

Reliable Clinical and Forensic Drug Testing: Guideline Supports High-Quality Standards in Laboratory Analysis

Developing reliable and efficient procedures for clinical and forensic drug testing is a challenge for many laboratories. Individual laboratories must determine the need to perform clinical or forensic drug testing, and in some cases be prepared to encounter both types of testing scenarios. Therefore, it is critical that laboratories understand the differences between clinical and forensic drug testing, evaluate what level of testing is required to support medical staff and patients, and realize that clinically intended drug testing results can be used in legal situations as well.

The Clinical and Laboratory Standards Institute (CLSI) document, *Toxicology and Drug Testing in the Clinical Laboratory; Approved Guideline—Second Edition (C52-A2)*, released in April 2007, is designed to aid the clinical laboratorian in developing procedures for the efficient and reliable analysis of clinical and forensic specimens to qualitatively and/or quantitatively determine the presence of drugs-of-abuse and other commonly encountered drugs. This guideline addresses forensic drug testing applications such as workplace, criminal justice system, and rehabilitation settings, and clinical drug testing as typically undertaken for the diagnosis and treatment of emergency room patients. Its primary objective is to ensure that high-quality standards are maintained within both of these important areas of clinical laboratory analysis.

The document conforms to the objective by addressing specimen collection and processing, methods of analysis, quality assurance, and the reporting and interpretation of results. Because the results of forensic analyses have obvious potential for use as evidence in legal proceedings, information is provided relating to forensic procedures used to safeguard the identity of the specimen, document the chain of custody, and ensure proper use of analytical results.¹ “The scope of C52-A2 is very useful in that it provides a ‘big picture’ of the process of drug testing from beginning to end,” according to Doug Rheinheimer, MT, FDA Center for Devices and Radiological Health (Rockville, MD), and a member of the working group involved in producing the document. “It covers basic definitions, preanalytical, analytical, and postanalytical issues, and the chain of custody. Within each section is enough detail to guide laboratories on how to tailor recommendations to their specific needs,” he adds.

Determining the primary purpose of testing

Clinical laboratories interested in establishing or maintaining drug testing procedures must first determine the primary

purpose of the testing. Laboratory directors must identify the scope of the drug testing that is appropriate for the medical staff and patients served by the laboratory. Clinical drug testing is primarily conducted for medical reasons. Forensic drug testing is performed for administrative or legal purposes and not for patient care. “Laboratories need to determine the extent of toxicology testing they should perform to meet their facility’s medical needs. C52-A2 provides guidance as to the types of toxicology testing that laboratories may undertake such as therapeutic drug monitoring (TDM), drugs-of-abuse (DOA) testing, and miscellaneous toxicology analytes (acetaminophen, salicylates, volatiles); the types of methods available to perform testing (immunoassays, chromatographic procedures); and the purpose of testing (either clinical or forensic),” explains David Armbruster, Ph.D., DABCC, FACB, **Abbott Diagnostics** (Abbott Park, IL), and chairholder of the CLSI committee that produced the document. He continues, “C52-A2 urges clinical laboratories to perform enough toxicology testing to support the medical needs of their facilities, but not to perform toxicology testing if it is not required just because analytical procedures happen to be available. C52-A2 also emphasizes that laboratories should determine if the toxicology testing it performs is for clinical or forensic purposes, because forensic drug testing must conform to strict requirements and uses a chain of custody.”

It is important to recognize that sometimes there is a gray area where the line between clinical and forensic drug testing situations is blurred. For example, a pregnant woman who undergoes drug testing as a patient but who screens positive for a DOA could be referred to the authorities for prosecution for drug use or for endangering the fetus. Testing emergency room patients for ethanol may have forensic implications, for example, in the case of an automobile accident with fatalities.¹ This underscores the importance of a clear understanding of the two types of drug testing.

A comprehensive examination of drug testing

C52-A2 is a revised edition of a previously released CLSI document. This new edition takes a more comprehensive look at clinical drug testing. “The previous edition of this guideline was primarily focused on DOA testing for forensic purposes. The new C52-A2 guideline is more general in scope, because most laboratories perform some toxicology testing, and it is mainly for clinical, instead of forensic,

purposes. C52-A2 has shifted the focus to general toxicology testing to support medical treatment, yet it retains most of the original information specific to forensic toxicology,” Armbruster points out.

The C52-A2 document was produced in response to requests from the clinical laboratory community for more information related to drug testing. Armbruster notes, “Although toxicology testing is routinely performed in clinical laboratories, it is still a more specific subdiscipline and not always clearly understood. For example, the distinction between screening tests and confirmatory tests for DOAs is still a source of confusion, along with the use of analyte-specific ‘cutoff’ or ‘threshold’ concentrations for the DOAs that differ between screening and confirmatory tests. These kinds of specifics and details are addressed in C52-A2.” Amitava Dasgupta, Ph.D., of the University of Texas–Houston Medical School in Houston, and also a member of the CLSI working group involved in producing the document, adds, “C52-A2 is an important document, because it supplies all the possible misdiagnoses and outlines the consequences to the patient.”

A trusted resource

CLSI is uniquely positioned to produce a resource such as C52-A2. CLSI provides standards and guidelines to support quality initiatives in health care, in addition to producing documents that define terminology and discuss performance characteristics from a preanalytical through postanalytical path of work flow. These documents represent the best practices in the field and are created through a unique consensus process involving input from all areas of the health-care community.

CLSI, formerly NCCLS, is an international, interdisciplinary, nonprofit, standards-developing, educational organization that promotes the development and use of voluntary consensus standards and guidelines within the health-care community. It is a professional society organized by interested stakeholders with a vast global member and volunteer base.

With a history of 35+ years, CLSI is a proven leader with undisputed credibility, continually bringing together profes-

sionals to provide critical resources that are the gold standard for best practices in health care. The organization is committed to responding to the needs of the health-care community by facilitating the development of tools that aid the user in achieving effectiveness and efficiency in the workplace. CLSI proactively evolves to stay on the cutting edge of health-care science and developments by maintaining an open and unbiased forum to address critical issues in the health-care community.

CLSI is recognized worldwide for the application of its unique consensus process in the development of standards and guidelines for patient testing and related health-care issues. Its standards and guidelines represent a consensus opinion on good practices and reflect the substantial agreement by interested parties obtained by following CLSI’s established consensus procedures.

CLSI welcomes comments and questions about the documents; this feedback serves as the basis for updated document editions. All comments and responses are formally addressed and published in the next edition of the document. For more information about CLSI references and best practices, visit www.clsi.org or call 610-688-0100. CLSI offers a collection of products for health-care professionals interested in clinical laboratory drug testing. Related documents include *Mass Spectrometry in the Clinical Laboratory (C50-A)* and *Gas Chromatography/Mass Spectrometry (GC/MS) Confirmation of Drugs (C43-A)*. For more information on these and other CLSI documents and resources, please visit www.clsi.org.

Reference

1. *Toxicology and Drug Testing in the Clinical Laboratory; Approved Guideline—Second Edition*. CLSI document C52-A2. Clinical and Laboratory Standards Institute: Wayne, PA, 2007.

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