%. The prevalence of pharmaceuticals as the only drug or drugs detected decreased from 14.0% to 10.4% and in the majority of these cases the drug concentrations were within the therapeutic range. Copyright 2005, Elsevier Scientific Publishers Ireland, Ltd.

**The effect of nabilone on neuropsychological functions related to driving ability: An extended case series.**

Kurzthaler I; Bodner T; Kemmler G; Entner T; Wissel J; Berger T et al. *Human Psychopharmacology: Clinical and Experimental* 20(4): 291-293, 2005. (5 refs.)

The primary goal of this prospective extended case series was to obtain the first data about the potential influence of nabilone intake on driving ability related neuropsychological functions. Six patients were investigated within a placebo controlled, double-blind crossover study of this synthetic cannabinoid (2 mg/day) in patients with multiple sclerosis and spasticity associated pain. Five neuropsychological functions (reaction time, working memory, divided attention, psychomotor speed and mental flexibility) were assessed. No indication was found of a deterioration of any of the five investigated neuropsychological functions during the 4-week treatment period with nabilone. [Note: Nabilone is a synthetic cannabinoid.] Copyright 2005, John Wiley & Sons Ltd.

**Effects of two doses of methylphenidate on simulator driving performance in adults with attention deficit hyperactivity disorder.**

Barkley RA; Murphy KR; O'Connell T; Connor DF. *Journal of Safety Research* 36(2): 121-131, 2005. (30 refs.)

Introduction: Numerous studies have documented an increased frequency of vehicular crashes, traffic citations, driving performance deficits, and driving-related cognitive impairments in teens and adults with attention deficit hyperactivity disorder. Method: The present study evaluated the effects of two single, acute doses of methylphenidate (10 and 20 mg) and a

placebo on the driving performance of 53 adults with ADHD (mean age=37 years, range= 18-65) using a virtual reality driving simulator, examiner and self-ratings of simulator performance, and a continuous performance test (CPT) to evaluate attention and inhibition. A double-blind, drug-placebo, within-subjects crossover design was used in which all participants were tested at baseline and then experienced all three drug conditions. Results: A significant beneficial effect for the high dose of medication was observed on impulsiveness on CPT, variability of steering in the standard driving course, and driving speed during the obstacle course. A beneficial effect of the low dose of medication also was evident on turn signal use during the standard driving course. An apparent practice effect was noted on some of the simulator measures between the baseline and subsequent testing sessions that may have interacted with and thereby obscured drug effects on those measures. Conclusions: The results, when placed in the context of prior studies of stimulants on driving performance, continue to recommend their clinical use as one means of reducing the driving risks in ADHD teens and adults. Impact on industry: Given the significantly higher risk of adverse driving outcomes associated with ADHD, industry needs to better screen for ADHD among employees who drive as part of employment so as to improve safety and reduce costs. Use of stimulants to treat the adult ADHD driver may reduce safety risks. Copyright 2005, National Safety Council.

**Predictors of completion status in a remedial program for male convicted drinking drivers.**

Rootman DB; Mann RE; Ferris LE; Chalin C; Adlaf E; Shuggi R. *Journal of Studies on Alcohol* 66(3): 423-427, 2005. (27 refs.)

Objective: Rates of attrition in alcohol and drug treatment programs are often greater than 50%, and completion of treatment has been shown to be a potent predictor of posttreatment outcome. The current study examined both rates and predictors of completion among male participants in a remedial measures program for convicted drinking drivers. Method: Male individuals (n = 5,409) convicted of a drinking driving offense in Ontario between October 2000 and December 2002 who did and did not complete a mandatory rehabilitation program were described in terms of demographic, drug use and legal variables collected at time of assessment. Results: The program completion rate was extremely high (97.3%). In multivariate analyses, noncompleters- relative to completers-were younger; drank more frequently; were less likely to own a home; and were more likely

to live in urban centers, have two or more lifetime impaired driving convictions and have experienced more than one adverse consequence of substance use. Conclusions: Ontario's remedial measures program for convicted drinking drivers, in which the return of a suspended license after the period of mandatory suspension is contingent on the completion of the program, demonstrates a very low level of client attrition. Individuals who do not complete the program bear many similarities to those at high risk for persistent drink-drive behavior and its associated negative health consequences. Copyright 2005, Alcohol Research Documentation Inc.

**An evaluation of the sensitivity of the Standardised Field Sobriety Tests (SFSTs) to detect impairment due to marijuana intoxication.**

Papafotiou K; Carter JD; Stough C.

*Psychopharmacology* 180(1): 107-114, 2005. (20 refs.)

The Standardised Field Sobriety Tests (SFST) were developed to test for alcohol intoxication but are currently being used by the State Police of Victoria (Australia) to test for driving impairment associated with drugs other than alcohol. The aim of the present study was to assess whether the SFSTs provide a sensitive measure of impairment following the consumption of a drug other than alcohol: delta-9-tetrahydrocannabinol (THC or cannabis). In a repeated-measures design, 40 participants consumed cigarettes that contained either 0% THC (placebo), 1.74% THC (low dose) or 2.93% THC (high dose). For each condition, after smoking a cigarette, participants performed the SFSTs on three occasions: 5 min (Time 1), 55 min (Time 2) and 105 min (Time 3) after the smoking procedure had been completed. The results revealed that there was a positive relationship between the dose of THC administered and the number of participants classified as impaired based on the SFSTs. Results also revealed that the percentage of participants classified as impaired decreased from Time 1 to Time 3 and that the addition

of a new sign, head movements or jerks (HMJ), increased the percentage of participants classified as impaired in both the low and high THC conditions. These findings suggest that impaired performance on the SFSTs is positively related to the dose of THC administered and that the inclusion of HMJ as a scored sign in the SFSTs improves their predictive validity when testing for THC intoxication. Copyright 2005, Springer.

**Assessment of driver impairment: Evaluation of a two-choice tester using ethanol.**

Tiplady B; Degia A; Dixon P. Transportation Research. Part F, *Traffic Psychology and Behavior* 8(4-5): 299-310, 2005. (31 refs.)

Fifteen healthy volunteers aged 18-35 years took part in this three period crossover study evaluating a portable performance tester designed for roadside use. They received by mouth placebo and two doses of ethanol on separate days. Doses were calculated to produce blood alcohol levels of 50 and 80 mg/100 ml. Testing was carried out before the drink and starting at 40 min after the drink. Breathalyser readings showed peak blood alcohol levels of 54.4 mg/100 ml (S.D. 11.1) for the smaller dose and 83.0 mg/100 ml (S.D. 8.4) at the larger dose. Significant impairment was seen with the larger dose of ethanol. Response time was increased for the arrow flankers test (attention in the presence of distractors), and errors were increased for paired associates (visuospatial working memory) and for length estimation judgment). A composite measure showed a clear dose-related pattern of impairment. These results indicate that a short test battery taking about ten minutes to complete can reliably show the effects of ethanol under controlled laboratory conditions. Further work is needed in the field, and with a more varied population to assess the use of such a device to assess impairment due to alcohol and drugs at the roadside. Copyright 2005, Elsevier Science.