USDTL News

July 2011 Volume 2 Issue 3

Long-term alcohol biomarkers proportional to the area under the blood alcohol curve

by Joseph Jones
Vice President Laboratory Operations

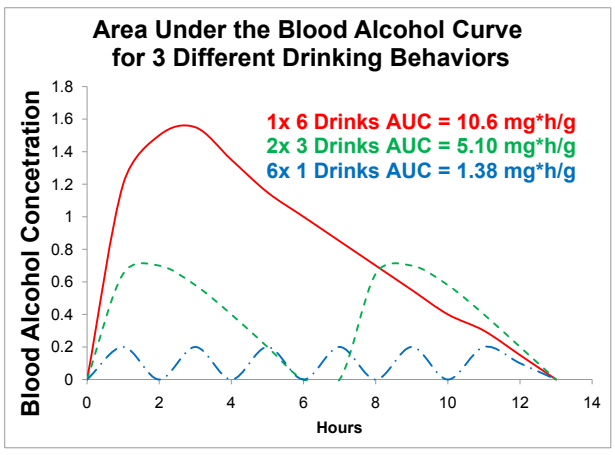
When reviewing the results of long-term alcohol biomarkers, knowing how many drinks are required to achieve a positive is important. To uncover the dose response for long-term alcohol biomarkers, our research team recently executed a Small Business Innovative Research (SBIR) phase II study funded by the National Institute of Alcohol Abuse and Alcoholism (NIAAA).

USDTL gathered an extensive 90-day time line follow back (TLFB) history, coupled with hair and fingernail specimens from over 600 consenting students at the University of Wisconsin-Milwaukee. USDTL analyzed the hair and fingernail specimens for the direct alcohol biomarker ethyl glucuronide (EtG).

Initially, when comparing the EtG results to self-report, the results were unclear. The results seemed to reflect not only the number of drinks consumed but also how they were consumed (non-hazardous versus hazardous or binge drinking). The individuals with positive results needed to achieve appreciable blood alcohol content. Revisiting a recent journal article allowed us to realize a predicted pattern.

Last year, a research paper published by Pragst, et al., proposed that long-term alcohol biomarker results did not necessarily correlate to the number of drinks ingested. Pragst proposed that the results actually correlated to the area under the blood alcohol versus time curve (BAC).

If an individual connected to a continuous blood alcohol monitoring device consumed standard drinks at various rates of time per drink, Pragst indicated that the data would appear something like that depicted in Chart 1. Assuming one standard drink (one beer, one serving of wine, one shot of distilled spirits) is approximately 14 to 17 grams of ethanol, most of the ethanol is absorbed in the small intestine



F. Pragst et al. (2010) *For Sci Int, 196* , 101-110.

Chart 1

approximately 50 minutes after a drink and alcohol is eliminated at an approximate rate of one hour per drink.

If an individual consumed one drink every two hours for 12 hours, there would be six little peaks on the test chart. Chart 1 depicts this reading as the blue dot-dash line. Pragst calculated the area under these six small peaks as 1.38 mg-h/g. If the individual rapidly consumed three drinks six hours apart, there would be two medium peaks on the test chart. Chart 1 depicts this reading as the green dashed line. Pragst calculated the area under these two medium peaks as 5.10 mg-h/g. If the individual consumed six drinks all at once, there would be one large peak on the test chart. Chart 1 depicts this reading as the red solid line. Pragst calculated the area under this large peak as 10.6 mg-h/g.

This illustration depicts a single individual, drinking the same amount of alcohol (six drinks), over the same amount of time (12 hours), using three different drinking patterns (paced drinking to binge drinking), with three very different areas under the blood alcohol curve (1.38, 5.10, & 10.6). With this observation in mind, the EtG fingernail and hair assays and PEth blood and bloodspot assays seem to test for risky alcohol behavior, not all alcohol use.

Ask the President

President Douglas Lewis

Q: What can our NICU do if we strongly suspect that a newborn was drug-exposed, but the CordStat® or MecStat® results came back negative?

A: USDTL hospital clients can "dispute" a negative result and request a "re-test" for one or more specific drug classes that they suspect are present.

The re-test is a concept routinely used in workplace urine testing where a subject disputes a positive result and requests a re-test, which is a re-confirmation of the specimen with a cutoff of 40 percent of the original confirmation cutoff. For newborns, the clinical professionals act on behalf of the newborn and dispute the negative finding. This re-test then becomes the result of record for the case.

To order a re-test, fax or email USDTL Client Services a re-test request on your letterhead and state the test(s) requested, the newborn demographic information, the USDTL lab number and your contact information. You can also call Client Services with the case information. Our representative will provide you with the necessary paperwork for you to sign and return to initiate the re-test process.

Client Services will return a re-test result to you in one to two working days. If you have any questions after receiving the re-test results, please contact Client Services and they will assist you or direct you to one of our forensic toxicologists to discuss the case with you.

Got a question for USDTL? Ask our president and scientific director, Douglas Lewis. E-mail heather.sliwinski@usdtl.com with your questions, and you may be featured in our newsletter!

Client profile: Women's and Children's Services, Central Baptist Hospital

Client:
Holly Rollins, CSW, MSW, Women's and Children's Social Services, Central Baptist Hospital

Explain your role in social services:
I am consulted for many reasons on a daily basis. Some of the most frequent consults are for substance abuse. In this day and time, our communities are struggling with substance abuse, and many babies are born to mothers and fathers who struggle with addiction.

How do you use drug testing results in your work?
Because of the frequency of substance abuse in our communities, I depend greatly on the results. This allows us to see a better picture of what is going on in a particular family. After results are received, I review them along with the medical chart and make appropriate referrals and assistance for the entire family.

What do you see as the value of chain of custody?
The chain of custody is a very important legal step. With the use of chain of custody, it allows drug test results be physical evidence in our courts. Without chain of custody, I do not believe the results would be permissible in court.

Have you found any advantages to using umbilical cord testing?
Very rarely do we still use meconium. I have found in the few cases that the [doctor] has ordered both meconium and umbilical cord, the results have been very similar. I do like using the umbilical cord because there is always a sample available. Sometimes an infant would pass the meconium before we decided we needed to drug screen, and our sample would be lost. With the umbilical cord we collect a sample on all babies and store it until discharge in case we need to order a drug screen at a later date. I refer all positive test results on to Child Protective Services. I have never heard of a case where the drug tests were not permissible in court.

2011 Conference review

To keep clients informed of the latest trends in newborn drug testing, USDTL attends over 30 industry conferences every year. We look forward to speaking with our supporters and value your time and feedback. These events are just a few from our schedule:

Where we've been

Gravens Conference, Clearwater Beach, Fla.
NEO The Conference, Orlando, Fla.
OB and Neonatal Nursing Conference, Las Vegas, Nev.
MEDNAX Meeting, Las Vegas, Nev.
Advanced Practice Neonatal Nurses Conference, Waikiki, Hawaii
AWHONN Convention, Denver, Colo.

Where we're headed

National Neonatal Nurses and Mother Baby Nurses Conference, Washington, D.C.
National Association of Neonatal Nurses Conference, Orlando, Fla.

We hope to see you there!

1700 S. Mount Prospect Rd. | Des Plaines, IL 60018 | (800) 235-2367 | www.usdtl.com