



PRE-MED STUDENT HANDBOOK

*A Useful Guide to Assist UT Students in the Medical School
Application Process*

Dear Pre-Medical Students,

The following guide has been created to introduce you to the various components of pre-medical education. Since medical schools are seeking highly qualified students with a sincere motivation for entering a health profession, you should begin exploring the demands and opportunities in medical education as early as your freshman year. The health professions staff and advisors in Arts and Sciences Advising Services, 313 Ayres Hall, are available to discuss academic and career goals, outline prerequisite courses for medical school, and discuss the application process. Please take advantage of this valuable resource by meeting with a health professions advisor each semester.

Do not hesitate to contact Arts and Sciences Advising Services with any questions concerning your pre-medical program. Our number is (865) 974-4481. We look forward to working with you in pursuing your goal of becoming a successful medical school applicant.

Sincerely,

Mary Anne Hoskins
Chair, Health Professions
Associate Director, Arts and Sciences Advising Services

Medical School: Where Do I Start and How Do I Get There?

Required Academic Courses

Ideally, your preparation for the Medical College Admissions Test (MCAT) and medical school should begin your freshman year. This early work ensures that those classes necessary for a sound performance on the MCAT are completed before the spring semester of your junior year. (You should plan on taking the MCAT by the spring of your junior year). Which classes you take and the sequence in which you approach them are very important. Your long term academic planning should be discussed with a pre-health advisor who can assist you in individualizing the schedule for your given area of study. The following classes are HIGHLY recommended for you to have adequate competency for the MCAT:

Chemistry 120,130 (General Chemistry)
Biology 150 (Organismal and Ecological Biology)
Biology 159 (Skills of Biological Investigation)
Biology 160 (Cellular and Molecular Biology)
*The above three courses were previously Biology 130 and 140.
Biology 240 (Genetics)
Chemistry 350,360,369 (Organic Chemistry)
Biochemistry and Cellular and Molecular Biology 401 (Biochemistry I)
Physics 221,222 (Elements of Physics)
Psychology 110 (General Psychology)
Sociology 120 (General Sociology)

Many courses have prerequisites (courses that must be taken prior to taking the listed course). You should review the course description in the undergraduate catalog (catalog.utk.edu) of any course you are considering to determine what prerequisites, if any, exist for the course. Freshmen should be particularly aware that Chemistry 120 has a prerequisite of Math 119 (College Algebra) or an ACT Math score of 25. Physics 221 has a prerequisite of Math 130 or any calculus course. (Note: Math 151 does not contain calculus.) An academic advisor can help you select the math course or sequence that best fits your academic plans.

Additional Courses

The following courses are recommended to improve your readiness for medical school (you may elect to take all, some, or none):

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| Anthropology 480 | Human Osteology |
| Biology 220 | General Microbiology |
| Biology 229 | General Microbiology Lab |
| BCMB 230 (or 440) | Human Physiology |
| BCMB 330 | Mechanisms of Development |
| BCMB 402 | Biochemistry II |

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| BCMB 412 | Molecular Biology and Genomics |
| BCMB 440 | General Physiology |
| Classics 273 | Medical and Scientific Terminology |
| EEB 240 | Human Anatomy |
| Microbiology 330 | Immunology |
| Microbiology 420 | Microbial Pathogenesis |

These courses can be challenging, but they can also provide you with a firm foundation in your first year medical school classes. Anything that may alleviate some of the academic burden of the first year is advisable. Additionally, the medical schools to which you apply may request updates on your academic performance during your senior year. Extra consideration may be shown to students who are taking rigorous courses and recording strong grades in them. Remember, you must always work to distinguish yourself from your competition.

Additionally, plan to enroll in rigorous course loads after your freshman year. Medical schools recommend that prospective medical students attempt 16-18 hours per semester. This load recommendation is to assess whether a student will be able to endure the 21+ credit hour course loads that are a part of the medical school experience. These 16-18 hours should contain at least three academically challenging courses. Rigorous course loads which contain challenging courses demonstrate a strong academic aptitude.

The ideal freshman year includes:

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| <u>Fall</u> | <u>Spring</u> |
| Chemistry 120 | Chemistry 130 |
| Biology 150 | Biology 160, 159 |
| English 101 | English 102 |
| Math | Math |
| FYS 101 | |
| INPG 100 (Introduction to Health Care Delivery) | |

Interdisciplinary Programs (INPG) 100 *Introduction to Health Care Delivery* is recommended for all pre-medical students at some point during their undergraduate years. This one hour satisfactory/no credit course is offered each fall term and is held predominantly at the UT Medical Center. It features lectures by hospital staff, local practitioners, specialists, medical lawyers, medical ethicists, medical school representatives, as well as discussions concerning current issues in the medical community such as health care reform. Check the timetable each fall for the correct section number.

The recommended freshman schedule for pre-medical students includes both Biology and Chemistry. This schedule allows students to complete all required courses for the MCAT by the end of the junior year. A student, however, should carefully consider his/her high school math and science background and level of commitment to the pre-medical program before enrolling in both of these laboratory sequences. A student who elects to take only one science sequence should consult with a pre-health advisor

concerning the appropriate course selection.

So What Should I Major In?

Pre-medical students do not follow a prescribed "pre-med" major. Many students believe that medical schools only accept science majors in their programs. This idea is simply not true. The type of student that a medical school desires is one with academic ability and competency that can meet the rigors of medical school and fulfill the role of a physician. Given the current trends in medical school admission criteria, a student should seek to have a broad educational background as well as a firm foundation in the sciences. It is true, however, that pre-medical students in all majors are strongly recommended to take a large number of science classes to prepare them for their goals. Because of this recommendation, many pre-medical students pursue majors within the sciences.

No one major produces a better candidate for medical school. While current statistics exist that suggest that a higher percentage of social science and humanities majors are gaining acceptance, one statistic remains unvaried. Those students with high GPA's, high MCAT scores, a challenging undergraduate record, medically related work experiences, and strong recommendations are consistently accepted at any medical school. This pattern should be the guiding force in your academic decisions. Therefore, pick a major that interests you, take the classes necessary for the MCAT, and work hard. This is the surest path to success.

Clinical Experience

The competitive nature of medical school admissions requires that a student have some type of medical work experience. Experience can come in many different forms. Many students choose to volunteer in a hospital or clinical setting. Volunteering will do much to improve your resumé in that it shows a commitment to your health interest as well as actual experience in a medical atmosphere. An admissions committee wants to see students that understand the reality of the medical profession. It is important for you to determine if you enjoy the atmosphere of a medical setting and if you are able to deal with the issues of sickness and death that are an everyday element of a profession in medicine.

You should not feel that volunteering is the only way to gain valuable experience. Another excellent route that actually affords a more intimate look into the life and work of a doctor is to shadow a physician during a work day. Shadowing means that you establish contact with a doctor and ask permission to follow him or her on rounds and appointments for a day or more. This time will allow you to observe the interaction between doctor and patient and may open opportunities for assisting or hands-on experience.

In cooperation with the UT Medical Center, the College of Arts and Sciences Advising

Services maintains a list of physicians from a variety of specialty areas who have agreed to allow UT students to shadow them. Through this program students can contact a physician of choice and arrange a day to visit the physician's practice, observe him/her, interact with patients and/or follow the physician on rounds. A list of participating physicians and contacts for volunteering in area hospitals is available on the Arts & Sciences Advising Services website at www.artsci.utk.edu/advising. The UT Medical Center also sponsors a program called Medical Explorers for students wishing to explore medicine more closely. More information about this program is available at <http://gsm.utmck.edu/medexp/>.

Extracurricular Activities

Another excellent addition to your resumé can be your extracurricular activities. This non-academic period can show how you choose to spend your free time and where some of your outside interests lie. Your activities are also an area where you can accumulate valuable leadership experience. Community service, student government, campus committees, honor societies and clubs are all excellent opportunities that can become part of an impressive resumé. The only warning is to avoid becoming over involved. Remember to leave time for the academics. A strong GPA will greatly outweigh a large inventory of activities.

Student Organizations for Pre-Health Students

There are several student organizations geared toward medical students.

*Alpha Epsilon Delta, or AED, is a pre-health honor society that seeks to provide information and opportunities for all students with an interest within the health professions. AED activities include information sessions on taking admissions tests such as the MCAT, local speakers from the medical community, and trips to Tennessee medical schools and health centers. Annual activities include chances to meet recruiters and admissions persons from health professions schools such as UT Memphis and ETSU, mock MCAT sessions, tours of medical facilities, and the national AED convention. While you may not apply for full membership until your third semester at UTK, all are welcome to attend the meetings. Even if you can't or don't gain membership, you may still take part in most AED activities. For more information, log on to the website at <http://aedutk.wix.com/aed-utk/>.

Other pre-health student organizations that might interest you include the American Medical Student Association (AMSA), Clinic Vols, Health Occupations Students of American (HOSA), Academy of Student Pharmacists (ASP), Student Dental Association (SDA) and the Minority Association of Pre-Medical Students (MAPS).

Your Pre-Professional File

During the fall of your junior year, arrange to visit Arts and Sciences Advising Services to set up your pre-professional file. During this meeting, a health professions advisor

will review the application process to medical school, and you will complete the initial paperwork to establish your pre-professional file. The most important part of the file is the letter of evaluation form. This form should be completed by two science professors and one non-science professor. If a teaching assistant completes the evaluation, it must be co-signed by a full-time faculty member. You must deliver the forms to the evaluators, and the evaluators return them directly to Arts and Sciences Advising Services. You may want to include a resume or list of activities with your evaluation form as an aid to the faculty member. Once our file is complete and you have submitted applications to medical schools, Advising Services will forward your file to the schools you requested (AMCAS, osteopathic medical schools, international medical schools, and post-bac programs). Be sure that you have become well acquainted with your professors prior to the evaluations. Once you have started your file, keep in touch with the health professions secretary to periodically check on your file and to provide address and phone number updates.

The MCAT

If you are acquainted with pre-med students, you have heard a number of horror stories related to the MCAT. In reality, the MCAT is like any other important test. If you apply enough time and effort, it will be reflected in your results. The test is similar to the ACT and SAT that you took in high school in that it is a standardized test administered nationwide. It seeks to survey a general knowledge of and aptitude for the health sciences. Given the proper preparation, the MCAT need not be as stressful as it is made out to be. In addition to completing additional science courses, you may want to procure an MCAT preparatory manual with practice tests or take an MCAT prep course through a private company. Any way you choose, be sure to begin the review for this test several months prior to the test date. The timing is important. By sitting for the test early in the calendar year, you have two distinct advantages. First, you will receive your scores in time to retake the test if you are not satisfied with your performance. Secondly, if your scores prove to be competitive, you can finish the application process by mid-summer, ahead of applicants who are taking one of the later exams.

The MCAT contains four test sections:

- 1) Biological and Biochemical Foundations of Living Systems,
- 2) Chemical and Physical Foundations of Biological Systems,
- 3) Psychological, Social, and Biological Foundations of Behavior, and
- 4) Critical Analysis and Reasoning Skills

Total scores will be centered at 500, with scores ranging from 472 to 528. Each section will be scored on a range of 118 to 132, with a midpoint of 125.

The natural sciences sections (1 and 2 above) test concepts in biology, general and organic chemistry, biochemistry, and physics that medical school faculty rate as most important to entering students' success. These concepts are covered in introductory sequences in biology, general chemistry, organic chemistry, and physics and in first-semester biochemistry courses.

The Psychological, Social, and Biological Foundations of Behavior section tests your

knowledge of important introductory psychology and sociology concepts, as well as the introductory biology concepts that relate to mental processes and behavior. The addition of this section to the exam recognizes the importance of socio-cultural and behavioral determinants of health and health outcomes.

The Critical Analysis and Reasoning Skills section asks you to analyze, evaluate, and apply information provided by passages from a wide range of social sciences and humanities disciplines. It does not require specific knowledge of these disciplines, but it tests the analysis and reasoning skills you need for medical school, and may prompt you to read broadly as you prepare. Along with many others, passages about ethics and philosophy, cultural studies, and population health are included.

Competition

The competition for medical school is extremely intense. Many schools receive ten or more applications per seat while the most competitive have upwards of 65 or more per position! For the 2014 entering class, UT College of Medicine received 1716 applicants for 165 available seats. ETSU Quillen College of Medicine received 2078 applications for 72 available seats.

Additional Issues to Consider

Self-Exploration

One area of preparation with which no one can help you is self-reflection. As a student, you need to be aware of your strengths and weaknesses. While self-awareness is important for all students, it is especially important for a pre-medical student. The path to a medical profession is very demanding and stressful. You need to have good grades, but you also need to find time to get work experience. And what about the development of social skills? How does a pre-medical student maintain a personal life on top of all these other demands? These problems must be addressed and reconciled if you wish to have future success. This preparation is just as important as all other stages. Do not neglect it.

Another area of reflection should be in the area of your motivations and commitment to pursuing a medical career. Some simple things that students sometimes overlook could make a medical profession one of the worst choices of their lives. Can you stand the smell of a hospital? How do you handle situations of sickness and death? Are you able to operate on a rotating schedule that may interrupt your personal life? Do you react adversely to high pressure situations? Have you reconciled yourself to the fact that the career path you have chosen will total over 11 years of higher education? Take the time to confront these issues and others that may arise. Also, have alternative career plans in case your interest in or attitude towards medicine changes.

Medical Ethics

Today's science and medical fields have witnessed a refocusing of the public eye upon their works and practices. Now, more than ever, ethical issues are an integral dimension of the medical profession. Issues of life support, organ transplant, and gene therapy are among the issues medical practitioners are facing. Some of today's doctors are well versed in current techniques but have neglected the many human factors that are also a part of their work. As a result, the coming classes of medical students will not only need to be well versed in medical procedures, but also in the ethical questions that arise from new technologies in the field. You can become more educated in this area by taking some related courses such as Philosophy 345 (Bioethics), Philosophy 242 (Contemporary Moral Problems) and/or reading about medical issues in various journals and on numerous health related websites.

The Importance of Communication Skills

Being a student, it is very easy to envision medicine in terms of the preparatory classes you are taking. The truth is that medicine, in an ideal situation, would be as formulaic as the sciences and technologies that it employs. One small component of that formula, though, proves highly variable: the patient. Medicine concerns the human body and, by unavoidable association, human behavior and all its quirks. While every patient will be different, one fact remains: you will need to be able to understand them and they will need to understand you. This fact requires you to develop those communication skills that will allow you to reach patients.

The most obvious communication skill you need to develop is speaking, and its close relation, listening. You must learn to speak with confidence and clarity, and you will gain skills in your oral communication general education course. Learn to speak in front of groups as well as with individuals. If speaking is one of your weak points, practice as much as you can, seeking opportunities to speak to groups. This can be achieved by accepting leadership positions within various organizations. You can be sure that a medical school admissions interviewer will analyze your speaking abilities during the interview. Effective doctors are able to communicate effectively with their patients. You might consider pursuing a Communication Studies minor, which would give you the opportunity to take a course entitled *Interpersonal Health Communication*. The course focuses on interpersonal communication between physician and patient by utilizing role plays and case studies.

Another skill that is important is writing ability. Your writing skills can be developed by taking additional writing emphasis courses beyond the university requirement. Choose elective courses that help you further develop your communications skills. Clear and organized writing signifies great control over analytical and reasoning skills as well as a working knowledge of language. That is why good writing impresses admissions committees and instructors. Be sure to nurture your writing talents and take every

opportunity afforded you to demonstrate them.

One last communication skill that comes as a premium in any field is a working knowledge of a foreign language. In the ever-increasing diversity of racial demographics and increased integration, there is a great demand for bilingual physicians. To achieve language diversity, do not think of required language courses as compulsory classes; rather, treat them as voluntary electives. Intermediate language classes should provide you with basic speaking and writing skills. If you have a lingual interest, consider taking upper level language classes at advanced conversational levels. A second language can only help you in future endeavors.

Making Friends with Your Professors?

One of the greatest resources of information on this campus is the UT faculty. The University has hired these individuals because of their professional achievements within their respective academic fields. In short, you are taking classes from experts. The sphere of their knowledge extends far beyond the courses they instruct. They are a source of quantified knowledge and experience. You can use their abilities in your exploration of yourself and your future. Do not hesitate to initiate a conversation with your instructor. Most enjoy interacting with students who show interest.

Another thing that you can gain from your instructors is legitimacy. On applications, you can claim everything you want to about your personal academic traits and skills, but it requires confirmation. When this confirmation comes in the form of a letter of evaluation or a letter of recommendation from a respected faculty member, it becomes even more believable. Such an evaluation is only possible if the faculty members know more about you than their grade book can tell them. Take the time to meet your instructors on a personal level long before you need them to complete an evaluation or write a recommendation.

Medical Awareness: Your Unofficial Homework

Currently, the medical profession is being reshaped by a variety of factors. Technology, economics, philosophy, and politics are driving forces behind the various changes. Developments in technology now allow for procedures not even imagined thirty years ago. The financial state of the medical industry and our nation is causing many to question how to keep medical costs affordable. With new technologies and economic factors, we are challenged to re-evaluate the way we think about medicine and services to patients. Some medical protocols are being questioned and redefined based on ethical concerns. What limitations are required to maintain the humanity and dignity of a patient? The issues at hand and the subsequent decisions made will dictate your future career. Your challenge is to educate yourself on the topics and stay current in your knowledge.

The internet is the best resource for your research. Laser, computer, and

pharmaceutical breakthroughs are occurring daily in the medical profession. Health reform and questions of accessibility to affordable health care are constant topics of discussion. To improve your knowledge about these topics, subscribe to a number of reputable on-line journals and websites. Gain a working knowledge of the factors that are shaping your future. The work of a physician includes constant updating of one's education. Begin this habit now with some light research. Preliminary work will ensure that not only are you sure of your professional target, but you will be sure of where that profession will lead you in your future.

Need Help? Arts and Sciences Advising Services: Contact Us!

Your preparation for medical school can be a stressful process. One way to alleviate some of that stress is to amass all the information you can and stay on top of your progress and objectives. One important aid in accomplishing this level of preparedness is to get regular advising from a trained pre-health advisor in Arts and Sciences Advising Services, 313 Ayres Hall. There are pre-health advisors on staff in the office that include directors, professional advisors, and graduate teaching assistants. All of them are specifically trained to deal with the various aspects and academic needs of pre-medical students. Your advisor can keep you on course and update you on special opportunities within your field.

Available Resources

Take advantage of all of the vast information on the internet while you are a college student. You will be able to learn about any subject imaginable during your years of study. Utilize these resources that are literally at your fingertips.

You are now ready to embark on getting prepared to apply for medical school. The following checklist may help you remember all the steps in the preparation process. Good luck!

PRE-MEDICAL PROGRAM CHECKLIST

Freshman Year

- Begin completing pre-requisites for MCAT and medical school.
- Explore careers in the medical field through volunteer work or shadow a physician (see pre-health website for options)
- Participate in student organizations relevant to the health professions: Alpha Epsilon Delta (AED), American Medical Student Association (AMSA), Academy of Student Pharmacists (ASP), Student Dental Association (SDA), Health Occupations Student Association (HOSA) and Clinic VOLs.
- Meet with a health professions advisor to discuss admissions requirements for medical school and major options.
- Identify extra-curricular activities and community service projects to meet your personal interests.
- Start keeping a journal of all your medicine related activities to chronicle your exposure to medicine and to record your impressions about the experiences.
- Enroll in Interdisciplinary Studies (INPG) 100, Introduction to Health Care Delivery (fall only). Call 865-974-4481 for more information.

Sophomore Year

- Continue completing pre-requisites for MCAT and medical school.
- Apply for AED. Pick up applications on-line at <http://aedutk.wix.com/aed-utk/> or in Advising Services in 313 Ayres Hall.
- Establish relationships with professors in preparation for undergraduate research and/or requesting academic evaluations.
- Continue volunteer work in a variety of clinical settings.
- Become actively involved in extra-curricular activities and community service work.
- Begin organizing a resume of all activities, volunteer work, and employment.
- Continue making entries in your journal regarding your medically related experiences.
- Meet with health professions advisor in 313 Ayres Hall.
- Declare major and be assigned faculty advisor in department of major.

Junior Year

- Attend a Pre-Health Group Meeting to set up pre-professional file.
- Complete pre-requisites for the MCAT.
- Begin preparation for the MCAT (i.e., develop study plan, take practice tests, and register on-line at www.aamc.org).
- Engage in undergraduate research.
- Explore a variety of medical school programs (i.e., utilize the internet, participate in AED tours of health professions schools or tour on your own, and review medical school admissions requirements).
- Continue volunteer work.
- Continue making entries in your journal regarding your medically related experiences.
- Create first draft of personal statement in anticipation of medical school application.
- Complete the AMCAS (American Medical College Application Service) application - available on-line at www.aamc.org. AMCAS begins accepting applications in early June. Request official transcripts from all schools attended to be sent to AMCAS.
- Check on status of pre-professional file, and if complete, sign release form to have it sent to AMCAS, AACOMAS, or other medical schools.
- Meet with health professions advisor in 313 Ayres Hall and meet with faculty advisor in major.

Senior Year

- Consider taking upper-level science courses in preparation for medical school.
- Complete degree requirements.
- If not previously completed, sign release form to have your pre-professional file sent to AMCAS, AACOMAS, or other medical schools.
- Complete supplemental applications according to the deadlines set by the medical schools.
- Prepare for medical school interviews (i.e., attend Career Services interview skills workshop, read current literature on health issues, participate in a mock interview, and review AMCAS essay and application).
- Upon acceptance to medical school, contact the health professions secretary and inform her of the program you will be attending.
- If you are not accepted to medical school, schedule an appointment with health professions advisor to discuss options.

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