

**Pre-Medical
Education at the
University of Oregon
2006-2007**



**Prepared by:
The Office of Academic Advising
Pre-Health Science Center
364 Oregon Hall • 346-3211**

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Pre-Medical Education at the University of Oregon

This pamphlet is intended as a general outline of the pre-medical program. It provides a broad outline only and should be used as a map to locate sources of more complete information. Use the pamphlet as a guide but not as a substitute for conversation with university advisers.

Curricular Requirements for Medical School Admission

High School Background

As a potential applicant to medical school, you must, of course, satisfactorily complete a four-year high school program or its equivalent. Where possible, basic science requirements should be supplemented with additional work in laboratory sciences and in mathematics. While the additional work is not mandatory, the skills acquired may permit enrollment in advanced or honor sections of classes at the university level. The high school transcript itself is not used in the selection process, but the skills and habits learned and developed in high school influence the success of the college program. If possible, you should also take advantage of classes or voluntary employment which brings you in contact with medical situations.

If you took Advanced Placement (AP) tests and earned credit, you must speak with your advisers about the risks of by-passing lower-division science courses. **Not all medical schools accept AP work in lieu of requirements.**

Undergraduate Requirements for Medical School

General Requirements:

All medical schools require the equivalent of three years of full-time work in an accredited college or university. If admitted without a degree, you are usually expected to complete your bachelor's degree within two years of starting medical school, either through the transfer of credit for work done at medical school or through summer session work. More than 90% of the first-year medical students in the nation have completed an undergraduate degree.

Oregon Health & Science University School of Medicine requires that a bachelor's degree be completed prior to first attendance. It may be possible to save some time through intensive summer course work. The current trend in admissions has favored the older student with medically related experience.

Specific Course Requirements:

Specific course requirements vary between medical schools; minimum expectations are, however, markedly similar. All schools require some work in biology or zoology, chemistry, physics, and mathematics. Exact admissions requirements are detailed in the yearly revised *Medical School Admissions Requirements: USA and Canada* (MSAR). This text may be ordered through <<http://www.aamc.org/>>.

A recent edition is in the office of the Pre-Health Science Adviser for quick reference, and in the Pre-Health Science Center library (364 Oregon Hall). You should review the variations in requirements early in your academic career to insure time to cover any outstanding deficiencies. Foreign-language requirements are especially important to note.

For most Oregon *residents* the Oregon Health & Science University (OHSU) School of Medicine in Portland represents their first choice. Its stated *minimum* requirements include:

- *A Bachelor's Degree*
- *Chemistry*—Two academic years of chemistry (with lab) to include general chemistry (with lab) and organic chemistry (with lab). An introductory course in biochemistry is required. Courses in advanced chemistry are recommended for applicants considering special medical programs e.g. M.D./Ph.D. Combined Degree Program.
- *Biology*—One academic year of general biology. A course in basic genetics is required. Advanced courses in molecular biology are recommended for applicants considering the M.D./Ph.D. Program.
- *Physics*—One academic year of general physics (with lab).
- *College Mathematics*—One college level math course (semester/quarter) such as algebra, calculus, etc. Calculus is recommended.
- *Humanities (Arts & Letters), Social Sciences and English*—One academic year of humanities, one academic year of social sciences and one academic year of English to include at least one course in composition.

Recommended University of Oregon Curriculum:

The minimum requirements for admission to OHSU School of Medicine and many other medical schools can be met with the following classes:

- General Chemistry CH 221, 222, 223 with laboratories CH 227, 228, 229 or Honors General Chemistry CH 224, 225, 226 with laboratories CH 237, 238, 239.
- Organic Chemistry CH 331, 335, 336 with laboratories CH 337, 338 (third term lab optional.)
- A year of Biology (BI 251, 252, 253). Advanced courses in Genetics (BI 320) and Biochemistry (CH 461, 462, or 463) are required by OHSU. BI 251-253 or BI 211-214 can be used to meet one of these course requirements but not both.
- Minimally you need the skills of College Algebra (Math 111) and Elementary Functions (Math 112) to function in course work and to prepare for the MCAT. A few medical schools and all science majors require calculus.
- General Physics PHYS 201, 202, 203 with laboratories PHYS 204, 205, 206.
- Arts and letters courses can meet UO graduation requirements and OHSU humanities requirements. Literature courses from English are recommended.
- Social science-as above. Psychology, sociology, and anthropology are recommended.
- The English requirement can be met with WR 121, WR 122 or 123 and a third course from the English department (literature) in *addition* to the year of arts & letters.
- All of the courses listed above should be completed on a graded basis.

Specific courses are recommendations only, and, in some instances, alternatives may be acceptable or preferred to meet admission requirements.

Transfer students, for example, might have completed courses with entirely different numbers and titles which would still be adequate. Note that most medical schools prefer that the majority of pre-medical requirements be completed at a four year college.

Pre-medical Model Programs:

The following represents a four-year program model and a one-year Post Bac model. The models only suggest two sample arrangements. Other programs may be possible, especially through the use of intensive summer courses. All models assume a math placement of Math 111.

The Pre-Medical Curriculum:

Freshman Year:

<u>Fall Term</u>	<u>Winter Term</u>	<u>Spring Term</u>
CH 221 ¹ + 227 lab -or- CH 224 ² + 237 lab MATH 111	CH 222 + 228 lab -or- CH 225 + 238 lab MATH 112	CH 223 + 229 lab -or- CH 226 + 239 lab MATH 246, 251 or 261 ³ (if needed for major)

- Consider:**
- Begin Health-Related Experience
 - English Composition (*graded*)
 - Arts & Letters, Social Science or Multicultural classes
 - Major requirements (*if a major has been chosen*)

Sophomore Year:

BI 251 ⁴ CH 331 + 337 lab (math continuation)	BI 252 CH 335 + 338 lab	BI 253 CH 336 + 339 lab* (* <i>optional lab</i>)
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- Consider:**
- English Composition (*graded*)
 - Arts & Letters, Social Science or Multicultural classes
 - Major requirements (*if a major has been chosen*)

Junior Year:

PHYS 201 + 204 CH 461 ⁵	PHYS 202 + 205	PHYS 203 + 206 MCAT BI 320 ⁶
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- Consider:**
- English literature (*graded*)
 - Arts & Letters, Social Science or Multicultural classes
 - Major requirements

Senior Year:

Completion of all University and department requirements.
Apply to medical school during the summer prior to senior year.

Comments:

1. General Chemistry (CH221) requires prior experience in high school chemistry. MATH 111 & 112 are required as a pre- or co- requisites.
2. Honors General Chemistry (CH224-226 with 237-239 labs) requires a strong background in chemistry and math. Corequisite: calculus sequence.

3. There are 3 calculus sequences appropriate for science majors: MATH 246-247 Calculus I & II for Biological Sciences, MATH 251-253 Calculus I, II, & III, and MATH 261-263 Honors Calculus I, II, III. Consult with your major adviser for the appropriate sequence.
4. BI 251-253 requires prerequisite or concurrent enrollment in organic chemistry, CH 331, 335, 336.
5. Students may choose from CH 461-463 to meet the biochemistry requirement. Consult with the chemistry department.
6. Upper division genetics courses are highly recommended. OHSU requires one course in genetics and one course in biochemistry for admissions. BI 211-214 or BI 251-253 from the U of O may meet one of these requirements but not both.

Post-Baccalaureate Accelerated Pre-Medical Curriculum:

<u>Summer:</u>		
<u>4 Week Session</u>	<u>3 Week Session</u>	<u>4 Week Session</u>
CHEM 221 ¹ & Lab 227	CHEM 222 + Lab 228	CHEM 223 & Lab 229

<u>Fall</u>	<u>Winter</u>	<u>Spring</u>
CH 331 & Lab 337 BI 251 ⁴	CH 335 & Lab 338 BI 252	CH 336 & Lab 339* (*optional lab) BI 253

<u>Summer:</u>		
<u>4 Week Session</u>	<u>4 Week Session</u>	<u>Irregular Session</u>
PHYS 201 + Lab 204	PHYS 202 & Lab 205	PHYS 203 & Lab 206 (August - MCAT)

<u>Fall</u>	<u>Winter</u>	<u>Spring</u>
CH 461		BI 320

- This model assumes math proficiency of at least Math 112, Elementary Functions and experience in high school chemistry.
- Post-Bacs should consider a two year preparation model with some upper division work in Biology and the April MCAT, if possible. Consult the pre-medical adviser to create a plan that meets your individual needs.

The Undergraduate Major and Academic Advising

The curricular and non-curricular requirements described so far constitute the pre-medical program, but not an undergraduate major.

Science Majors

Given the pre-medical curriculum, the obvious and ready major is someplace in the sciences; chemistry, biology, biochemistry, human physiology, general science, mathematics, physics, and psychology dovetail most efficiently with the recommended classes. Many of the requirements of those majors are satisfied with the pre-medical offering. As the requirements vary considerably between the majors, you should plot your second year in college very carefully in anticipation of a major choice if you have not already committed yourself.

Non-Science Majors

Almost all medical colleges make a special point of welcoming non-science majors. They emphasize their interest in candidates who demonstrate competency in other disciplines, from business to music. Obviously, it demands scrupulous planning to satisfy degree requirements in a non-science major and still complete the pre-medical curriculum. UO records show non-science majors are very successful in gaining admission.

The Major as an Alternative Career

As a pre-medical student, you should face realistically the possibility of not gaining admittance to medical studies. What will you do if you are not accepted? Another health allied career? Reapply? Don't be surprised if you are asked this often by friends, advisers, and interviewers. It isn't intended to discourage you but to remind you of the realities of medical school application.

Academic Advising

When you enter the university, you should be assigned an adviser by your major department or the Office of Academic Advising if you are undeclared. She/he should be available to discuss any academic problems you have and should discuss with you the career possibilities of the major. Ideally, she/he is an individual with whom you will have contact over a period of years. You should seek out your departmental adviser often, especially during regular registration periods. The Pre-Med adviser, Karen Cooper, is an adviser on career choices and on admission procedures in the health fields.

Non-Curricular Requirements for Medical School Admission

The Medical College Admission Test (MCAT)

The MCAT includes 4 subtests:

- Verbal Reasoning
- Physical Sciences (General Physics & General Chemistry)
- Writing Sample
- Biological Sciences (Biology & Organic Chemistry)

The best preparation for the science examinations is the required pre-medical program. The verbal reasoning section can best be prepared for through study in the university's arts and letters and social science curriculum. Improving writing abilities requires writing experience spread out over as long a time as possible, including the freshman composition courses and any other course which permits (or requires) that students write term papers and write essay examinations in lieu of standardized multiple-choice questions. Information of on-campus and commercial review courses is available in the Pre-Health Science Center. Watch for the MCAT preparation workshop in the fall term.

The MCAT is given 22 times per year from January to September each year. The computerized MCAT will now take 30 days to score instead of the two months for previous paper tests. With the more frequent offerings of the test and faster turnaround on scores, students can now take the exam between January and June and still have their MCAT scores available for timely submission of medical school applications in July. July, August, and September test dates are also available, but students should plan for earlier test dates if applying that academic year. Both Allopathic and Osteopathic schools require the MCAT. Advance registration is required to take the MCAT. For more information and to register for the MCAT, go to <http://www.aamc.org/mcat/>.

Reference Letters

The letters of evaluation you submit to medical schools are extremely important. It is your obligation to become familiar with potential letter writers who provide clear, confidential judgments of you as a student, and as a human being. You must find writers who can provide what transcripts and test scores cannot: an estimate of your character, motivation, imagination, originality, scope of interests and skills, and even your emotional maturity.

Medical schools want information which can help them confirm that you will be a good science student and that you have the personality traits to be a competent physician. Since the University of Oregon does not compose an institutional letter, students will be approaching individuals for letters of evaluation. Some schools desire all supportive letters from the science faculty; others want a mix of science and non-science letters; still others ask for additional letters from persons out of the academic community entirely. Letters from a physician, volunteer endeavors and/or medically related employment may be requested by some schools. Be sure to read carefully all the information you receive from the medical schools to be sure you are replying with the letters and information requests particular to that school.

All medical schools prefer confidential reference letters. Whether you select a reference letter service or send letters in on your own be sure your letters are confidential. For more information on reference letters, please contact the Pre-Medical Adviser in 360 Oregon Hall.

Official Transcripts

All medical schools require official transcripts from **every** college you have attended. Although few medical schools publicly list mandatory GPAs for admission, accumulated statistics illustrate that only applicants with averages at 3.3 and above stand a good chance of admission. The recent national mean for accepted applicants was 3.6 in all college work. 3.6+ in science has been the mean at OHSU for several years.

Take all required courses graded. OHSU notes that "grades as 'pass' or 'satisfactory' are not acceptable for courses prescribed as requirements for admission." This includes: English and writing classes which are often required and should be taken graded.

In general, you should avoid dropping below a full academic load of 15 or 16 credit hours.

Health Related Experience

Health related experiences are a necessary part of the preparation for medical school. Not only is this a test of your own interests, but it is the exposure necessary to understanding what a medical career entails. The types of experiences are varied and range from working in a hospital or clinic, as an EMT, peer health educator, hotline counselor, working in summer camps for children with disabilities to volunteering with organizations such as the HIV Alliance or American Cancer Society. A research environment is also relevant. The experience does not have to be volunteer although in most situations this will be the case. CNA or phlebotomy training are two ways to acquire health related experience while being paid. The Pre-Health Science Center can provide you with a list of some suggestions for obtaining health related experience and further understanding of what medical schools are looking for in a candidate for their program.

The Application Process

The American Medical College Application Service (AMCAS):

The American Medical College Application Service is a non-profit service organized and administered by the Association of American Medical Colleges. Its role is the facilitation of the application process; it offers no advice and reaches no judgments. The service acts as a clearinghouse: collecting, processing, and distributing the materials of application. Some medical schools use the AMCAS as the first of a multi-stage process. The Oregon Health & Science University School of Medicine will only accept applications through AMCAS. (See *Medical School Admission Requirements [MSAR]*.) The AMCAS application is now electronic. You may access it at <http://www.aamc.org/> from April to October.

Non-AMCAS Schools:

You will have to contact directly schools not utilizing the AMCAS to request individual application materials. The MSAR indicates participating and non-participating schools as well as the earliest dates application forms may be requested.

AACOMAS:

Osteopathic schools handle applications through the AACOMAS application service. They begin application processing June of each year. Applications should be submitted as soon as possible as most schools will want to contact the student for further information such as letters of recommendation and secondary application forms.

Most application deadlines are in November of the year prior to admission, but early application is important. See <<http://www.aacom.org>> for more information.

The Personal Interview:

The personal interview is generally, but not uniformly, required of all serious contenders. Institutions may conduct interviews with an entire admission team or a single field representative. The interview might involve a quick air trip to an eastern city or a local motel. Anticipate and be prepared for any mode of interview. Be prepared for the cost of interview trips. Be sure to review the *Interview Report* notebook in the Pre-Health Science Center, which includes former UO students' reactions to interviews.

Ideally, the interview is two-way. The interviewer wants additional information about you, and you should want some specific information about the school. The interviewers often begin by referring to your personal statement, asking for elaboration; they might ask you about your academic successes and failure, your special interests in medicine, or your reasons for choosing their particular school, but they also want you to demonstrate a potential for conversation. Pick-up sample questions in the Office of Academic Advising.

Interviewing schedules start as early as August and continue into the spring of the following year.

An Application Calendar:

This calendar is designed for the applicant who chooses the four-year preparation. Students may also delay applying until after graduation.

Junior Year:

Fall Term

- Begin collecting reference letters
- Attend MCAT preparation workshop

Winter Term

- Review for the MCAT
- Register for spring MCAT <<http://www.aamc.org/students/mcat/>>
- Apply for MCAT and AMCAS fee waivers
<<http://www.aamc.org>>

Spring Term

- Take MCAT April through June
- Notify Pre-Med adviser of your intention to apply to medical school

- Attend application workshops, usually in April or May
- Review the MSAR and select schools of interest
- Begin working on AMCAS application and/or AACOMAS application <<http://www.aamc.org/>> and <<http://aacomas.aacom.org/>>
- Order applications from non-participating schools
- Anticipate costs of applying to medical school
- Continue collecting reference letters

Summer Term

- Complete and submit your AMCAS and/or AACOMAS application after you receive your MCAT results. If taking July or August tests submit application without scores.
- Submit a copy of you AMCAS application to the Pre-Med Adviser
- After Spring grades are posted order official transcripts from the Registrar's office
- Register for summer MCAT early in the summer, if earlier tests missed.
- Double check with medicals schools regarding the completeness of your application
- Mail application materials
- Receive and complete secondary applications from medical schools

Senior Year

Fall/Winter Term

- Continue receiving and completing secondary applications
- Review interview materials in the Pre-Health Science Center
- Consider scheduling a mock interview
- Consult with the pre-medical adviser

The Early Decision Program:

Some institutions have decided to announce appointments to medical school for a selected small group early in the fall. MSAR lists participating schools. Under the Early Decision Program, the student can apply to a single participating school of his/her choice in early summer and expect a decision usually by October 1st. The student cannot apply to more than one school until a decision is reached, and she/he is committed to accept any offer given.

The Early Decision Program is designed only for the superior candidate—the candidate with excellent chances of being admitted to any medical school. Some state medical schools will consider non-resident applicants only through the Early Decision Program. OHSU does not accept early decision applications.

Selecting Medical Schools:

Begin thinking about selecting medical schools long in advance of the application time. Since selection for interviews depends first on residency, then on GPAs and MCAT scores, a reasonable approach is to review the MSAR. Match your objective data to national means; examine which schools admit non-residents and then pick perhaps 15 (besides OHSU) that appeal to you. Cross-check the school's website for information on their academic program and profiles of recent classes. Then, read the individual school catalogs and the *AAMC Curriculum Directory*; ask critical questions of yourself and your interests: Do you want to wait until your third year for clinical experiences? Do you want schools which have only Pass/No Pass grading systems? Do you want instructional programs which are self-managed? Computer managed? A common question at interviews is "Why do you want to come to this particular school?" You must have an informed answer. In selecting schools, you should ask yourself how you will finance your education.

When selecting medical schools, you can use the resources of the Pre-Health Science Center, but also consider the information available on the web. Each medical school has information on its academic programs and admission procedures; there are chat rooms of premedical and medical students. Testing agencies discuss their wares. In addition, there is much information on current medically related topics: managed care, health care reform, physician assisted suicide, etc. Many links are found on the Pre Health Science web site <<http://advising.uoregon.edu/prehealth/>>.

Most students apply to 10-11 schools. If your grades and MCATs are below the national means of accepted students, you might wish to apply to more schools, but don't waste time and money applying to schools far above your qualifications.

Foreign Medical Schools—Information is available in the Pre-Health Sciences Center on this route to medical school.

Chances for Admission: Self-Evaluation

The best way to assess your chances for gaining admission to medical school begins with a review of selection features.

Applicants and First-Year Places— In 2005, roughly 45% of the national pool of applicants were accepted. OHSU admits 120 students to its medical program each year. In 2006, 70% of the matriculants were residents of Oregon. The average GPA of matriculated students in 2006 was 3.63. Reapplication by strong students is usually welcome. Osteopathic schools are a bit less focused on grades.

Residence—The likelihood of acceptance is greatest at the public institutions in the state of which you are a legal resident. Most state schools automatically screen out non-residents unless their objective record is spectacular. OHSU does accept non-residents.

MCAT Scores—MCATs are scored on a 1–15 scale on each of the three sections. The national mean score of accepted applicants has been 10's on each section for the last two years. OHSU means have been 10's and 11's on each section with a composite score of 31.

Academic Record—Next to residency, the GPA appears to be critical in selection. The national mean has been 3.5 to 3.6 for some time. Good grades guarantee nothing, however, by themselves. They do indicate a solid performance in the past and can be used to predict a high probability of repeated success in the first two years of the medical school curriculum. It is clear that students with a 3.2 GPA and below are in a high-risk category.

Motivation—Grades prove scientific competence; medically allied experience can demonstrate both your commitment and your understanding of health careers. Pick up the handout on medically related experiences at the Office of Academic Advising. **Don't ignore this important part of your preparation. Health-related experiences are required at most schools.**

Minority Students—All U.S. public and private schools are seeking under-represented minority and other non-traditional applicants. Be sure to contact the pre-medical adviser for information.

International Students—When applying to public schools, foreign students are considered non-residents. Private schools accept some foreign students; review the MSAR for recent statistics. UO foreign students have in the past few years been accepted at Albert Einstein College of Medicine, Jefferson Medical College, the University of Toronto Faculty of Medicine, Northwestern, Medical College of Wisconsin, Creighton, Washington University (St. Louis), and Chicago Medical. Students with permanent residence (green card) status are considered U.S. residents.

Of Special Interest

Asklepiads—Asklepiads is a club at the U of O, formed by students who are interested in pursuing a medical career. Asklepiads provides opportunities for medical preceptorships, volunteer projects, and presentations by relevant speakers. Email: health@gladstone.uoregon.edu

The Pre-Health Science Center—The Pre-Health Science Center gathers and publishes information on programs in the health field. There are over 200 professional and occupational categories in health-allied jobs, and while the medical doctor is often the first profession considered, it should not be the only one examined as a career possibility. Many other fields require the same undergraduate preparation as outlined in the pre-medical curriculum. The recommended freshman program of chemistry and mathematics, for example, prepares one as well for dentistry, medical technology, optometry, osteopathic medicine, pharmacy, physical therapy, podiatry, veterinary medicine, and many other health professions.

Scholarships—The Pre-Medical Scholarship Committee awards three scholarships each year.

- The Kenneth A.J. Mackenzie Memorial Scholarship is awarded annually to an outstanding pre-medical student accepted for enrollment in OHSU for the following year.
- The William and Marjorie Shearon Memorial Scholarship in Medicine is an award given to an outstanding University student accepted at a United States medical school.
- The John J. and Corabelle Rogers, John Fielding Ambrose and Glenn and Marjorie Keiper, Minnie Morden Pre-Medical scholarships are awarded annually to a pre-medical student on the basis of scholarship and financial need. The awards are for one year. The awardee must have demonstrated scholastic aptitude at the level generally needed for admission to medical schools and fully intend to enroll in medical school upon completion of his/her pre-medical curriculum.

We strongly encourage all pre-medical students to apply for all university scholarships through the office of student Financial Aid at <http://financialaid.uoregon.edu/scg-univ.html>. Contact the pre-health adviser in 360 Oregon Hall to apply for the Mackenzie and Shearon Scholarships. For more information see <http://advising.uoregon.edu/prehealth/scholarships.htm> or contact the pre-medical adviser in 364 Oregon Hall. Financial assistance is also available through military scholarships.

Osteopathic Medicine

Osteopaths are physicians like M.D.s, differing only in that they have graduated from an institution granting the D.O. degree rather than the M.D. degree.

Osteopathic physicians share "equal but separate" status with M.D.s; both are licensed in the U.S. to deliver full health care. Osteopathic physicians maintain that all patients should have a choice to select the kind of health care of their preference and that no single organization of physicians should have the advantage of monopolizing the health care system. As a result, the profession has resisted past attempts by the AMA to merge the two.

Osteopathic physicians do the same types of things as allopathic physicians. They are not chiropractors or physical therapists. Only M.D.s and D.O.s are fully licensed to practice all areas of medicine which include performing major surgery and prescribing drugs. The osteopathic curriculum is intended to interrelate the body systems and to emphasize the overall influence of the musculoskeletal system. Some 300-500 additional hours are spent learning osteopathic techniques employing palpation diagnosis and manipulative therapy to be used in conjunction with all other forms of medicine.

American Osteopathic Association
<<http://www.aoa.org/>>

American Association of Colleges of Osteopathic Medicine (AACOM)
<<http://www.aacom.org/>>

Related Health Fields

Chiropractic Medicine
Association of Chiropractic Colleges
<<http://www.chirocolleges.org>>

Naturopathic Medicine
American Association of Naturopathic Physicians
<<http://www.naturopathic.org>>

Podiatric Medicine
American Podiatric Medical Association
<<http://www.apma.org>>
American Association of Colleges of Podiatric Medicine
<<http://www.aacpm.org/>>

For periodic updates on health-related events, pertinent announcements and deadlines, and articles of interest, join the Pre-Health list serve. Notify karenc@uoregon.edu to be added to this list.

The University of Oregon is an equal opportunity, affirmative-action institution committed to cultural diversity and compliance with the Americans with Disabilities Act.

*This publication will be made in accessible formats upon request—
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