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USMLE[®] STEP 2 CK Clinical Knowledge

Ninth Edition

**A STUDENT-TO-
STUDENT GUIDE**

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USMLE Step 2 CK

Ninth Edition

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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.

KEYFACT

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.

KEYFACT

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

KEYFACT

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.

KEYFACT

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%)

Additional examination tips are as follows:

- Note the age and race of the patient in each clinical scenario. When ethnicity is given, it is often relevant. Know these well (see high-yield facts), especially for more common diagnoses.
- Be able to recognize key facts that distinguish major diagnoses.
- Questions often describe clinical findings rather than naming eponyms (eg, they cite “audible hip click” instead of “positive Ortolani sign”).
- Questions about acute patient management (eg, trauma) in an emergency setting are common.

The cruel reality of the Step 2 CK is that no matter how much you study, there will still be questions you will not be able to answer with confidence. If you recognize that a question cannot be solved in a reasonable period of time, make an educated guess and move on; you will not be penalized for guessing. Also bear in mind that some of the USMLE examination questions are “experimental” and will not count toward your score.

HOW LONG WILL I HAVE TO WAIT BEFORE I GET MY SCORES?

The USMLE reports scores 3–4 weeks after the examinee’s test date. During peak periods, however, as many as 6 weeks may pass before reports are scored. Official information concerning the time required for score reporting is posted on the USMLE Web site, <http://www.usmle.org>.

HOW ARE THE SCORES REPORTED?

Like the Step 1 score report, your Step 2 CK report includes your pass/fail status, a numeric score, and a performance profile organized by discipline and disease process (see Figures 1-1A and 1-1B). The score is a 3-digit scaled score based on a predefined proficiency standard. As of July 1, 2014, the required passing score is 209. This score requires answering 60–70% of questions correctly. Any adjustments in the required passing score will be available on the USMLE Web site.

Defining Your Goal

The first and most important thing to do in your Step 2 CK preparation is define how well you want to do on the exam, as this will ultimately determine the extent of preparation that will be necessary. The amount of time spent in preparation for this examination varies widely among medical students. Possible goals include the following:

- **Simply passing.** This goal meets the requirements for becoming a licensed physician in the United States. However, if you are taking the Step 2 CK in a time frame in which residency programs will see your score, you should strive to do as well as or better than you did on Step 1.
- **Beating the mean.** This signifies an ability to integrate your clinical and factual knowledge to an extent that is superior to that of your peers (around 240 for recent examination administrations). Others redefine this goal as achieving a score 1 standard deviation above the mean (usually in the range of 245–250). Highly competitive residency programs may use your Step 1 and Step 2 scores (if available) as a screening tool or as a selection requirement (see Figure 1-2). International medical graduates should aim to beat the mean, as USMLE scores are likely to be a selection factor even for less competitive US residency programs.


	<p>UNITED STATES MEDICAL LICENSING EXAMINATION[®]</p> <p>STEP 2 CLINICAL KNOWLEDGE (CK) SCORE REPORT</p> <p>This score report is provided for the use of the examinee. Third party users of USMLE information are advised to rely solely on official USMLE transcripts.</p>		
<p>Schmoe, Joe</p> <p>USMLE ID: 1-234-567-8</p>	<p>Test Date: July 2014</p>		
<p>The USMLE is a single examination program consisting of three Steps designed to assess an examinee's understanding of and ability to apply concepts and principles that are important in health and disease and that constitute the basis of safe and effective patient care. Step 2 is designed to assess whether an examinee can apply medical knowledge, skills, and understanding of clinical science essential for the provision of patient care under supervision, including emphasis on health promotion and disease prevention. The inclusion of Step 2 in the USMLE sequence is intended to ensure that due attention is devoted to principles of clinical sciences and basic patient-centered skills that provide the foundation for the safe and competent practice of medicine. There are two components to Step 2: a Clinical Knowledge (CK) examination and a Clinical Skills (CS) examination. This report represents results for the Step 2 CK examination only. Results of the examination are reported to medical licensing authorities in the United States and its territories for use in granting an initial license to practice medicine. This score[§] represents your result for the administration of Step 2 CK on the test date shown above.</p>			
<table border="1"> <tr> <td style="text-align: center;">PASS</td> <td>This result is based on the minimum passing score recommended by USMLE for Step 2 CK. Individual licensing authorities may accept the USMLE-recommended pass/fail result or may establish a different passing score for their own jurisdictions.</td> </tr> </table>	PASS	This result is based on the minimum passing score recommended by USMLE for Step 2 CK. Individual licensing authorities may accept the USMLE-recommended pass/fail result or may establish a different passing score for their own jurisdictions.	
PASS	This result is based on the minimum passing score recommended by USMLE for Step 2 CK. Individual licensing authorities may accept the USMLE-recommended pass/fail result or may establish a different passing score for their own jurisdictions.		
<table border="1"> <tr> <td style="text-align: center;">270</td> <td>This score is determined by your overall performance on Step 2 CK. For recent administrations, the mean and standard deviation for first-time examinees from U.S. and Canadian medical schools are approximately 238 and 19, respectively, with most scores falling between 140 and 260. A score of 209 is set by USMLE to pass Step 2 CK. The standard error of measurement (SEM)[‡] for this scale is six points.</td> </tr> </table>	270	This score is determined by your overall performance on Step 2 CK. For recent administrations, the mean and standard deviation for first-time examinees from U.S. and Canadian medical schools are approximately 238 and 19, respectively, with most scores falling between 140 and 260. A score of 209 is set by USMLE to pass Step 2 CK. The standard error of measurement (SEM) [‡] for this scale is six points.	
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<p>[§]Effective April 1, 2013, test results are reported on a three-digit scale only. Test results reported as passing represent an exam score of 75 or higher on a two-digit scoring scale.</p> <p>[‡]Your score is influenced both by your general understanding of clinical science and the specific set of items selected for this Step 2 CK examination. The Standard Error of Measurement (SEM) provides an index of the variation in scores that would be expected to occur if an examinee were tested repeatedly using different sets of items covering similar content.</p>			

FIGURE 1-1 A. Sample score report—front page.

- **Acing the exam.** Perhaps you are one of those individuals for whom nothing less than the best will do—and for whom excelling on standardized examinations is a source of pride and satisfaction. A high score on the Step 2 CK might also represent a way to strengthen your application and “make up” for a less-than-satisfactory score on Step 1.
- **Evaluating your clinical knowledge.** In many ways, this goal should serve as the ultimate rationale for taking the Step 2 CK, as it is technically the reason the examination was initially designed. The case-based nature of the Step 2 CK differs significantly from the more fact-based Step 1 examination in that it more thoroughly assesses your ability to recognize classic clinical presentations, deal with emergent situations, and follow the step-by-step thought processes involved in the treatment of particular diseases.
- **Preparing for internship.** Studying for the USMLE Step 2 CK is an excellent way to review and consolidate all of the information you have learned in preparation for internship.

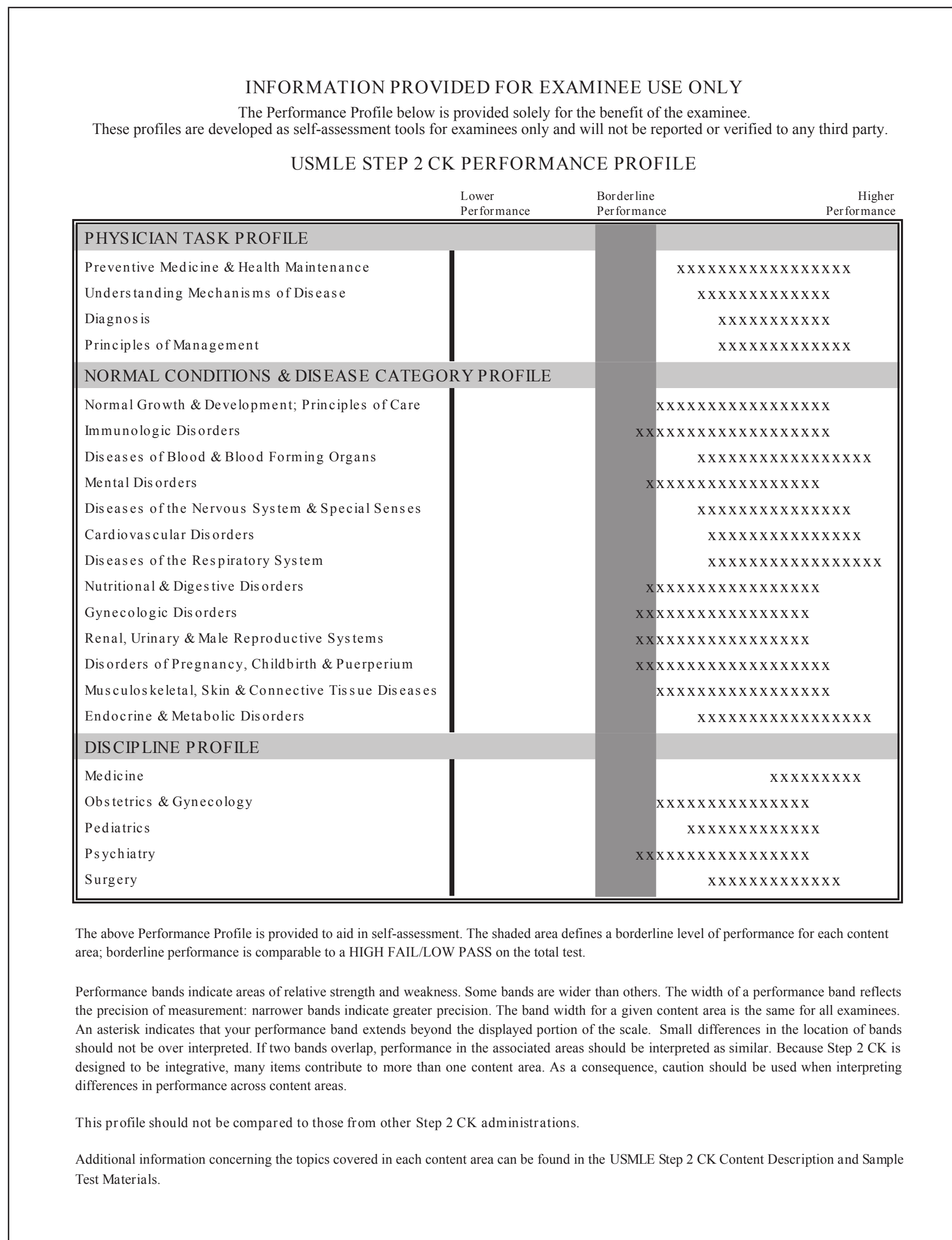


FIGURE 1-1 B. Sample score report—back page.

Matching statistics, including examination scores related to various specialties, are available at the National Resident Matching Program Web site at <https://www.nrmp.org> under “Match Data.”

WHEN TO TAKE THE EXAM

The second most important thing to do in your examination preparation is to decide when to take the examination. With the CBT, you now have a wide variety of options regarding when to take the Step 2 CK. Here are a few factors to consider:

- **The nature of your objectives**, as defined above.
- **The specialty to which you are applying.** It is clear that an increasing number of residency programs are viewing the Step 2 CK as an integral part of the residency application process. Several research publications

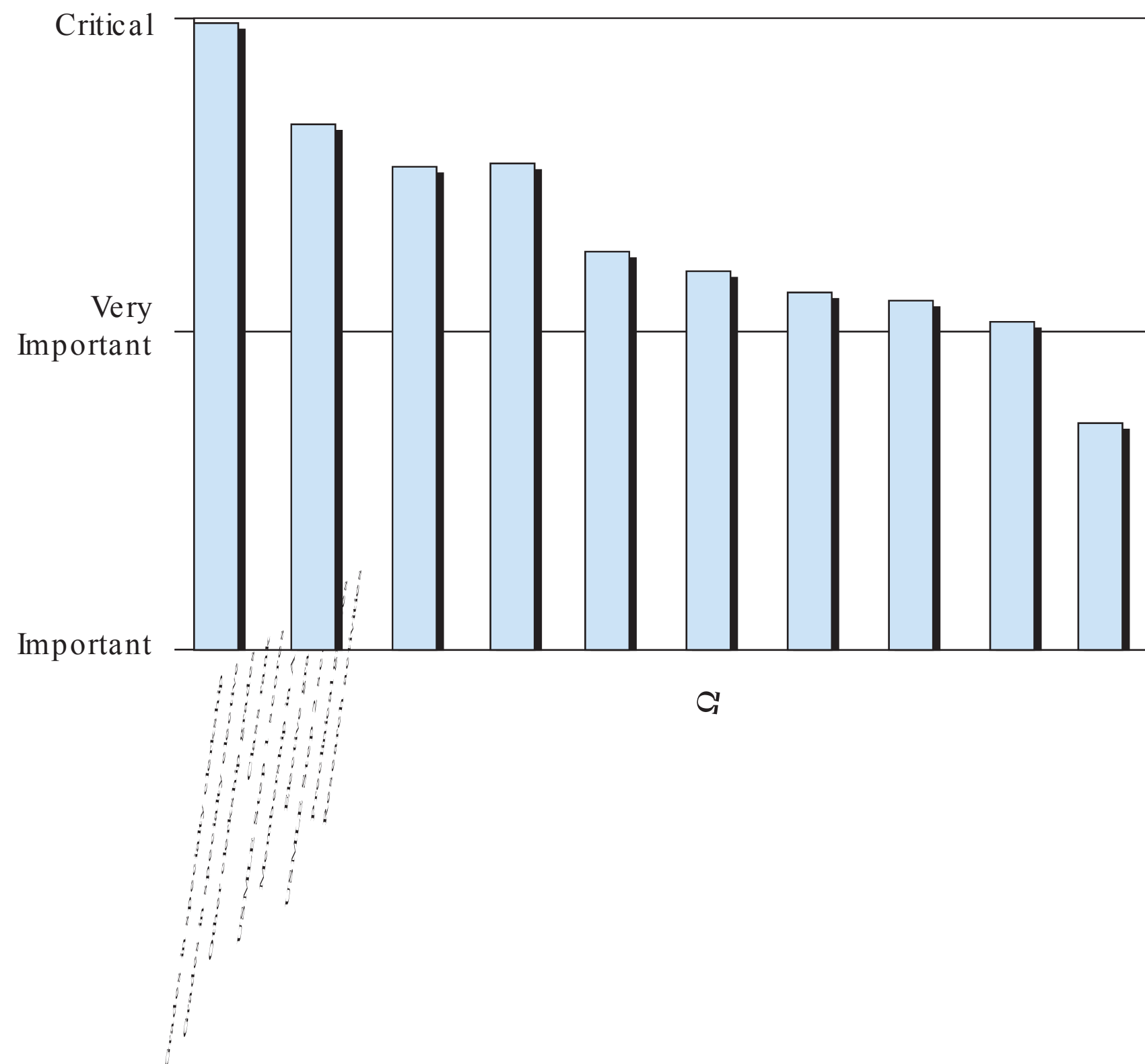


FIGURE 1-2. Academic factors important to residency directors.

demonstrate the increasing importance placed on this examination by residency directors. Some programs are now requiring the Step 2 CK score in order to rank candidates for a residency position. It is therefore in the best interest of candidates to have this examination done in time for scores to be available for the residency application. Taking the examination in June or July ensures that scores will be available for the Match period that begins in September. Some programs, however, will accept scores after the application process starts. Check with programs in your desired specialty to determine when to take the examination.

- **Prerequisite to graduation.** If passing the USMLE Step 2 CK is a prerequisite to graduation at your medical school, you will need to take the examination in the fall or winter at the latest.
- **Proximity to clerkships.** Many students feel that the core clerkship material is fresher in their minds early in the fourth year, making a good argument for taking the Step 2 CK earlier in the fall.
- **The nature of your schedule.**
- **Considerations for MD/PhD students.** The dates of passing the Step 1, Step 2, and Step 3 examinations should occur within a 7-year period. However, the typical pathway for MD/PhD students consists of 2–3 years of preclinical (and sometimes clinical) work in medical school, 3–4 years of graduate work with research, and finally returning to medical school for clinical work. MD/PhD students typically exceed the 7-year limit. Depending on the state in which licensure is sought, such students may need to petition their licensure body for an exception to this rule.

KEYFACT

The Step 2 CK is an opportunity to consolidate your clinical knowledge and prepare for internship.

Study Resources

QUALITY CONSIDERATIONS

Although an ever-increasing number of USMLE Step 2 CK review books and software packages are available on the market, the quality of this material is highly variable (see Section 3). Some common problems include the following:

- Some review books are too detailed to be reviewed in a reasonable amount of time or cover subtopics that are not emphasized on the examination (eg, a 400-page anesthesiology book).
- Many sample question books have not been updated to reflect current trends on the Step 2 CK.
- Many sample question books use poorly written questions, contain factual errors in their explanations, give overly detailed explanations, or offer no explanations at all.
- Software for boards review is of highly variable quality, may be difficult to install, and may be fraught with bugs.

CLINICAL REVIEW BOOKS

Many review books are available, so you must decide which ones to buy by carefully evaluating their relative merits. Toward this goal, you should compare differing opinions from other medical students; read the reviews and ratings in Section 3 of this guide; and examine the various books closely in the bookstore. Do not worry about finding the “perfect” book, as many subjects simply do not have one.

There are 2 types of review books: those that are stand-alone titles and those that are part of a series. Books in a series generally have the same style, and you must decide if that style is helpful for you and optimal for a given subject.

TEST BANKS

A test bank can serve multiple functions for examinees, including the following:

- Provide information about strengths and weaknesses in your fund of knowledge.
- Add variety to your study schedule.
- Serve as the main form of study.
- Improve test-taking skills.
- Familiarize examinees with the style of the USMLE Step 2 CK examination.

Students report that some test banks have questions that are, on average, shorter and less clinically oriented than those on the current Step 2 CK. Step 2 CK questions demand fast reading skills and the application of clinical facts in a problem-solving format. Approach sample examinations critically, and do not waste time with low-quality questions until you have exhausted better sources.

After you have taken a practice test, try to identify concepts and areas of weakness, not just the facts that you missed. Use this experience to motivate your study and to prioritize the areas in which you need the most work. Analyze

KEYFACT

The best review book for you reflects the way you like to learn. If a given review book is not working for you, stop using it no matter how highly rated it may be.

KEYFACT

Use test banks to identify concepts and areas of weakness, not just facts that you missed.

the pattern of your responses to questions to determine if you have made systematic errors in answering questions. Common mistakes include reading too much into the question, second-guessing your initial impression, and misinterpreting the question.

TEXTS AND NOTES

Most textbooks are too detailed for high-yield boards review and should be avoided. When using texts or notes, engage in active learning by making tables, diagrams, new mnemonics, and conceptual associations whenever possible. If you already have your own mnemonics, do not bother trying to memorize someone else's. Textbooks are useful, however, to supplement incomplete or unclear material.

COMMERCIAL COURSES

Commercial preparation courses can be helpful for some students, as they offer an effective way to organize study material. However, multiweek courses are costly and require significant time commitment, leaving limited time for independent study. Also note that some commercial courses are designed for first-time test takers, students who are repeating the examination, or international medical graduates.

NBME/USMLE PUBLICATIONS

We strongly encourage students to use the free materials provided by the testing agencies and to study the following NBME publications:

- USMLE Step 2 Clinical Knowledge (CK): Content Description and General Information. This publication provides you with nuts-and-bolts details about the examination (included on the Web site <http://www.usmle.org>; free to all examinees).
- USMLE Step 2 Clinical Knowledge (CK): Sample Test Questions. This is a PDF version of the test questions and test content also found at <http://www.usmle.org>.
- **NBME Test Delivery Software (FRED) and Tutorial.** This includes 131 valuable practice questions. The questions are available as a download from the USMLE Web site. Make sure you are using the new version of FRED and not the older Prometric version.
- **USMLE Web site (<http://www.usmle.org>).** In addition to allowing you to become familiar with the CBT format, the sample items on the USMLE Web site provide the only questions that are available directly from the test makers. Student feedback varies as to the similarity of these questions to those on the actual exam, but they are nonetheless worthwhile to know.

Test-Day Checklist

THINGS TO BRING WITH YOU TO THE EXAM

- Be sure to bring your scheduling permit and a photo ID with signature. (You will not be admitted to the examination if you fail to bring your permit, and Prometric will charge a rescheduling fee.)
- Remember to bring lunch, snacks (for a little “sugar rush” on breaks), and fluids (including a caffeine-containing drink if needed).

- Bring clothes to layer to accommodate temperature variations at the testing center.
- Earplugs will be provided at the Prometric center.

Testing Agencies

National Board of Medical Examiners (NBME)
Department of Licensing Examination Services
3750 Market Street
Philadelphia, PA 19104-3102
(215) 590-9700
Fax: (215) 590-9460
<http://www.nbme.org/contact/>
e-mail: webmail@nbme.org

USMLE Secretariat
3750 Market Street
Philadelphia, PA 19104-3190
(215) 590-9700
Fax: (215) 590-9460
<http://www.usmle.org>
e-mail: webmail@nbme.org

Educational Commission for Foreign Medical Graduates (ECFMG)
3624 Market Street
Philadelphia, PA 19104-2685
(215) 386-5900
Fax: (215) 386-9196
<http://www.ecfmg.org/contact.html>
e-mail: info@ecfmg.org

Federation of State Medical Boards (FSMB)
400 Fuller Wiser Road, Suite 300
Euless, TX 76039
(817) 868-4041
Fax: (817) 868-4098
<http://www.fsmb.org/contact-us>
e-mail: usmle@fsmb.org

SECTION 2

DATABASE OF HIGH-YIELD FACTS

Cardiovascular

Dermatology

Endocrinology

Epidemiology

Ethics and Legal Issues

Gastrointestinal

Hematology/Oncology

Infectious Disease

Musculoskeletal

Neurology

Obstetrics

Gynecology

Pediatrics

Psychiatry

Pulmonary

Renal/Genitourinary

Selected Topics in Emergency Medicine

Rapid Review

How to Use the Database

The ninth edition of First Aid for the USMLE Step 2 CK contains a revised and expanded database of clinical material that student authors and faculty have identified as high yield for boards review. The facts are organized according to subject matter, whether medical specialty (eg, Cardiovascular, Renal) or high-yield topic (eg, Ethics). Each subject is then divided into smaller subsections of related facts.

Individual facts are generally presented in a logical fashion, from basic definitions and epidemiology to **History/Physical Exam, Diagnosis, and Treatment**. Lists, mnemonics, pull quotes, vignette flash cards, and tables are used when they can help the reader form key associations. In addition, color and black-and-white images are interspersed throughout the text. At the end of Section 2, we also feature a Rapid Review chapter consisting of key facts and classic associations that can be studied a day or two before the exam.

The content contained herein is useful primarily for the purpose of reviewing material already learned. The information presented is not ideal for learning complex or highly conceptual material for the first time.

The Database of High-Yield Facts is not comprehensive. Use it to complement your core study material, not as your primary study source. The facts and notes have been condensed and edited to emphasize essential material. Work with the material, add your own notes and mnemonics, and recognize that not all memory techniques work for all students.

We update Section 2 biannually to keep current with new trends in boards content as well as to expand our database of high-yield information. However, we must note that inevitably many other high-yield entries and topics are not yet included in our database.

We actively encourage medical students and faculty to submit entries and mnemonics so that we may enhance the database for future students. We also solicit recommendations of additional study tools that may be useful in preparing for the examination, such as diagrams, charts, and computer-based tutorials (see How to Contribute, p. xiii).

DISCLAIMER

The entries in this section reflect student opinions of what is high yield. Owing to the diverse sources of material, no attempt has been made to trace or reference the origins of entries individually. We have regarded mnemonics as essentially in the public domain. All errors and omissions will gladly be corrected if brought to the attention of the authors, either through the publisher or directly by e-mail.

HIGH-YIELD FACTS IN

CARDIOVASCULAR

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Electrocardiogram

KEYFACT

Heart rate = 300 / number of large boxes between two consecutive QRS complexes.

Assess the ECG for rate, rhythm, axis, intervals, ischemia, and chamber enlargement (see Figure 2.1-1).

Rate

Normal adult HR is 60–100 bpm. HR < 60 bpm is **bradycardia**. HR > 100 bpm is **tachycardia**.

Rhythm

Sinus rhythm: Normal rhythm that originates from sinus node (ECG: P before every QRS and QRS after every P).

Axis

Can be determined by examining the QRS in leads I and aVF. Axis deviation can be a sign of ventricular hypertrophy or bundle branch block. See Table 2.1-1.

Intervals

- **PR interval:** Normally between 120 and 200 msec; in AV block PR interval > 200 msec (AV block can also present as P with no QRS afterward).
- **QRS interval:** Normally < 120 msec. Two important patterns that have a widened QRS are left and right bundle branch block:
 - **Left bundle branch block (LBBB):** QRS duration > 120 msec; deep S wave and no R wave in V_1 ; wide, tall R waves in I, V_5 , and V_6 (see Figure 2.1-2).
 - **Right bundle branch block (RBBB):** QRS duration > 120 msec; RSR' complex (“rabbit ears”); qR or R morphology with a wide R wave in V_1 ; QRS pattern with a wide S wave in I, V_5 , and V_6 (see Figure 2.1-3).

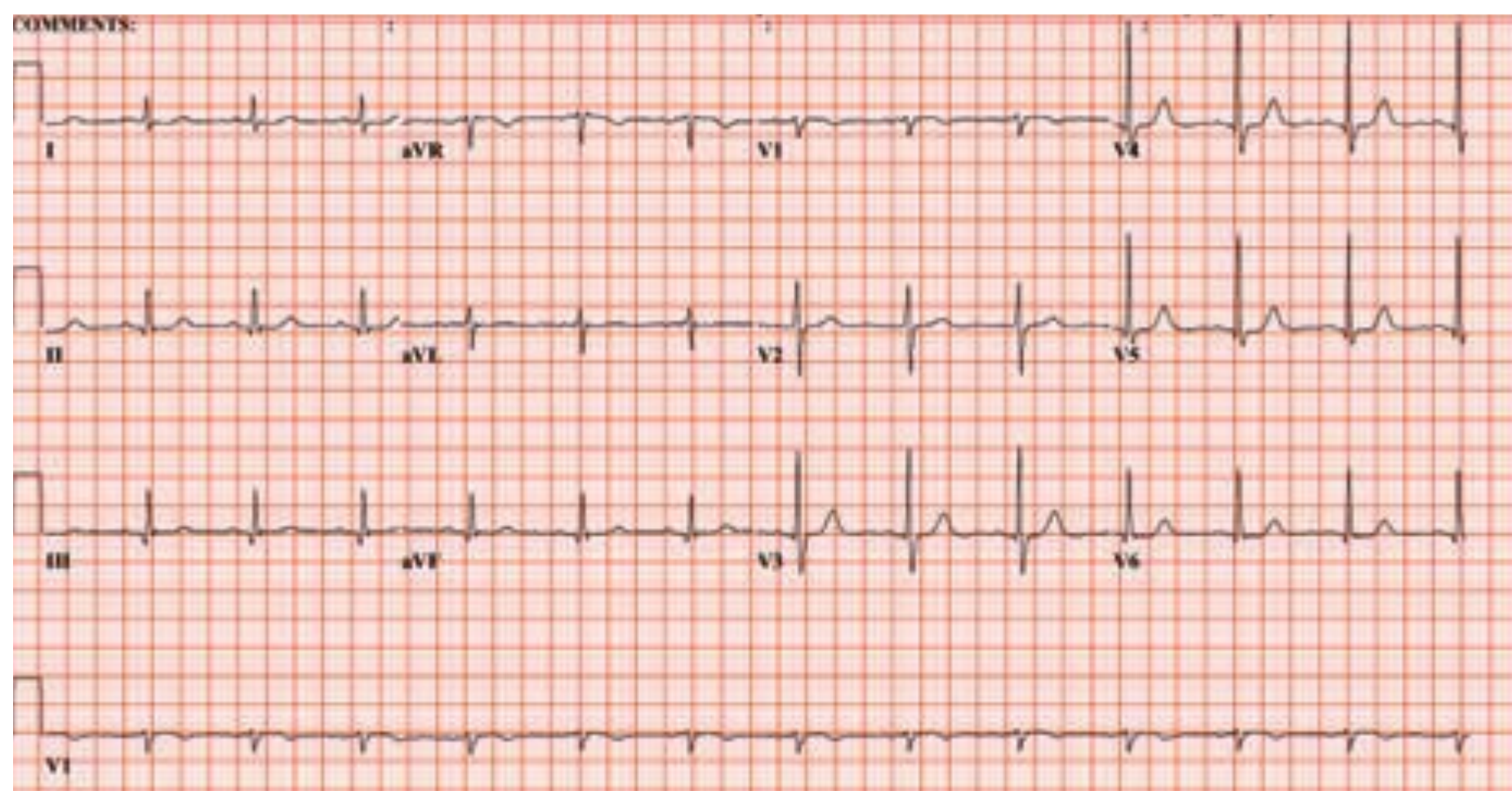


FIGURE 2.1-1. Normal electrocardiogram from a healthy subject. (Reproduced with permission from USMLE-Rx.com.)

TABLE 2.1-1. Axis Deviation by ECG Findings

	Lead I	Lead aVF	degrees
Normal axis	↑	↑	⊖30–⊕90
Left axis deviation	↑	↓	≤ ⊖30
Right axis deviation	↓	↑	> ⊕90

- QT interval:** Normally QTc (the QT interval corrected for extremes in heart rate) is < 440 msec. In long QT syndrome, QTc > 440 msec. Long QT syndrome is an underdiagnosed congenital disorder that is one cause of a long QT and predisposes to ventricular tachyarrhythmias.

Ischemia/Infarction

- Acute ischemia:** Natural progression starts with T-wave inversion, progresses to ST-segment changes (either depression or elevation), and finally results in Q waves (> 40 msec or more than one-third of the QRS amplitude) on the ECG. Because of this, Q waves signify either acute or prior ischemic events and do not provide information on when an event took place.
- Poor R-wave progression in precordial waves can also be a sign of ischemia, although it is not specific. In a normal ECG, R waves increase in size compared to the S wave between leads V₁ and V₅. Poor R-wave progression refers to diminished R waves in these precordial leads.

Chamber Enlargement

- Atrial enlargement:**
 - Right atrial abnormality (P pulmonale):** The P-wave amplitude in lead II is > 2.5 mm.
 - Left atrial abnormality (P mitrale):** The P-wave width in lead II is > 120 msec, or terminal ⊖ deflection in V₁ is > 1 mm in amplitude and > 40 msec in duration. Notched P waves can frequently be seen in lead II.
- Left ventricular hypertrophy (LVH; see Figure 2.1-4):**
 - The amplitude of S in V₁ + R in V₅ or V₆ is > 35 mm.**
 - Alternative criteria:** The amplitude of R in aVL + S in V₃ is > 28 mm in men or > 20 mm in women.
- Right ventricular hypertrophy (RVH):** Right-axis deviation and an R wave in V₁ > 7 mm.

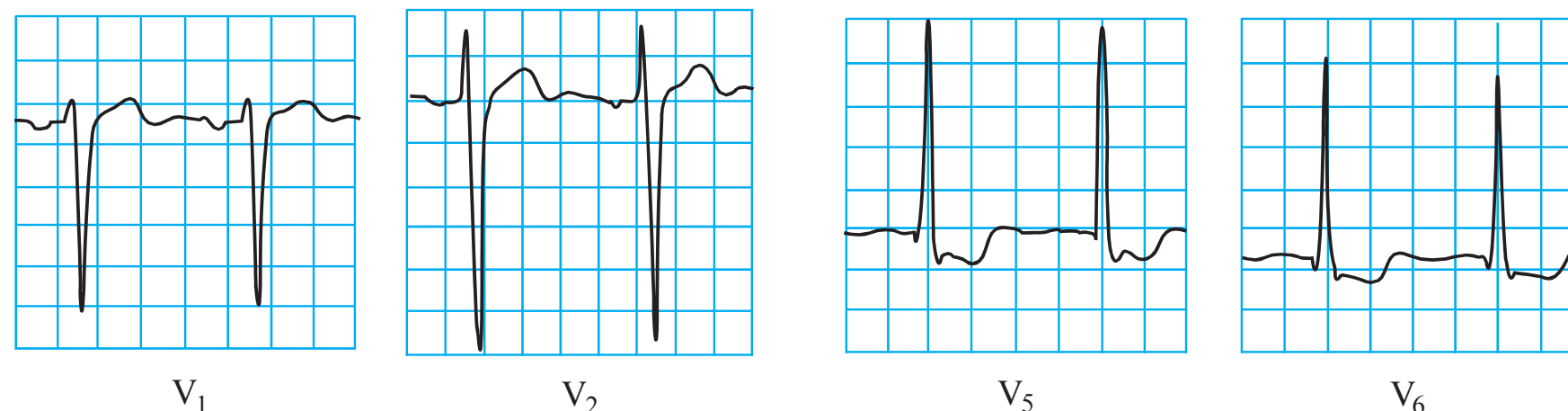


FIGURE 2.1-4. Left ventricular hypertrophy. Shown are leads V₁, V₂, V₅, and V₆. S wave in V₁ + R wave in V₅ = 45 mm. Note ST changes and T-wave inversion in V₅ and V₆, suggesting strain. (Reproduced with permission from Gomella LG, Haist SA. Clinician's Pocket Reference, 11th ed. New York, NY: McGraw-Hill; 2007.)

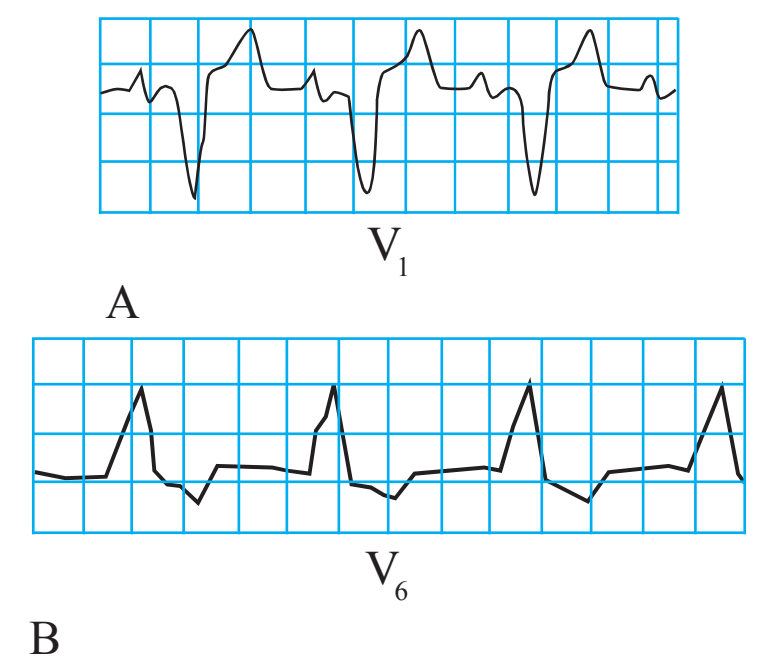


FIGURE 2.1-2. Left bundle branch block. Characteristic ECG findings are seen in leads V₁ (A) and V₆ (B). (Adapted with permission from USMLE-Rx.com.)

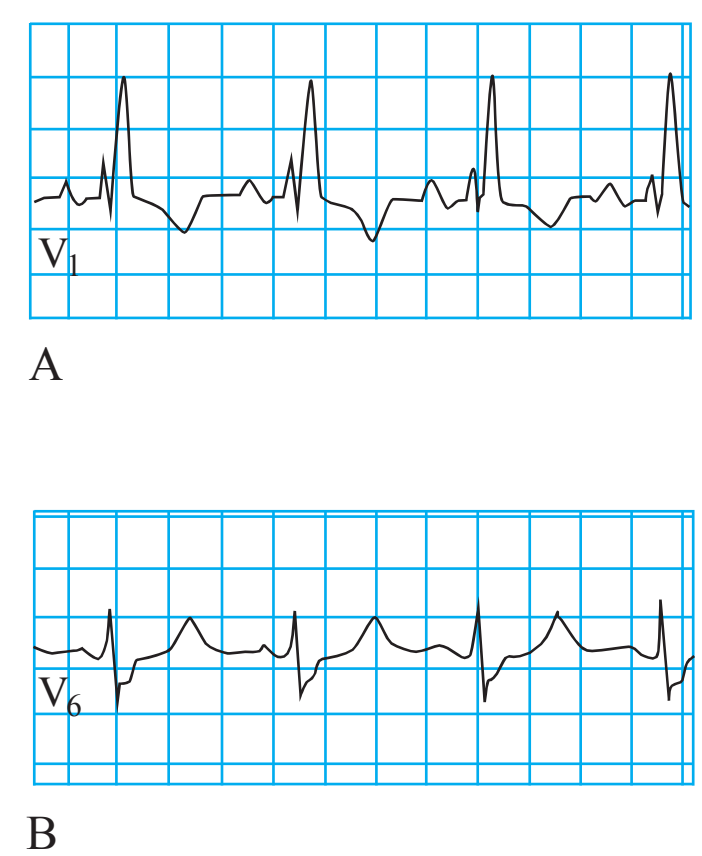


FIGURE 2.1-3. Right bundle branch block. Characteristic ECG findings are seen in leads V₁ (A) and V₆ (B). (Adapted with permission from USMLE-Rx.com.)

KEYFACT

P Pulmonale causes Peaked P waves.
P Mitrale causes M-shaped P waves.

KEYFACT

Axis deviation can be a sign of ventricular enlargement.

Cardiac Physical Exam

Key examination findings that can narrow the differential include the following:

- **Jugular venous distention (JVD, > 7 cm above the sternal angle):** Most typically from **volume overload**, stemming from conditions such as right heart failure or pulmonary hypertension.
- **Hepatojugular reflux** (distention of neck veins upon applying pressure to the liver): Seen in same conditions as JVD.
- **Kussmaul sign (↑ in jugular venous pressure [JVP] with inspiration):** Often seen in **cardiac tamponade** and **constrictive pericarditis**.
- **Systolic murmurs** (see Table 2.1-2 and Figures 2.1-5 and 2.1-6).
 - **Aortic stenosis:** A **harsh systolic ejection** murmur that radiates to the carotids.
 - **Mitral regurgitation:** A **holosystolic** murmur that radiates to the axilla.
 - **Mitral valve prolapse:** A midsystolic or late systolic murmur with a **preceding click**.
 - **Flow murmur:** Usually a soft murmur that is position-dependent (very common, and does not imply cardiac disease).
- **Diastolic murmurs** (see Table 2.1-2 and Figures 2.1-5 and 2.1-6): Always abnormal.
 - **Aortic regurgitation:** An **early decrescendo** murmur.
 - **Mitral stenosis:** A **mid- to late, low-pitched** murmur.
- **Gallops:**
 - **S3 gallop:** A sign of fluid overload (ie, heart failure, mitral valve disease); often normal in younger patients and in high-output states (eg, pregnancy).
 - **S4 gallop:** A sign of decreased compliance (ie, hypertension, diastolic dysfunction); usually pathologic but can be normal in younger patients and in athletes.
- **Edema:**
 - **Pulmonary:** Left heart failure (fluid “backs up” into the lungs).
 - **Peripheral:** Right heart failure and biventricular failure (fluid “backs up” into the periphery). Also nephrotic syndrome, hepatic disease, lymphedema, hypoalbuminemia, and drugs.
- **Peripheral pulses:**
 - **Increased:** Compensated aortic regurgitation (bounding pulses); coarctation (greater in arms than legs); patent ductus arteriosus.
 - **Decreased:** Peripheral arterial disease; late-stage heart failure.
 - **Pulsus paradoxus** (↓ systolic BP with inspiration): **Pericardial tamponade**; also seen in obstructive lung diseases, tension pneumothorax, and foreign body in airway.
 - **Pulsus alternans** (alternating weak and strong pulses): Cardiac tamponade; impaired left ventricular systolic function. Poor prognosis.
 - **Pulsus parvus et tardus** (weak and delayed pulse): **Aortic stenosis**.



MNEMONIC

Heart auscultation locations:

All Physicians Take Money

Aortic
Pulmonic
Tricuspid
Mitral

TABLE 2.1-2. Cardiac Murmurs

SyStolic MurMurS	diaStolic MurMurS
Aortic stenosis	Aortic regurgitation
Mitral regurgitation	Mitral stenosis
Mitral valve prolapse	
Tricuspid regurgitation	

Arrhythmias

BRADYARRHYTHMIAS AND CONDUCTION ABNORMALITIES

Table 2.1-3 outlines the etiologies, clinical presentation, and treatment of common bradyarrhythmias and conduction abnormalities.

TACHYARRHYTHMIAS

Tables 2.1-4 and 2.1-5 outline the etiologies, clinical presentation, and treatment of common supraventricular and ventricular tachyarrhythmias.

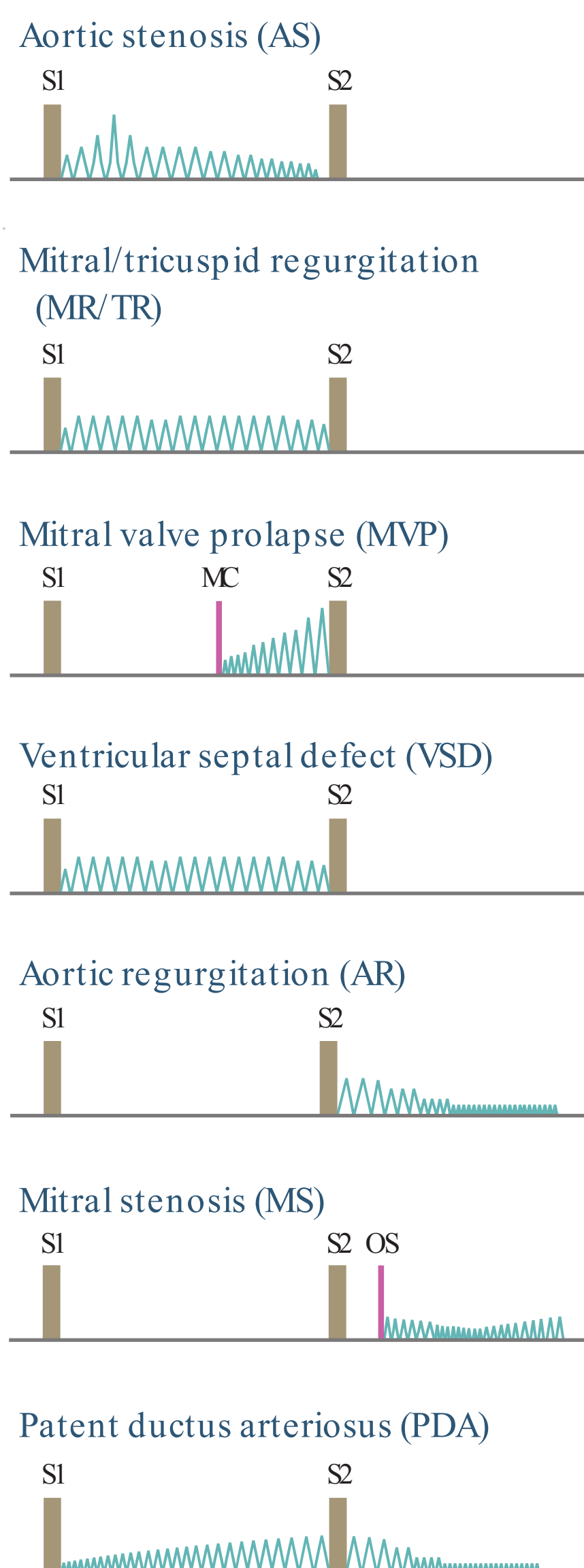


FIGURE 2.1-6. Heart murmurs. Visual representations of common heart murmurs are shown in relation to S1 and S2. MC = midsystolic click; OS = opening snap. (Systolic and diastolic figures adapted with permission from Le Tet al. First Aid for the USMLE Step 1 2015. New York, NY: McGraw-Hill; 2015. Continuous figure adapted with permission from USMLE-Rx.com.)

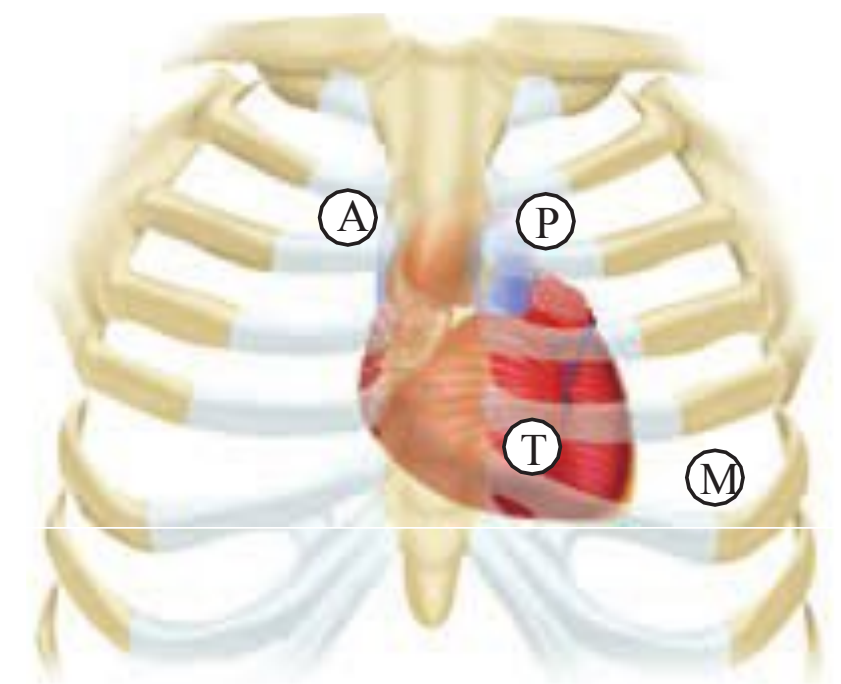


FIGURE 2.1-5. Auscultation locations. Auscultation sites are shown with associated valves. A = aortic valve; M = mitral valve; P = pulmonic valve; T = tricuspid valve. (Reproduced with permission from Le Tet al. First Aid for the USMLE Step 1 2015. New York, NY: McGraw-Hill; 2015.)

MNEMONIC

Management options for atrial fibrillation—

ABCD

- Anticoagulate
- β -blockers to control rate
- Cardiovert/Calcium channel blockers
- Digoxin (in refractory cases)

KEYFACT

Use the **CHA₂DS₂-VASc** scoring system to estimate stroke risk in atrial fibrillation and anticoagulate for a score of 2 or more:

- CHF (1 point)
- HTN (1 point)
- Age ≥ 75 (2 points)
- Diabetes (1 point)
- Stroke or TIA history (2 points)
- Vascular disease (1 point)
- Age 65–74 (1 point)
- Sex category (female) (1 point)

Q

A college aged man “passed out” while playing basketball and had no prodromal symptoms or signs of seizure. His cardiac examination is unremarkable, and an ECG shows a slurred upstroke of the QRS. What are the next best steps?