K45 Detecting Drugged Driving in Wisconsin: A Comparison of Whole Blood and Roadside Oral Fluid Specimens

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The goal of this presentation is to introduce attendees to the application of a portable, roadside oral fluid instrument to evaluate the frequency of individuals Driving Under the Influence of Drugs (DUID) and compare the results to evidentiary whole blood specimens.

This presentation will impact the forensic science community by providing valuable information regarding the efficacy of using oral fluid screening as a screening tool to detect and arrest drugged drivers.

A pilot study was conducted in Dane County, WI, combining resources from the Wisconsin Department of Transportation's Bureau of Transportation Safety, Dane County Sheriff's Department, local law enforcement, and the Wisconsin State Laboratory of Hygiene (WSLH) to compare evidentiary whole blood specimens collected from subjects arrested for allegedly Operating (a motor vehicle) While Intoxicated (OWI) to oral fluid results.

The objectives of the study were to evaluate: the utility of the oral fluid detection system as a tool for law enforcement, the prevalence of OWI, specifically the number of individuals driving under the influence of both alcohol and drugs, the differences between detecting drugs in oral fluid and in whole blood, and the effectiveness of the WSLH drug cancellation policy when Blood Alcohol Concentrations (BAC) exceed 0.10g/100 mL.

Following a traffic stop and collection of legal blood specimens, subjects were asked to voluntarily participate in the pilot study and provide an oral fluid specimen. Participation in the study did not influence the outcome of the subject's OWI offense. Immediately following the legal blood draw, oral fluid was tested by law enforcement with an Alere DDS®2 oral fluid testing instrument following collection with the system's collection cartridge. Four portable instruments were deployed at various locations throughout the county with the capability of detecting six drug classes (target cutoff concentration), including amphetamine (50ng/mL), benzodiazepines (temazepam=20ng/mL), cocaine (benzoylecgonine=30ng/mL), methamphetamine (50ng/mL), opiates (morphine=40ng/mL), and cannabis (THC) (Δ^9-THC=25ng/mL). Oral fluid results were forwarded to the WSLH, paired with the subject's blood specimen, and subsequently de-identified following the University of Wisconsin-Madison protocol.

A total of 117 subjects aged 18 to72 years volunteered to participate in the study, yielding a final number of 104 (*n*=22 female, *n*=82 male) valid oral fluid specimens. Evidentiary whole blood specimens were analyzed for alcohol and drugs following routine protocols: Gas Chromatography (GC) -headspace/ Flame Ionization Detector (FID) for volatiles, Enzyme Immunoassay (EIA) for barbiturates (secobarbital=100ng/mL), buprenorphine (100ng/mL), benzodiazepines (lorazepam=40ng/mL), cocaine (benzoylecgonine=50ng/mL), opiates (morphine=40ng/mL), and THC (carboxy-THC=10ng/mL), and finally an alkaline basic drug screen. To compensate for differences in drug categories between the EIA screen and oral fluid panel, EIA and alkaline basic drug screen results were combined when comparing whole blood to oral fluid.

Seventy-six of 104 (73%) subjects suspected of OWI were driving under the influence of alcohol and 71 of those 76 (93%) had BACs exceeding 0.10g/100 mL. In cases in which BAC exceeded 0.10g/100mL, drugs were detected in both oral fluid and blood for 28 and 29 subjects, respectively. Fifty of 104 arrests (48%) occurred

between the hours of midnight and 6:00 a.m., 22/104 (21%) between the hours of 12:00 p.m. and 6:00 p.m., and 29/104 (28%) between the hours of 6:00 p.m. and 10:00 p.m.

In general, oral fluid results were consistent with results obtained from evidentiary blood specimens. THC was the most frequently detected drug category in both oral fluid (*n*=46) and whole blood (*n*=44). Benzodiazepines were detected more frequently in blood (*n*=11) than in oral fluid (*n*=6). In contrast, amphetamine and methamphetamine were detected in 14 oral fluid specimens; however, they were reportable in only two blood specimens. Data discussed is preliminary in nature and detailed analysis is ongoing.

Driving, Intoxicated, Drugs