CLINICAL AND LABORATORY STANDARDS INSTITUTE®

2nd Edition

M53

Criteria for Laboratory Testing and Diagnosis of Human Immunodeficiency Virus Infection

This guideline includes recommendations for performing human immunodeficiency virus testing and for interpretation of results by health care providers in advanced diagnostic laboratories.

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

M53-Ed2
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Replaces M53-A

Criteria for Laboratory Testing and Diagnosis of Human Immunodeficiency Virus Infection

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Abstract

Clinical and Laboratory Standards Institute guideline M53—*Criteria for Laboratory Testing and Diagnosis of Human Immunodeficiency Virus Infection* provides an extensive review of existing laboratory methods commonly used to test for HIV infection. The accurate diagnosis of HIV infection is essential for limiting the spread of infection and for the appropriate clinical management of persons infected with HIV. Numerous tests and strategies have been developed and are used by laboratorians and clinicians to diagnose HIV infection. This guideline also offers recommendations for how to best use and interpret these tests accurately and effectively to diagnose HIV infection.

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Foreword

Since HIV testing was introduced, laboratory-based methods have undergone tremendous change. The routine use of nucleic acid testing, the introduction of antigen/antibody combination tests, and the widespread implementation of rapid testing methods, including the use of different specimen types, have changed the way HIV infection is diagnosed. Although these tests may offer improved sensitivity, specificity, and turnaround times, clinicians and laboratorians need to determine which tests to perform and how to best interpret the results.

There is increasing momentum to establish universal routine testing programs for HIV infection to limit the spread of infection and to identify individuals who may benefit from earlier initiation of antiviral therapy. The Centers for Disease Control and Prevention has issued recommendations for routine HIV screening of all patients in the health care setting. Concurrent with these recommendations, laboratorians and clinicians have used several new tests and testing strategies to diagnose HIV infection. Although an increased demand for these tests exists, adequate consensus guidelines have not been proposed to assist in the appropriate use and interpretation of these tests and testing strategies.

Overview of Changes

This guideline replaces the previous edition of the approved guideline, M53-A, published in 2011. Several changes were made in this edition, including:

- Reorganizing the text to follow the testing path of workflow
- Expanding the scope to include testing recommendations for resource-limited settings and for managing patients with HIV type 1-positive infections
- Adding an HIV testing and interpretation process flow chart
- Revising the algorithms used to select HIV testing protocols and associated text
- Deleting all references to HIV test "generations"
- Updating:
  - Information on currently available and preferred HIV tests
  - Test principal figures
  - Information on molecular testing
  - Recommended approaches for HIV diagnostic testing
  - Special situations for HIV testing
  - QC information

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

KEY WORDS

algorithms
antibody differentiation assay
antibody discrimination assay
enzyme immunoassay
genotypic drug-resistance test
HIV-1
HIV-2
immunoassay
initial test
nucleic acid test
phenotypic drug-resistance test
single-use devices
supplemental test
Western blot

Chapter 1

Introduction

Criteria for Laboratory Testing and Diagnosis of Human Immunodeficiency Virus Infection

1 Introduction

1.1 Scope

This guideline provides:

- An overview of the natural history and response to HIV infection
- An in-depth review of initial and supplemental tests used for diagnosing HIV infection
- Tests for monitoring and managing HIV type 1 (HIV-1) infections
- Recommendations for initiating an HIV QC program

This guideline also discusses special situations that commonly cause confusion in HIV testing, including:

- Diagnosis of acute and recent HIV infection
- Testing for HIV-1, group 1, non-B subtype, and HIV type 2 (HIV-2) infections
- Initial and supplemental testing during pregnancy, labor, and delivery
- Newborn testing
- HIV-1 seroconversion or incomplete antibody (Ab) response
- Recipients of HIV vaccines or chimeric antigen receptor T-cell (CAR-T) therapy
- Viral suppressors (elite controllers [ECs])
- Testing for pre- and postexposure prophylaxis
- Testing for CSF for HIV-associated central nervous system (CNS) disorders
- Self-collection and self-testing

Also included are:

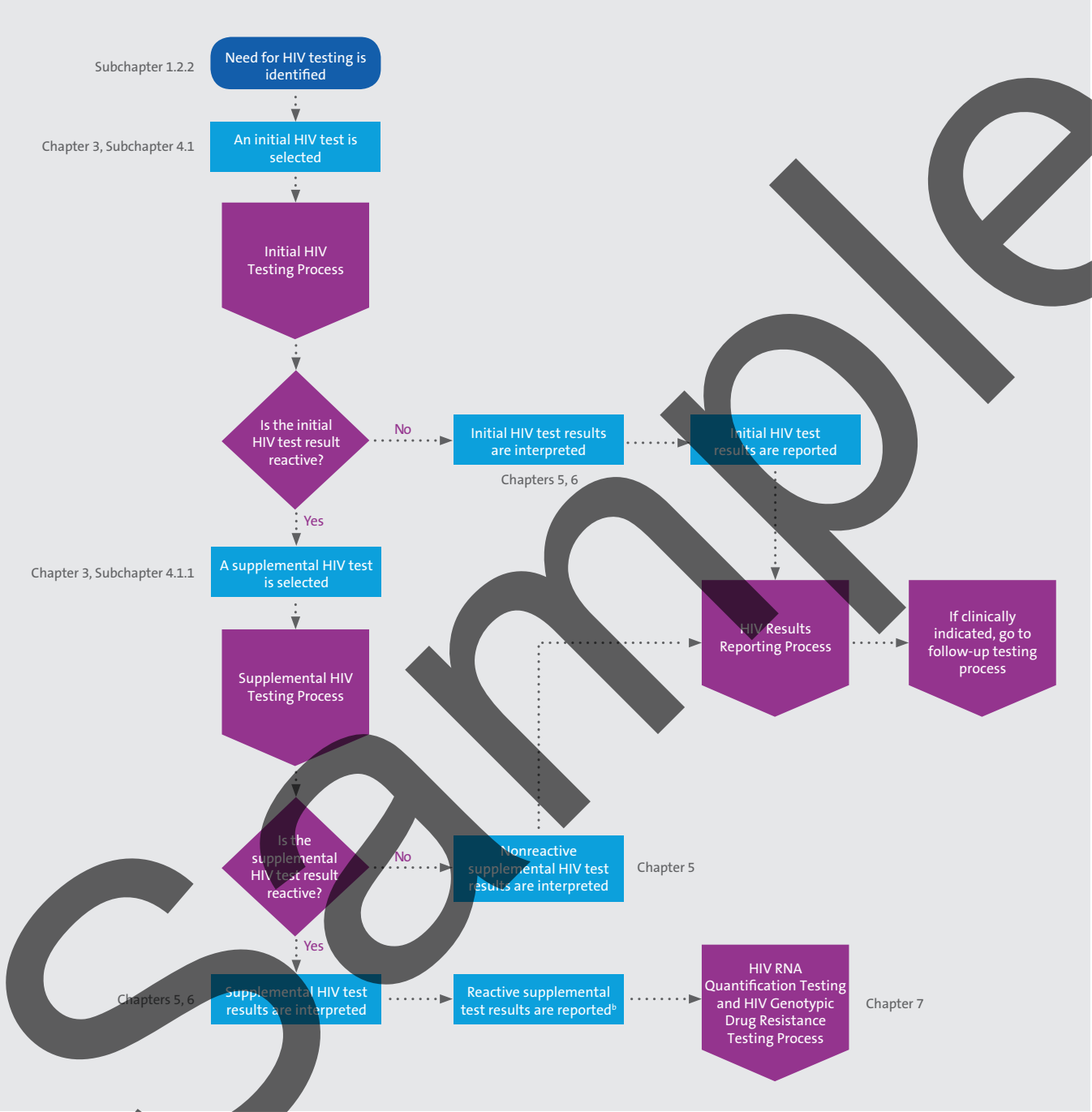
- Diagnostic testing algorithms to assist clinicians and laboratorians in the stepwise use of HIV tests
- A framework for determining the need for additional testing
- Results interpretation
- Reporting criteria for commonly obtained test results

This guideline is intended for use in diagnosing HIV-1 and HIV-2 infections in both advanced diagnostic laboratories and point-of-care (POC) settings, including resource-limited environments. It does not:

- Discuss methods or strategies for screening the blood supply or organ or tissue donation.
- Provide recommendations for use outside the clinical setting.
- Cover issues for diagnosing HIV from nonhuman material, environmental surfaces, or postmortem samples.

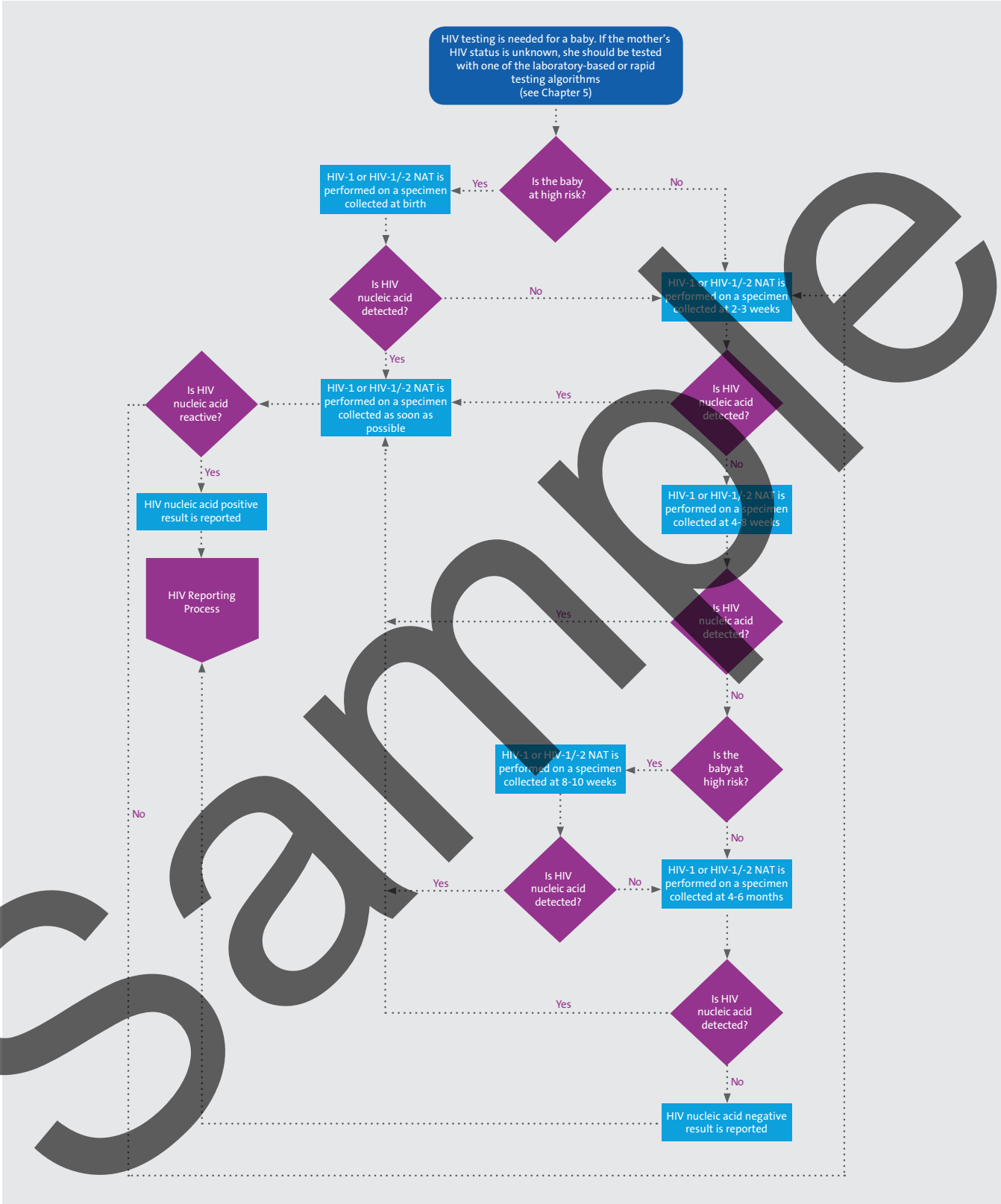
2 HIV Testing and Interpretation Process

Figure 4 shows the process flow chart for selecting HIV tests and interpreting results.



Abbreviations: HIV, human immunodeficiency virus; RNA, ribonucleic acid.
[a] Five basic symbols are used in this process flow chart: oval (signifies the beginning or end of a process), arrow (connects process activities), box (designates process activities), diamond (includes a question with alternative "Yes" and "No" responses), pentagon (signifies another process).
[b] Additional supplemental (confirmatory) testing may be needed depending on which algorithm is selected.

Figure 4. HIV Testing and Results Interpretation Process[a]



Abbreviations: HIV, human immunodeficiency virus; HIV-1, human immunodeficiency virus type 1; HIV-1/-2, human immunodeficiency virus types 1 and 2; NAT, nucleic acid test.

Figure 21. Algorithm VII: Testing in Babies With Known or Suspected Perinatal HIV Exposure

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