mg/L; liver benzoylecgonine, 2.71 mg/kg, liver cocaine, 1.89 mg/kg; and brain benzoylecgonine, 1.13 mg/kg, brain cocaine, 0.96 mg/kg. The tissue distribution of the second case was as follows: blood benzoylecgonine, 2.93 mg/L, blood cocaine, 0.75 mg/L; liver benzoylecgonine, 2.75 mg/kg, liver cocaine, 1.44 mg/kg; brain benzoylecgonine, 1.13 mg/kg, brain cocaine, 1.25 mg/kg; and kidney benzoylecgonine, 2.37 mg/kg, kidney cocaine, 0.59 mg/kg. The first two cases were attributed to prematurity, with maternal cocaine use as a contributing factor. The tissue distribution of the third case was as follow: blood benzoylecgonine, negative, blood cocaine, 0.07 mg/L; liver benzoylecgonine, negative, liver cocaine, 0.07 mg/kg; brain benzoylecgonine, negative, brain cocaine, 0.07 mg/kg; spleen benzoylecgonine, negative, spleen cocaine, 0.15 mg/kg; and kidney benzoylecgonine, negative, kidney cocaine 0.05 mg/kg. The third case was attributed to cocaine intoxication. The tissue distribution of the fourth case was as follows: blood benzoylecgonine, 0.67 mg/L, blood cocaine, negative; liver benzoylecgonine, 0.70 mg/kg, liver cocaine. negative; brain benzoylecgonine, 0.25 mg/kg, brain cocaine, 0.07 mg/kg; spleen benzoylecgonine, 0.29 mg/kg, spleen cocaine, negative; and kidney benzoylecgonine, 0.69 mg/kg, kidney cocaine negative. The fourth case was attributed to intrauterine asphyxia of undetermined etiology. The tissue distribution of the fifth case was as follows: blood benzoylecgonine, 0.28 mg/L, blood cocaine, negative; liver benzoylecgonine, 0.31 mg/kg, liver cocaine, 0.07 mg/kg; brain benzoylecgonine, 0.20 mg/kg, brain cocaine, 0.07 mg/kg and kidney benzoylecgonine, 0.36 mg/kg, kidney cocaine, 0.13 mg/kg. The fifth case was also positive for ethanol. The fifth case was attributed to macerated stillborn due to abruptio placenta, with maternal cocaine use as a contributing factor. The tissue distribution of the sixth case was as follows: chest cavity fluid benzoylecgonine, 0.19 mg/L, chest cavity fluid cocaine, negative; liver benzoylecgonine, negative, liver cocaine, negative; and brain benzoylecgonine, 0.69 mg/kg, brain cocaine, negative. The sixth case was attributed to intrauterine asphyxia due to maternal multiple injuries sustained from an automobile accident. The tissue distribution of the seventh case was as follows: blood benzoylecgonine, 2.47 mg/L, blood cocaine, 0.08 mg/L; liver benzoylecgonine, 3.00 mg/kg, liver cocaine, 0.11 mg/kg; brain benzoylecgonine, 1.84 mg/kg, brain cocaine, 0.16 mg/kg; spleen benzoylecgonine, 2.40 mg/kg, spleen cocaine, 0.31 mg/kg; kidney benzoylecgonine, 3.00 mg/kg, kidney cocaine, 0.11 mg/kg; urine benzoylecgonine, 6.10 mg/L, urine cocaine, 0.09 mg/L; and mother's blood benzoylecgonine, 2.60 mg/L, mother's blood cocaine, 0.15 mg/L. The tissue distribution of the eighth case was as follows: blood benzoylecgonine, 0.31 mg/L, blood cocaine, 0.13 mg/L; liver benzoylecgonine, 0.29 mg/kg, liver cocaine 0.17 mg/kg; and brain benzoylecgonine, 0.82 mg/kg, brain cocaine, 0.11 mg/kg. The eighth case was attributed to intrauterine asphyxia of unknown etiology.

In these pediatric and fetal deaths, multiple tissue specimens were submitted to the toxicology laboratory when the pathologist requested testing for drugs of abuse. In the event, that a positive finding occurred, in one specimen from the case, the toxicology staff was then able to analyze multiple tissue specimens in order to provide a tissue distribution study. In the pediatric fatalities, a positive finding of a drug of abuse usually implied that someone other than the deceased child/infant was involved with the administration of the drug in question. In fetal deaths, a positive finding of a drug of abuse implied that the mother used that particular drug. A tissue distribution study performed in this type of case will provide the toxicology finding as an unequivocal litigation package. Toxicologists are only able to do tissue distribution studies in cases such as these, with the full support of the pathology staff.

Cocaine Tissue Distribution, Pediatric and Fetal Deaths, Toxicology

F16 Hit Me Wth Your Best Shot: Lack of Effect to Evidential Breath Alcohol Testing With Recent Facial Dousing of Pepper Spray

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Learning Objective: After attending this presentation, the participant will understand that capsicum based pepper sprays do not cause a reaction on a forensic breath alcohol test after recent direct facial dousing.

This paper has one objective: to compare breath alcohol analysis readings pre and post facial dousing by capsicum pepper spray to determine if the pepper spray causes a reaction on a forensic infrared breath alcohol test.

Method: Comparative chemical analysis of infrared breath alcohol samples.

A common defense to evidential breath alcohol analysis is that non-ethanol substances may falsely elevate the results produced by a breath alcohol analyzer. Capsicum or pepper based sprays are occasionally used by law enforcement to gain physical control of unruly or combative individuals suspected of driving under the influence of alcohol (DUI). Because of the requirement to perform breath alcohol analysis on these individuals, an investigation was undertaken to determine if pepper sprays could falsely elevate the measurement of breath alcohol.

This experiment was undertaken as the result of two DUI suspects who submitted to breath alcohol testing on an Intoxilyzer 5000 series infrared breath alcohol analyzer (CMI Inc. Owensboro, KY) after being sprayed directly in the face with capsicum based pepper spray. The results were challenged by the defense as not being forensically reliable. The defense claimed the exposure to the capsicum pepper spray was the cause and not the alcohol in their blood. The results obtained were .221 and .230 (subject 1); .111 and .121 (subject 2). All results were reported as grams per 210 Liters of air (g/210L).

Three male subjects were chosen as controls. All signed informed consent prior to participating. The subjects did not consume any alcohol 12 hours prior to this study. Baseline breath alcohol levels were established from all 3 subjects with results of .000 g/210L. Breath alcohol testing was performed on an Intoxilyzer 5000 infrared breath alcohol testing instrument.

The pepper spray utilized for this experiment is typical for a law enforcement application as it contained water (57%), ethanol (29%) and propylene glycol (14%) as solvents and carriers of the capsicum. The control subjects were sprayed directly in the face with the pepper spray. The following symptoms were observed and confirmed by the control subjects: tearing with a heavy burning sensation in the eyes causing involuntary closure and minor temporary inflammation of the surrounding eye tissues, an exponential increase in nasal mucus discharge and burning sensation on the affected skin areas.

The control subjects were then decontaminated following their direct exposure to the pepper spray. Protocol calls for a decontamination procedure that is outlined as follows: removing the affected individuals from the contaminated area to an upwind position and flushing the face with tap water.

The control subjects then provided samples of their breath for post exposure analysis with the following results: subject 1) .000 g/210L (13 min post exposure), subject 2) .000 g/210L (16 min post exposure) and subject 3) .000 g/210L (18 min post exposure). No post exposure breath alcohol testing was performed earlier then 13 minutes as the controls needed at least that much time to decontaminate themselves. The variability associated with the post exposure times is owing to the decontamination process with each control subject. At no time were any positive alcohol results recorded on the breath alcohol analyzer by any of the controls post exposure.

The results of this study clearly indicate that direct facial exposure to capsicum based pepper spray causes no reaction to an evidential breath alcohol test. The frequency of these types of cases is rare as most individuals who are pepper sprayed by law enforcement refuse to provide breath sample.

Breath Alcohol Testing, Forensic Toxicology, Pepper Spray, Capsicum, DUI

K17 A Two-Year Study of Suspected Drinking Drivers With No Obvious Signs of Alcohol Intoxication Who Failed a Roadside Screening Device in Toronto, Canada

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After attending this presentation the participants will learn the importance of roadside breath ethanol screening in detection of drinking drivers who have a high alcohol tolerance and do not show obvious alcohol intoxication. In addition, the participants will learn about the accuracy of the roadside screening device (RSD) under field conditions (e.g., mouth alcohol) which may affect the RSD.

In Canada the equivalent per se statutory breath ethanol concentration (BrEC) for drivers is set at 0.080 g/210L (grams of ethanol in 210 litres of breath). In order to enforce this limit the Criminal Code of Canada allows a police officer to demand a breath sample from a person who is operating or has care or control of a motor vehicle if the officer reasonably suspects that the driver has alcohol in his/her body. Reasonable suspicion can include the odor of an alcoholic beverage detected by the police officer, admission of drinking, or slight signs of alcohol intoxication. If the drivers fails the RSD (i.e., BrEC $\geq$ 0.100 g/210L), the driver is arrested and taken for an evidential breath test. Drivers who do not fail the RSD are either given a 12 hour suspension of license without criminal charges being laid (if the BrEC is between 0.050-0.099 g/210L) or allowed to proceed (if the BrEC is <0.050 g/210L).

If the police officer detects obvious signs of alcohol intoxication, a RSD test is not conducted. The driver is arrested and taken for an evidential breath test without the intervening use of the RSD. This decision made by the police officer at the roadside allows a study to be conducted on a group of drivers who did not show obvious signs of alcohol intoxication and required the RSD. This group of drivers would be expected to generally have a high tolerance to alcohol and without the RSD would not have been detected by the police.

A two-year study was conducted between January 1, 1998, and December 31, 1999, in the City of Toronto, Canada. During that time 811 drivers obtained a fail on the RSD (Alcotest 7410) and were later tested on an evidential instrument (Intoxilyzer 5000C). There were 734 men (90.5%) and 77 women (9.5%) whose ages ranged between 17 to 79 years of age. The Intoxilyzer 5000C tests of the arrested drivers were conducted between 0.1-2.6 hours after the fail on the RSD. The BrECs as determined by the Intoxilyzer 5000C ranged between 0.0 – 0.310 g/210L, (mean = 0.134 g/210L) and 46 drivers (5.7%) had a BrEC > 0.200 g/210L.

One-way Analysis of Variance (ANOVA) were used to test for significant differences in BrECs between different comparison groups. In instances where significant variability was observed a Tukey-Kramer post-test was used to test for significant differences between the mean BrEC of different groups. The level of significance was a $p<0.05$ level.

There were 31 male drivers and one female driver who were less than 21 years of age. The youngest was a 17-year-old male. Their BrECs ranged between 0.091 – 0.186 g/210L (mean = 0.118 g/210L) which is statistically different from the group as a whole and indicated that younger drivers have not developed a similar degree of tolerance to alcohol found in older drivers. This is reflected in the laws and regulations countries including the U.S. in which there is a lower BrEC drivers less than 21 years of age.

There were 31 male drivers and one female driver who years of age. The oldest was a 79-year-old female. Their BrEC between 0.092-0.200 g/210L (mean = 0.127 g/210L), which is sta different than the group as a whole. This may indicate that elderly have lost their consumption tolerance to alcohol or may ind decrease in the rate of heavy alcohol consumption with elderly dr

The percentage of female drivers increased with increasing Female drivers represented 9.5% of the total number of drivers increased to 12.5% of the drivers with a BrEC > 0.150 g/210L 18.0% of the drivers with a BrEC > 0.200 g/210L. However, there statistically significant difference in the mean BrECs of male and drivers.

The large number of drivers at high BrECs (up to 0.310 g/210 no obvious signs of alcohol intoxication is in agreement with other Without the RSD these drivers would not have been detected by the This emphasizes the importance of RSD in enforcing per se laws.

Of the 811 drivers who failed the RSD, only two (0.2%) had mated BrEC < 0.08 g/210L at the time of the roadside test. Thi cates that the number of false positives with the RSD and the inc of mouth alcohol in the field are very low.

Breath Ethanol, Roadside Screening, Alcohol Intoxication

K18 Comparison of J&W© Megabore Colu vs. Supelco© Carbopack® Columns fo Blood Alcohol Analysis by Headspace GC/FID

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Total chromatography elution time is a critical element of alcohol analysis in a high-volume laboratory. An automated hea injection system with a multi-sample equilibration oven mak overall run time dependent only on the cycle time of the GC an Hence, improvements in laboratory productivity for blood a analysis are often focused on shortening the run-time of the chrom raphy system. However, any increase in run-time productivity not be made at the expense of accuracy, precision, sensitivity, and ficity. In legal blood alcohol analysis, for example, agreement be duplicate samples must meet specific requirements as prescribed b In terms of specificity, adequate separation of ethanol from other v components such as methanol, isopropanol, acetone, and acetaldeh also of great importance.

The authors recently changed from packed columns (Carbop Supelco©, Bellafonte, PA) to a new matched megabore column s for blood alcohol analysis (J&W Scientific©, Folsom, CA). Carbopack® columns consisted of Carbopack C 60/80 with Carbowax® 1500 ("Cpack1"), and Carbopack C 80/100 with THEED ("Cpack2"). The megabore columns used are designated ALC1 and DB-ALC2 by the manufacturer. These columns measu m in length by 0.53 mm inside diameter (film thickness: 3.0 ?m fo ALC1, 2.0 ?m for DB-ALC2), compared to the packed column meters of 1.83m x 2mm id. The megabore columns were used in ulated direct" mode, i.e., the inlet configuration was kept in the pa column mode. After six months of routine blood alcohol an (January through June, 2000, n=1375), the agreement between dup samples analyzed on the two megabore columns was reviewed, measure of the overall precision of the system. There is exc agreement between the two columns, as demonstrated by l regression analysis: DB-ALC2 = 0.998(DB-ALC1) + 0.0006 (r

* Presenting A