CLINICAL AND LABORATORY STANDARDS INSTITUTE®

2nd Edition

CLSI MM19™

Establishing Molecular Testing in Medical Laboratory Environments

CLSI MM19 provides comprehensive recommendations for molecular diagnostic testing, that cover strategic planning, regulatory requirements, implementation, quality management, and special considerations for subspecialties of molecular genetics including infectious diseases, oncology, malignant hematology, and pharmacogenetics.

A guideline for global application developed through the Clinical and Laboratory Standards Institute consensus process.

CLSI MM19-Ed2
October 2025
Replaces CLSI MM19-A

Establishing Molecular Testing in Medical Laboratory Environments

Ronald M. Przygodzki, MD
Ted E. Schutzbank, PhD, D(ABMM)
Kimberly Starr, PhD
Rodney C. Arcenas, PhD, D(ABMM)
Laurie Bauer, DO, FCAP, FASCP
Karen E. Bijwaard, MS, RAC, MB(ASCP)
George Broukhanski, PhD
Julia Bugrysheva, PhD
Davina E. Campbell, MS, MPH
Sugganth Daniel, MD, FCAP
James J. Dunn, PhD, D(ABMM), MT(ASCP)
Helen Fernandes, PhD
Lei Fu, PhD, DABCC, FADLM, FCACB
Mukesh Gandhi, CMLTO
Amy Shirley Gargis, PhD, MS
Alison SL Halpin, PhD
Duane W. Newton, PhD, D(ABMM), FIDSA
Heddie L. Nichols, PhD, PHM
Honey V. Reddi, PhD, FACMG
Kate Rhodes, PhD
Nadeem A. Tusneem, MA

Abstract

CLSI MM19-Ed2—*Establishing Molecular Testing in Medical Laboratory Environments* provides a framework for decision-making and implementation of clinical molecular diagnostics and is intended for those in established medical laboratories that are implementing a molecular program for the first time. When implementing any diagnostic test, many factors should be considered before the test is available for use in patient care. CLSI MM19 focuses on the laboratory path of workflow, including safety and the QMS, with an emphasis on considerations for molecular diagnostics. An organized approach to strategic planning is presented, and relevant regulatory requirements and an implementation plan are discussed in detail.

Importantly, special considerations are provided for each of the following molecular subspecialty areas: heritable diseases, oncology and malignant hematology, pharmacogenomics, and infectious diseases.

CLSI. *Establishing Molecular Testing in Medical Laboratory Environments.* 2nd ed. CLSI guideline MM19-Ed2. Clinical and Laboratory Standards Institute, USA, 2025.

CLINICAL AND LABORATORY STANDARDS INSTITUTE®

Suggested Citation

CLSI. *Establishing Molecular Testing in Medical Laboratory Environments.* 2nd ed. CLSI guideline MM19. Clinical and Laboratory Standards Institute, USA, 2025.

Previous Edition:
May 2011

CLSI MM19-Ed2

ISBN 978-1-68440-301-1 (Print)

ISBN 978-1-68440-302-8 (Electronic)

ISSN 1558-6502 (Print)

ISSN 2162-2914 (Electronic)

Volume 45, Number 15

Contents

Contents (Continued)

Foreword

CLSI MM19 was written in response to a broader clinical need to add common molecular diagnostic tests to the routine medical laboratory environment. The use of molecular assays in routine medical laboratories is growing based on the availability of *in vitro* diagnostic devices for molecular testing and the relative ease of their implementation. Incorporating molecular testing into the routine medical laboratory test menu decreases the need for send-out testing, improving turnaround time and the financial health of the laboratory.

Overview of Changes

CLSI MM19-Ed2 replaces CLSI MM19-A, published in 2011. Several changes were made in this edition, including:

- Updating and streamlining all content
- Providing specific guidance on procedural, technological, and regulatory aspects of developing molecular testing within a routine medical testing environment
- Providing specific guidance on important preexamination, examination, and postexamination aspects for heritable disease, oncology and malignant hematology, pharmacogenomic, and infectious diseases molecular testing subspecialties
- Adding infrastructure and data retention requirements

NOTE: The content of CLSI MM19 is supported by the CLSI consensus process and does not necessarily reflect the views of any single individual or organization.

KEY WORDS

molecular diagnostics
molecular genetics
molecular infectious diseases
molecular regulatory requirements
strategic planning
unidirectional workflow

Chapter 1

Introduction

Establishing Molecular Testing in Medical Laboratory Environments

1 Introduction

1.1 Scope

CLSI MM19 provides an overview of how molecular diagnostics are implemented to support existing laboratory services. It provides general recommendations for establishing an appropriate testing environment in which molecular assays are developed and implemented. Because molecular diagnostics is multidisciplinary in nature, CLSI MM19 provides an overview of special considerations that are unique to identified subspecialties. Cross references to other CLSI documents providing assay technical details are included.

CLSI MM19 is intended for use by medical laboratory professionals who understand the fundamentals of medical testing but are looking to expand testing by adding molecular methods to a currently existing medical laboratory.

Assays and areas not covered include:

- Paternity and forensics
- Blood banking
- Detection of bioterrorism agents that require biosafety levels 3 or higher
- Preimplantation genetic diagnostics and screening

1.2 Background

Nucleic acid testing for oncology and malignant hematology, infectious diseases, and human genetics continues to be a rapidly growing field in laboratory medicine. Detection of small DNA and RNA sequence variations improves the ability not only to diagnose, but also to identify those at risk for disease and those infected with an identifiable pathogen. Amplification technologies have become increasingly rapid and multiplexed, and next-generation sequencing (NGS) has allowed for comprehensive assessment of genomes.

The maturation of molecular testing systems has allowed for routine placement in most medical laboratories and facilitated the expansion of test menus without large investments in research and development. Simplification of molecular platforms provides multiple options for molecular diagnostic testing at the point of care.

Thus, the use of molecular testing is expected to increase in medical settings where technical knowledge might be limited. CLSI MM19 is written for medical laboratories seeking guidance when incorporating molecular assays into their testing menus. It begins with basic elements that factor into the decision to implement a molecular assay, as well as an overview of implementation activities.

Because the clinical relevance of molecular assay findings cannot always be derived from the analytical results alone, clinical correlation is needed between the genotype and phenotype, limitations of the method, and in the case of genetic testing, patient and family history. CLSI MM19 also presents many of the special considerations that are unique to each molecular testing subspecialty.

Medical directors should ensure that the clinical validity of molecular tests has been adequately demonstrated and should seek evidence of clinical use. Several groups publish evidence-based reviews of molecular genetic and genomic tests.[1]

CLINICAL AND LABORATORY STANDARDS INSTITUTE®

PRINT ISBN 978-1-68440-301-1

ELECTRONIC ISBN 978-1-68440-302-8

CLSI MM19-Ed2