

Anne M. Van Leeuwen

Debra J. Poelhuis-Leth

Davis's

**Comprehensive Handbook of
Laboratory and
Diagnostic Tests with
Nursing Implications**

THIRD EDITION



Davis's

**Comprehensive Handbook *of*
Laboratory and
Diagnostic Tests—with
Nursing Implications**

Anne M. Van Leeuwen, MA, BS, MT (ASCP)

Debra J. Poelhuis-Leth, MS, RT (R)(M)

With special considerations by

Marijke Vroomen-Durning, RN

Davis's

**Comprehensive Handbook of
Laboratory and
Diagnostic Tests—with
Nursing Implications**

THIRD EDITION



E. A. DAVIS COMPANY • Philadelphia

F. A. Davis Company
1915 Arch Street
Philadelphia
PA 19103

www.fadavis.com

Copyright © 2009 by F. A. Davis Company
All rights reserved. This book is protected by copyright. No part of it may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without written permission from the publisher.

Printed in the United States of America

Last digit indicates print number: 10 9 8 7 6 5 4 3 2 1

Publisher: Lisa B. Deitch
Art and Design Manager: Carolyn O'Brien
Managing Editor: David Orzechowski
Project Editor: Christina C. Burns

As new scientific information becomes available through basic and clinical research, recommended treatments and drug therapies undergo changes. The authors and publisher have done everything possible to make this book accurate, up to date, and in accord with accepted standards at the time of publication. The authors, editors, and publisher are not responsible for errors or omissions or for consequences from application of the book, and make no warranty, expressed or implied, in regard to the contents of the book. Any practice described in this book should be applied by the reader in accordance with professional standards of care used in regard to the unique circumstances that may apply in each situation. The reader is advised always to check product information (package inserts) for changes and new information regarding dose and contraindications before administering any drug. Caution is especially urged when using new or infrequently ordered drugs.

Library of Congress Cataloging-in-Publication Data

Van Leeuwen, Anne M.

Davis's comprehensive handbook of laboratory and diagnostic tests : with nursing implications/Anne M. Van Leeuwen, Debra Poelhuis-Leth.—3rd ed.

p. ; cm.

Includes bibliographical references and index.

ISBN-13: 978-0-8036-1826-8

ISBN-10: 0-8036-1826-3

1. Diagnosis, Laboratory—Handbooks, manuals, etc. 2. Nursing—Handbooks, manuals, etc. I. Poelhuis-Leth, Debra J. II. Title. III. Title: Comprehensive handbook of laboratory and diagnostic tests.

[DNLM: 1. Laboratory Techniques and Procedures—Handbooks. 2. Laboratory Techniques and Procedures—Nurses' Instruction. 3. Nursing Diagnosis—methods. 4. Diagnostic Techniques and Procedures—Handbooks. 5. Diagnostic Techniques and Procedures—Nurses' Instruction. QY 39 V217d 2009]

RB38.2.S37 2009

616.075—dc22

2008030782

Authorization to photocopy items for internal or personal use, or the internal or personal use of specific clients, is granted by F. A. Davis Company for users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that the fee of \$.25 per copy is paid directly to CCC, 222 Rosewood Drive, Danvers, MA 01923. For those organizations that have been granted a photocopy license by CCC, a separate system of payment has been arranged. The fee code for users of the Transactional Reporting Service is: 8036-1826/09 0 + \$.25

Dedication

Inspiration springs from Passion.... Passion is born from unconstrained love, commitment, and a vision no one else can own.

Lynda, thank you—I could not have done this without your love, strong support, and belief in me. My gratitude to Mom, Dad, Adele, Gram...all my family and friends, for I am truly blessed by your humor and faith. A huge hug for my daughters, Sarah and Margaret—I love you very much. To my puppies, Maggie, Taylor, and Emma for their endless and unconditional love. My thanks and welcome to Debra Poelhuis-Leth for her contributions to this third edition. And, very special thanks to Lisa Deitch, Publisher, for her friendship, excellent direction, and unwavering encouragement.

Anne M. Van Leeuwen, MA, BS, MT (ASCP)

Director of Laboratory Services
Highlands Regional Medical Center
Sebring, Florida

To my husband, Bill, who encouraged and supported me during this new adventure. To my beautiful children, Abbie and Andy, the lights of my life, please remember to always push yourselves to excel. Thanks Mom and Dad for always showing your pride in my endeavors. Anne, Lynette, Lisa, and Rob, your confidence in my abilities and your continued support, guidance, and assistance is greatly appreciated. I look forward to our continued relationship. And lastly, my thanks to Arlene Adler for recommending me for this awesome experience.

Debra J. Poelhuis-Leth, MS, RT, (R)(M)

Director, Radiology Program
Montgomery County Community College
Pottstown, Pennsylvania

About This Book

The authors would like to thank all the users of the previous editions for helping us identify what they like about this book as well as what might improve its value. We want to continue this dialogue. As writers, it is our desire to capture the interest of our readers, to provide essential information, and to continue to improve the presentation of the material in the book and ancillary products. We encourage our readers to provide feedback to the Web site and to the company's sales professionals. Your feedback helps us modify the material—to change with your changing needs. Several new monographs have been added: urea breath test, anti-cyclic citrullinated peptide antibodies, and fluorodeoxyglucose PET scan. Monographs have been expanded to include additional information, for example: US OB biophysical profile, amniotic fluid analysis, and creatinine/eGFR. Some monographs have been combined to consolidate similar tests and a few less frequently used tests have been condensed into a mini-monograph format that highlights abbreviated test-specific facts, with the full monographs for those tests now resident on the DavisPlus Web site (<http://davisplus.fadavis.com>). The names of some test monographs have been changed to assist the reader in locating them more easily. For example, the tests that relate to the complete blood count have been renamed to begin with CBC, “test name” (CBC, hemaglobin; CBC, red blood cell count; etc.), so they are grouped together alphabetically in the text; the individual tests are also listed separately under their own names in the index. All of these changes have been made in response to feedback from our readers.

The authors have taken care to especially enhance four areas in this new edition: pathophysiology that affects test results, patient safety, patient education, and integration of related laboratory and diagnostic testing. First, the result section has been expanded to include an explanation of increased or decreased values, as many of you requested. Second, the authors appreciate that nurses are the strongest patient advocates with a huge responsibility to protect the safety of their patients, and we have observed student nurses in clinical settings being interviewed by facility accreditation inspectors, so we have integrated a number of reminders that parallel the Joint Commission's national patient safety goals. The pretest section reminds the nurse to positively identify the patient before beginning a procedure, administering medications, etc. The pretest section also addresses hand-off communication of critical information. The third area of emphasis is that each monograph coaches the student to focus on patient education and prepares the nurse to anticipate and respond to a patient's questions or concerns; from describing the purpose of the procedure, addressing concerns about pain, understanding the implications of the test results, and describing postprocedural care. Various related Web sites for patient education have been included throughout the book. And fourth, laboratory and diagnostic tests do not stand on their own—all the pieces fit together to form a picture. The section at the end of each monograph that lists related tests by modality has been changed to integrate both laboratory and diagnostic tests. The authors thought it might be more useful for a nurse to know what other tests might be ordered together—and all the related tests are listed alphabetically for ease of use.

To make sure that we remain on target with each revision, we submit the manuscript to a thorough review process. Our reviewers look at the manuscript from both the nursing perspective and the technical perspective, and the insights they provide help mold every edition, but this edition's review was particularly extensive and rigorous. To see the full list of reviewers who participated in the process, go to <http://davisplus.fadavis.com>.

Now—more about the details of this book—laboratory and diagnostic studies are essential components of a complete patient assessment. Examined in conjunction with an individual's history and physical examination, laboratory and diagnostic data provide clues about health status. Nurses are increasingly expected to integrate an understanding of laboratory and diagnostic procedures and expected outcomes in assessment, planning, implementation, and evaluation of nursing care. The data help develop and support nursing diagnoses, interventions, and outcomes.

Nurses may interface with laboratory and diagnostic testing on several levels, including:

- Interacting with patients and families of patients undergoing diagnostic tests or procedures, and providing pretest, intratest, and post-test information and support
- Maintaining quality control to prevent or eliminate problems that may interfere with the accuracy and reliability of test results
- Ensuring completion of testing in a timely and accurate manner
- Collaborating with other health care professionals in interpreting findings as they relate to planning and implementing total patient care
- Communicating significant alterations in test outcomes to other appropriate health care team members
- Coordinating interdisciplinary efforts

Whether the nurse's role at each level is direct or indirect, the underlying responsibility to the patient, family, and community remains the same.

This book is a reference for nurses, nursing students, and other health care professionals. It is useful as a clinical tool as well as a supportive text to supplement clinical courses. It guides the nurse in planning what needs to be assessed, monitored, treated, and taught regarding pretest requirements, intratest procedures, and post-test care. It can be used by nursing students at all levels as a textbook in theory classes, integrating laboratory and diagnostic data as one aspect of nursing care; by practicing nurses, to update information; and in clinical settings as a quick reference. Designed for use in academic and clinical settings, *Davis's Comprehensive Handbook of Laboratory and Diagnostic Tests—with Nursing Implications* provides the user with a comprehensive reference that allows easy access to information about laboratory and diagnostic tests and procedures. A general overview of how all the tests and procedures included in this book relate to body systems can be found in tables at the end of the monographs. The tests and procedures are presented in this book in alphabetical order by their complete name, allowing the user to locate information quickly without having to first place tests in a specific category or body system. Each monograph is presented in a consistent format for easy identification of specific information at a glance. The following information is provided for each laboratory and diagnostic test:

- *Test Name* for each monograph is given as a commonly used designation, and all test monographs in the book are organized in alphabetical order by name.

- *Synonyms/Acronyms* for each test are listed where appropriate.
- *Specimen Type* includes the amount of specimen usually collected and, where appropriate, the type of collection tube or container commonly recommended. Specimen requirements vary from laboratory to laboratory. The amount of specimen collected is usually more than what is minimally required so that additional specimen is available, if needed, for repeat testing (quality control failure, dilutions, or confirmation of unexpected results). In the case of diagnostic tests, the *type* of procedure (e.g., nuclear medicine, x-ray) is given.
- *Reference Values* for each monograph include age-specific and gender-specific variations, when indicated. It is important to give consideration to the normal variation of laboratory values over the life span and across cultures; sometimes what might be considered an abnormal value in one circumstance is actually what is expected in another. Reference values for laboratory tests are given in conventional and standard international (SI) units. The factor used to convert conventional to SI units is also given. Because laboratory values can vary by method, each laboratory reference range is listed along with the associated methodology.
- *Description & Rationale* of the study's purpose and insight into how and why the test results can affect health are included.
- *Indications* are a list of what the test is used for in terms of assessment, evaluation, monitoring, screening, identifying, or assisting in the diagnosis of a clinical condition.
- *Results* present a list of conditions in which values may be increased or decreased and, in some cases, an explanation of variations that may be encountered.
- *Critical Values*, or findings that may be life-threatening or for which particular concern may be indicated, are given along with age span considerations where applicable. This section also includes signs and symptoms associated with a critical value as well as possible nursing interventions.
- *Interfering Factors* are substances or circumstances that may influence the results of the test, rendering the results invalid or unreliable. Knowledge of interfering factors is an important aspect of quality assurance and includes pharmaceuticals, foods, natural and additive therapies, timing of test in relation to other tests or procedures, collection site, handling of specimen, and underlying patient conditions.
- *Nursing Implications and Procedure* provides an outline of pretest, intratest, and post-test concerns.
- *Pretest* section addresses the need to:
 - Obtain pertinent clinical, laboratory, dietary, and therapeutic history of the patient, especially as it pertains to comparison of previous test results, preparation for the test, and identification of potentially interfering factors.
 - Understand the interrelationship between various body systems. In this section, the reader is informed of the body systems that may be involved in the study of interest and is referred to body system tables where correlated laboratory and diagnostic studies are alphabetically listed.
 - Explain the requirements and restrictions related to the procedure as well as what to expect; provide the education necessary for the patient to be properly informed.
 - Anticipate and allay patient concerns or anxieties.
 - Provide for patient safety.

- *Intratest* section can be used in a quality control assessment by the nurse or as a guide to the nurse who may be called on to participate in specimen collection or perform preparatory procedures and gives:
 - Specific directions for specimen collection and test performance.
 - Important information such as patient sensation and expected duration of the procedure.
 - Precautions to be taken by the nurse and patient.
- *Post-test* section provides guidelines regarding:
 - Specific monitoring and therapeutic measures that should be performed after the procedure (e.g., maintaining bed rest, obtaining vital signs to compare with baseline values, signs and symptoms of complications).
 - Specific instructions for the patient and family, such as when to resume usual diet, medications, and activity.
 - General nutritional guidelines related to excess or deficit as well as common food sources for dietary replacement.
 - Indications for interventions from public health representatives or for special counseling related to test outcomes.
 - Indications for follow-up testing that may be required within specific time frames.
 - Related tests for consideration and evaluation, an alphabetical listing of related laboratory and/or diagnostic tests that is intended to provoke a deeper and broader investigation of multiple pieces of information; the tests provide related data that, when combined, can form a more complete picture of health or illness.
 - Reference to the specific body system tables of related laboratory and diagnostic tests that might bear on a patient's situation.

Color and icons have been used to facilitate locating critical information at a glance. On the inside front and back covers is a full color chart describing specific tube tops used for various blood tests and their recommended order of draw.

The nursing process is evident throughout the laboratory and diagnostic monographs. Within each phase of the testing procedure, the nurse has certain roles and responsibilities. These should be evident in reading each monograph.

Information provided in the appendices includes a summary of specimen collection procedures and materials; a summary chart of transfusion reactions, their signs and symptoms, associated laboratory findings, and potential nursing interventions; an introduction to CLIA (Clinical Laboratory Improvement Amendments) with an explanation of the different levels of testing complexity; a summary chart that details suggested approaches to persons at various developmental stages to assist the provider in facilitating cooperation and understanding; a list of some of the herbs and nutraceuticals that have been associated with adverse clinical reactions or have been associated with drug interactions related to the affected body system; and guidelines for Standard and Universal Precautions.

This book is also about teaching. Additional educationally supportive materials are provided for the instructor and student in an *Instructor's Guide*, available on the Instructor's Resource Disk (CD) and posted to DavisPlus (<http://davisplus.fadavis.com>). Organized by nursing curriculum, presentations, and case studies with emphasis on laboratory and diagnostic test-related information and nursing implications have been developed for selected conditions and body systems; new to this edition is the sensory, obstetric, and

nutrition coverage. Open-ended and NCLEX-type multiple-choice questions are provided as well as suggested critical thinking activities. This supplemental material will aid the instructor in integrating laboratory and diagnostic materials in assessment and clinical courses and provide examples of activities to enhance student learning.

Newly developed for this third edition is a robust collection of online material for students and educators posted to the DavisPlus Web site (<http://davisplus.fadavis.com>) including:

- a searchable library of mini-monographs for all the active tests included in the text itself. The mini-monograph gives each test's full name, synonyms/acronyms, specimen type (laboratory tests) or area of application (diagnostic tests), reference ranges or contrast, and results
- an archive of full monographs of retired tests that are referenced by mini-monographs in the text
- interactive drag and drop, quiz show, flash card, and multiple-choice exercises
- a printable file of critical values
- a printable table of monograph template section titles matched to corresponding national patient safety goals
- all the instructor and student material from the Instructor's Resource Disk.

The authors hope that the changes and additions they've made to the book and its CD- and Web-based ancillaries will reward users with an expanded understanding of and appreciation for the place laboratory and diagnostic testing holds in the provision of high-quality nursing care as well as made it easy for instructors to integrate this important content in their curricula.



Preface

Laboratory and diagnostic testing. The words themselves often conjure up cold and impersonal images of needles, specimens lined up in collection containers, and high-tech electronic equipment. But they do not stand alone. They are tied to, bound with, and tell of health or disease in the blood and tissue of a person. Laboratory and diagnostic studies augment the health care provider's assessment of the quality of an individual's physical being. Test results guide the plans and interventions geared toward strengthening life's quality and endurance. Beyond the pounding noise of the MRI, the cold steel of the x-ray table, the sting of the needle, the invasive collection of fluids and tissue, and the probing and inspection is the gathering of evidence that supports the health care provider's ability to discern the course of a disease and the progression of its treatment. Laboratory and diagnostic data must be viewed with thought and compassion, however, as well as with microscopes and machines. We must remember that behind the specimen and test result is the person from whom it came, a person who is someone's son, daughter, mother, father, husband, wife, friend.

This book is written to help health care providers in their understanding and interpretation of laboratory and diagnostic procedures and their outcomes. Just as important, it is dedicated to all health care professionals who experience the wonders in the science of laboratory and diagnostic testing, performed and interpreted in a caring and efficient manner.

Contents

Dedication v

About This Book vii

Preface xiii

Monographs 1

System Tables 1237

APPENDIX A

Patient Preparation and Specimen Collection 1251

APPENDIX B

Potential Nursing Diagnoses Associated with Laboratory
and Diagnostic Testing 1264

APPENDIX C

Guidelines for Age-Specific Communication 1265

APPENDIX D

Transfusion Reactions: Laboratory Findings and Potential
Nursing Interventions 1269

APPENDIX E

Introduction to CLIA 1988 & 1992 1273

APPENDIX F

Effects of Natural Products on Laboratory Values 1274

APPENDIX G

Standard and Universal Precautions 1277

Bibliography 1293

Index 1301

Acetylcholine Receptor Antibody

SYNONYM/ACRONYM: AChR.

SPECIMEN: Serum (1 mL) collected in a red-top tube.

REFERENCE VALUE: (Method: Radioimmunoassay) Less than 0.03 nmol/L.

DESCRIPTION: Normally when impulses travel down a nerve, the nerve ending releases a neurotransmitter called acetylcholine (ACh), which binds to receptor sites in the neuromuscular junction, eventually resulting in muscle contraction. Once the neuromuscular junction has been polarized ACh is rapidly metabolized by the enzyme acetylcholinesterase. When present, acetylcholine receptor (AChR) antibodies block ACh from binding to receptor sites on the muscle membrane. AChR antibodies also destroy AChR sites, interfering with neuromuscular transmission and causing muscle weakness. Antibodies to AChR sites are present in 90% of patients with generalized myasthenia gravis (MG) and in 55% to 70% of patients who either have ocular forms of MG or are in remission. MG is an acquired autoimmune disorder that can occur at any age. It seems to strike women between the ages of 20 and 40 years; men appear to be affected later in life than women. It can affect any voluntary muscle, but muscles that control eye, eyelid, and facial movement and swallowing are most frequently affected. Antibodies may not be detected in the first six to twelve months after the first appearance of symptoms. MG is a common complication associated with thymoma. The relationship between the thymus gland and MG is not completely understood. It is believed that miscommunication in the thymus gland directed at developing

immune cells may trigger the development of autoantibodies responsible for MG. Remission after thymectomy is associated with a progressive decrease in antibody level. Other markers used in the study of MG include muscle AChR-binding antibodies, muscle AChR-blocking antibodies, muscle AChR-modulating antibodies, striational antibodies, thyroglobulin, HLA-B8, and HLA-DR3. These antibodies are often undetectable in the early stages of MG.

INDICATIONS:

- Confirm the presence, but not the severity, of MG
- Detect subclinical MG in the presence of thymoma
- Monitor the effectiveness of immunosuppressive therapy for MG
- Monitor the remission stage of MG

RESULT:

Increased in:

- *(It is believed that miscommunication in the thymus gland directed at developing immune cells may trigger the development of autoantibodies responsible for MG.)*
- Generalized MG
- Thymoma associated with MG

Decreased in:

- Post-thymectomy *(The thymus gland produces the T-lymphocytes responsible for cell-mediated immunity. T-cells also help control B-cell development for the production of antibodies. T-cell response is directed at*

cells in the body that have been infected by bacteria, viruses, parasites, fungi, or protozoans. T-cells also provide immune surveillance for cancerous cells. Removal of the thymus gland is strongly associated with a decrease in AChR antibody levels.)

CRITICAL VALUES: N/A

INTERFERING FACTORS:

- Drugs that may increase AChR levels include penicillamine (long-term use may cause a reversible syndrome that produces clinical, serological, and electrophysiological findings indistinguishable from MG).
- Biological false-positive results may be associated with amyotrophic lateral sclerosis, autoimmune hepatitis, Eaton-Lambert myasthenic syndrome, primary biliary cirrhosis, and encephalomyeloneuropathies associated with carcinoma of the lung.
- Immunosuppressive therapy is the recommended treatment for MG; prior immunosuppressive drug administration may result in negative test results.
- Recent radioactive scans or radiation within 1 wk of the test can interfere with test results when radioimmunoassay is the test method.
- Inability of the patient to cooperate or remain still during the procedure because of age, significant pain, or mental status may interfere with the test results.

NURSING IMPLICATIONS AND PROCEDURE

PRETEST:

- ▶ Positively identify the patient using at least two unique identifiers before providing care, treatment, or services.
- ▶ Inform the patient that the test is used to identify antibodies responsible for

decreased neuromuscular transmission and associated muscle weakness.

- ▶ Obtain a history of the patient's complaints, including a list of known allergens, especially allergies or sensitivities to latex, and any prior complications with general anesthesia.
- ▶ Obtain a history of the patient's musculoskeletal system, symptoms, and results of previously performed laboratory tests and diagnostic and surgical procedures.
- ▶ Note any recent procedures that can interfere with test results.
- ▶ Obtain a list of the patient's current medications, including herbs, nutritional supplements, and nutraceuticals.
- ▶ Review the procedure with the patient. Inform the patient that specimen collection takes approximately 5 to 10 min. Address concerns about pain and explain that there may be some discomfort during the venipuncture.
- ▶ *Sensitivity to social and cultural issues*, as well as concern for modesty, is important in providing psychological support before, during, and after the procedure.
- ▶ There are no food, fluid, or medication restrictions unless by medical direction.

INTRATEST:

- ▶ If the patient has a history of allergic reaction to latex, avoid the use of equipment containing latex.
- ▶ Instruct the patient to cooperate fully and to follow directions. Direct the patient to breathe normally and to avoid unnecessary movement.
- ▶ Observe standard precautions, and follow the general guidelines in Appendix A. Positively identify the patient, and label the appropriate tubes with the corresponding patient demographics, date, and time of collection. Perform a venipuncture.
- ▶ Remove the needle and apply direct pressure with dry gauze to stop bleeding. Observe venipuncture site for bleeding or hematoma formation and secure gauze with adhesive bandage.
- ▶ Promptly transport the specimen to the laboratory for processing and analysis.

POST-TEST:

- ▶ A report of the results will be sent to the requesting health care provider

(HCP), who will discuss the results with the patient.

- Recognize anxiety related to test results, and be supportive of impaired activity related to lack of neuromuscular control, perceived loss of independence, and fear of shortened life expectancy. Discuss the implications of positive test results on the patient's lifestyle. It is important to note that a diagnosis of MG should be based on positive results from two different diagnostic tests. These tests include AChR antibody assay, edrophonium test, repetitive nerve stimulation, and single-fiber electromyography. Thyrotoxicosis may occur in conjunction with MG; related thyroid testing may be indicated. MG patients may also produce antibodies that demonstrate reactivity in tests like ANA and RF that are not primarily associated with MG. Evaluate test results in relationship to a future general anesthesia, especially regarding therapeutic management of MG with cholinesterase inhibitors. Succinylcholine-sensitive patients may be unable to metabolize the anesthetic quickly, resulting in prolonged or unrecoverable apnea. Provide teaching and information regarding the clinical implications of the test results as appropriate. Educate the patient regarding

access to counseling services. Provide contact information, if desired, for the Myasthenia Gravis Foundation of America (www.myasthenia.org) and Muscular Dystrophy Association (www.mdusa.org).

- Reinforce information given by the patient's HCP regarding further testing, treatment, or referral to another HCP. Answer any questions or address any concerns voiced by the patient or family.
- Depending on the results of this procedure, additional testing may be performed to evaluate or monitor progression of the disease process and determine the need for a change in therapy. If a diagnosis of MG is made, a computed tomography (CT) scan of the chest should be performed to rule out thymoma. Evaluate test results in relation to the patient's symptoms and other tests performed.

RELATED MONOGRAPHS:

- Related tests include ANA, antithyroglobulin and antithyroid peroxidase antibodies, CT chest, myoglobin, pseudocholinesterase, RF, TSH, and total T4.
- Refer to the Musculoskeletal System table at the back of the book for related tests by body system.

Acid Phosphatase, Prostatic

SYNONYM/ACRONYM: Prostatic acid phosphatase, *o*-phosphoric monoester phosphohydrolase, AcP.

SPECIMEN: Serum (1 mL) collected in a red-top tube.

A swab with vaginal secretions may be submitted in the appropriate transfer container. Other material such as clothing may be submitted for analysis. Consult the laboratory or emergency services department for the proper specimen collection instructions and containers.

REFERENCE VALUE: (Method: Spectrophotometric)

Conventional & SI Units

Less than 2.5 ng/mL