



### E12 Forensic Chemistry and Toxicology Laboratory Tests: Are Reliable Principles Being Reliably Applied?

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After attending this presentation, attendees will understand the principles that make forensic chemistry and toxicology laboratory test results reliable, what laboratory documents are necessary to assess whether those reliable principles have been reliably applied to the case at hand, and how to evaluate the requested documents to determine if the reported results are, in fact, reliable.

This presentation will impact the forensic science community by describing the importance of examining all relevant laboratory documents. Attorneys play a critical role in the criminal justice system since they are the last reviewers before the trier of fact evaluates the physical evidence. To be effective in this role, knowledge of what documents to request and what documents demonstrate reliability, skills in how to evaluate the documents, and understanding to recognize when to consult with an expert.

Why is it that so often attorneys accept crime laboratory reports at face value and fail to request critical documents? Most testing methodologies used in forensic chemistry and toxicology are decades, if not centuries, old. As methodologies, the principles of screening tests (color, microcrystal, and immunoassay tests) are reliable; the principles of confirmation tests (gas chromatography-mass spectrometry (GC/MS), liquid chromatography-mass spectrometry (LC/MS), and infrared (IR)) are reliable; and, the principles of determining sample weights using analytical balances are reliable. However, reliable principles must be reliably applied. Critical laboratory documents hold the key to determining if the crime laboratory's reported results are reliable.

Naming practices for laboratory documents vary from state to state and laboratory to laboratory. Familiarity with a laboratory's nomenclature is crucial. Attorneys sometimes use boilerplate request-for-discovery letters that contain lists of documents that were drafted by an attorney in a different state. Often much of what is requested is not provided by the laboratory, as the laboratory uses different language to describe their documents. If requesting attorneys don't understand what they are requesting and why, they may not realize that they are not getting the documents they need to properly evaluate the physical evidence. If a red document is requested, one that the laboratory calls a fuchsia document, the laboratory probably won't provide the desired document and they won't inform the requestor why the requested documents are not being provided.

The reliability, or lack thereof, of scientific findings affects criminal, civil, and family court matters. Cases will be presented illustrating how reliability can turn on large details and seemingly small ones as well.

Small elements that can result in a laboratory result being excluded include a police officer's missing signature on a breath-alcohol test report, a missing internal (laboratory) sample chain of custody, or a failure to demonstrate analytical sensitivity through proper use of calibrators and controls. Large occurrences that can affect a laboratory result include a lack of written laboratory protocols, training records, bench notes, and method validation. Evaluation of the documents of reliability can lead to a sample result being excluded or in some cases —shutting down an entire laboratory.

Reliability must be demonstrated for every test on every item of physical evidence in every case. Reliability can only be demonstrated through documents.

#### **Reliability, Evidence, Testing**