

**FIRST AID** FOR THE<sup>®</sup>

**USMLE<sup>®</sup>**  
**STEP 2 CK**  
**Clinical Knowledge**

**Ninth Edition**

**A STUDENT-TO-STUDENT GUIDE**

- Comprehensive high-yield review for the USMLE Step 2 CK •
- Embedded case vignettes test your application of knowledge •
- Key facts and mnemonics reinforce essential information •
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- Includes hundreds of color clinical images and illustrations •

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**TAO LE ■ VIKAS BHUSHAN ■ VINCENT CHEN ■ MICHAEL KING**

# **FIRST AID** FOR THE<sup>®</sup> **USMLE Step 2 CK**

## **Ninth Edition**

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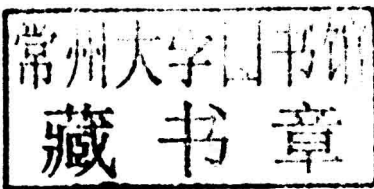
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## First Aid for the® USMLE Step 2 CK, Ninth Edition

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## DEDICATION

To the contributors to this and future editions, who took time to share their knowledge, insight, and humor for the benefit of students.

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# Preface

With the ninth edition of *First Aid for the USMLE Step 2 CK*, we continue our commitment to providing students with the most useful and up-to-date preparation guide for the USMLE Step 2 CK. The ninth edition represents a thorough revision in many ways and includes:

- Full color images designed for better learning.
- Vignette-style flash cards embedded in the margins to reinforce key concepts.
- Hundreds of color images and illustrations throughout the text.
- A revised and updated exam preparation guide for the USMLE Step 2 CK that includes updated study and test taking strategies.
- Revisions and new material based on student experience with recent administrations of the USMLE Step 2 CK.
- Concise summaries of more than 1000 heavily tested clinical topics written for fast, high-yield studying.
- An updated “rapid review” that tests your knowledge of each topic for last-minute cramming.
- A completely revised, in-depth, student-to-student guide to clinical science review and sample examination resources.

The ninth edition would not have been possible without the help of the many students and faculty members who contributed their feedback and suggestions. We invite students and faculty to continue sharing their thoughts and ideas to help us improve *First Aid for the USMLE Step 2 CK*. (See How to Contribute, p. xiii.)

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# How to Contribute

In our effort to continue to produce a high-yield review source for the Step 2 CK exam, we invite you to submit any suggestions or corrections. We also offer paid internships in medical education and publishing ranging from three months to one year (see below for details). Please send us your suggestions for

- Study and test-taking strategies for the Step 2 CK exam
- New facts, mnemonics, diagrams, and illustrations
- Low-yield topics to remove

For each entry incorporated into the next edition, you will receive a \$20 gift certificate as well as personal acknowledgment in the next edition. Diagrams, tables, partial entries, updates, corrections, and study hints are also appreciated, and significant contributions will be compensated at the discretion of the authors. Also let us know about material in this edition that you feel is low yield and should be deleted.

The preferred way to submit entries, suggestions, or corrections is via our blog:

[www.firstaidteam.com](http://www.firstaidteam.com)

We are also reachable by e-mail at [firstaidteam@yahoo.com](mailto:firstaidteam@yahoo.com).

## NOTE TO CONTRIBUTORS

All entries become property of the authors and are subject to editing and reviewing. Please verify all data and spellings carefully. In the event that similar or duplicate entries are received, only the first entry received will be used. Include a reference to a standard textbook to facilitate verification of the fact. Please follow the style, punctuation, and format of this edition if possible.

## INTERNSHIP OPPORTUNITIES

The author team is pleased to offer part-time and full-time paid internships in medical education and publishing to motivated physicians. Internships may range from three months (eg, a summer) up to a full year. Participants will have an opportunity to author, edit, and earn academic credit on a wide variety of projects, including the popular *First Aid* series. Writing/editing experience, familiarity with Microsoft Word, and Internet access are desired. For more information, e-mail a résumé or a short description of your experience along with a cover letter to [firstaidteam@yahoo.com](mailto:firstaidteam@yahoo.com).

# How to Use This Book

We have made many improvements and added several new features to this edition of *First Aid for the USMLE Step 2 CK*. In particular, we have added more tables, charts, and images throughout the text to facilitate studying. We encourage you to read all aspects of the text to learn the material in context; however, when you get closer to test day, focus on the high-yield bolded text and comments in the margins of each page. These features have many of the “buzzwords” you should be looking for on exam day. Finally, we have included additional vignette questions to periodically test your knowledge of key concepts. These questions are located in the lower corner of certain pages. To prevent peeking at the answers, you’ll find the answer on the back of the same page in the lower corner. These questions are not always representative of test questions.

To **simulate** the actual test day and to properly judge your true understanding of the material, you can use the *USMLE-Rx Step 2 CK Qmax* question test bank ([www.usmle-rx.com](http://www.usmle-rx.com)), which was developed by the First Aid author team. The test bank and this text are more than enough to allow many students to ace the exam. However, if you are constantly on the move while preparing for this exam or need some extra practice, use the *USMLE-Rx Step 2 CK* mobile application for mobile devices.

To **broaden** your learning strategy, you can **integrate** your First Aid study with *First Aid Cases for the USMLE Step 2 CK* and *First Aid Q&A for the USMLE Step 2 CK*. Please note that *First Aid Q&A* draws a portion of its questions from USMLE-Rx. *First Aid Cases* and *First Aid Q&A* are organized to match *First Aid for the USMLE Step 2 CK* **chapter for chapter**. After reviewing a chapter within *First Aid*, you can **review cases** on the same topics and then **test your knowledge** in the corresponding chapters of *First Aid Cases* and *First Aid Q&A*. *First Aid Q&A* is also available as an iPhone app. Additional materials may also be found in the Review Resources section of this book.

Good luck!

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## Introduction

The United States Medical Licensing Examination (USMLE) Step 2 allows you to pull together your clinical experience on the wards with the numerous “factoids” and classical disease presentations that you have memorized over the years. Whereas Step 1 stresses basic disease mechanisms and principles, Step 2 places more emphasis on clinical diagnosis and management, disease pathogenesis, and preventive medicine. The Step 2 examination is now composed of 2 parts:

- The Step 2 Clinical Knowledge examination (Step 2 CK)
- The Step 2 Clinical Skills examination (Step 2 CS)

The USMLE Step 2 CK is the second of three examinations that you must pass in order to become a licensed physician in the United States. The computerized Step 2 CK is a 1-day (9-hour) multiple-choice examination.

Students are also required to take the Step 2 CS, a 1-day live examination in which students examine 12 standardized patients. For more information on this examination, please refer to *First Aid for the USMLE Step 2 CS*. Information about the Step 2 CS format and about eligibility, registration, and scoring can be found at <http://www.nbme.org>.

The information found in this section as well as in the remainder of the book will address only the Step 2 CK.

### KEY FACT

The goal of the Step 2 CK is to apply your knowledge of medical facts to clinical scenarios you may encounter as a resident.

## USMLE Step 2 CK—Computer-Based Testing Basics

### HOW WILL THE CBT BE STRUCTURED?

The Step 2 CK is a computer-based test (CBT) administered by Prometric, Inc. It is a 1-day examination with approximately 352 questions divided into eight 60-minute blocks of 44 questions each, administered in a single 9-hour testing session. Some sections may have more or fewer than 44 questions, but the maximum question total for the exam is 355. The Step 2 CK uses the same **FRED v2** software program as that used on the USMLE Step 1 examination.

Three question styles predominate throughout the examination. The most common format is **Single One Best Answer** questions. This is the traditional multiple-choice format in which you are tasked with selecting the “most correct” answer. Another common style is **Matching Sets**. These questions consist of a series of questions related to a similar topic or prompt. Finally, “**Sequential Item Sets**” have been introduced to the examination. These are sets of multiple-choice questions that are related and must all be answered in sequence without skipping a question in the set along the way. As you answer questions in a given set, the previous answers become locked and cannot be changed. These are the only questions on the USMLE examination that are locked in such a way. There will be no more than 5 Sequential Item Sets within each USMLE Step 2 CK examination. In 2011, the USMLE examination introduced Sequential Item Sets that include a pharmaceutical ad or an abstract on which the questions are based.

During the time allotted for each block on the USMLE Step 2 CK, the examinee can answer test questions in any order and can also review responses and change answers (with the exception of responses within the Sequential Item

Sets described above). However, under no circumstances can examinees return to previous blocks and change answers. Once an examinee has finished a block, he or she must click on a screen icon in order to continue to the next block. Time not used during a testing block will be added to the examinee's overall break time, but it cannot be used to complete other testing blocks.

### TESTING CONDITIONS: WHAT WILL THE CBT BE LIKE?

Even if you're familiar with computer-based testing and the Prometric test centers, FRED v2 is a testing format that you should access from the USMLE Web site (<http://www.usmle.org>) and try out prior to the examination. If you familiarize yourself with the FRED v2 testing interface ahead of time, you can skip the 15-minute tutorial offered on examination day and add those minutes to your allotted break time of 45 minutes.

For security reasons, examinees are not allowed to bring personal equipment (except those needed for medical reasons and soft-foam earplugs as detailed below) into the testing area—which means that writing implements, outerwear, watches (even analog), cellular telephones, and electronic paging devices are all prohibited. Food and beverages are prohibited as well. The proctor will assign you a small locker in which you can store your belongings and any food you bring for the day. Examinees will also be given 2 (8" × 11") laminated writing surfaces, pens, and erasers for note taking and for recording their test Candidate Identification Number (CIN). These materials must be returned after the examination. Testing centers are monitored by audio and video surveillance equipment. Each time you enter the testing room, you will have to undergo a screening process to ensure that you are not bringing in personal items.

You should become familiar with a typical question screen. A window to the left displays all the questions in the block and shows you the unanswered questions (marked with an "i"). Some questions will contain figures, color illustrations, audio, or video adjacent to the question. Although the contrast and brightness of the screen can be adjusted, there are no other ways to manipulate the picture (eg, zooming or panning). Larger images are accessed with an "exhibit" button. The examinee can also call up a window displaying normal **lab values**. You may **mark** questions to review at a later time by clicking the check mark at the top of the screen. The **annotation** feature functions like the provided dry erase sheets and allows you to jot down notes during the examination. Play with the **highlighting/strike-out** and annotation features with the vignettes and multiple answers.

You should also do a few practice blocks to determine which tools actually help you process questions more efficiently and accurately. If you find that you are not using the marking, annotation, or highlighting tools, then **keyboard shortcuts** can be quicker than using a mouse. Headphones are provided for listening to audio and blocking outside noise. Alternatively, examinees can bring soft earplugs to block excess noise. These earplugs must be examined by Prometric staff before you are allowed to take them into the testing area.

### WHAT DOES THE CBT FORMAT MEAN FOR ME?

The CBT format is the same format as that used on the USMLE Step 1. If you are uncomfortable with this testing format, spend some time playing with a Windows-based system and pointing and clicking icons or buttons with a mouse.

#### KEY FACT

Expect to spend up to 9 hours at the test center.

#### KEY FACT

Keyboard shortcuts:

- A-E—Letter choices.
- Enter or space bar—Move to the next question.
- Esc—Exit pop-up Lab and Exhibit windows.
- Alt-T—Countdown and time-elapsed clocks for current session and overall test.



The USMLE also offers students an opportunity to take a simulated test, or practice session, at a Prometric center. The session is divided into three 1-hour blocks of 50 test items each. The 143 Step 2 CK sample test items that are available on the USMLE Web site (<http://www.usmle.org>) are the same as those used at CBT practice sessions. **No new items are presented.** The cost is about \$52 for US and Canadian students but is higher for international students. Students receive a printed percent-correct score after completing the session. No explanations of questions are provided. You may register for a practice session online at <http://www.usmle.org>.

The National Board of Medical Examiners (NBME) provides another option for students to assess their Step 2 CK knowledge with the Comprehensive Clinical Science Self-Assessment (CCSSA) test. This test is available on the NBME Web site in several versions for \$50, or \$60 for expanded feedback, which will display at the end of the exam all of the questions you answered incorrectly, without additional explanations. The content of the CCSSA items resembles that of the USMLE Step 2 CK. Upon completion of the CCSSA, users will be provided with a performance profile indicating their strengths and weaknesses. This feedback is intended for use as a study tool only and is not necessarily an indicator of Step 2 CK performance. For more information on the CCSSA examination, visit the NBME's Web site at <http://www.nbme.org>, and click on the link for "NBME Web-based Self-Assessment Service."

#### HOW DO I REGISTER TO TAKE THE EXAMINATION?

Information on Step 2 CK format, content, and registration requirements can be found on the USMLE Web site. To register for the examination, students/graduates of accredited schools in the United States and Canada can apply online at the NBME Web site (<http://www.nbme.org>), whereas students/graduates of non-US/Canadian schools should apply through the Educational Commission for Foreign Medical Graduates ECFMG (<https://iwa2.ecfm.org>). A printable version of the application is also available on these sites. The preliminary registration process for the USMLE Step 2 CK is as follows:

- Complete a registration form, and send your examination fees to the NBME (online).
- Select a 3-month block in which you wish to be tested (eg, June/July/August).
- Attach a passport-type photo to your completed application form.
- Complete a Certification of Identification and Authorization form. This form must be signed by an official at your medical school such as the registrar's office (if you are a student) or a notary public (if you have graduated) to verify your identity. It is valid for 5 years, allowing you to use only your USMLE identification number for future transactions.
- Send your certified application form to the NBME for processing. (Applications may be submitted more than 6 months before the test date, but examinees will not receive their scheduling permits until 6 months prior to the eligibility period.)
- The NBME will process your application within 4–6 weeks and will send you a slip of paper that will serve as your scheduling permit.
- Once you have received your scheduling permit, decide when and where you would like to take the examination. For a list of Prometric locations nearest you, visit <https://www.prometric.com>.
- Call Prometric's toll-free number or visit <https://www.prometric.com> to arrange a time to take the examination.
- The Step 2 CK is offered on a year-round basis except for the first 2 weeks

in January. For the most up-to-date information on available testing days at your preferred testing location, refer to <http://www.usmle.org>.

The scheduling permit you receive from the NBME will contain the following important information:

- Your USMLE identification number.
- The eligibility period during which you may take the examination.
- Your “scheduling number,” which you will need to make your examination appointment with Prometric.
- Your CIN, which you must enter at your Prometric workstation in order to access the examination.

Prometric has no access to the codes and will not be able to supply these numbers, so **do not lose your permit!** You will not be allowed to take the Step 2 CK unless you present your permit along with an unexpired, government-issued photo identification that contains your signature (eg, driver’s license, passport). Make sure the name on your photo ID exactly matches the name that appears on your scheduling permit.

#### WHAT IF I NEED TO RESCHEDULE THE EXAMINATION?

You can change your date and/or center within your 3-month period by contacting Prometric if space is available. If you reschedule 31 days before your scheduled testing date, there is no fee; between 6 and 30 days before, there is a \$50 fee; 5 or fewer days before, there is a larger fee. If you need to reschedule outside your initial 3-month period, you can apply for a single 3-month extension (eg, April/May/June can be extended through July/August/September) after your eligibility period has begun (visit <http://www.nbme.org> for more information). This extension currently costs \$70. For other rescheduling needs, you must submit a new application along with another application fee.

#### WHAT ABOUT TIME?

Time is of special interest on the CBT examination. Here is a breakdown of the examination schedule:

Tutorial	15 minutes
60-minute question blocks (44 questions per block)	8 hours
Break time (includes time for lunch)	45 minutes
<hr/>	
Total test time	9 hours

The computer will keep track of how much time has elapsed during the examination. However, the computer will show you only how much time you have remaining in a given block. Therefore, it is up to you to determine if you are pacing yourself properly.

The computer will not warn you if you are spending more than the 45 minutes allotted for break time. The break time includes not only the usual concept of a break—when you leave the testing area—but also the time it takes for you to make the transition to the next block, such as entering your CIN or even taking a quick stretch. **If you do exceed the 45-minute break time, the time to complete the last block of the test will be reduced.** However, you can elect not to use all of your break time, or you can gain extra break time either by skipping the tutorial or by finishing a block ahead of the allotted time.

#### KEY FACT

Because the Step 2 CK examination is scheduled on a “first-come, first-served” basis, you should be sure to call Prometric as soon as you receive your scheduling permit.



### SECURITY MEASURES

Smile! The NBME uses a check-in/check-out process that includes electronic capture of your fingerprints and photograph. These measures are intended to increase security by preventing fraud, thereby safeguarding the integrity of the examination. The new procedures also decrease the amount of time needed to check in and out of the examination throughout the day, thereby maximizing your break time. However, you still need to sign out and sign in with the Test Center Log when exiting and entering the testing area.

### IF I LEAVE DURING THE EXAMINATION, WHAT HAPPENS TO MY SCORE?

You are considered to have started the examination once you have entered your CIN onto the computer screen. In order to receive an official score, however, you must finish the entire examination. This means that you must start and either finish or run out of time for each block of the examination. If you do not complete all the question blocks, your examination will be documented on your USMLE score transcript as an incomplete attempt, but no actual score will be reported.

The examination ends when all blocks have been completed or time has expired. As you leave the testing center, you will receive a written test completion notice to document your completion of the examination.

### WHAT TYPES OF QUESTIONS ARE ASKED?

The Step 2 CK is an integrated examination that tests understanding of normal conditions, disease categories, and physician tasks. Almost all questions on the examination are case based. A substantial amount of extraneous information may be given, or a clinical scenario may be followed by a question that could be answered without actually requiring that you read the case. It is your job to determine which information is superfluous and which is pertinent to the case at hand. Content areas include internal medicine, OB/GYN, pediatrics, preventive services, psychiatry, surgery, and other areas relevant to the provision of care under supervision. Physician tasks are distributed as follows:

- Establishing a diagnosis (25–40%)
- Understanding the mechanisms of disease (20–35%)
- Applying principles of management (15–25%)
- Promoting preventive medicine and health maintenance (15–25%)

Most questions on the examination have a **Single Best Answer** format, but some **Matching Sets** and **Sequential Item Sets** will be found throughout the examination. Regardless of the question format, the part of the vignette that actually asks the question—the **stem**—is usually found at the end of the scenario and generally relates to the physician task. From student experience, there are a few stems that are consistently addressed throughout the examination:

- What is the most likely diagnosis? (40%)
- Which of the following is the most appropriate initial step in management? (20%)
- Which of the following is the most appropriate next step in management? (20%)
- Which of the following is the most likely cause of ... ? (5%)
- Which of the following is the most likely pathogen ... ? (3%)
- Which of the following would most likely prevent ... ? (2%)
- Other (10%)