

PREPARING FOR MEDICAL SCHOOL: A GUIDE FOR FRESHMEN AND SOPHOMORES

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HEALTH PROFESSIONS AND PRELAW CENTER

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GOOD BEGINNINGS

The Health Professions and Prelaw Center (HPPLC) advises students--freshmen through graduate students--who are preparing for medical school. Admission is highly competitive, and it is important for you to have correct and current information. In addition to reading this guide, please read all information on the HPPLC website (www.hpplc.indiana.edu) related to careers in medicine and healthcare, the application process, and the HPPLC Recommendation Service. Please make sure that you are subscribed to the HPPLC mailing list for your area of interest. Through the list you will receive pertinent information about meetings, deadlines, and opportunities. Attend as many events for premedical students as you can.

COURSE REQUIREMENTS FOR INDIANA UNIVERSITY SCHOOL OF MEDICINE

The following science course work is required for admission to Indiana University School of Medicine; each course must include a lecture and a laboratory component:

IU SCHOOL OF MEDICINE REQUIREMENT	IU BLOOMINGTON EQUIVALENT
General/inorganic chemistry, 8-10 credit hours (one academic year)	CHEM-C 117 and CHEM-N 330*
Organic chemistry, 8-10 credit hours (one academic year)	CHEM-C 341,** 342, and 343
Physics, 8-10 credit hours (one academic year)	PHYS-P 201 and 202 or PHYS-P 221 and 222
Biological sciences, 8-10 credit hours (one academic year)	BIOL-L 111, 112, and 113 or BIOL-L 112, 113, and 211

SEQUENCE OF CHEMISTRY COURSES FOR PREMED STUDENTS

CHEM-C 117 Principles of Chemistry and Biochemistry I
CHEM-C 341 Organic Chemistry I Lectures
CHEM-C 342 Organic Chemistry II Lectures
CHEM-C 343 Organic Chemistry I Laboratory***
CHEM-N 330 Intermediate Inorganic Chemistry

* In order to obtain the best preparation to meet the requirements for all medical schools, students should complete the sequence of courses for chemistry majors through CHEM-N 330, including CHEM-C 341, 342, and 343. Students should complete CHEM-C 342 and 343 before CHEM-N 330. The Indiana University School of Medicine will accept CHEM-C 118 in place of CHEM-N 330. However, the IUB Department of Chemistry and HPPLC strongly recommend all premed students complete CHEM-N 330 instead of CHEM-C 118 to meet the general/inorganic requirements for admission to medical schools.

** Premed students should not enroll in the alternate organic chemistry course CHEM-R 340. Students cannot obtain credit for both CHEM-R 340 and CHEM-C 341.

*** It is recommended that students enroll concurrently in CHEM-C 342 and 343.

The minimum requirement for entering the Indiana University School of Medicine is 90 credit hours, excluding physical education and ROTC courses. Any major from the traditional arts and sciences curriculum is acceptable. Applications of students with educational backgrounds in other fields will be evaluated based on a minimum of 90 credit hours (three academic years) of college course work of arts and sciences equivalence.¹

The chart above lists the specific Indiana University Bloomington courses that we recommend that all premed students complete. These courses provide essential preparation for the Medical College Admission Test (MCAT). Students should be aware that some medical schools will not accept Advanced Placement or credit-by-examination towards meeting admission requirements, or accept such credit only under restricted circumstances.

¹ Note that **very few** students are admitted and enroll having completed only the minimum number of required credit hours (three years of college coursework).

Students should also be aware that receiving an exemption from a requirement is not generally considered equivalent to Advanced Placement credit, credit-by-examination, or credit from coursework. College-level coursework is often preferable for preparation for the Medical College Admissions Test (MCAT).

ADMISSION REQUIREMENTS FOR OTHER SCHOOLS

Requirements for many other medical schools are similar to the requirements of the Indiana University School of Medicine, but there can be important variations. Most medical schools require one year of lecture and lab in biology, general/inorganic chemistry, organic chemistry, and physics. Additional common requirements include one year of English composition and a semester or year of math (see below). An increasing number (15) of medical schools require biochemistry, and most medical schools now strongly recommend it. Many schools also require two semesters of organic chemistry lab. Students should review the individual school entries in *Medical School Admission Requirements 2011-2012*, or the school websites for detailed information.

MATH

Of the 132 allopathic medical schools, 33 require college math and an additional 20 specifically require Calculus. In some cases the requirement is for one semester; in some cases it is for one year. Many schools that do not specifically require math or calculus strongly recommend knowledge in those subjects as a useful tool in medical education. Many undergraduate degree programs will include required math courses.

MAJOR

Medical schools do not have a preference for any specific majors. There is neither a preference for science majors or for non-science majors. Therefore, you may major in almost anything. If you question this, read Chapter 2 "Building a Strong Foundation: Your Undergraduate Years" in *Medical School Admission Requirements 2011-2012*, available at the HPPLC front desk. This book is published by the medical schools and is the most authoritative source for preparation for and admission to medical school. One passage from Chapter 2 of the book may interest you:

Unbeknownst to many college students, there is no such thing as the "best" major for those bound for medical school. **In fact, no medical school requires a specific major of its applicants.** That's because admissions committee members know that students develop the essential skills of acquiring and synthesizing information through a wide variety of academic disciplines and therefore should be free to select whichever majors they find interesting and challenging.

Even so, many premedical students choose to major in a scientific discipline. If that's the direction you're heading, and you're doing so because you are fascinated by science and believe that such a major will be the foundation for a variety of career options, great. If you're doing so because you believe it will enhance your chances for admission, think again. Admissions committee welcome students whose intellectual curiosity leads them to a wide variety of disciplines.

And no... you won't necessarily be at a disadvantage if you choose to major in English, for example, rather than biology. Using just one measure, those of MCAT scores, you may be surprised to learn that there is very little difference in median total scores among those who major in the humanities, social sciences and biological sciences.²

You should consider a major which you enjoy, in which you perform well, or which might serve as a basis for further graduate work or for employment in the event you choose not to apply or you are not admitted to medical school. Admission committees expect variety in an educational program, including a significant number of humanities and social and behavioral science courses in addition to science courses. The majority of our premedical students major in science; however, many applicants majoring in non-science areas are successful applicants to the Indiana University School of Medicine as well as to other medical schools. All applicants must meet the schools' specific requirements, regardless of major. At IU-Bloomington, premedical students usually choose a major in the College of Arts and Sciences, although majors from other schools may be selected.

² Association of American Medical Colleges, *Medical School Admission Requirements, 2011-2012*, (Washington, D.C.2010) p. 10

FACTORS IN ADMISSION

A number of factors may be considered by medical school admission committees. These differ in importance by school, but generally include academic credentials (GPA, course load, and grade trends), MCAT scores, a personal interview, and letters of evaluation, perception of personal character, interpersonal skills, as well as demonstrated knowledge of and commitment to the profession and knowledge of the school and its program. Some schools interview only those applicants meeting certain initial standards based on residency, GPA, and MCAT. It should be noted that a low GPA and MCAT cannot be overcome by an excellent interview; however, a low grade or one semester of poor grades will probably not keep a good candidate out of most medical schools. Schools look at the background of applicants and judge whether they are ready for the rigors of medical school.

MEDICAL COLLEGE ADMISSION TEST (MCAT)

The MCAT plays a significant role in medical school admissions decisions. You cannot substitute a sparkling personality or excellent volunteer work for an acceptable MCAT. The MCAT exam is a standardized test that measures aptitude and reasoning skills in science and other areas related to the study of medicine.

We recommend that you look at the test format and content as you begin to take your first science classes so you may see how material from these courses will be used on the MCAT. Understanding the type of skills measured by the test can help you study more effectively in your coursework. Many freshman students are aware that science skills are tested, but they do not realize that reading comprehension and writing skills are also evaluated. The four sections of the test are: Verbal Reasoning, Physical Sciences, Writing Samples, and Biological Sciences.

Verbal Reasoning: The Verbal Reasoning section of the test measures your ability to ". . . understand, evaluate, and apply information and requirements found in prose texts."³ If your ACT or SAT verbal score is weak, pay special attention to the Verbal Reasoning section of the MCAT. Rather than avoid reading courses, it might be a good idea to take some. Skill in reading is not a skill quickly acquired. It is interesting to note how many students with excellent grade point averages have poor verbal reasoning scores. Perhaps they assume that they are better readers than they are. Perhaps their success in sciences causes them to avoid humanities and social sciences courses that require a different kind of reading.

Sciences: Within the science portions of the MCAT, the test measures your ability to think critically and analytically, employing science concepts. Reliance on your memory alone is not sufficient in doing well in this portion of the exam.

Underestimate this test at your peril.

ACADEMIC EVALUATIONS

As part of your application to medical school you will be required to submit academic evaluations written by your professors. Evaluations are usually requested from professors in the sophomore and junior years and at the conclusion of the class, rather than a year later. If you have had particularly noteworthy achievements in a freshman class, these too may provide a valuable evaluation. HPPLC offers a recommendation service that can help you in obtaining letters of recommendation for your application.

We strongly urge enrollment in some small size or seminar-type classes in which you work closely with your professors. Make yourself known to instructors if they have time to talk during office hours – even if you think you understand all the material. Taking more than one small class from a teacher may be helpful. Getting an evaluation from an instructor in a small upper-level class in which you have demonstrated exemplary work is ideal.

In addition to science evaluations, academically challenging courses in a non-science subject of interest will be one excellent means to demonstrate your intellectual versatility. Undergraduate research provides another wonderful opportunity for interested students to develop relationships with faculty. Do not underestimate the importance of these letters, and do not leave this task until late in your junior year.

³ Explanation of Scores for Advisors, Association of American Medical Colleges, September 1994, p. 1.

In addition to questions from students about major, requirements for admission, the MCAT and recommendation letters, here are a number of additional questions frequently asked, with our answers.

IS THERE A PREFERENCE SHOWN FOR THE BACHELOR OF SCIENCE OR BACHELOR OF ARTS DEGREE?

No. Each applicant's record is evaluated on an individual basis. Both Bachelor of Science and Bachelor of Arts degrees are acceptable for premedical programs. Often a B.S. program in the sciences requires a student to delve into the subject in greater depth, and an admission committee will be aware of this fact. However, an admission committee would expect an applicant to do well with either degree. The B.A. degree leaves room for a greater breadth of study and this, too, may be attractive to all admission committees. Committees look at the quality of the transcript rather than the name of the degree.

SHOULD I ENROLL IN AN HONORS PROGRAM?

If it interests you, yes. Admissions committees look at the level of difficulty of an applicant's course work. In many instances, the greater depth and breadth of honors programs/courses are reflected in a greater knowledge of the subject area in question. Classes are often smaller, and classmates are similarly motivated achievers. Many successful medical school applicants have enrolled in honors programs; however, many successful applicants have completed rigorous curricula which did not include honors courses.

DO MEDICAL SCHOOLS REQUIRE A FOREIGN LANGUAGE FOR ADMISSION?

The College of Arts and Sciences at Indiana University Bloomington requires the study of a foreign language. We know of no medical school that does; however, medical students and practicing physicians have found working knowledge of a second language very helpful.

WHAT'S SO DIFFICULT ABOUT BEING A PREMEDICAL STUDENT?

For many freshmen, the most difficult task is to acquire the study skills and self-discipline required to attain academic excellence. Many freshmen premed students have been highly successful in high school. They have been accustomed to being "stars", frequently without having developed systematic study habits. The success of your academic transition to Indiana University Bloomington depends not only on ability, but also strongly upon motivation, organization, and the learned skills of studying effectively. Some of you will initially be discouraged and will have to have the determination to learn how to study more systematically. Demands of the premedical curriculum are rigorous. You may have to work harder than students who are not aiming for competitive admission graduate programs.

IS IT BECOMING MORE DIFFICULT TO GET INTO MEDICAL SCHOOL?

Even among those students who succeed in passing the premed required coursework and take the MCAT, in most years less than half of all applicants to MD programs are admitted. In 2009 there were 18,771 applicants competing for 40,811 seats in allopathic medical schools. If you do the math, that means that fewer than one out of two applicants were admitted. There are far fewer seats available in medical schools than qualified applicants. Medical school admission committees are able to ask for high standards. Freshman students should anticipate that by the time they apply they may need to meet higher admission standards than were in effect when they started college. You must be determined, well prepared, and well informed. You should actively explore alternative approaches and alternative careers – keep your options open!

IS IT ALL OVER IF I HAVE A BAD SEMESTER?

There is a false but persistent rumor among freshman premedical students that if you have a bad science grade or a bad semester you will have to give up. That's not true. Medical school admission committees look carefully at student abilities and development. They realize that not every student enters college with a burst of academic brilliance. They expect an excellent academic record, but will make allowances for problem semesters or a slow start---**some** allowances.

WHEN SHOULD I TAKE THE MCAT?

The best advice is to take the MCAT when you have thoroughly prepared and are ready to perform well on the exam. We generally recommend that students complete all basic premed science requirements and do

significant preparation through review and practice testing before taking the exam. If you are planning to begin medical school directly following graduation, then you should plan to complete all basic premed requirements by the spring of your junior year, and take the MCAT early in the summer between junior and senior year. You will want to take the MCAT by early summer of whatever year you plan to apply to medical school. For example, if you are applying for the entering medical school class of fall 2014, we would recommend that you complete all premed requirements by spring semester of 2013 and take the MCAT in the early summer of 2013.

Some students attempt to take the exam in the summer after sophomore year if they have already completed the premed requirements, but we find that they sometimes do not obtain the level of score they are seeking because they have not had as much time to prepare for the exam. If you are considering taking the exam this early in your college career it is critical that you consult with an advisor in HPPLC first, in order to discuss your goals for admission to medical school.

WHAT IS THE MEAN GRADE-POINT AVERAGE (GPA) OF STUDENTS ADMITTED TO MEDICAL SCHOOLS?

It varies from school to school. The average GPA for the Indiana University School of Medicine usually is around a 3.7 or 3.8. Talk with an advisor about this. While numbers are important, trends, courseloads, and personal circumstances all may enter into admissions decisions. Preserving a 4.0 GPA by taking a light courseload, spreading science courses out, or completing them over the summer or at other campuses can be self-defeating, as admissions committees are on the lookout for students who are pursuing such strategies to artificially inflate their GPA's. Beware of advice to take certain courses that are thought to be "easy" in order to boost your GPA (such advice can often be faulty, anyway). If premedical students on our campus have determined that they are "easy" courses, medical school admissions committees might make the same determination.

ARE EXTRACURRICULAR ACTIVITIES IMPORTANT?

In addition to high levels of academic achievement, medical schools look for many traits in applicants, including motivation, evidence of humanism, responsibility, maturity, leadership, communication skills, breadth of interests, and ability to manage multiple tasks. Students are encouraged to participate actively, but not to substitute activities for academic excellence. Moreover, a list of organization memberships means little to experienced committees. An admissions committee will be interested to know what you have contributed.

There is no list of preferred activities. However, volunteer activities through which you develop your interpersonal skills and gain experience working with people from a wide variety of backgrounds (not just fellow college students), are especially relevant. Any volunteer activity that requires you to provide support for people facing distress will especially be valued by admission committees as helping you to prepare for the role of a physician.

A good beginning resource for finding appropriate volunteer activities can be found in the medicine section under "Community Service Experience" on the HPPLC website (<http://www.hpplc.indiana.edu/medicine/med-coexp.shtml>). This section provides information on the types of activities you may wish to seek and web resources for locating volunteer agencies. Also, a central location for those seeking these activities may be found in the Bloomington Volunteer Network website at <http://bloomington.in.gov/volunteer/>.

WHAT IS OSTEOPATHIC MEDICINE?

Osteopathic Physicians (DOs) are fully licensed physicians and share the same privileges as MDs. They can analyze, diagnose, prescribe drugs and therapy, perform surgery, and pursue all of the medical specialties available to MDs. In addition, they receive hundreds of hours of additional training in manipulative medicine techniques and diagnosis. With Osteomaniulative Treatment (OMT), Osteopathic Physicians use their hands to diagnose injury and illness and encourage the body's natural healing processes. The patient is viewed as a whole rather than a collection of parts. Special attention is focused on the musculoskeletal system as it reflects and influences the condition of all other body systems. Osteopathic schools hold that this training makes possible a better understanding of the ways that an injury and illness in one part of your body can affect another.

WHAT CHANCE DOES A NONRESIDENT HAVE AS AN APPLICANT TO THE INDIANA UNIVERSITY SCHOOL OF MEDICINE?

Many state-supported schools show preference to their own state residents. It is not unusual for the Indiana University School of Medicine to offer places to 100 or more nonresidents per year, and non-resident Indiana University students with good records are encouraged to apply.

HOW DO I KNOW IF MEDICINE IS THE RIGHT CAREER FOR ME?

Read, talk, listen, observe, and compare. Shadow physicians to learn what they do on a day-to-day basis. Read about healthcare issues and changes occurring in medicine. Talk with physicians about what they like and don't like about their profession. Attend HPPLC meetings and listen to health professionals who come to talk about their careers and answer student questions. Pay attention to your progress in the sciences. Are you a good science student? Observe through volunteer opportunities what it will be like to work with people requiring medical assistance. Investigate other careers so you have some comparisons. That's a lot of work--but if you enter the medical profession, you may be a physician for forty or more years. Make sure that you like doing what physicians do.

HOW CAN THE HEALTH PROFESSIONS AND PRELAW CENTER HELP ME?

Preparing for medical school requires careful, long-range planning and accurate information. Advisors at the Center specialize in helping students prepare for medical careers, and you should periodically set up an appointment to meet with us. Course selection, course sequencing, minors, MCAT preparation, how to request recommendations, and completing applications are among the subjects that we can address with you. Our website contains useful information on preparing for medical school and other health professions. Remember that we want to contribute toward your successful entry to a program of your choice.

We encourage you to use e-mail to ask questions, check your recommendation files, and to communicate with our premed advisors. Send e-mail to an individual premed advisor or to hpplc@indiana.edu.

This document has been prepared for Indiana University - Bloomington students by the Health Professions and Prelaw Center. Please note that specific requirements and policies can change at any time without notice. Students are responsible for obtaining the most current information directly from the application services, schools, and programs in which they have an interest.