

# Forensic Toxicology

## An Introduction



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### KEYWORDS

- Forensic toxicology • Workplace drug testing • Postmortem toxicology
- Human performance toxicology

### KEY POINTS

- The difference in the science behind the fields of forensic toxicology and clinical toxicology is minimal, if any.
- Providing toxicology results to the legal system requires the use of terms and language used in that field, as opposed to strictly medical language.
- There are 3 components of forensic toxicology: workplace drug testing, postmortem toxicology, and human performance toxicology.

Forensics, by definition, is the use of science within the legal system. Forensic toxicology is no different. The difference between clinical toxicology and forensic toxicology is not in the science or the methods. Those are exactly the same. The difference lies in the end use of the results. In clinical toxicology, the end user is a physician who is using the results to treat and care for a patient. In forensic toxicology, the end user can be a physician, or a nonmedical professional such as a lawyer, a human resources employee, or probation officer who is using the results to determine a cause of death, employment eligibility, or compliance with terms of parole.

Forensic toxicology can be generally divided into 3 areas:

- Workplace or preemployment testing
- Human performance
- Postmortem

Workplace toxicology deals with preemployment drug screens or drug screens required by the Department of Transportation. Human performance deals with correlating a person's actions with a drug(s) they ingested. This could be driving under the

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influence of alcohol or drugs, committing a crime while on a drug, or having a crime committed against an individual such as a sexual assault. Postmortem toxicology deals with the toxicology testing on deceased individuals and is a routine part of the autopsy process.

## **WORKPLACE DRUG TESTING**

Workplace drug testing is divided into two areas, regulated and nonregulated testing. Regulated testing is testing that is mandated by the federal government via the Department of Health and Human Services, and is overseen by Substance Abuse and Mental Health Services Administration (SAMHSA). This testing is mandatory for truck drivers who cross state lines, all federal employees, military employees, and for those with many other federal jobs. Nonregulated Workplace drug testing is any testing that is required of a new employee to start a job. The guidelines are not as stringent as regulated testing, although the basic tenants are still adhered to.<sup>1</sup>

### ***Accreditation***

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Regulated workplace drug testing laboratories are accredited by SAMHSA through the National Laboratory Certification Program. Laboratories are inspected twice a year. They are challenged with proficiency samples 4 times per year, 25 samples per challenge. As of 2016, there were 30 accredited laboratories in the country. It is a very difficult, but prestigious, accreditation to obtain, hence the low number of accredited laboratories. To qualify as a federal drug testing laboratory, the laboratory has to demonstrate and adhere to the most stringent protocols in the world for drug testing. The goal of the National Laboratory Certification Program is to ensure consistency among all certified laboratories. So that regardless of the location where the sample is tested, the same result would be produced. It also creates an environment where split-sample testing can be instituted, and the comparison of results of "A" and "B" samples are made easier. At the time of collection, the specimen is split into 2 separate containers, "A" and "B." Each container is sealed and sent to the testing laboratory. The "A" sample is tested and the results are reported. If those results are disputed by the donor, they have the option to have the "B" sample reconfirmed at a separate laboratory. Additionally, the guidelines that are imposed are designed to protect the laboratory in litigation.

Nonregulated laboratories are accredited by the College of American Pathology's Forensic Drug Testing program. Although not as stringent as the SAMHSA program, the same forensic principles are adhered to.

### ***Specimen***

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The specimen for regulated workplace testing is always urine. It must be collected under direct observation or with measures in place so that tampering with the collection are eliminated. Once a sample is collected, it is split into 2 containers ("A" and "B"). A tamper-evident seal is placed across each lid and is signed by both the donor and collector. A paper requisition must be presented by the donor to the collector before sample collection. This is known as the Custody Control Form. This paperwork will accompany the specimen from the time it is collected until final results are recorded.

The specimen for nonregulated workplace testing is also urine. The collection may or may not be observed, and the use of a tamper-evident seal is also optional, although many establishments do use it. There is usually a paper requisition that accompanies the specimen; however, the results are usually not reported on it.

The Department of Health and Human Services has proposed guidelines as to the use of oral fluid and hair as acceptable samples for regulated testing.<sup>2</sup> Oral fluid is

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