

Workplace Testing Rules Are Poor Governance For Environmental Exposure Analysis in Child Samples

By Joseph Salerno, Scientific Copywriter, USDTL

“A drug endangered child is a person, under the age of 18, who lives in or is exposed to an environment where drugs, including pharmaceuticals, are illegally used, possessed, trafficked, diverted, and/or manufactured and, as a result of that environment: the child experiences, or is at risk of experiencing, physical, sexual, or emotional abuse; the child experiences, or is at risk of experiencing, medical, educational, emotional, or physical harm, including harm resulting or possibly resulting from neglect; or the child is forced to participate in illegal or sexual activity in exchange for drugs or in exchange for money likely to be used to purchase drugs.”

- Federal Interagency Task Force for Drug Endangered Children (2010)

Properly conducted forensic drug analysis of hair specimens is valuable for identifying exposure of children to environments where illicit substance abuse is a problem. Specialized drug testing for environmental exposure should take into account the differences between levels of native drug compounds and drug metabolites in the sample. Exposure testing should also recognize that workplace testing guidelines set forth by the Substance Abuse and Mental Health Services Administration (SAMHSA) are not the appropriate parameters for conducting this type of analysis. The health and well-being of a child are far too important to not take these factors into account.

Environmental exposure analysis can be carried out using several specimen types — oral fluid, urine, or hair for example — but is most effectively carried out using hair samples. For example, a recent study found that hair samples were 10 times and 3.5 times more likely than oral fluid and urine respectively to detect environmental methamphetamine exposure.¹

Many drug testing groups apply SAMHSA workplace drug testing guidelines to environmental exposure testing, but this is problematic for two reasons. First, responsibly done, exposure analysis should examine native drug compounds first and metabolites second. Under SAMHSA guidelines

only drug metabolites are analysed for several drug classes.

Marijuana exposure, for example, will result in detectable levels of native-THC in hair samples, but little or no carboxy-THC, the metabolite that results from marijuana ingestion, and which is mandated under SAMHSA as the analyte for cannabinoid testing. The same can be said for cocaine versus benzoylecgonine, the cocaine metabolite. When detected, drug metabolites in a child’s specimen may indicate very heavy drug use by adults and subsequent exposure to the child, heavy enough to cause incidental ingestion, or that the child has gained access to, and used, an adult’s illicit substance. But, testing solely for the drug metabolite, which can only occur from ingestion, may completely miss the signs of exposure evidenced by the presence of the native drug in the hair sample.

A second concern with SAMHSA workplace drug testing rules is that mandated cutoffs are often too high to trigger the report of a positive result in an exposure test. SAMHSA positive cutoff values are set at the ng/ml level, yet environmental exposure results are typically in the pg/ml range, especially in the case of cannabinoid testing.² The application of standard workplace testing guidelines to children’s samples runs the risk of false negative testing results and the possibility of leaving a child in a harmful environment.

Living in circumstances where they are exposed to illicit substance abuse by adults around them, children are often subject to other harms including physical and sexual abuse and neglect. Children in drug environments are almost three times more likely to experience abuse and four times more likely to experience neglect.³ Such high stakes demand the application of proper and responsible criteria to drug testing children’s samples for environmental exposure.



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USDTL Research Report

USDTL And University of Wisconsin-Milwaukee Research on Alcohol Biomarker EtG in Nails And Hair to be Published in The Journal *Addiction*

By Joseph Salerno, Scientific Copywriter, USDTL

Berger, L., Fendrich, M., Jones, J., Fuhrman, D., Plate, C., & Lewis, D. (2013). Ethyl Glucuronide in Hair and Fingernails as a Long-Term Alcohol Biomarker. *Addiction*, published online November, 27, 2013.

Des Plaines, IL - Researchers from the University of Wisconsin-Milwaukee and USDTL (United States Drug Testing Laboratory, Inc.) have published study results in the OpenOnline edition of the journal *Addiction* demonstrating the use of the direct alcohol biomarker ethyl glucuronide (EtG). Their results demonstrate EtG has promising ability to differentiate between various levels of alcohol consumption when analyzed in fingernail and hair specimens. Reinforcing earlier research, the study also demonstrated the effectiveness of EtG testing in alternate specimen types, especially fingernails, as an objective long-term alcohol biomarker. The results will be published in the print edition of *Addiction* in an early 2014 issue.

Ethanol is metabolically converted to EtG in the liver, which can then be captured within the keratin fibers of growing fingernails and hair. The detection of EtG in hair as a measure of chronic excessive alcohol consumption (as supported by the Society of Hair Testing) has become more prevalent in the drug and alcohol testing industry in the last decade. In 2011 USDTL developed an assay to analyze fingernails for the EtG metabolite. Scientists from USDTL secured funding from the National Institute on Alcohol Abuse and Alcoholism (NIAAA) to compare the effectiveness of EtG analysis in fingernails to EtG hair testing. Researchers from the Center for Addiction and Behavioral Health Research at the University of Wisconsin-Milwaukee lent their expertise in alcohol and substance abuse research to the study.

The research examined paired fingernail and hair specimens from more than 600 students attending a Midwestern university. The students were surveyed for their drinking history - how often and how much they drank - over the 90 days prior to the study to establish the level of alcohol consumption associated with each set of samples. Fingernail and hair analysis is able to detect EtG that has been captured by the samples within the previous 90 days of growth. The study authors theorized college students would be more honest about their drinking habits because of a reduced stigma among their peers associated with drinking. Statistical

Forensic Account Set-Up

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2. Complete the Account Application and return it via email or fax.
3. Meghan will contact you to discuss services, supplies and pricing.
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 - b. Account Set Up
 - c. Supply Order Form
5. Complete all three forms and return them via email or fax.
6. Your account will be finalized by a Client Services Representative and supplies are shipped to you.
7. You will be sent a USDTL Welcome Packet in the mail containing your client ID number.
8. You are ready to submit samples for testing.

analysis suggested that assumption was correct.

Based on their answers to the alcohol consumption survey, subjects were classified into one of three drinking categories: 1-14 drinks/week, 15-29 drinks/week, or 30 or more drinks/week. Each subject's fingernail and hair specimens were then analyzed for the presence of EtG. The study authors statistically analyzed the assay results to see how effectively EtG analysis in fingernails and hair could identify alcohol consumption by subjects in each category.

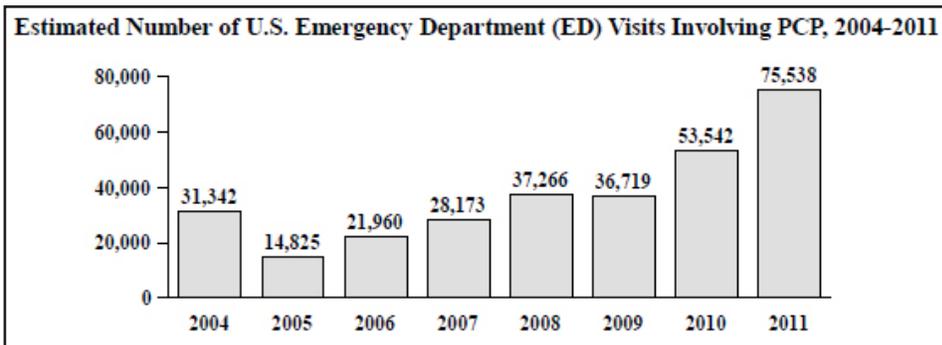
The results demonstrated a very high efficiency of EtG analysis in both fingernail and hair samples to qualitatively identify any level of drinking. Fingernail analysis was 100% effective for identifying alcohol consumption in the highest category (more than 30 drinks/week, "high-risk" drinking as classified by NIAAA). Some indications from the study results also suggest that EtG analysis in fingernails may hold promise as a quantitative analytical tool to distinguish between the different levels of alcohol consumption, however, further research is necessary to develop this potential use of fingernail EtG testing.

PCP-Related U.S. Emergency Department Visits on The Rise; Likely Driven by Increases in New York City And Chicago

CESAR FAX, December 2, 2013, Volume 22, Issue 47

The estimated number of PCP-related emergency department (ED) visits in the U.S. continues to increase, according to the most recent data from the Drug Abuse Warning Network (DAWN). The sharpest increase in ED visits that involved PCP either as a direct cause or a contributing factor occurred from 2009 (36,719) to 2011 (75,538; see figure below). The national scope of these data, however, masks geographic differences in PCP use, which has historically been localized in specific metropolitan areas¹. While DAWN cannot produce valid regional estimates, metropolitan area estimates indicate that PCP-related ED visits are increasing in only two of the eleven over-sampled metropolitan areas--New York City (618% increase from 2004 to 2011) and Chicago (182% increase). In the remaining areas, estimates of PCP-related ED visits are either stable (Phoenix, San Francisco, Seattle) or were too small or imprecise to report. The authors suggest that “increased efficiency might result from geographic targeting of prevention and treatment efforts based on additional studies.”²¹

Editor’s Note: These findings should be interpreted with caution for two reasons. First, nearly three-fourths (72%) of PCP-related ED visits in 2011 involved another



substance (i.e., alcohol, prescription drugs, illicit drugs) combined with PCP, which means that the ED visit may not be attributed solely to PCP. Second, DAWN does not require that all drugs reported for an ED visit be confirmed by laboratory testing (only 56% of the 2011 PCP-related ED visits were confirmed), toxicology tests are not used consistently across EDs, and those that do test may not test specifically for PCP. Thus, visits by patients who report taking PCP and/or who present with symptoms similar to PCP use will be recorded as PCP-involved, when it is possible that the substance taken was another drug.

1. CESAR FAX, Volume 13, Issue 15; Drug Enforcement Administration, “PCP: The Threat Remains,” Microgram Bulletin 36(8): 181-190, 2003; Thombs, D.L., “A Review of PCP Abuse Trends and Perceptions,” Public Health Rep. 104(4):325-8, 1989.

SOURCE: Adapted by CESAR from Substance Abuse and Mental Health Services Administration (SAMHSA), “Emergency Department Visits Involving Phencyclidine (PCP),” The DAWN Report, November 12, 2013. Available online at <http://www.samhsa.gov/data/2K13/DAWN143/sr143-emergency-phencyclidine-2013.pdf>.

Tips For Easy Collection of Dried Blood Spot Specimens

PEth (phosphatidylethanol) testing in dried blood spots offers a simple, rapid, and innovative way to test for direct alcohol biomarkers. Here are some tips to follow to ensure easy blood spot specimen collection every time.

- Do not use ethanol-based hand sanitizer or alcohol pad.
- Do not puncture the center of the fingertip. Blood flow is best accomplished with an off-center puncture. (see the picture at right)
- Wiping away the first drop of blood improves blood flow.
- Allow the collection paper to wick blood out of the puncture.
- Do not press the finger against the collection paper.
- Do not layer successive drops of blood.
- Avoid “milking” the finger, which can speed clotting.
- Do not touch the already filled collection circles.



Photo by Michelle Lach

For complete blood spot collection instructions visit our website at www.USDTL.com/bloodspot-collection.html.

Exposure, Continued from page 1.

References

1. Castaneto, M.S. et al. (2013). Identifying Methamphetamine Exposure in Children. *Therapeutic Drug Monitoring*, 35(6), 823-830.
2. Uhl, M. and Sachs, H. (2004). Cannabinoids in Hair: Strategy to Prove Marijuana/Hashish Consumption, *Forensic Science International*, 145(2-3), 143-147.
3. Substance Abuse and Mental Health Services Administration (SAMHSA). (1996). *National Household Survey on Drug Abuse: Main Findings*. Rockville, MD: SAMHSA, Office of Applied Studies.

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Quarterly Forensic Newsletter

Upcoming Events:

- January 15-17 – 21st Annual Children’s Law Institute – Albuquerque, NM
- January 23-25 – American Society of Transplant Surgeons 14th Annual State of the Art Winter Symposium – Miami, FL
- March 2-5 – Family Law Institute for Judges and Lawyers – Monterey, CA
- March 3-4 – 28th Annual Conference on Prevention of Child Abuse – San Antonio, TX
- March 24-27 – 30th National Symposium on Child Abuse – Huntsville, AL
- March 25-28 – 2014 National Organization of Alternative Programs Educational Conference – San Diego, CA

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