PHYSICIAN UPDATE

New Urine Ethanol (Alcohol) Markers Available – Ethyl Glucuronide and Ethyl Sulfate

WHAT’S NEW?

Effective Wednesday, March 7, 2012, two new urine ethanol markers will be available from PeaceHealth Laboratories as quantitative tests by HPLC/MS/MS to directly identify and measure the concentration of ethyl glucuronide (EtG) and ethyl sulfate (EtS).

These markers have an extended detection time of up to 80 hours following moderate to excessive alcohol beverage consumption compared to the common urine ethanol test that detects ethanol for less than 12 hours.

Urine EtG and EtS are direct alcohol markers that are more effective to document abstinence, detect relapse and deter drinking in your patients.

A very small fraction (< 0.1%) of ingested ethanol is conjugated in the liver to produce EtG and EtS, catalyzed by uridine diphosphate-glucuronosyl-transferase and sulfotransferase, respectively. EtG and EtS are excreted mainly in the urine.

This testing is not intended for use in forensic investigations and is not recommended for employment testing.

REFERENCE RANGE

Ethyl glucuronide < 500 ng/mL
Ethyl sulfate < 200 ng/mL

The cutoff levels for EtG and EtS were carefully selected to reduce the likelihood of false positives due to incidental exposure, as can happen with a very low detection limit. Interpretive comments on reports will indicate if the result is consistent with ethanol ingestion or if the result indicates potential interferences.

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INCIDENTAL EXPOSURE
Incidental exposure to ethanol can occur from many sources since ethanol is common in many available products. Ethanol is used in cooking, hygiene products, antibacterial hand gels, perfumes, bug spray, gasohol, communion wine, wine vinegar, soy sauce, as a solvent in over-the-counter medications and in many other sources.

Individuals being monitored using EtG/EtS should be warned to avoid all sources of ethanol including foods containing ethanol, ethanol based mouthwash, over-the-counter medications containing ethanol, and vapors from any products for topical use that contain ethanol. There is currently no known reference range that can reliably distinguish between all possible incidental exposure to ethanol and beverage ethanol consumption.

Effect of Ethanol Containing “Non-Alcoholic” Beverages on EtG and EtS
The effect on test results for EtG and EtS when patients consume “non-alcoholic”* beverages in large quantities is shown in Table 1.

- “Non-alcoholic” beer (2.5 L) may cause a positive EtG and a positive EtS.
- “Non-alcoholic” wine (750 mL) may cause a positive EtS but not a positive EtG.

Effect of Exposure to Ethanol Containing Products on EtG and EtS
Table 2 lists the effects of the following products on EtG and EtS.

- Mouthwash
- Hand sanitizers
- Baker’s yeast and sucrose
- Brewer’s yeast and sucrose

Effect of Urinary Tract Infections on EtG and EtS
The effect of *E. coli* urinary tract infections on EtG and EtS is shown in Table 3.

- *E. coli* urinary tract infection (UTI) may cause degradation of EtG (false-negative result) but does not affect EtS.
- *E. coli* UTI with ethanol, or *E. coli* UTI with yeast and glucose may cause positive EtG but not a positive EtS.

QUESTIONS?
Stephen Erfurth, PhD, DABCC, DABCC/TC
Director of Science and Technology
📞 541-341-8092
📞 800-826-3616 ext. 8092
serfurth@peacehealthlabs.org

Grant Beardsley, MS, MT(ASCP), NRCC/TC
Manager, Drug Testing Services, Clinical Toxicologist
📞 541-687-2134 ext. 8137
📞 800-826-3616 ext. 8137
gbeardsley@peacehealthlabs.org

*”non-alcoholic” beer and “non-alcoholic” wine may contain ethanol at approximately 0.40% and 0.20%, respectively, which may cause a positive EtG and/or EtS test result.*
**Table 1 – Effect of Ethanol Containing Beverages on EtG and EtS**

<table>
<thead>
<tr>
<th>Condition / Characteristic</th>
<th>EtG (Ethyl Glucuronide) Reference Range &lt; 500 ng/mL</th>
<th>EtS (Ethyl Sulfate) Reference Range &lt; 200 ng/mL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average duration of EtG/EtS above reference range following one alcoholic beverage</td>
<td>20.6 hrs.</td>
<td>21.2 hrs.</td>
</tr>
<tr>
<td>Will ingestion of large amounts of “non-alcoholic” beer (2.5 L) produce a result above the reference range?</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Will ingestion of large amounts of “non-alcoholic” wine (750 mL) produce results above the reference range?</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Table 2 – Effect of Exposure to Ethanol Containing Products on EtG and EtS**

<table>
<thead>
<tr>
<th>Condition / Characteristic</th>
<th>EtG (Ethyl Glucuronide) Reference Range &lt; 500 ng/mL</th>
<th>EtS (Ethyl Sulfate) Reference Range &lt; 200 ng/mL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Will intense exposure to mouthwash with high ethanol content produce a result above the reference range?</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Will the intense use of hand sanitizer containing ethanol produce a result above the reference range?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Will ingesting Baker’s yeast and sucrose together produce a result above the reference range?</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Will ingesting Brewer’s yeast and sucrose produce a result above the reference range?</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

**Table 3 – Effect of Urinary Tract Infections* on EtG and EtS**

<table>
<thead>
<tr>
<th>Condition / Characteristic</th>
<th>EtG (Ethyl Glucuronide) Reference Range &lt; 500 ng/mL</th>
<th>EtS (Ethyl Sulfate) Reference Range &lt; 200 ng/mL</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the presence of E. coli from a UTI, could the result be lower due to degradation of EtG or EtS?</td>
<td>Yes (could cause a false-negative result)</td>
<td>No</td>
</tr>
<tr>
<td>Will in-vitro synthesis of EtG/EtS in presence of E. coli and ethanol cause the result to be above the reference range?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Will in-vitro synthesis of EtG/EtS in presence of E. coli, fermenting yeast and glucose cause the result to be above the reference range?</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

*UTI = urinary tract infection or E. coli contamination of urine.
New Urine Ethanol (Alcohol) Markers Available – Ethyl Glucuronide and Ethyl Sulfate

ORDERING INFORMATION

36980 Ethyl Glucuronide/Ethyl Sulfate, UR

Methodology: High-Performance Liquid Chromatography/Tandem Mass Spectrometry (HPLC/MS/MS)

Performed: Monday, Wednesday, Friday

Released: Less than 72 hours

CPT Code: 82055 x 2

SPECIMEN REQUIREMENTS

Collect: Random urine in a clean, dry plastic container

Handling: Specimen stable ambient; refrigerate if specimen will not reach testing laboratory within 7 days of collection.

Stability: Ambient: 7 days

Refrigerated: 4 weeks

Frozen: 6 months

Transport: Ambient or refrigerated

Standard Volume: 30 mL urine

Minimum Volume: 10 mL urine

Rejection Criteria: Insufficient quantity, unlabeled or mislabeled specimen, or delayed transport

Retention: 12 months

Comments: 500 ng/mL Ethyl Glucuronide (EtG) threshold/cutoff; 200 ng/mL Ethyl Sulfate (EtS) threshold/cutoff. Interpretation provided with each specimen result.

REFERENCES