



Clinical Update: September 2019

What Did My Patient Actually Take? An Overview of Alcohol Results

According to the National Survey on Drug Use and Health conducted in 2015, 86.4% of people over the age of 18 reported drinking alcohol at some point in their lifetime, with 33.9% of these individuals reporting either binge drinking or heavy alcohol use in the past month.¹ Of those that drink alcohol, approximately 15.1 million adults have been diagnosed as having alcohol use disorder (AUD), with only 6.7% of adults with AUD receiving treatment.¹ With alcohol use and abuse both incredibly high in the US, it is important for providers to be aware of their patients' use patterns and the potential drug interactions with their prescribed medications. However, as with all testing, there are things providers should be aware of when considering the interpretation of their patients' test results regarding alcohol findings.

Ethanol can be directly detected in all matrices offered by Aegis – blood, oral fluid, and urine – at a threshold of 10 mg/dL. Ethanol is only detectable for up to 8 hours post ingestion, which is indicative of recent ingestion. Aegis can also analyze samples for two ethanol metabolites, ethyl glucuronide (EtG) and ethyl sulfate (EtS), with detection periods up to 72 hours post-ingestion at positive thresholds of 500 ng/mL and 200 ng/mL respectively. Period of detection is influenced by patient-specific factors, amount ingested, and chronicity of ingestion.^{2,3} Due to the variability of ethanol metabolism, it is possible to observe differing amounts of the metabolites or the presence of one metabolite in absence of another. There are several scenarios that providers should be aware of that may result in unexpected positives. Post-collection fermentation is a common cause of positive results for ethanol and/or EtG only and has been shown to be responsible for up to one-third of unexpected positive results.⁴ Post-collection fermentation is of particular concern when the sample has been left at room temperature for a day or longer, which can allow yeast naturally present in the body to ferment excreted glucose and form ethanol, which in turn can be converted to EtG in the presence of bacteria.^{5,6} This phenomenon is often seen in samples from diabetic patients as they can excrete a greater than normal amount of glucose in their urine.

EtG and EtS testing may have unexpectedly positive results stemming from “incidental exposures” such as electronic cigarette use, heavy use of hand sanitizer, or consuming certain foods/beverages.⁷⁻⁹ Though generally an uncommon practice, the consumption of raw, live Baker's yeast, when taken in combination with a source of sugar, can result in *in vivo* fermentation.¹⁰ Some patients consuming large amounts of grape juice may have detectable EtS levels due to the natural fermentation of fruit's sugar.¹¹ When considering positive results, it is important to discuss the use of “nonalcoholic” beers and wines with patients as these beverages may contain up to 0.5 vol. % ethanol.¹² Heavy consumption of these “nonalcoholic” beers and wines can lead to EtG and EtS levels at or above the Aegis reporting threshold.^{11,13,14} Other fermented beverages such as kombucha, a drink consisting of tea, sugar, bacteria, and yeast, may have up to a 3% alcohol content despite being listed as a non-alcoholic beverage and may cause an unexpected positive result.¹⁵⁻¹⁷

Providers should also keep alcohol-containing medications in mind (prescription and over the counter [OTC]), which patients may not report using prior to their test. Certain formulations of particular



concern are: cough and cold syrups, tinctures, allergy medications, anti-diarrheals, laxatives, and toothache, cold sore, and canker sore medications. Advise patients to consult product labels or their pharmacist for alcohol content in OTC or prescription medications. While OTC medications are restricted to a maximum of 10% alcohol content, some prescription drugs may exceed this level. If heavy medication use is suspected or known, or if the presence of alcohol metabolites conflicts with a patient's treatment agreement, advise patients to use non-alcoholic formulations when possible.

Clinicians should be aware of the rare possibility that a patient may have auto-brewery syndrome. This syndrome causes patients to naturally make large amounts of ethanol *in vivo*. Individuals affected by this disease will likely have severe bowel dysfunction, an overabundance of yeast, and a carbohydrate rich diet which worsens their symptoms.^{18,19}

A common misconception regarding alcohol testing is that mouthwash or perfume/cologne use may lead to a positive test. Aegis has not found any data that indicates that proper use of mouthwash or personal scent products will result in a positive test, however, improper use, such as purposefully consuming these products for their alcohol content, can produce positive results.^{14,20} Additionally, when conducting definitive testing for alcohol, it must be noted that there is no correlation between the amount ingested and the concentration detected in urine. Furthermore, there is not a correlation between the amount detected and the patients' impairment or intoxication when the sample was collected.²¹ Though definitive testing reports concentrations of ethanol, EtG, and EtS, these concentrations cannot be used to infer the exact time or amount of alcohol last ingested.

Please call our clinical scientists at 1-877-552-3232 if you require additional information.

NOTICE: The information above is intended as a resource for health care providers. Providers should use their independent medical judgment based on the clinical needs of the patient when making determinations of who to test, what medications to test, testing frequency, and the type of testing to conduct.

References:

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Additional Resources

1. *Clinical Reference Guide: Drug Testing in Healthcare.* Aegis Sciences Corporation, 2019.
2. National Institute of Drug Abuse: <https://www.drugabuse.gov/drugs-abuse/alcohol>
3. Auto-brewery Syndrome Stat Pearls: <https://www.ncbi.nlm.nih.gov/books/NBK513346/>
4. Aegis Labs Clinical Update Site: <https://www.aegislabs.com/resources/clinical-update/>
5. Athena Clinical Page: <https://athena.aegislabs.com/departments/clinicalscience/Pages/Home.aspx>