

Toxicological Testing

Toxicological Testing

is a laboratory-based process whereby specimens are examined for substances of toxicological significance (drugs, alcohols, poisons). Test findings based upon proficient laboratory analyses are scientifically accurate and reliable. Variables such as, but not limited to specimen source, collection, timing, custody, maintenance, availability and condition do not effect scientific accuracy and reliability unless they disrupt the testing process.

It is what it is.

Toxicological Testing is the analysis of specimens for drugs (including ethanol) and poisons which may have some pharmacologic or toxic effect. As such, toxicological analysis represents a tool for establishing what drugs or combination a subject may have ingested and the degree of impairment the subject may have experienced following such ingestion. Several types of toxicological analyses are conducted for different purposes. These include forensic toxicological analysis, workplace drug testing and clinical/diagnostic/hospital drug/ethanol testing.

Toxicological testing may be **qualitative** or **quantitative**. Qualitative analyses are intended to identify particular substances in a specimen. Quantitative analyses are intended to both identify particular substances and to establish how much is present. Quantitative analyses are necessarily more complicated than are qualitative analyses because quantitative analyses must be calibrated and controlled for each particular substance.

Toxicological testing is destructive, meaning the specimen is consumed during the analytical process. Accordingly, while the universe of potential substances of toxicological interest may be vast, the actual scope of analysis is limited by the technology and specimen(s) available.

Forensic toxicological analysis is conducted for medical-legal purposes, which include death and criminal investigations. Laboratory findings are intended for use in Court. Accordingly, specimens are considered evidence and are received, maintained, processed and disposed under strict chain-of-custody practices. Specimens are primarily biological. Analyses are conducted in specialty laboratories pursuant to scientifically acceptable and legally defensible standards, which include redundant procedures that incorporate both **presumptive** and **confirmatory** processes and/or testing technologies.

Evidential ethanol analyses may be conducted with biological specimens including breath and some non-biological specimens such as beverages.

While forensic toxicological analyses themselves are not legally regulated, consensus-based practice standards <<https://www.aafs.org/academy-standards-board>> are evolving and laboratories are increasingly gaining independent accreditation <<https://anab.ansi.org/>>. Standards and operations for forensic laboratory practices are also the subject of a 2009 report by the National Academy of Sciences <<http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=12589>>.

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Workplace drug and ethanol testing is conducted for medical-legal purposes, typically as part of an employer's drug deterrence program. Because employment law invokes due-process, laboratory findings are intended for use in Court. Accordingly, specimens are considered evidence and are received, maintained, processed and disposed under strict chain-of-custody practices. Specimens are strictly biological. Analyses are conducted in specialty laboratories pursuant to scientifically acceptable and legally defensible standards, which include redundant procedures that incorporate both presumptive and confirmatory testing technologies.

What distinguishes workplace drug testing from forensic toxicological testing is the limited scope of specimens and target analytes. This is based in the original intent for workplace drug testing, namely to identify drug ingestion among safety-sensitive federally-regulated transportation industries such as railroads, aviation, trucking and pipelines. The specimens for workplace drug testing are typically limited to urine, hair and more recently, oral fluid. The scope of target drugs is primarily limited to drugs-of-abuse.

Workplace ethanol testing is typically conducted with breath.

Workplace drug testing is regulated pursuant to CFR 49 Part 40 <[http:// www.dot.gov/dapc/](http://www.dot.gov/dapc/)>.

Use of positive workplace drug testing findings may be appropriate for some evidential purposes but not others without qualification or explanation.

Hospital/clinical drug testing is conducted for diagnostic purposes. Analyses are conducted within the treatment facility as expeditiously as possible, typically without instrumental methods and without definitive confirmation that is the hallmark of forensic examinations. Testing is typically limited to urine and the scope of target drugs is primarily limited to drugs-of-abuse.

Diagnostic drug testing is intended as a guide to treatment (e.g. drug overdose) and to avoid potentially contraindicated medication. Presumptive analytical technology (immunoassay) alone is sufficient for this purpose as is the reporting of generic drug class findings (e.g. opiates). Confirmation analysis for specific substances (e.g. morphine) is less important because members of a generic drug class will typically dictate similar treatment. Successful treatment is the goal, not production of legally defensible analytical findings.

Without confirmation of "positive" findings, diagnostic findings are inadequate to establish the presence of any particular substance. Use of "positive" hospital/clinical drug test findings is generally inappropriate for evidential purposes and reported findings typically bear disclaimers stating such.

Hospital/clinical ethanol testing is conducted for diagnostic purposes. Analyses are conducted within the treatment facility as expeditiously as possible, typically with instrumental methods different from those used in forensic laboratories. Testing is typically limited to serum derived

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from whole blood.

Diagnostic ethanol test findings considered for legal proceedings may be qualified as accurate and reliable even though practices and documentation may not be as rigorous as those in forensic examinations. Furthermore, diagnostic findings are based upon serum or plasma rather than whole blood, the accepted basis matrix for determining intoxication. Accordingly, expert testimony may be necessary to properly explain the significance of diagnostic ethanol findings used for evidential purposes.

Diagnostic or hospital drug and ethanol testing is regulated pursuant to Clinical Laboratory Improvement Amendments (CLIA) <<https://www.cdc.gov/cia/php/about/index.html>>.