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USMLE STEP 3

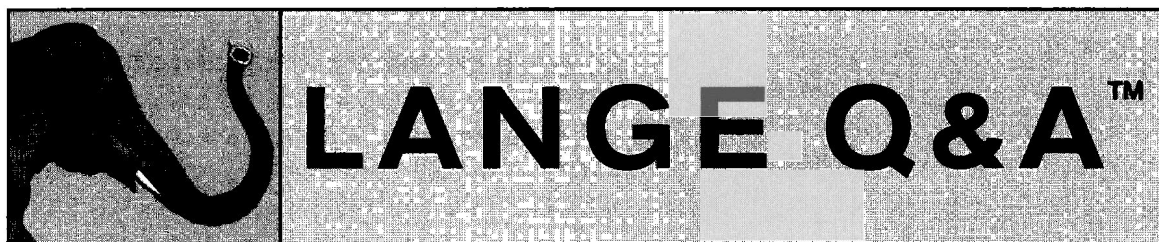
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Donald A. Briscoe

4TH
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FOURTH EDITION



USMLE STEP 3

Donald A. Briscoe, MD
Associate Program Director
Family Medicine Residency Program
CHRISTUS St. Joseph Hospital
Houston, Texas

McGraw-Hill
Medical Publishing Division

New York Chicago San Francisco Lisbon London Madrid Mexico City Milan
New Delhi San Juan Seoul Singapore Sydney Toronto

Lange Q&A™: USMLE Step 3, Fourth Edition

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1 2 3 4 5 6 7 8 9 0 QPD/QPD 0 9 8 7 6 5

ISBN: 0-07-144579-X

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This book was set in Palatino by International Typesetting and Composition.
The editor was Catherine A. Johnson.
The production supervisor was Phil Galea.
Project management was provided by International Typesetting and Composition.
The cover designer was Aimee Nordin.
Quebecor World Dubuque was printer and binder.

This book is printed on acid-free paper.

Library of Congress Cataloging-in-Publication Data

Lange Q & A. USMLE Step 3 / [edited by] Donald A. Briscoe.—4th ed.

p. ; cm.

Rev. ed. of: Appleton & Lange's review for the USMLE Step 3 / [edited by] Samuel L. Jacobs. 3rd ed. c2001.

Includes index.

ISBN 0-07-144579-X

1. Medicine—Examinations, questions, etc. 2. Physicians—Licenses—United States—Examinations—Study guides. I. Title: Lange Q and A. USMLE Step 3. II. Title: USMLE Step 3. III. Briscoe, Donald A. IV. Appleton & Lange's review for the USMLE Step 3.

[DNLM: 1. Medicine—Examination Questions. W 18.2 L2742 2005]

R834.5.A662 2005

610'.76—dc22

2005041516

Contributors

Douglas Adler, MD

Assistant Professor
University of Texas Medical School at Houston
Houston, Texas
Internal Medicine—Gastroenterology

S. Sohail Ahmed, MD

Assistant Professor
Boston University School of Medicine
Boston, Massachusetts
Internal Medicine—Rheumatology

Cesar Arias, MD

Resident
University of Texas Medical School at Houston
Houston, Texas
Internal Medicine

Sean Blitzstein, MD

Clinical Assistant Professor of Psychiatry
University of Illinois at Chicago
Chicago, Illinois
Psychiatry

Kristina Bogar, DO

Chief Resident, Family Practice
CHRISTUS St. Joseph Hospital
Houston, Texas
Internal Medicine, Pediatrics

Donald A. Briscoe, MD

Associate Program Director
Family Medicine Residency Program
CHRISTUS St. Joseph Hospital
Houston, Texas
Preventive Medicine, Internal Medicine

Joan Bull, MD

Professor
University of Texas Medical School at Houston
Houston, Texas
Internal Medicine—Oncology

Edison Catalano, MD

Professor and Chief
Robert Wood Johnson Medical School at Camden
Camden, New Jersey
Pathology

Abigail Caudle, MD

Chief Resident
University of North Carolina School of Medicine
Chapel Hill, North Carolina
Surgery

Evelyn Chan, MD

Assistant Professor
University of Texas Medical School at Houston
Houston, Texas
Internal Medicine—Medical Ethics

Christian Chisholm, MD

Assistant Professor
University of Virginia School of Medicine
Charlottesville, Virginia
Obstetrics and Gynecology

Mohamed Elfar, MD

Resident, Surgery
CHRISTUS St. Joseph Hospital
Houston, Texas
Surgery

Miguel Escobar, MD

Assistant Professor
University of Texas Medical School at Houston
Houston, Texas
Internal Medicine—Hematology

Elise Everett, MD

Clinical Instructor
University of Virginia School of Medicine
Charlottesville, Virginia
Obstetrics and Gynecology

Christopher Greeley, MD

Assistant Professor
Vanderbilt University School of Medicine
Nashville, Tennessee
Pediatrics

Vanessa Gregg, MD

Resident
University of Virginia School of Medicine
Charlottesville, Virginia
Obstetrics and Gynecology

Eric Haas, MD

Colorectal Surgical Associates
Department of Surgery
CHRISTUS St. Joseph Hospital
Houston, Texas
Surgery

Mark Hughes, MD

Assistant Professor
The Johns Hopkins School of Medicine
Baltimore, Maryland
Internal Medicine—Medical Ethics

Kathie Hullfish, MD

Associate Professor
University of Virginia School of Medicine
Charlottesville, Virginia
Obstetrics and Gynecology

William Irvin, MD

Associate Professor
University of Virginia School of Medicine
Charlottesville, Virginia
Obstetrics and Gynecology

David Johnson, PhD

Associate Professor
Duquesne University Mylan School of Pharmacy
Pittsburgh, Philadelphia
Internal Medicine—Pharmacology

Philip C. Johnson, MD

Professor
University of Texas Medical School at Houston
Houston, Texas
Internal Medicine—Infectious Disease

Judianne Kellaway, MD

Associate Professor
University of Texas Medical School at Houston
Houston, Texas
Ophthalmology

Uday Khosla, MD

Private Practice
Houston, Texas
Internal Medicine—Nephrology

Hong Jin Kim, MD

Assistant Professor
University of North Carolina School of Medicine
Chapel Hill, North Carolina
Surgery

Steven Mays, MD

Assistant Professor
University of Texas Medical School at Houston
Houston, Texas
Internal Medicine—Dermatology

Amal Melhem, MD

Resident
University of Texas Medical School at Houston
Houston, Texas
Internal Medicine

Philip Orlander, MD

Professor
University of Texas Medical School at Houston
Houston, Texas
Internal Medicine—Endocrinology

Alberto Puig, MD, PhD

Assistant Professor
University of Texas Medical School at Houston
Houston, Texas
Internal Medicine—General Medicine

Husam Saad-Eddin, MD

Resident, Family Practice
CHRISTUS St. Joseph Hospital
Houston, Texas
Preventive Medicine, Internal Medicine

Margaret Walkup, MD

Resident
University of North Carolina School of Medicine
Chapel Hill, North Carolina
Surgery

Christopher Williams, MD

Assistant Professor
University of Virginia School of Medicine
Charlottesville, Virginia
Obstetrics and Gynecology

Introduction

This book is designed for those preparing for the United States Medical Licensing Examination (USMLE) Step 3. It provides a comprehensive review source with over 850 “exam-type” multiple choice questions covering the clinical sciences. Detailed explanations are provided for each question, with attempts to explain both why the correct answer is correct and, when appropriate, why the incorrect answers are incorrect. In addition, the last section of this book provides integrated, multispecialty practice tests, both to provide self-assessment and to simulate the multiple choice parts of the Step 3 examination.

The United States Medical Licensing Examination, Step 3

Purpose of the Examination

The purpose of Step 3 is to determine if a physician possesses and can apply the medical knowledge and understanding of clinical science considered essential for the unsupervised practice of medicine, with emphasis placed on patient management in ambulatory care settings. The inclusion of Step 3 in the USMLE sequence of examinations ensures that attention is devoted to the importance of assessing the knowledge and skills of physicians who are assuming independent responsibility for providing general medical care to patients.

Examination Format

Step 3 consists of multiple choice items and computer-based simulations, distributed according to the content blueprint. The examination material is prepared by committees broadly representing the medical

profession. The committees comprise recognized experts in their fields, both academic and nonacademic practitioners, as well as members of state medical licensing boards.

Step 3 is a 2-day examination. You must complete each day within 8 hours. The examination has approximately 480 multiple choice items divided into blocks of 35 to 50 items. There will be 45–60 minutes of time allowed for the completion of each block, depending on the number of items in the block. There are also approximately 9 computer-based simulations, with one case in each block, which you will complete on the second day of the exam. You will have up to 25 minutes to complete each block.

Forty-five minutes is allotted for break time each day. The break time can be divided in any way that you choose. You may take a short break between blocks or a longer break for a meal. If you complete a block early, you may use any remaining time for breaks. You may not use any excess time to complete other blocks of the test. If you take too much break time, your time to complete the last block in the testing session will be reduced. If you run out of time while working on a block, you will not be able to move to any new screens. Some versions of the software used will close the session while others will allow you to answer the question that you are viewing. In the latter case, your overall session time is still running and the amount of time that you have remaining for breaks or to complete the session will be reduced.

Step 3 is organized along two principal dimensions: clinical encounter frame and physician task. Encounter frames are the circumstances surrounding physicians’ clinical encounters with patients. These include encounters with patients seen for the first time for nonemergency issues, known patients seen for continued care, and patients seen for

life-threatening emergency situations. These encounters may occur in clinics, offices, skilled nursing facilities, hospitals, emergency rooms, or on the phone.

Each test item also represents one of six physician tasks. These are obtaining history and performing a physical examination, using laboratory and diagnostic studies, formulating a most likely diagnosis, evaluating the severity of the patient's problems, applying scientific contents and mechanisms of disease, and managing the patient. Patient management includes issues of health maintenance, clinical intervention, therapeutics, and legal/ethical issues.

The 2005 USMLE Bulletin of Information specifies that the clinical encounter frames will be broken down as follows: 20–30% initial care; 50–60% continued care; and 15–25% emergency care. The physician tasks will be broken down as follows: 8–12% obtaining history and performing physical examination; 8–12% using laboratory and diagnostic studies; 8–12% formulating most likely diagnosis; 8–12% evaluating severity of patient's problems; 8–12% applying scientific concepts and mechanisms of disease; and 45–55% managing the patient. All of these percentages are subject to change. The most up-to-date information is available at the USMLE web site (www.usmle.org).

During the allowed time for an individual block, the questions may be answered in any order, reviewed, and changed. After exiting a block, no further review of items or change of answers within that block is possible. Policies regarding review of test items may be changed without notice. The most current policies regarding review are posted on the USMLE web site at www.USMLE.org. The computer interface includes, among other features, clickable icons for marking questions for review, automated review of marked and incomplete items, and a clock indicating the amount of time remaining. A tutorial on using the computer interface is available at the USMLE web site. A 15-minute optional tutorial will be available for your use on the day of your examination.

Step 3 cases are intended to reflect the diversity of health care populations with respect to age, cultural group, and occupation. The patient population mix is intended to be representative of data collected from various national databases that study health care in the United States.

Clinical Settings

The multiple choice items are organized into blocks that correspond to the clinical settings in which you will encounter the patients. Each setting is described at the beginning of its block. These descriptions are shown here as they would appear during the examination.

Setting I: Office/Health Center

You see patients in two locations: at your office suite, which is adjacent to a hospital, and at a community-based health center. Your office practice is a primary care generalist group. Most of the patients you see are from your own practice and are appearing for regularly scheduled return visits. Occasionally you will encounter a patient whose primary care is managed by one of your associates. Reference may be made to the patient's medical records. Known patients may be managed by the telephone. You may have to respond to questions about information appearing in the public media, which will require interpretation of the medical literature. The laboratory and radiology departments have a full range of services available.

Setting II: Inpatient Facilities

You have general admitting privileges to the hospital, including the children's and women's services. On occasion you will see patients in the critical care unit. Postoperative patients are usually seen in their rooms, unless the recovery room is specified. You may also be called to see patients in the psychiatric unit. There is a short-stay unit where you may see patients undergoing same-day operations or being held for observation. Also, you may visit patients in the adjacent nursing home/extended care facility and the detoxification unit.

Setting III: Emergency Department

Most patients in this setting are new to you, but occasionally you arrange to meet there with a known patient who has telephoned you. Generally, patients encountered here are seeking urgent care. Also available to you are a full range of social services, including rape crisis intervention, family support, and security assistance backed up by local police.

Step 3 Test Item Formats

Multiple Choice Items

Multiple choice items are presented in several formats within each test block. Each of the formats requires selection of the one best choice. The general instructions for answering items are as follows:

Read each question carefully and in the order in which it is presented. Then select the one best response option of the choices offered. More than one option may be partially correct. You must select ONE BEST answer by clicking your mouse on the appropriate answer button or pressing the letter on the keyboard.

Single Items

This is the traditional, most frequently used multiple choice format. It usually consists of a patient in a clinical setting and a reason for the visit. The item vignette is followed by four or five response options lettered A, B, C, D, and E. You are required to select the best answer to the question. Other options may be partially correct, but there is only ONE BEST answer.

Process for single items:

- Read the patient description of each item carefully.
- Try to formulate an answer and then look for it in the list of options.
- Alternatively, read each option carefully and eliminate those that you think are incorrect.
- Of the remaining options, select the one that you believe is most correct.
- If unsure about an answer, it is better to guess, as unanswered questions are counted as incorrect.

Directions for this format and an example item follow:

Example item 1

1. A 45-year old Black man comes to the office for the first time because he says, "I had blood in my urine this morning." He reports no other symptoms. On physical examination, his blood pressure is elevated and his kidneys are palpable bilaterally. The information in his history that is most pertinent to his current condition is

- (A) chronic use of analgesics
- (B) cigarette smoking
- (C) a family history of renal disease
- (D) occupational exposure to carbon tetrachloride
- (E) recent sore throats

The correct answer is (C).

Multiple Item Sets

A single patient-centered vignette may be associated with two or three consecutive questions about the information presented. Each question is linked to the vignette, but is testing a different point. Items are designed to be answered independently of each other. You are required to select the one best choice for each question. Other options may be partially correct, but there is only ONE BEST answer. The process of answering these items is the same as for single items.

Example Items 2–4

A 38-year-old White woman, who is a part-time teacher and mother of three children, comes to the office for evaluation of hypertension. You have been her physician since the birth of her first child 8 years ago. One week ago, an elevated blood pressure was detected during a regularly scheduled examination for entrance into graduate school. Vital signs today are:

Temp.: 98.6°F

Pulse: 100 bpm

Resp.: 22 per minute

BP: 164/100 mmHg (right arm, supine)

2. The most likely finding on physical examination is
 - (A) an abdominal bruit
 - (B) cardiac enlargement
 - (C) decreased femoral pulses
 - (D) thyroid enlargement
 - (E) normal retinas

The correct answer is (E).

3. The most appropriate next step is to order
 - (A) complete blood count
 - (B) serum electrolytes and creatinine
 - (C) serum glucose
-

- (D) serum thyroxine
- (E) urine culture

The correct answer is (B).

4. To assess this patient's risk factors for atherogenesis, the most appropriate test is determination of
- (A) plasma renin activity
 - (B) serum cholesterol
 - (C) serum triglycerides
 - (D) urinary aldosterone excretion
 - (E) urinary metanephrine excretion

The correct answer is (B).

Cases

A single-patient or family-centered vignette may ask as few as two and as many as three questions, each related to the initial opening vignette. Information is added as the case unfolds. *It is extremely important to answer the questions in the order presented.* Time often passes within a case and your orientation to an item early in a case may be altered by the additional information presented later in the case. If you do skip items, be sure to answer earlier questions with only the information presented to that point in the case. Each item is intended to be answered independently. You are required to select the ONE BEST choice to each question.

Example Items 5–7

A 24-year-old man comes to the office because of intermittent chest pain that began a few weeks ago. You have been his physician for the past 2 years and he has been in otherwise good health. He says that he is not having pain currently. A review of his medical record shows that his serum cholesterol concentration was normal at a preemployment physical examination 1 year ago. You have not seen him since that visit and he says that he has had no other complaints or problems in the interim. He reminds you that he smokes a pack of cigarettes a day. When you question him further, he says that he does not use any alcohol or illicit drugs. Although the details are vague, he describes the chest pain as a substernal tightness that is not related to exertion.

5. The finding on physical examination that would be most consistent with costochondritis as the cause of his chest pain is

- (A) crepitance over the second and third ribs anteriorly
- (B) deep tenderness to hand pressure on the sternum
- (C) localized point tenderness in the parasternal area
- (D) pain on deep inspiration
- (E) normal physical examination

The correct answer is (C).

6. In light of the patient's original denial of drug use, the most appropriate next step to confirm a diagnosis of cocaine use is to

- (A) ask the lab if serum is available for a toxicologic screening on his previous blood sample
- (B) call his family to obtain corroborative history
- (C) obtain a plasma catecholamine concentration
- (D) obtain a urine sample for a routine urinalysis but also request a toxicologic screen
- (E) present your findings to the patient and confront him with the suspected diagnosis

The correct answer is (E).

7. Cocaine use is confirmed. The patient admits a possible temporal relationship between his cocaine use and his chest pain. He expresses concern about long-term health risks. He should be advised that

- (A) Cocaine-induced myocardial ischemia can be treated with beta-blockers.
- (B) Death can occur from cocaine-induced myocardial infarction or arrhythmia.
- (C) The presence of neuropsychiatric sequelae from drug use indicates those at risk for sudden death associated with cocaine use.

- (D) Q wave myocardial infarction occurs only with smoked “crack” or intravenous cocaine use.
- (E) Underlying coronary artery disease is the principal risk for sudden death associated with cocaine use.

The correct answer is (B).

Primum Computer-Based Case Simulations (CCS)

Primum CCS allows you to provide care for a simulated patient. You decide which diagnostic information to obtain and how to treat and monitor the patient’s progress. In Primum CCS, you may request information from the history and physical examination; order labs, diagnostic studies, procedures, or consultations; and start medications or other therapies. As time passes, the patient’s condition changes based on the underlying problem and the interventions that you order. You must monitor the results of the tests that you order and the interventions that you make. When you confirm that there is nothing further that you want to do, you may advance simulated time in order to reevaluate the patient’s condition. You cannot go back in time but you can change your orders to reflect your updated management plan. The patient’s chart contains an order sheet and reports resulting from your orders. You can review the vital signs, progress notes, patient updates, and test results. You may care for and move the patient among the office, home, emergency department, intensive care unit, and hospital ward.

The CCS scoring process compares your patient management strategy with policies obtained from experts. Actions resembling a range of optimal strategies will produce a higher score. Dangerous and unnecessary actions will detract from your score. You must balance thoroughness, efficiency, avoidance of risk, and timeliness in responding to the clinical situation.

Practice time with the CCS software is not available on the day of the test. You must review the CCS orientation material and practice the sample cases well in advance of your testing day in order to have an understanding of how the CCS system works. Sample cases are provided to Step 3 applicants on the USMLE CD and are available at the USMLE website.

Specific Information of the Step 3 Examination

The USMLE is sponsored by the Federation of State Medical Boards (FSMB) and the National Board of Medical Examiners (NBME). Rules for the USMLE program are established by a composite committee that includes representatives of the FSMB, NBME, Educational Commission for Foreign Medical Graduates (ECFMG), and the American public. Information is published in an annual Bulletin of Information, which is available for download at the USMLE website (www.usmle.org). You must be familiar with and will be subject to the policies and procedures of the Bulletin of Information for the year in which you take your examination. Changes in the USMLE program may occur after the release of the bulletin. If changes occur, information will be posted on the USMLE website.

The registration entity for the Step 3 examination is the FSMB. You must contact the FSMB for information on how to apply for the USMLE, application materials, information on the status of your application or scheduling permit, or information on obtaining a replacement scheduling permit (in the event that it is lost). The FSMB may be contacted at:

FSMB
Department of Examination Services
P.O. Box 619850
Dallas, TX 75261-9850
Website: www.fsmb.org
Email: usmle@fsmb.org

To be eligible for Step 3, prior to submitting your application, you must

- Meet the Step 3 requirements set by the medical licensing authority to which you are applying.
- Obtain the MD degree (or its equivalent) or the DO degree.
- Pass Step 1, Step 2 CK and, if required based on the rules, Step 2 CS.
- Obtain certification by the ECFMG or successfully complete a “Fifth Pathway” program if you are a graduate of a medical school outside of the United States or Canada.

Application procedures for Step 3 vary among jurisdictions. You should begin inquiries at least

3 months in advance of the dates on which you expect to take the test.

The Step 3 examination is given at Prometric Test Centers in the United States and its territories. Prometric is a division of Thomson Learning, Inc. Once your application has been approved, an eligibility period is assigned. A scheduling permit will be issued to you with instructions for making an appointment at a Prometric Test Center. The eligibility period starts immediately and extends for approximately 90 calendar days, so you should contact Prometric immediately after receiving your scheduling permit to schedule your test dates. If you are unable to take the test during your eligibility period, contact the FSMB to inquire about a 3-month eligibility period extension (a fee is charged for this and restrictions may apply). If you fail to take your examination within your eligibility period and wish to take it in the future, you will need to submit a new application and fee(s).

Physical Conditions

On the day(s) of your test, you should arrive at the Prometric center 30 minutes before your scheduled testing time. If you arrive late, you may not be admitted. If you arrive more than 30 minutes after your scheduled time, you will not be admitted.

When you arrive at the test center, you must present your scheduling permit and an acceptable form of identification. These include: passport, driver's license with photograph, national identity card, other government-issued identification, and ECFMG-issued identification card. If you do not have your scheduling permit and identification, you will not be admitted to the test.

Test center staff monitors all testing sessions. You must follow their instructions throughout the examination. They are not authorized to answer questions regarding examination content, software, or scoring.

On the day of the examination, you are not allowed to bring any personal belongings into the testing area. If you bring any personal belongings to the test center, you must store them in a designated locker or cubicle outside of the testing room. You will be provided with laminated writing surfaces, dry erase markers, and an eraser, which must be returned after the test. Making notes of any kind, except on the materials provided, is not permitted. You may not leave your testing station for breaks

unless the break screen is visible on your computer monitor. During testing breaks, you may use a telephone or other communication device, but only for purposes not related to test content. You may not remove any materials (written, printed, recorded, and so forth) from the test center. Complete rules of conduct are available in the Bulletin of Information.

Organization of this Book

This book is organized to cover each of the clinical science areas that you will encounter on the Step 3 examination. Each chapter lists questions first, followed by the answers and explanations, and a bibliography for further study. The question formats here have been chosen to conform to the style that you will encounter on the examination. This is done to familiarize you before you sit for the examination.

As is done for the actual examination, the practice test items are arranged in blocks of 50, for which 1 hour should be allotted, and organized by one of the three clinical settings described above. The amount of time allowed is proportional to the amount of time that will be available for each block of questions during the actual examination.

Answers, Explanations, and Bibliography

In each of the sections of the book, the question sections are followed by a section containing the answers, explanations, and references to the questions. This section tells you the answer to each question, provides an explanation and review of both why the answer is correct and why the other answers are incorrect, and tells you where you can find more information on the subject. We encourage you to use this section as a basis for further study and understanding.

If you choose the correct answer to a question, you can then read the explanation for reinforcement and to add to your knowledge of the subject matter. If you choose the wrong answer to a question, you can read the explanation for a discussion of the material in question. You can also look up the reference cited for a more in-depth discussion.

How to Use this Book

There are two logical ways to get the most value from this book. We will call them Plan A and Plan B.

In Plan A, you go straight to the practice tests and complete them according to the instructions. After taking the tests and checking your answers, the number of questions that you answered incorrectly will be a good indicator of your initial knowledge state and the types of questions that you answered incorrectly will help point you in the right direction for further preparation and review. At this point, you can use the individual specialty chapters of the book to help you improve any areas of relative weakness.

In Plan B, you go through the clinical chapters first. Once you've completed this process, then you take the practice tests, check your answers and see how well prepared you are at this point. If you still have an area of significant weakness, it should be apparent in time for you to take remedial action.

In Plan A, by taking the practice test first, you get quick feedback regarding your initial areas of strength and weakness. You may find that you know all of the material very well, indicating that perhaps only a cursory review is necessary. This may be good to know early on in your exam prepa-

ration. On the other hand, you may find that you have some specific areas of weakness (such as pediatrics and psychiatry) and could then focus on these areas in your preparation—not only with this book but also with textbooks of pediatrics and psychiatry.

However, it is unlikely that you will not do some preparation prior to taking the USMLE Step 3 (especially since you have this book). Therefore, it may be more realistic to take the practice test after you have reviewed the specialty sections—as in Plan B. This will probably give you a more realistic test-type situation, as few of us may sit down for a test without studying first. In this case, you will have done some reviewing (from superficial to in-depth) and your practice test will reflect this studying time. If, after reviewing the specialty sections and taking the practice test, your scores indicate some weaknesses, you can then go back for further review of the subject sections and supplement your preparations with appropriate texts.

Now take a deep breath, relax, and good luck!

Acknowledgments

While one name may go on the cover of this book, this was far from a one person job. I would first like to thank all of the contributors to this book. This project gave me the chance to work with some old friends and with some new ones. I appreciate everyone's excellent contributions and dedication. I also would like to acknowledge the work of the contributors to the previous editions of the book, published as *Appleton & Lange's Review for the USMLE Step 3*. We made significant changes in this edition, but it was built on the foundations of the previous title. I truly appreciate the assistance of Catherine Johnson and the professional staff at McGraw-Hill for leading me through this endeavor.

I also appreciate the assistance of everyone at CHRISTUS St. Joseph Hospital. My colleagues in the Family Practice Residency—Dan Kalb, Neeta Gautam, Juan Garcia, Olufunke Odetunde, Kent Lee, and Anush Pillai—who gave me some room to work and provided helpful comments and suggestions throughout. I thank the residents with whom I have the privi-

lege of working and from whom I learn something new everyday. To Shaylor Thomas, Tracy Salinas, the clinical and administrative staffs of the FPC and CMG, thank you for all that you do for the residency and the patients. A special thank you goes to Eugene Toy, who gave me a first writing opportunity and introduced me to those responsible for this book.

This would not have been possible without the support of my family. To Heather, Cal, Casey, and my parents, I give my thanks and love. To Lisa Peden, Eileen Lafleur, and all of our family in Maryland and Texas, thanks for all of your help during this busy time.

Finally, on behalf of everyone involved with this project, I dedicate this book to those for whom it is intended—residents in the midst of their medical training. Step 3 is just one more hurdle to clear as you go. We wish you the best of luck on your examinations and in your careers.

Donald A. Briscoe, MD

USMLE STEP 3 LABORATORY VALUES

	REFERENCE RANGE	SI REFERENCE INTERVALS
BLOOD, PLASMA, SERUM		
* Alanine aminotransferase (ALT), serum	10–40 U/L	10–40 U/L
* Alkaline phosphatase, serum	Male: 30–100 U/L Female: 45–115 U/L	Male: 30–100 U/L Female: 45–115 U/L
Amylase, serum	25–125 U/L	25–125 U/L
* Aspartate aminotransferase (AST), serum	15–40 U/L	15–40 U/L
* Bilirubin, serum (adult), total // direct	0.1–1.0 mg/dL // 0.0–0.3 mg/dL	2–17 μ mol/L // 0–5 μ mol/L
Calcium, serum (total)	8.4–10.2 mg/dL	2.1–2.8 mmol/L
* Cholesterol, serum		
Total	150–240 mg/dL	3.9–6.2 mmol/L
HDL	30–70 mg/dL	0.8–1.8 mmol/L
LDL	<160 mg/dL	<4.2 mmol/L
Cortisol, serum	8:00 AM: 5–23 μ g/dL // 4:00 PM: 3–15 μ g/dL	138–635 nmol/L // 82–413 nmol/L
	8:00 PM: # 50% of 8:00 AM	Fraction of 8:00 AM: # 0.50
Creatine kinase, serum	Male: 25–90 U/L Female: 10–70 U/L	25–90 U/L 10–70 U/L
* Creatinine, serum	0.6–1.2 mg/dL	53–106 μ mol/L
Electrolytes, serum		
* Sodium (Na ⁺)	135–146 mEq/L	135–146 mmol/L
* Potassium (K ⁺)	3.5–5.0 mEq/L	3.5–5.0 mmol/L
* Chloride (Cl ⁻)	95–105 mEq/L	95–105 mmol/L
* Bicarbonate (HCO ₃ ⁻)	22–28 mEq/L	22–28 mmol/L
Ferritin, serum	Male: 15–200 ng/mL Female: 12–150 ng/mL	15–200 μ g/L 12–150 μ g/L
Follicle-stimulating hormone, serum/plasma	Male: 4–25 mIU/mL Female: premenopause 4–30 mIU/mL midcycle peak 10–90 mIU/mL postmenopause 40–250 mIU/mL	4–25 U/L 4–30 U/L 10–90 U/L 40–250 U/L
Gases, arterial blood (room air)		
PO ₂	75–100 mmHg	10.0–14.0 kPa
PCO ₂	35–45 mmHg	4.4–5.9 kPa
pH	7.35–7.45	[H ⁺] 36–44 nmol/L
* Glucose, serum	Fasting: 70–110 mg/dL 2-h postprandial: <120 mg/dL	3.8–6.1 mmol/L <6.6 mmol/L
Immunoglobulins, serum		
IgA	76–390 mg/dL	0.76–3.90 g/L
IgE	0–380 IU/mL	0–380 kIU/L
IgG	650–1500 mg/dL	6.5–15 g/L
IgM	40–345 mg/dL	0.4–3.45 g/L
Iron	50–170 μ g/dL	9–30 μ mol/L
Lactate dehydrogenase, serum	45–90 U/L	45–90 U/L
Luteinizing hormone, serum/plasma	Male: 6–23 mIU/mL Female: follicular phase 5–30 mIU/mL midcycle 75–150 mIU/mL postmenopause 30–200 mIU/mL	6–23 U/L 5–30 U/L 75–150 U/L 30–200 U/L
Osmolality, serum	275–295 mOsm/kg H ₂ O	275–295 mOsm/kg H ₂ O
Phosphorus (inorganic), serum	3.0–4.5 mg/dL	1.0–1.5 mmol/L
Proteins, serum		
Total (recumbent)	6.0–7.8 g/dL	60–78 g/L
Albumin	3.5–5.5 g/dL	35–55 g/L
Globulin	2.3–3.5 g/dL	23–35 g/L
Thyroid-stimulating hormone (TSH), serum	0.5–5.0 μ U/mL	0.5–5.0 mU/L
Thyroxine (T ₄), serum	5–12 μ g/dL	64–155 nmol/L
Triglycerides	35–160 mg/dL	0.4–1.81 mmol/L
Triiodothyronine (T ₃) resin uptake	25–35%	0.25–0.35
* Urea nitrogen, serum (BUN)	7–18 mg/dL	1.2–3.0 mmol/L
Uric acid, serum	3.0–8.2 mg/dL	0.18–0.48 mmol/L
CEREBROSPINAL FLUID		
Cell count	0–5 cells/mm ³	0–5 \times 10 ⁶ /L
Chloride	118–132 mEq/L	118–132 mmo
Gamma globulin	3–12% total proteins	0.03–0.12
Glucose	40–70 mg/dL	2.2–3.9 mmol/L

(Continued)

	REFERENCE RANGE	SI REFERENCE INTERVALS
Pressure	70–180 mm H ₂ O	70–180 mm H ₂ O
Proteins, total	<40 mg/dL	<0.40 g/L
HEMATOLOGIC		
Bleeding time (template)	2–7 minutes	2–7 minutes
CD4 cell count	>500/mm ³	
Erythrocyte count	Male: 4.3–5.9 million/mm ³ Female: 3.5–5.5 million/mm ³	4.3–5.9 × 10 ¹² /L 3.5–5.5 × 10 ¹² /L
Erythrocyte sedimentation rate (Westergren)	Male: 0–15 mm/h Female: 0–20 mm/h	0–15 mm/h 0–20 mm/h
Hematocrit	Male: 41–53% Female: 36–46%	0.41–0.53 0.36–0.46
Hemoglobin blood	Male: 13.5–17.5 g/dL Female: 12.0–16.0 g/dL	2.09–2.71 mmol/L 1.86–2.48 mmol/L
Hemoglobin A _{1c}	≤6%	≤0.06%
Leukocyte count and differential		
Leukocyte count	4500–11,000/mm ³	4.5–11.0 × 10 ⁹ /L
Neutrophils, segmented	54–62%	0.54–0.62
Neutrophils, band	3–5%	0.03–0.05
Eosinophils	1–3%	0.01–0.03
Basophils	0–0.75%	0.0–0.0.75
Lymphocytes	25–33%	0.25–0.33
Monocytes	3–7%	0.03–0.07
Mean corpuscular hemoglobin (MCH)	25–35 pg/cell	0.39–0.54 fmol/cell
Mean corpuscular hemoglobin concentration (MCHC)	31–36% Hb/cell	4.81–5.58 mmol Hb/L
Mean corpuscular volume (MCV)	80–100 μm ³	80–100 fl
Partial thromboplastin time (activated)	<28 s	<28 s
Platelet count	150,000–400,000/mm ³	150–400 × 10 ⁹ /L
Prothrombin time	<12 seconds	<12 seconds
Reticulocyte count	0.5–1.5% of red cells	0.005–0.015
Volume		
Plasma	Male: 25–43 mL/kg Female: 28–45 mL/kg	0.025–0.043 L/kg 0.028–0.045 L/kg
Red cell	Male: 20–36 mL/kg Female: 19–31 mL/kg	0.020–0.036 L/kg 0.019–0.031 L/kg
URINE		
Calcium	100–300 mg/24 h	2.5–7.5 mmol/24 h
Creatinine clearance	Male: 97–137 mL/min Female: 88–128 mL/min	
Osmolality	50–1400 mOsmol/kg H ₂ O	
Oxalate	8–40 μg/mL	90–445 μmol/L
Proteins, total	<150 mg/24 h	<0.15 g/24 h

An astrisk (*) indicates a laboratory value included in the biochemical profile.

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