

SUCCESS IN MEDICAL SCHOOL

INSIDER ADVICE
FOR THE
PRECLINICAL YEARS

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Chapter 1

Introduction

The preclinical years of medical school are extremely challenging, and that may be understating the reality. At one medical school, faculty assigned "29,239 pages of reading for the 12 basic science modules that were scheduled during 71 weeks."¹

As you begin med school, you'll hear a lot of advice.

- "If you thought the MCAT was tough, wait until you see the USMLE."
- "The material it took you a semester to cover in college? You'll get through that in a week in med school."
- "If you want to go down the ROAD, you'd better start planning now, figure out your research, and make your connections early - and you'll have to maximize that first summer off." [ROAD = Radiology, Ophthalmology, Anesthesiology, Dermatology]

There is at least some truth in every one of those statements.

Medical school is extremely challenging, and not just in the ways that you'd assume. The sheer volume of material covered is staggering. And most importantly, unlike in some of your college courses, much of it builds upon prior material. Your study methods therefore have to ensure long-term retention. In Chapter 2 [Preclinical Courses], you'll hear advice from students, faculty, and experts, as well as the results of research, on how to learn such a large volume of material, and how to ensure retention. In one study, researchers found that "in general, study skills are stronger predictors of first-semester total grades than aptitude as measured by the MCAT and undergraduate GPA."² The importance of long-term retention of basic science material is emphasized by the United States Medical Licensing Exam. The USMLE Step 1 exam is

taken at the end of the preclinical years, and your score on this single exam can influence the course of your career. The exam tests your ability to take the basic science material covered over two years in medical school and apply it to clinical situations. In Chapter 3, you'll learn about the exam itself, as well as the most common mistakes that students make when preparing. You'll learn about resources that can aid your preparation, and you'll learn about the importance of this single score in the residency application process. Chapter 4 provides specifics about the COMLEX Level 1 exam. This exam, taken by osteopathic students, is of similar importance.

While mastering such a large amount of basic science material is extremely challenging, unfortunately that's not enough. Your skills in the hands-on art and science of patient care will be critical. Learning about a disease and its manifestations in the classroom does not ensure that you'll know what to do when faced with a patient in the clinic. It is widely believed that physicians' examination skills have deteriorated over the years. While a number of factors may be responsible, it is believed that clinical skills training may play a role. In fact, if you don't adequately learn certain skills and techniques during your preclinical courses [Introduction to Clinical Medicine or Physical Diagnosis], you may never learn them, not even during clerkships. "Surveys have indicated that less than 16% of attending time may be spent at the patient's side."³ This has important ramifications for patient care. When researchers observed interns and residents, they noted frequent errors in physical exam technique, including improper use of instruments. In Chapters 5 [Taking a Patient History] and 6 [Physical Examination], you'll learn how to make the most of your history and physical exam education.

The challenges of the preclinical years extend beyond the well-known. Chapters 11 and 12 provide some startling statistics on medical student well-being and issues of professionalism. Physicians are challenged on a daily basis with the stressors of clinical patient care, and the coping mechanisms and buffering strategies you develop now, as a preclinical student, will be vital throughout the course of your career.

Several chapters highlight the significant opportunities available to medical students. Medical schools, organizations, and individual medical students have all been able to impact medical practice or their communities in significant ways, and their accomplishments are inspiring. Chapters on Community Service, Extracurricular Activities, and Research serve as a guide on how to get started, and highlight the numerous opportunities for preclinical students to become involved and thus have the opportunity to make a

meaningful impact. Chapters on teaching, awards, and international experiences provide details on further opportunities.

Throughout these challenges, you do have to consider your future. As the residency selection process for certain fields becomes ever more competitive, students who have at least started strategizing early in their education will be at an advantage. Chapter 16 [Choosing a Specialty] reviews the process of strategizing in detail. For the most competitive specialties, great grades and high USMLE scores are not enough. You'll need great letters of recommendation and support from faculty advocates. In Chapter 10 [Mentoring], you'll learn ways in which preclinical students can approach established faculty members and obtain their assistance and guidance. You'll also need additional distinctions. Most applicants to the competitive specialties will have performed research, and many will have publications or presentations to their name. Chapter 7 [Research] reviews the process, demonstrates how students can begin, details what to seek in a research project, and provides specifics on research, publication, and presentation opportunities available to medical students. Some residency programs also seek additional factors of distinction, such as involvement in extracurricular activities, evidence of leadership, and commitment to service. In "Choosing a Specialty," you'll learn how to start the process of exploring a specialty. The chapter also includes specifics about identifying research opportunities, locating specialty-specific mentors, seeking out community service projects within the field, and other specialty-specific opportunities.

Throughout the next 300+ pages, we'll review each of these areas in detail. From grades and exams, to the art of patient care, to strategizing for your career, you'll learn specific, detailed information relevant to the preclinical medical student. These reviews and recommendations are based on the experiences of students, residents, and faculty, as well as a thorough review of the scientific literature in the areas of medical education and patient care. This combination of insider information and evidence-based advice is utilized to help you gain the strongest foundation as you face the challenges of medical school. Your goal is to become the best doctor possible, and that process begins on day one of medical school.

Preclinical courses/grades

At one medical school, faculty assigned “29,239 pages of reading.”¹

The core of this chapter centers on one vital question related to that startling fact. How can a student read and retain such a large volume of information?

In Chapter 2, you'll learn what students, faculty, and experts advise on how to get through the mountain of material a med student is expected to master. The most common mistake that med students seem to make? They assume that studying longer and harder will be enough to succeed.

It's not.

The students who are able to excel in medical school have learned how to effectively strategize and utilize the techniques of active learning, among other study strategies. Reading and highlighting material, even multiple times, won't be enough to ensure the long-term retention that medical school requires.

Upperclassmen at the University of Alabama Birmingham School of Medicine offer the following advice to new students: “The material is rarely difficult; there is just a mountain’s worth to cover. A normal medical school exam seems like a cumulative final in the most strenuous science course you took in undergraduate. You simply cannot learn the material overnight or with one quick read-through of the scripts.”⁴

Prior to med school, you no doubt heard about the heavy academic workload. The volume of material to be covered is truly enormous, and while students expect this, it doesn't fully sink in until the first week when you receive lecture materials, syllabi, and books. Consider the following comments made by new medical students:

- “I was worried that I wouldn’t be able to keep up.”
- “What scared me most was the amount of information I was asked to master.”
- “It was all so overwhelming. How could I possibly learn it all? After all, I could barely carry it.”

While the preclinical curriculum will vary among medical schools, most schools will focus on the same core subjects. In 2006, the

International Association of Medical Science Educators convened a group of respected medical educators to answer some key questions about the role and value of the basic sciences in medical education.⁵ The educators identified eight sciences - anatomy, physiology, biochemistry, neuroscience, microbiology, immunology, pathology, and pharmacology – as “vital foundations of medical practice.” Also deemed critical to a strong foundation was education in behavioral sciences, genetics, epidemiology, molecular biology, and biostatistics.

Given the significant challenges of learning and retaining this much material, what is the best way for students to approach their preclinical courses? In this chapter, you'll learn the differences between top and average performers, and you'll learn about study strategies that have led to success. In one study, researchers found that “in general, study skills are stronger predictors of first-semester total grades than aptitude as measured by the MCAT and undergraduate GPA.”² You'll learn about common mistakes that students make when approaching the basic sciences, and how to avoid those mistakes. You'll also hear suggestions from students who have successfully navigated these challenges.

USMLE Step 1 Exam

The USMLE Step 1 exam is a critical factor in the residency selection process. While there's a lot that can be said about preparation for this exam, it can be summarized in one sentence: typical study methods don't work for this exam.

To become an allopathic physician with the license to practice in the United States, you must pass the three-part United States Medical Licensing Exam, referred to as the USMLE. Medical students typically take the first part of the USMLE (Step 1 exam) at the end of the second year of medical school. The Step 1 score is also an important criterion used by residency programs in the selection process. In a 2006 survey of over 1,200 residency program directors across 21 medical specialties, the USMLE Step 1 score was found to be the second most important residency selection factor, following only grades in required clerkships.⁶

In competitive specialties such as dermatology, plastic surgery, ophthalmology, otolaryngology, radiology, neurosurgery, orthopedic surgery, and urology, many programs have a cut-off, or threshold, USMLE Step 1 score. Highly sought-after programs in less competitive specialties may also have threshold scores. Applicants who

score above the cut-off are considered for interviews. Those below the cut-off may be removed from consideration.

“Many medical students that we have talked to underestimate the amount of clinical material on the USMLE Step 1 examination.... Furthermore, many students also leave the exam feeling somewhat intimidated regarding the clinical slant of how the basic science material is tested.” - Drs. Tao Le and Chirag Amin, authors of the popular book *First Aid for the USMLE Step 1*.⁷

The National Board of Medical Examiners (NBME), which administers the exam, states that the USMLE Step 1 exam “assesses whether you can understand and apply important concepts of the sciences to the practice of medicine, with special emphasis on the principles and mechanisms underlying health, disease, and modes of therapy.”⁸

While strong factual knowledge is necessary for exam success, most questions seek to determine your ability to apply basic science knowledge to clinical problems, rather than regurgitate isolated facts. In a recent posting at www.usmle.org, the National Board of Medical Examiners announced a further reduction in the number of Step 1 items presented without a clinical vignette.

This focus on clinical applications, rather than rote memorization, makes the USMLE a distinctive and challenging exam for most students. Adding to the challenge is the amount of information that students are expected to master. The content of the exam is drawn from the following disciplines: Anatomy, Physiology, Biochemistry, Pathology, Pharmacology, Microbiology, Behavioral Sciences, and Nutrition/Genetics/Aging. The Step 1 exam, therefore, covers information that requires 2 years of medical school to learn. Most students devote a 6 week block of time to review material and prepare for this exam. Cramming, obviously, won't work.

In Chapter 3, you'll learn the basics of the Step 1 exam. What material does it cover, and what material do you need to review? Does the curriculum offered by your school provide adequate preparation? Most schools adhere to a disciplines-based, organ-based, or problem-based curriculum, or a combination thereof. Researchers have utilized AAMC [Association of American Medical Colleges] data to determine what effects, if any, the curricular approach had on USMLE scores.

What are the mistakes that students make when preparing for the exam? Dr. Judy Schwenker, Kaplan's Curriculum Director, has identified the five most common mistakes students make when preparing for the Step 1 exam.⁹ These include passive studying, insufficient practice with questions, memorizing without understanding the material, inappropriate test day strategies, and misreading or

misinterpreting questions. In this chapter, we provide suggestions on exam preparation that avoid these common mistakes.

How should you study for an exam of this importance that's so distinct from other exams? Drs. Helen Loeser and Maxine Papadakis, Deans at the UCSF School of Medicine, advise: "Use active learning methods as you integrate your knowledge and apply basic science information to clinical vignettes."¹⁰ Research has shown that active learning leads to better long-term retention of information and easier retrieval of information when needed. In this chapter you'll learn about techniques of active learning, and resources that can aid in your preparation.

COMLEX Level 1 Exam

For osteopathic students, the route to licensure requires passage of the three-level COMLEX. These parts include COMLEX Level 1, COMLEX Level 2 (further subdivided into Level 2 Cognitive Evaluation or CE and Level 2 Performance Evaluation or PE), and COMLEX Level 3. Osteopathic students typically take the COMLEX Level 1 exam near the end of the second year, while both components of the Level 2 exam are taken in the fourth year.

According to the National Board of Osteopathic Medical Examiners (NBOME), which administers the exam, the COMLEX Level 1 exam "emphasizes the scientific concepts and principles necessary for understanding the mechanisms of health, medical problems and disease processes."¹¹ Information about the content of the exam is available at their website (see Bulletin of Information), and should be reviewed carefully. In contrast to the USMLE, the COMLEX examination incorporates osteopathic principles, including the use of osteopathic manipulative treatment.

Like the USMLE, the COMLEX Level 1 exam is used by programs in the residency selection process. This process can be divided into two phases – screening and ranking. In the screening phase, programs whittle down a large applicant pool into a smaller group. The members of this group will be offered interview invitations. The COMLEX Level 1 score is frequently used in the screening process by allopathic and osteopathic residency programs. In 2010, a survey of several thousand allopathic residency program directors representing multiple specialties was performed by the National Resident Matching Program. The survey found that the Level 1 score was the factor used most commonly in the screening process.¹²

In competitive specialties such as dermatology, plastic surgery, ophthalmology, otolaryngology, radiology, neurosurgery, orthopedic surgery, and urology, many programs have a cut-off or threshold COMLEX Level 1 score. Highly sought-after programs in less competitive specialties may also have threshold scores. Applicants who score above the cut-off are considered for interviews. Those below the cut-off may be removed from consideration.

In this chapter, you'll learn about how the COMLEX Level 1 score is used by residency programs in the selection process. You'll learn about ways to identify your strengths and weaknesses, as well as indicators that you may be at risk for a low COMLEX score. You'll also hear tips to help you prepare for the exam. For example, the NBOME offers students the opportunity to take the Comprehensive Osteopathic Medical Self-Assessment Exam (COMSAE) as a means to assess readiness for the COMLEX Level 1 exam. The format and structure of the Phase 1 COMSAE resembles that of the Level 1 exam. Furthermore, scoring and reporting of the two exams are similar. In a study performed by the NBOME, the organization found that the two scores were highly related. While candidates can take a timed or untimed COMSAE, the data seems to suggest that the timed exam has higher self-assessment value.

While we review the role of the COMLEX in the residency selection process, in this chapter you'll learn that this score, by itself, may not be sufficient for all residency programs. In recent years, an increasing number of osteopathic students have applied to residency programs approved by the Accreditation Council for Graduate Medical Education (ACGME). According to Drs. Cummings and Sefcik, Deans at the Michigan State University College of Osteopathic Medicine, "in 2006, more than two of every three DOs [6,629 of 9,618] in postdoctoral training were in an ACGME program."¹³ Since ACGME-accredited programs are less familiar with the COMLEX score, these programs often recommend that osteopathic applicants take the USMLE Step 1 exam. This allows programs to make easier comparisons between MD and DO student applicants.

Taking a Patient History

It's well-known that the transition between learning about medicine in the classroom and actually applying that knowledge in the care of real patients is quite challenging. Studies have confirmed that students have high levels of stress and anxiety as they move from the preclinical to clinical years of medical school.¹⁴

Clinical skills, including the history and physical exam, are often mentioned as a major struggle in the transition period. One student described her discomfort. "I felt uncomfortable talking to the patient and trying to come up with methodical ways of asking questions and making sure I didn't miss things, not just jumping around all over the place."¹⁵

Traditionally, preclinical students have had limited contact with patients. In recent years, however, schools have placed new emphasis on clinical skills training in early medical education. Some schools now even introduce students to patients as soon as the first week or month of medical school.

Medical organizations have also recognized the importance of an early emphasis on clinical skills, including communication. In 2004, the Institute of Medicine made the acquisition and development of communication skills a top priority during medical education. That same year, the National Board of Medical Examiners (NBME) began requiring students to take a clinical skills exam (USMLE Step 2 CS) as a means to assess competence in communication. The hope is that through education on effective communication, students will be better versed in how to listen, question, counsel, and motivate patients.

Your efforts to improve communication skills will also impact your clerkship performance. In a survey of clerkship directors, while over 95% felt that students require an intermediate to advanced level of communication skills, approximately 30% felt that new clerkship students aren't sufficiently prepared.¹⁶

Medical schools evaluate communication skills in different ways. One is through comprehensive clinical skills assessment using standardized patients. Researchers have interviewed faculty members responsible for helping those students who don't perform well in these assessments. Some of the issues have focused on patient histories.¹⁷ "Many low-scoring students focused prematurely, failing to ask open-ended questions or adequately characterize the chief complaint. Respondents also observed students being too focused on the history of present illness, omitting or incompletely exploring the pertinent past medical, social, or family history, particularly as they related to the chief complaint." Some students failed to explore the patient's

perspective on the illness. The authors wrote that “these students treated standardized patients as symptoms or diagnoses rather than as people with feelings or concerns.”

In Chapter 5, you’ll learn how to make the most of your clinical skills education. You’ll learn about the deficiencies that have been documented in the physician-patient communication literature with respect to history taking, and how educators have developed benchmarks to guide medical students in their acquisition of important communication skills. As you develop your history taking skills, you’ll learn how to use these benchmarks, solicit feedback to assess your progress, and reflect on your own performance in order to improve your skills.

Physical Examination

Although 80% of diagnoses are made based on the history and physical examination, evidence indicates that the physical exam skills of physicians today are inadequate. It is widely believed that physicians’ examination skills have deteriorated over the years. While advances in technology, including laboratory testing and radiologic imaging, are partly to blame for this decline, clinical skills training during medical school and residency are also factors. According to Dr. Sal Mangione, Director of the Physical Diagnosis Curriculum at Jefferson Medical College, too little time is spent during medical school learning these skills. “Surveys have indicated that less than 16% of attending time may be spent at the patient’s side.”¹⁸

Physical exam skills have important, obvious ramifications for patient care, and the education you receive in this area during medical school is critical. If you don’t learn certain skills at this stage of your education, you may never have the opportunity to do so. In one study, researchers observed interns and residents, and noted frequent errors in physical exam technique.¹⁹ Errors included improper manual technique or use of instruments. The authors asserted that these errors resulted from a failure to learn the necessary psychomotor skills during the preclinical years.

In the real world of medicine, these deficiencies in skills have serious consequences. In a study of interns and residents on a general medicine service, at least one serious physical exam error was made for nearly two-thirds of the patients examined. The errors included failure to detect splenomegaly or focal neurological signs, findings that once discovered led to significant changes in diagnosis and treatment.²⁰

While clinical courses such as “Introduction to Clinical Medicine” and “Physical Diagnosis” teach these skills, this is one area where students cannot rely on passive learning. In Chapter 6, you’ll learn how to make the most of your physical exam education. These skills aren’t easy to learn. While a recent study showed that third-year med students felt quite confident about their ability to measure blood pressure, students were significantly less confident in their ability to assess retinal vasculature, detect a thyroid nodule, or measure jugular venous pressure.²¹

You’ll also learn the importance of soliciting preceptor feedback. If errors aren’t picked up at this stage of your education, they may never be. While you might expect that your future residents or attendings would be able to correct your performance, the literature has shown that students on clerkships often aren’t observed while performing physical exams. They are typically assumed to already possess the necessary skills.

The chapter also addresses other facets of physical exams, including the patient’s comfort. You’ll learn how to approach an often uncomfortable situation in a manner that most reassures the patient. In the article “Learning to Doctor,” Conrad aptly describes the concerns of students:²²

Students tell patients twice their age to get undressed, and then cross conventional barriers of interpersonal space to inspect the intimacies of their bodies. In addition to anxiety about doing it right, students frequently must deal with their own reactions to their patient as well as discomfoting feelings of being invasive.

Research

In a presentation to medical students titled “Research in Medical School,” Dr. Daniel West discussed reasons why students should consider involvement in research. Dr. West noted that participation in research allows medical students to explore a specialty in more depth, enhance critical thinking and other related skills, assess suitability for a career in academic medicine, and strengthen credentials for residency positions.²³ Medical students recognize these benefits as well. In a survey of students at three medical schools, 83% agreed that participation in research was valuable within their medical education.²⁴

In Chapter 7, we’ll discuss these benefits in more depth. There are significant benefits to participation in research, and while barriers exist, many medical students are able to overcome these barriers,

enhance their own skills and education, and make contributions to the scientific literature.

Research training leads to better critical thinking skills. The ability to critically appraise the literature is essential to the practice of evidence-based medicine. The University of Arizona College of Medicine writes that “as future physicians, being able to critically read a scientific journal along with keeping abreast of new medical innovations is an important facet of practice that can profoundly impact patient outcomes.”²⁵ In a recent article, Mayo researchers wrote about how research benefits medical students.²⁶ “Studies have shown that students who had conducted research during medical school reported gains in knowledge and skills in appraising the literature, analyzing data, and writing for publication, along with more positive attitudes toward future research.” Students report significant benefits from learning the process of research, from conception of an idea to publication and presentation. It is important for all physicians to learn about literature review, hypothesis generation, study methodology, and data analysis.

Research also has known benefits in the residency selection process. Dr. Scott Pretorius, former Radiology Residency Program Director at the University of Pennsylvania, wrote that “in this competitive market for radiology residency slots, medical students with research backgrounds...allow themselves the opportunity to stand out in a field of increasingly highly qualified applicants. As an advisor of medical students, I routinely recommend that students intending to apply for radiology residency seek out a research mentor and undertake some kind of research project.”²⁷ In a survey of University of Tennessee medical students, 63% reported that research experience was beneficial in helping them secure a residency position.²⁸

As you're applying for residency positions, it's important to know your competition. Among dermatology applicants, nearly 95% had participated in at least one research project, with over 80% claiming at least one abstract, publication, or presentation.²⁹ In radiation oncology, among U.S. senior applicants, only 9 of the 152 applicants reported not having a single abstract, publication, or presentation. While it's not a prerequisite for students applying to competitive fields, a student may stand out due to their lack of any research experience in these fields.

While students recognize the benefits of research, many find the barriers to involvement daunting. Difficulty finding a research supervisor can be a significant barrier, with only 44% of students in one study reporting that it was easy to identify one.²⁴ In this chapter, you'll learn how to identify research opportunities at your institution. We

highlight ways to identify the "right" research mentor, as well as what to discuss with potential mentors and how to evaluate potential research projects.

In evaluating research experience during medical school, residency programs will look closely at the level of your involvement. Did you merely collect data? Or were you involved through all phases of the project (design of the project, data collection, analysis of the data, and writing the manuscript)? Programs also assess your productivity. Did your work result in a tangible measure, such as an abstract, manuscript, or presentation at a meeting? For many students involved in research, a publication or presentation resulting from their work would be ideal. While this isn't always possible, in this chapter you'll learn how to approach the issue of publication and learn about journals that are targeted to medical students.

You'll also learn about possibilities for presentation, even if those opportunities aren't initiated by your research mentor. Students may seek out opportunities to present their work at local, regional, national, and international meetings. At Stanford University School of Medicine, 52% of medical students had presented at a national meeting.³⁰ Symposiums and meetings geared to medical student research presentations include the National Student Research Forum (NSRF), Eastern-Atlantic Student Research Forum (ESRF), and Western Student Medical Research Forum (WSMRF). The NSRF is held at the University of Texas Medical Branch in Galveston, and provides a forum for students to give either poster or oral presentations.³¹ Over 30 awards are given at this annual event.

Time has been reported as a major barrier to pursuing research in medical school. Many students become involved in research in the summer between the first and second years of medical school. Opportunities for summer research may also be available for newly admitted students who haven't yet started medical school. At the Mt. Sinai School of Medicine, 54 to 65% of students participated in summer research between 2001 and 2004.³²

Some students are interested in a more substantial research experience, and in this chapter you'll learn about some of the "year-out" opportunities available to students across the country. The Clinical Research Fellowship for Medical Students, sponsored by the Doris Duke Charitable Foundation, offers one-year fellowships at one of 12 selected institutions in the U.S. The HHMI – NIH (Howard Hughes Medical Institute - National Institutes of Health) Research Scholars Program and NIH Clinical Research Training Program allow participants the opportunity to work on the NIH campus. Research Training Fellowships through the HHMI are also available to students,

and support one year of research at a variety of academic institutions. This chapter highlights a number of other opportunities that are available for students interested in more substantial research experience.

Extracurricular Activities

As in college, the learning environment in medical school extends beyond the classroom, and institutions offer valuable opportunities to participate in a variety of extracurricular activities. For example, at the Case Western Reserve University, there are over 40 medical student organizations.³³

Involvement in these organizations provides a number of opportunities and benefits, and in Chapter 8 you'll learn more about the opportunities available. One of the most important is the further development of skills that are directly applicable to success as a physician. A few examples of vital skills in the daily life of a physician are teamwork, self-discipline, time management, and leadership, all of which are strengthened outside of the classroom through extracurricular involvement. Involvement in organizations is a way to develop and strengthen bonds with classmates, and since student organizations often have a faculty advisor or sponsor, students have extraordinary opportunities to work closely with faculty members. Such opportunities are usually unavailable to students during the preclinical years.

Some students are awarded recognition for their involvement. Every year, the American Medical Association honors 15 students with AMA Foundation Leadership Awards. These awards recognize students who have demonstrated “strong, nonclinical leadership skills in advocacy, community service, public health, and/or education.”³⁴ Many other organizations recognize student involvement as well. When evaluating a student's contributions, organizations seek evidence of leadership, commitment, and the ability to make meaningful contributions to the goals of an organization. Some students, after reviewing the opportunities available at their school, commit to starting a new organization or founding a new chapter of a national organization. In this chapter, you'll learn what questions to ask, and what resources are available, as you review your opportunities.

Involvement may also help students reach their professional goals. Extracurricular activities “might provide evidence for non-cognitive attributes that predict success,” writes Dr. Andrew Lee, Chairman of the Department of Ophthalmology at The Methodist Hospital.³⁵ “Leadership skills demonstrated by being an officer in

extracurricular activities or being an Eagle Scout, or a leader or founder of a new organization or club are all looked upon favorably. The second goal is to look for evidence of non-cognitive attributes that might make a superior ophthalmologist (conflict resolution, team work, leadership ability, communication skills, performance under stress, maturity, seriousness of purpose, prior scholarly activity). Finally, programs are looking to graduate (and thus select) residents who will make the program proud.”

In fact, extracurricular activities do serve as a significant nonacademic factor in the residency selection process. In a recent NRMP survey of 1,840 program directors representing the nineteen largest medical specialties, 59% of respondents cited volunteer/extracurricular experiences as a factor in selecting applicants to interview.³⁶

Evidence suggests that meaningful contributions in extracurricular activities, particularly leadership, may serve as a predictor of residency performance. In one study of emergency medicine residency program directors, having a “distinctive factor” such as being a championship athlete or medical school officer, was one of three factors most predictive of residency performance.³⁷ In a study to determine predictors of otolaryngology resident success using data available at the time of interview, candidates having an exceptional trait such as leadership experience were found to be rated higher as residents.³⁸

Community Service

In researching community service opportunities for medical students, we found ourselves amazed and inspired by the accomplishments of medical schools, medical school organizations, and individual medical students. In Chapter 9, you'll hear about the significant contributions made by students. You'll learn about opportunities for participation in community service, the impact your participation can have on the health of the community, and how your involvement can help you grow personally and professionally.

According to Dr. Aaron McGuffin, Senior Associate Dean for Medical Education at Marshall University School of Medicine, “there has been 2,700 hours of community service donated from the medical school students in the past 12 months. That is a lot of time in addition to doing their medical school work.”³⁹ In 2008, the AAMC found that a significant percentage of medical school applicants had been involved in community service.⁴⁰ Sixty-three percent of the applicants reported

nonmedical volunteer experience, while medical volunteer experience was reported by 77% of applicants. “They have a real sense of service, commitment, and discovery that I know we all want in a future doctor at our bedside,” said Dr. Darrell Kirch, the AAMC President.⁴¹

While the provision of community service has been a major area of emphasis at U.S. medical schools for years, educators have recently stressed the importance of fostering education in community service among medical students. In 1998, Seifer defined service learning as “a structured learning experience that combines community service with preparation and reflection.”⁴² The Liaison Committee on Medical Education (LCME), which is responsible for the accreditation of medical schools, recommends that schools should not only provide students with sufficient opportunities “to participate in service-learning activities,” but also “encourage and support student participation.”⁴³

Many schools provide such opportunities for service learning. In 2001, the Morehouse School of Medicine established the Center for Community Health and Service - Learning to engage students and other healthcare professionals in community service and service learning. Partnering with other organizations in the Atlanta area, the center aims to address the health disparities affecting underserved populations. At the University of New Mexico School of Medicine, community service is a key priority.⁴⁴ Educators have gone beyond just encouragement by freeing students in the afternoons during the first year for service engagement.

At other schools, student organizations have been able to make significant contributions to their communities. The AAMC’s Medicine in the Community Grant Program (formerly known as Caring for Community) offers grant awards to medical students who wish to initiate, develop, and run a community service project.⁴⁵ According to the AAMC, “Medicine in the Community will help students to translate great ideas into meaningful service by contributing needed start-up and supplemental funds.” Past recipients of the grant include the Medical College of Wisconsin Hmong Health Education Program. HHEP is an effort to improve health education and healthcare services for Wisconsin’s Hmong population through educational workshops, outreach programs, support groups, and public service announcements. Another past recipient is the University of New Mexico School of Medicine Community Vision Project. Through the use of mobile eye clinics, basic vision care services are provided to American Indian and Hispanic populations.

For students wishing to make significant contributions to their communities, a number of organizations provide grants and assistance. In this chapter, you’ll learn about grants and resources available to

students who wish to initiate their own service project, as well as hear about other successful projects. For example, the Medical Student Section of the AMA (AMA-MSS) has created a list and description of projects that AMA-MSS chapters across the country have developed and implemented.⁴⁶ Since the 1970s, *Project Bank: The Encyclopedia of Public Health and Community Projects*, a tool offered by the AMA Alliance, has served as a useful compendium of community service projects conducted by state and county Alliances.⁴⁷

Student-run health clinics have been initiated at many medical schools, and such involvement can have a significant impact on the personal and professional growth of medical students. At the University of California Davis, 85% of medical students volunteer in student clinics during their tenure in medical school.⁴⁸ “Students are often changed in unexpected, profound, and lasting ways after experiencing firsthand healthcare delivery to the poor, underserved, and marginalized,” explains Dr. Ed Farrell, a physician volunteer at the Stout Street Clinic, which is run by students attending the University of Colorado School of Medicine.⁴⁹

Not all schools have initiated such clinics. For motivated students, a number of resources are available for those wishing to establish a student-run health clinic. In an article published in JAMA, Cohen wrote “Eight Steps for Starting a Student-Run Clinic.”⁵⁰ Another useful resource, “25 Steps to Starting a Student-Run Clinic,” is available at the Society of Student-Run Free Clinics website.⁵¹

Community service provides known benefits to students as well. Research has shown that volunteering increases positive feelings, improves mental health, reduces the risk of depression, and lowers stress levels.⁵²⁻⁵⁴ Participation may also improve communication skills, a vital skill in medicine. Community service is also a significant nonacademic factor in the residency selection process. Once accepted for an interview, the depth and breadth of your involvement in community service may help you stand out in a sea of academically qualified applicants.

Mentoring

The further we’ve progressed in our own careers, the more it becomes apparent how many individuals have helped us along the way. To achieve professional success in almost any field requires help. This may not be initially obvious to medical students, who are used to studying hard and achieving high grades on their own. Reaching medical school though, definitely required help. Professors who

provided help outside of the classroom, researchers who offered the opportunity to participate in their project, advisors who provided letters of recommendation: the list goes on.

Succeeding in medical school, and succeeding in the residency match itself, requires even more assistance. At this next stage of your career, informed guidance and advice becomes even more important. For more competitive specialties or programs, you'll also require additional qualifications, which may mean approaching faculty members for research opportunities, in addition to the critically important letters of recommendation.

The definition of a mentor is one who "takes a special interest in helping another person develop into a successful professional."⁵⁵ Information, advice, and guidance from a knowledgeable faculty member is invaluable, and has the potential to impact your career in significant ways.

Sometimes the hardest part of initiating an effective relationship is just knowing how to get started. You'll be approaching respected, accomplished, busy individuals, and it can be difficult to know how to approach faculty members without appearing intrusive or presumptuous. For most students, asking for help from individuals in a position of authority can be intimidating. As a preclinical student, you also may have had limited experience in dealing with faculty on an individual level, and knowing what's acceptable can be hard to determine. Therefore, we provide advice from faculty experienced in this area. Certain approaches would be considered acceptable and non-intrusive by most faculty.

Some medical schools have formal mentoring programs. If such a program doesn't exist at your school, then you'll need confidence and possibly persistence to initiate a relationship. In one study, 28% of students met their mentors during inpatient clerkships, 19% through research activities, and 9% during outpatient clerkships.⁵⁶

Local, regional, and state medical societies may have established mentoring programs. For example, the Santa Clara County Medical Association has a Mentor Program for Stanford medical students.⁵⁷ National organizations are committed to mentoring future doctors also. The Society of Academic Emergency Medicine (SAEM) has a medical student virtual advisor program open to students at all institutions.⁵⁸ Through this program, students can query experienced individuals about a variety of issues, including the EM residency application process. Dr. Joshua Grossman reminds students that mentors don't have to be in close proximity to you. "Your mentor does not need to be someone involved with your residency program that you see on a daily basis. By sharing your experience with someone

removed from the situation you may be able to gain a different and beneficial perspective.⁵⁹

While many of us have worked with assigned advisors during our education, a mentoring relationship is unique, and can be hard to delineate. In Chapter 10, you'll hear from mentors and organizations about the best way to develop such a relationship, and specifics on expectations and etiquette. The Association of Women Surgeons writes "A mentor is a unique individual to you: neither friend, nor colleague, but something of a combination of these and more. Because the relationship differs from those you have with others in your department, you may feel more relaxed and less constrained by professional protocol. This is acceptable to a point, but make certain that you respect the relationship."⁶⁰

What do students talk about with a mentor? Issues may include those related to specialty choice, career satisfaction, wellness, work/life balance, residency selection process, research, interpersonal skills, professionalism, ethics, and courses. Once they have a firm idea of career choice, many students schedule meetings to discuss match strategy, seeking advice on steps they can take at their level to establish their credentials and strengthen their applications.

It can be intimidating and challenging to seek advice from qualified, well-informed faculty members. Is it worth seeking a mentor? While mentors can prove helpful throughout medical school, they can provide invaluable guidance during the process of preparing for the residency match. In researching our companion book, *The Successful Match: 200 Rules to Succeed in the Residency Match*, we asked applicants what they found most difficult about the residency application process. A number of applicants commented on the same issue. "There's so much conflicting information out there. How do you know what to believe? Who should you listen to?" Applicants with mentors have a decided advantage. Students benefit greatly when the wisdom, experience, and perspective of a knowledgeable faculty member are used to help them. Having a mentor to guide you through the complex residency application process is recognized by students as an important factor in boosting the strength of their application.

Well-being

In the past, issues of medical student well-being weren't a priority. Today, though, medical educators recognize that the intense pressures of medical school can have serious consequences for a medical student's physical health and emotional well-being. Research has

demonstrated that these aren't just soft issues; they have real ramifications for patient care as well. In a recent study of pediatric residents, 20% of participants met criteria for depression, and these residents made over six times as many medication errors as their non-depressed colleagues.⁶¹

It's clear that medical school can be intensely stressful. In a survey of medical students, Wolf asked students to rate medical school stressors on a scale of 1 (not stressful) to 7 (extremely stressful).⁶² The top four stressors, out of 16 ranked, were examinations, amount of classwork, financial responsibilities, and lack of time for recreation and entertainment. In a survey of medical students at 16 U.S. schools, 60% of first-year students reported either "moderate" or "a lot" of stress in the last two weeks.⁶³ This stress can lead to physician burnout, a condition which is characterized by emotional depletion from one's work, depersonalization, and the perception that one's work is inconsequential. In a survey of medical students in Minnesota, 45% had burnout.⁶⁴

We chose to emphasize issues of medical student well-being within this chapter for several reasons. One was to highlight the impact of med school stressors on a student's health and well-being. Evidence indicates that this impact can be significant, and it is common for medical students to be affected. Even more importantly, in this chapter you'll learn how to buffer this stress. You'll learn about effective coping strategies identified by researchers. There is significant evidence that sleep, exercise, and the maintenance of strong social connections can provide strong buffers against the stressors of med school. Many students let these activities go first, though, in their efforts to focus on coursework and exams. However, studies indicate that these strategies, and others, should actually be priorities at times of intense stress. In a cross-sectional study of medical students, approximately 77% suffered some degree of anxiety.⁶⁵ Anxiety symptoms were considerably less common in students exercising at least 30 minutes three times a week. Another study revealed that "strong social ties was the factor most positively related to better health and life satisfaction" among a group of first-year medical students.⁶⁶

It's important to develop effective coping strategies during the preclinical years, as the clinical care of patients only adds to stress. Dr. Liselotte Dyrbye, a faculty member at the Mayo Clinic, has performed extensive research in this area. She states that medical students need to have "the skills necessary to assess personal distress, determine its effects on their care of patients, recognize when they need assistance, and develop strategies to promote their own well-being. These skills are

essential to maintain perspective, professionalism, and resilience through the course of a career...”⁶⁴

In this chapter, you'll learn more about coping strategies. One effective strategy is problem-focused coping, in which efforts are made to solve or manage the problem causing the distress. Emotion-focused coping is another effective strategy, among many others. As a new med student, it's helpful to learn about how you cope with issues. In 1997, Charles Carver, a professor at the University of Miami, developed the brief COPE questionnaire, which can be used as a tool to help determine the coping strategies that you tend to use.⁶⁷ If your total scores are higher in the coping strategy categories of self-distraction, denial, substance abuse, or self-blame, you'll need to learn how to develop and use healthier and more effective coping skills. Dr. Julie Gentile, Director of Medical Student Mental Health Services at the Boonshoft School of Medicine at Wright State University, states that medical school “is a critical period in which to develop and utilize functional and effective coping strategies”⁶⁸

Professionalism

What is professionalism, and why does it matter?

Consider the following observation made by a student:

*Two doctors were down the hall from each other, and there were people around. One said to the other, “Did you hear about Mr. X?” And the other doctor said no, and he made a face like a dead face...sticking his tongue out, crossing his eyes, and tilting his head to the side. If anybody had noticed they wouldn't have been too happy with it.*⁶⁹

Students must be prepared to deal with issues of professionalism in their peers, in members of the healthcare team, and even in their teachers. Researchers found that exposure to unprofessional behavior began early in the medical education process and increased in each successive year. In Year 1 of medical school, 66% of students had “heard derogatory comments not in patient’s presence” and 35% had “observed unethical conduct by residents or attending physicians.”⁷⁰

Why else does professionalism matter?

The vast majority of the students we meet have core values and a strong sense of personal integrity. Many therefore assume that issues of professionalism, while they may impact others around them, don't have any relevance to their own behavior. This is due to the common assumption that our core values regarding unethical behavior are stable over time. Studies of medical students contradict this assumption.

In one study, medical students were given a list of 11 unprofessional behaviors, and asked "Is the following behavior unprofessional for a medical student?"⁷¹ Students were surveyed before matriculation and again six months into their first year of medical school. Researchers found that behaviors originally considered unprofessional rapidly became more acceptable. Medical students were also presented with four different scenarios, and asked "Must one do the following to be professional?" For the scenario "Report Cheating to a Professor or Administrator," 69% of students originally answered "yes." Six months into medical school, only 41% answered "yes."

There are therefore two core reasons to focus on this field. If you're a medical student, you are likely to witness lapses in professionalism in patient care, and you need to be prepared to deal with those lapses and protect your patients. You also need to define and protect your own core values and personal integrity.

What is professionalism? The foundation of the medical profession rests upon the trust that patients place in their physicians. Professionalism focuses on this foundation of trust. Although it's been defined in various ways, the core values and elements agreed upon include honesty, integrity, compassion, empathy, ability to communicate effectively with patients, and respect for others. Professionalism is a hot topic in undergraduate medical education. A number of medical education organizations, including the American Board of Internal Medicine, the Association of American Medical Colleges, and the National Board of Medical Examiners, have established professionalism as a required competency across the spectrum of medical education. Medical schools, in turn, have made it a point to educate preclinical students.

Many students, when hearing about a curriculum on professionalism, have similar reactions. "I already hold these values. Why should any of this concern me?" The studies that we describe in this chapter provide a definitive answer to that question. Most students are surprised to learn that the stresses and challenges of medical school can affect attitude, behavior, and conduct. However, this conclusion is clearly supported by a number of studies.

Even though medical students may actually harm patients when they act unethically, such actions persist. In a survey of

students at a single medical school, 13 to 24% admitted to cheating during the clinical years of medical school.⁷² Examples included “recording tasks not performed” and “lying about having ordered tests.” In another study, students were asked whether they had heard of or witnessed unethical behaviors on the part of their student colleagues.⁷³ In response, 21% had personal knowledge of students “reporting a pelvic examination as ‘normal’ during rounds when it had been inadvertently omitted from the physical examination.”

As students, you are likely to witness lapses in professional behavior, and may witness outright unethical behavior and fraud. These issues affect every level of our profession, and therefore you have to be prepared. You must guard against lapses in your own behavior, and be prepared to deal with lapses in colleagues or supervisors. As physicians, our goal is to treat and protect the patient, and this can be challenging in the real world of clinical medicine.

In a survey, third-year students at the University of Texas Medical Branch at Galveston were asked to evaluate their physicians’ professionalism.⁷⁴ Although this review of nearly 3,000 evaluation forms revealed significant praise for positive faculty role modeling, negative comments were not infrequent. The majority dealt with “issues of language use, inappropriate use of humor, disrespectful treatment of patients or colleagues, and apparent disinterest in teaching.”

Although we think of physicians as highly compassionate and ethical individuals, ethical lapses can extend to the highest levels of our profession. In a stunning case of scientific fraud, Dr. Scott Reuben, a highly regarded anesthesiologist whose research has significantly impacted how physicians treat surgical patients for pain, was found to have fabricated results in over 20 published studies.⁷⁵ In some cases, he is alleged to have even invented patients.

Choosing a Specialty

For many students, having just arrived at med school and facing voluminous amounts of material to be learned and retained, the focus will be on just making it through. Why, then, have we devoted a large chapter to the topic of choosing and exploring a specialty?

Those medical students who are able to plan and strategize for the residency match have a decided advantage. For the most competitive specialties, great grades and high USMLE scores are not enough. You’ll need great letters of recommendation and support from faculty advocates. You’ll also need additional distinctions. Most

applicants to the competitive specialties will have performed research, and many will have publications or presentations to their name. Some programs look for additional factors of distinction, such as involvement in extracurricular activities, evidence of leadership, and commitment to service.

We present this information not to scare you, but to prepare you. These are the realities of the residency match today, and students who are prepared for these realities have a definite advantage. Your preparation doesn't need to be an overwhelming experience, either. It can start with the basics, such as exploring different specialties by shadowing faculty or speaking to residents. You may choose to take an aptitude test to help guide you in your exploration of specialties. Many students maximize their free summer after first year by participating in research. Those who are knowledgeable can obtain research grants from organizations to fund their research. This has tangible benefits. It results in research experience, an awarded research grant, and the opportunity to develop a relationship with a research mentor who may be able to support your application down the road.

In this chapter, you'll learn more about how to approach the process of choosing a specialty. You'll learn how to approach your target department, and how to cultivate opportunities. You'll gain from the insider knowledge presented in this section, as the chapter outlines, for each and every specialty, detailed specifics about medical student opportunities. These include mentorship programs, research grants targeted to medical students, and information about national meetings.

Why is it important to at least start thinking about your specialty choice now? While many med students wait until the clinical years to assess fit, this approach can be problematic. At most schools, students are required to rotate through the major or core specialties (internal medicine, general surgery, pediatrics, psychiatry, family medicine, obstetrics & gynecology) before pursuing clerkships in other fields. After completing these core rotations during the third year, students aren't left with much time. Most have two to three months of elective time to explore other specialties before they need to decide, since residency applications are typically submitted in September of the fourth year. For example, in a survey of med schools, it was found that anesthesiology is an elective rotation in 66% of schools.⁷⁶ For most students, this means that unless you attend a school with a flexible clerkship curriculum, you won't be able to rotate through the specialty until the beginning of your fourth year.

This can have a decided impact on a student's career. In one study of medical students, 26.2% were unsure of their specialty choice at matriculation.⁷⁷ Surprisingly, a similar proportion remained

undecided at graduation. According to Gwen Garrison, Director of Student and Applicant Services at the AAMC, 30% of residents “either switch from their intended specialty after a transitional or preliminary year or switch outright during their specialty residency.”⁷⁸ Dr. George Blackall, Director of Student Development at Penn State University College of Medicine, offers some reasons why residents switch. “Residents primarily switch because they a) realize their initial choice is not as interesting as another specialty, or b) desire a different lifestyle, level of flexibility, or income.”⁷⁸

In this chapter, you'll learn how to start the process of exploring a specialty. During the preclinical years, one way to assess fit for specialties is by completing personality-type inventories. The premise of this approach is that people are most satisfied professionally when there is a good match between their specialty choice and their values, skills, and interests. Commonly used assessment methods include the AAMC Careers in Medicine program and the Glaxo Wellcome Pathway Evaluation Program. The AAMC Careers in Medicine (CiM) is a structured program designed to help students gain a better understanding of their personality, values, skills, and interests. The program also allows for exploration of different specialties. The AAMC writes that “as you work through the CiM program, you'll gain the tools to make an informed decision, based on guided self-reflection and the information you'll gather about many career options available to you.”⁷⁹ Another resource is the Medical Specialty Aptitude Test, an online test developed by the University of Virginia School of Medicine.⁸⁰ It is based on content and material from the book, *How to Choose a Medical Specialty*, by Anita Taylor. The website indicates that “you will be asked to rate your tendencies compared to the tendencies of physicians in each specialty. The higher your score for a given specialty, the more similar you are to the physicians in that specialty.”

What is the most important factor in choosing a specialty? In a recent survey of graduating medical students, approximately 97% reported that fit with personality, skills, and interests was moderately or strongly influential in choosing which specialty to pursue as a career.⁸¹ No other factor was given as much importance.

For many students, work/life balance also plays an important role. In the 2010 AAMC Medical School Graduation Questionnaire, over 11,000 graduating students were asked, “How influential was work/life balance in helping you choose your specialty?”⁸¹ Over 70% of respondents reported work/life balance as being either moderately or strongly influential in their decision-making process. In 1989, Schwartz introduced the term *controllable lifestyle* to

refer to “specialties that offer regular and predictable hours.”⁸² These specialties are often characterized by fewer hours spent at work and less frequent on-call duties, allowing for greater personal time and flexibility to pursue other activities. Specialties that are generally felt to offer a controllable lifestyle include anesthesiology, dermatology, neurology, ophthalmology, otolaryngology, pathology, psychiatry, and radiology.

Research has shown that efforts to explore specialties during the preclinical years can increase the certainty of specialty choice.⁸³ In this chapter, you'll learn about multiple avenues to learn more about specialties during the preclinical years. Examples include:

- Identify and work with a mentor
- Volunteer for clinical experiences (e.g., shadowing)
- Perform specialty-specific research
- Meet and speak with as many physicians as you can in your specialties of interest
- Attend local and national specialty organization meetings
- Join specialty interest groups (e.g., Internal Medicine Interest Group, Emergency Medicine Interest Group)

For each of these avenues, we've included specifics on how to proceed. Medical students value mentoring relationships, but identifying and working with a faculty member can be difficult. According to Dr. Gus Garmel, Co-Program Director of the Stanford-Kaiser Emergency Medicine Residency Program, finding a mentor is not easy.⁸⁴ “How students find faculty mentors is challenging, because their exposure to a broad selection of emergency medicine faculty may be limited early in their training.” We've provided suggestions on how to proceed for each of the specialties. For example, the American College of Physicians (ACP) has created a Mentoring Database. To access the database, which includes program directors, clerkship directors, chairs of medicine, practicing internists, and residents, you must be a member. Mentors are available to answer “specific questions about scheduling your summer preceptorships, getting through the match, and preparing for clerkships and residency interviews...”⁸⁵

We've also included further information about identifying research opportunities. For many of the most competitive specialties, such as dermatology and radiation oncology, your competition will almost all have performed research. Therefore, if you're considering dermatology as a career, you may wish to participate in research between the first and second years of medical school. Research experience has significant educational benefits. Beyond those benefits,

research allows a student the chance to develop a relationship with their research supervisor.

In this chapter, you'll gain from the insider knowledge presented for each and every specialty, with detailed, specific information about medical student opportunities.

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