

# PHYSICIAN HEALTH NEWS

The Official Newsletter of the Federation of State Physician Health Programs

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Welcome to the 13th issue of *Physician Health News*. We hope you will find this an informative forum for all aspects of physician health and well-being.

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The Federation of State Physician Health Programs is a nationwide organization whose purpose provides for an exchange of information among state physician health programs to develop common objectives, goals, and standards.

If you haven't, please consider joining the organization. State membership is \$400.00 per year, and individual (associate) membership is \$100.00 per year. We sincerely hope you will respond as an indication of your commitment to a stronger, more cohesive Federation of State Physician Health Programs. For more information on each of the membership categories, please contact Vicki Grosso of the American Medical Association at (312) 464-4574.

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## Message from the President



Luis Sanchez, MD

Over the course of the past year since our annual meeting in 2007, your FSPHP has been involved in numerous activities, programs, and projects designed to best position the organization as the recognized leader in matters impacting state Physician Health Programs (PHPs), patient safety in the PHP arena, and the physician participants of our state PHPs. These activities have been focused in a few significant areas that are highlighted here.

### Organizational Focus

The FSPHP is pursuing a strategic planning process to more clearly focus on the agenda of the organization. An initial one-day board planning session was held in early December. A significant amount of work was accomplished and your FSPHP Board will be reviewing the initial draft of the planning document in San Antonio prior to the annual meeting. The following areas stood out and will definitely be included in the organization's strategic plan going forward: diversifying operational funding sources for the FSPHP, increasing FSPHP visibility with various audiences, developing models to assist programs undergoing change, involvement in common data-based research, and increasing communications with numerous audiences, including the FSPHP membership.

It is anticipated that an update on our strategic planning process will be given during the 2008 Annual Meeting and Conference.

### Visibility of the FSPHP

As your president, I have represented the FSPHP as the official observer at the AMA House of Delegates meetings and increased visibility of the organization in that arena. These opportunities are extremely valuable as a means of exposing numerous audiences to the FSPHP and informing them who we are and which areas our expertise is in. I, along with our Executive Director, Michele Norbeck, met with AMA representatives to review how our organizations can work together. We have also met with the leaders of the physician health program in

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## Alcohol Marker Update — EtG and EtS, and Incidental Exposure

Greg Skipper, MD, FASAM

Ethylglucuronide (EtG) testing to detect alcohol use was introduced in the United States in 2002 and has rapidly gained popularity. School testing programs, the criminal justice system, family courts, liver transplant clinics, and others are now routinely using EtG testing, but most testing is coming from professional monitoring programs that oversee monitoring of health professionals, attorneys, and others. A survey of Physician Health Programs (PHPs) in 2007 revealed that 85 percent used EtG testing routinely. The number of laboratories performing EtG testing has also risen rapidly to more than 20, including the largest laboratories in the United States. Despite the widespread use of EtG testing, there has been surprisingly little research to validate its reliability or to better understand the troublesome problem of false identification of alcohol consumption — when an EtG result may be positive as a result of incidental exposure to any of the hundreds of products in the environment that contain alcohol. This article will briefly review new findings regarding EtG and other new markers, including the new information regarding incidental exposure.

### EtS Testing to Replace or Enhance EtG Testing

There is now growing evidence that a different non-oxidative metabolite of alcohol, EtS (ethyl-sulfate), may be superior to EtG. This is because EtS not only has a similar time curve of detection following alcohol consumption, but it appears to be more sensitive and specific. EtS is measured using the same LC/MS/MS technique.<sup>1</sup>

COMPARING ETG TO ETS		
CHARACTERISTIC	ETG	ETS
Average duration of positive following one drink	20.6 hours	21.2 hours
Lab cutoffs offered	100 to 500 ng/ml	25 to 100 ng/ml
Stability: degraded in presence of bacteria	Yes	No
In vitro synthesis by bacteria	Yes	No
LC/MS/MS	Yes	Yes
Number of labs performing test (2008)	20	2*
*Forensic Lab (Denver) and USDTL (Chicago)		

As an example of the superior sensitivity of EtS, in one study both tests were performed on 98 urine samples. Twenty-seven were positive for EtS and 20 were positive for EtG, suggesting a higher sensitivity for EtS. The authors concluded by recommending that both tests be performed when possible to improve sensitivity.<sup>2</sup> Further evidence regarding sensitivity and specificity came from two studies in Sweden, which demonstrated that EtG, but not EtS, can be destroyed in urine when certain bacteria are present.<sup>3</sup> Later the same authors found that EtG, but not EtS, is not only destroyed but can also be created in urine when alcohol and certain bacteria are present.<sup>4</sup> “Urine specimens with confirmed growth of *Escherichia coli*, *Klebsiella pneumoniae*, or *Enterobacter cloacae* were stored at room temperature in the presence of ethanol (either added to the samples or generated by inoculation with the fermenting yeast and glucose as substrate) and EtG, but not EtS, was later found.” They concluded that the presence of EtG in urine is not a unique indicator of recent drinking, but can originate from postcollection synthesis by bacteria. Given the associated risks for false identification of alcohol consumption and false-negative EtG results due to bacterial degradation, they recommended that EtG testing always be combined with EtS testing, or if only one test is feasible, EtS is superior.

### First Reliable Hair Test for Alcohol Consumption — Hair Tests for EtG and/or EtS

Phosphatidyl ethanol (PEth) is a blood test that turns positive only after long-term consumption of higher doses of ethanol (14 drinks per week for 2 weeks). PEth blood tests were compared to hair EtG levels, and it was found that hair EtG was superior to detect alcohol use over the previous month. Hair EtG was present in 49 of the 70 autopsy cases whereas PEth was present in 36. Thirty-nine cases had EtG levels above the cutoff limit ( $\geq 30$  pg/mg) compared with 29 for PEth ( $\geq 0.7$   $\mu\text{mol/l}$ ). Fifteen cases had EtG as the exclusive indicator for alcohol abuse compared with four cases for PEth. These findings suggest that measurements of EtG in hair may provide improved diagnostic information on alcohol abuse. They also point out that because of reduced sensitivity for detection of EtG in hair, an EtG level below the cutoff does not completely exclude previous alcohol abuse.<sup>5</sup>

Another study reported the curious finding that EtG may be more concentrated in pubic hair! In fact, it was present in up to 100-fold concentration in pubic hair.<sup>6</sup>

Another report found that EtG concentration in hair was not influenced by pigmentation.<sup>7</sup>

In yet another study, EtG concentrations in segments of hair were found to correlate well with the patient's history of alcohol use. Hair specimens from 15 patients in a treatment program after alcohol abuse cessation were segmented and analyzed for EtG. The results were then compared to self-reported past alcohol consumption. EtG concentrations measured in hair varied from 8 to 261 pg/mg. The pattern of EtG concentration detected in the different hair segments matched with the drinking history of patients, displaying variations (increase and decrease) in alcohol consumption and time of cessation.<sup>8</sup>

It is of note that subrogation of hair testing is likely rare, but recently there have been reports of "invalid" hair tests from patients presenting and submitting hair samples while wearing wigs. Tests were invalid because the hair was synthetic.

### New Immunoassay Screen (Quick Test) for EtG Testing – Accuracy Still Somewhat Uncertain

Despite the prospect of lower cost testing, an immunoassay test for EtG or EtS has not yet been widely used. A study was performed to test the new immunoassay for EtG, developed by Microgenics. Authors concluded favorably that the test works. "These results indicated a high level of accuracy and selectivity of the DRI-EtG EIA for quantification of urinary EtG." They suggested a cutoff for the immunoassay at 500 ng/ml.<sup>9</sup>

Subsequent authors, however, tested the kits and found that they worked in some cases, but they did not detect drinking in 19 subjects on specimens collected more than 26 hours after drinking. As a result, these authors expressed a concern regarding sensitivity.<sup>10</sup>

### EtG Testing Being Used in Liver Transplant Clinic

There was one report that EtG testing was superior to history and/or urine alcohol or breathalyzer in detecting alcohol consumption in alcoholic liver disease patients awaiting liver transplantation.<sup>11</sup>

### Incidental Exposure

Studies have been published documenting that alcohol-based hand gel<sup>12</sup> and mouthwash<sup>13</sup> cause positive EtG tests. More work is certainly needed to better define EtG and/or EtS levels generated by non-beverage sources of alcohol.

<sup>1</sup>Morini L, Politi L, Zucchella A, Poletti A. Ethyl glucuronide and ethyl sulphate determination in serum by liquid chromatography-electrospray tandem mass spectrometry. *Clin Chim Acta*. 2007 Feb;376(1-2):213-9.

<sup>2</sup>Wurst FM, Dresen S, Allen JP, Wiesbeck G, Graf M, Weinmann W. Ethyl sulphate: a direct ethanol metabolite reflecting recent alcohol consumption. *Addiction*. 2006 Feb;101(2):204-11.

<sup>3</sup>Helander A, Dahl H. Urinary tract infection: a risk factor for false-negative urinary ethyl glucuronide but not ethyl sulfate in the detection of recent alcohol consumption. *Clin Chem*. 2005 Sep;51(9):1728-30.

<sup>4</sup>Helander A, Olsson I, Dahl H. Postcollection synthesis of ethyl glucuronide by bacteria in urine may cause false identification of alcohol consumption. *Clin Chem*. 2007 Oct;53(10):1855-7.

<sup>5</sup>Bendroth P, Kronstrand R, Helander A, Greby J, Stephanson N, Krantz P. Comparison of ethyl glucuronide in hair with phosphatidylethanol in whole blood as post-mortem markers of alcohol abuse. *Forensic Sci Int*. 2007 Nov 13.

<sup>6</sup>Kintz P, Villain M, Vallet E, Etter M, Salquebre G, Cirimele V. Ethyl glucuronide: Unusual distribution between head hair and pubic hair. *Forensic Sci Int*. 2007 Nov 8.

<sup>7</sup>Appenzeller BM, Schuman M, Yegles M, Wennig R. Ethyl glucuronide concentration in hair is not influenced by pigmentation. *Alcohol Alcohol*. 2007 Jul-Aug;42(4):326-7.

<sup>8</sup>Appenzeller BM, Agirman R, Neuberger P, Yegles M, Wennig R. Segmental determination of ethyl glucuronide in hair: a pilot study. *Forensic Sci Int*. 2007 Dec 20;173(2-3):87-92.

<sup>9</sup>Böttcher M, Beck O, Helander A. Evaluation of a new immunoassay for urinary ethyl glucuronide testing. *Alcohol Alcohol*. 2008 Jan-Feb;43(1):46-8.

<sup>10</sup>Wojcik MH, Hawthorne JS. Sensitivity of commercial ethyl glucuronide (ETG) testing in screening for alcohol abstinence. *Alcohol Alcohol*. 2007 Jul-Aug;42(4):317-20.

<sup>11</sup>Erim Y, Böttcher M, Dahmen U, Beck O, Broelsch CE, Helander A. Urinary ethyl glucuronide testing detects alcohol consumption in alcoholic liver disease patients awaiting liver transplantation. *Liver Transpl*. 2007 May;13(5):757-61.

<sup>12</sup>Rohrig TP, Huber C, Goodson L, Ross W. Detection of ethylglucuronide in urine following the application of Germ-X. *J Anal Toxicol*. 2006 Nov-Dec;30(9):703-4.

<sup>13</sup>Costantino A, Digregorio EJ, Korn W, Spaydr S, Rieders F. The effect of the use of mouthwash on ethylglucuronide concentrations in urine. *J Anal Toxicol*. 2006 Nov-Dec;30(9):659-62.