

Holy Cross Premedical Program Primer

This primer was developed to help you make the most of the academic and advising resources here at Holy Cross, to help you consider different *paths* to medical and health professional schools, and as a general guide to course selection. This handout was not developed, however, to replace person-to-person advising; specific questions should be directed to your academic and premedical advisors.

The successful applicant to medical school

First, let me make a few general comments about premedical preparation and getting into medical school. While numbers of applications have dropped from a high of more than 45,000 for allopathic medical schools in the mid 1990's to about 38,000 currently, there are still many, many more qualified applicants than there are spots in medical school classes. A typical private medical school, for example, receives 6000 applications, interviews 700 applicants, and accepts 220 students to fill a class of 130. Clearly many excellent candidates do not get accepted. Moreover, the typical entering student is older – more than 24 years old at many medical schools (out of college at least two years). Clearly, students are accumulating meaningful experiences in basic and applied research, clinical work, volunteer settings, and more and more, in business settings prior to entering medical school. Consequently, whereas twenty years ago most students applied to medical school at the earliest possible time, i.e., after their third year – after completing the basic premedical requirements and then taking medical school admissions tests (MCAT) – today most successful applicants take a longer, less direct path to medical school. I say this only to emphasize that you should think of getting into medical school as more of a “marathon” than a “dash”: that all things being equal, e.g., science and non-science grades, etc., medical schools frequently prefer older and more “seasoned” applicants.

So how do you prepare for medical school at Holy Cross? The basic requirements for a successful application to medical school have not changed much in twenty years. You will still need to do well in required premedical courses *when you take them*, you will need to do reasonably well on the MCAT *when you take them*, and you will need to demonstrate personal integrity, interpersonal skills and maturity, a sense of dedication and service to others, and an authentic interest in medicine. However, you should take note of the italicized comments. Given the normalcy of older applicants, you should feel no rush to fit everything into your first three years at Holy Cross and thus be able to apply as soon as possible. Instead, you should feel free to consider a wide range of alternative paths to medical school, most significantly paths that include four years of course work at Holy Cross, paths that include more than just the required premedical science courses, paths that include a year of Study Abroad or participation in an academic concentration at Holy Cross, the Honors Program, etc. You may even consider paths to medical school that extend beyond four years at Holy Cross – paths that include significant research, business, or volunteer experiences after graduation. Indeed, the Premedical Committee provides counseling and support to many alumni who have had extraordinary experiences in the 2, 3, or 4 years since graduating from Holy Cross.

Premed is not a major

The selection of an academic major discipline is largely independent of the decision to be a premedical student. The best advice we can offer regarding the selection of a major discipline is perhaps somewhat clichéd: Choose an area of study that you really enjoy, an area you wish to learn in some breadth and depth. One neednot major in biology, for example, to be successful at getting into medical school. On the contrary, we have found no difference in the success rates of applicants who are biology majors vs. other majors, or of science vs. humanities majors, so long as students do well in the required premedical courses *when they take them*, and do well in their major discipline and other courses. Indeed, in the past three years, among our most successful applicants are many humanities and social science majors.

If you are currently designated as a premedical student at Holy Cross, then enrollment in the following required premedical courses is virtually guaranteed during your four years at Holy Cross:

One year of Mathematics – At Holy Cross, demonstrating competence in a full year course of calculus fulfills this requirement. There are several ways of doing this:

Most frequently, premedical students complete two semesters of *Calculus for the Physical and Life Sciences* (Math 131, 132) or *Intensive Calculus for the Physical and Life Sciences* (Math 133, 134), which meets more frequently each week. These courses provide excellent preparation for all students interested in coursework in the sciences and mathematics.

Students interested in majoring in economics should fulfill this requirement by completing *Calculus for the Social Sciences* (Math 125, 126). This introductory calculus course was developed specifically for economics majors. It is a terminal sequence, which is not recommended for students who will require additional mathematics or scientific coursework.

For students who have taken a year of calculus in high school or who have received a unit of advanced placement credit for calculus, the one semester version of Math 131, 132, *Advanced Placement Calculus* (Math 136), fulfills this requirement.

One year of Physics with laboratory – Premedical students fulfill this requirement by completing *General Physics in Daily Life* (Physics 115, 116), which has interactive experiments fully integrated into the lecture course, or by completing the traditional introductory lecture course, *General Physics I and II* (Physics 111, 112) with associated laboratories (Physics 113, 114). Since these are both calculus-based physics courses, students should have completed calculus previously or should enroll in calculus concurrently.

Two years of chemistry with laboratory – Premedical students fulfill this requirement by completing the following sequence of courses: *Atoms and Molecules* (Chem 101), *Organic I* (Chem 221), *Organic II* (Chem 222), and *Introduction to Equilibrium and Reactions* (Chem 231). These courses integrate lecture and laboratory, thus no additional laboratory courses are required.

One year of biology with laboratory – Premedical students can fulfill this requirement in different ways:

Premedical students who are not biology majors typically fulfill this requirement with *General Biology I* and *II* (Biology 120, 121). These courses integrate both lecture and laboratory, and are most frequently completed during the third or fourth year after the student completes introductory and organic chemistry.

Premedical students who are biology majors fulfill this requirement with a sequence of courses required for the major including *Introduction to Biology I* and *II* (Biology 131, 132) each of which includes a laboratory, and *Genetics* (Biology 261) which also includes a laboratory. While these three courses provide a sound foundation for the MCAT and for medical school, biology majors are required to take at least five other courses from the biology department's offerings (three with laboratory).

One year of English language or literature – Many courses are in keeping with “spirit” of this requirement – namely that students be able to critically read important works written in English and be able to express themselves clearly in writing. Completing two semesters of English literature or composition is the most obvious and readily acceptable way to fulfill this requirement. But other courses not taught by professors in the English department, e.g., a mythology course offered by the Classics department, or a comparative literature course offered in English by the Modern Languages department, may well fulfill this requirement.

The courses described above provide only the most basic requirements for the Premedical Program at Holy Cross and for application to medical school. *When* students take these courses, e.g., whether they “pack” these courses into the first three years at Holy Cross or “spread them out” over four years, and *how students augment these basic requirements*, e.g., what other basic science and humanities courses they complete, what major they choose, whether they participate in an academic concentration, College Honors, the Washington semester or Study Abroad programs, is largely a matter of personal choice and planning on the part of the student.

For students who are very clear about their interest in a medical career, have had significant medically relevant experience, and who excel in the sciences, a three-year sequence of premedical courses (like that described in the “three-year path” below) may be reasonable. Such a sequence will permit the student to apply for admission to medical school in the fall semester immediately after graduating from Holy Cross. In order to apply, the student *must complete all premedical requirements and take MCATs by the end*

of third year. Many students find that this is difficult to accomplish, and so a less direct and longer path may be more desirable.

Below, we offer two different sequences for preparing for medical schools as a way of highlighting the advantages and disadvantages of more direct (3 year) and less direct (4 year) paths. These are just examples and are not necessarily representative of your particular situation.

Three-year path for non-biology majors

First year - Chem 101, 221 or Physics 115, 116
 Math 131, 132
 An English course or two, e.g., CRAW (English 110)
 Courses selected according to your interests or to fulfill College common area requirements

Second year - Chem 222, 231 (if Chem begun during first year)
 Physics 115, 116
 Major courses, electives, and College common area requirements

Or

Chem 101, 221 (if Physics completed first year)
 Major courses and College common area requirements

Third year - Chemistry 222, 231 (if Physics completed first year and Chem started second year)
 Biology 121, 122
 Major courses, electives, and College common area requirements

Or

Biology 121, 122 (if both Physics and Chem completed)
 Major courses, electives, and College common area requirements

Clearly, the three-year path described above requires that students complete at least one year in which they are enrolled in two laboratory courses simultaneously. *This is particularly difficult to accomplish for some students who take Chemistry and Biology courses during the third year. These students must also prepare for and take the MCATs during the Spring semester of the third year if they plan on applying for admission to medical school for the fall semester immediately after their Holy Cross graduation.*

In light of such difficulties and given the older age of beginning medical school students, the four-year path described above is much more reasonable for the majority of Holy Cross students.

Four-year path for non-biology majors

First year - Chem 101, 221 or Physics 115, 116
Math 131, 132
An English course or two, e.g., CRAW (English 110)
Courses selected according to your interests or to fulfill College
common area requirements

Second year - Chem 222, 231 (if Chem begun during first year)
Major courses, electives, and College common area requirements

Or

Chem 101, 221 (if Physics completed first year)
Major courses and College common area requirements

Third year - Chemistry 222, 231 (if Physics completed first year and Chem
started second year)
Major courses, electives, and College common area requirements

Or

Physics 115, 116 or Biology 121, 122 (if Chemistry sequence is
completed)
Major courses, electives, and College common area requirements

Fourth year - Physics 115, 116 or Biology 121, 122 (the remaining requirement
is taken)
Major courses, electives, and College common area requirements

A four-year sequence of courses has many advantages over a three-year sequence, one of which is that students do not have to take two laboratory courses simultaneously. But it also has the advantage of offering the student the opportunity to take more than just the required science courses; e.g., *Biochemistry* can now be taken during the fourth year. Furthermore, it allows the student more time to prepare for the MCAT, and separates preparation for the MCAT, to a significant extent, from enrollment in required courses. Finally, and perhaps most significant, a four-year sequence permits students to explore different areas and programs of study, and to gain valuable clinical and service experiences. Students can participate in Study Abroad, enroll in academic internships, do independent research, work in a nursing home, etc., while also effectively completing premedical requirements when they use all four years at Holy Cross.

Both the three-year and four-year sequences presume that students take Chemistry or Physics courses in their first year. Even here, however, there is flexibility. For a variety of reasons, students may postpone the science courses until the second year. Perhaps students are not yet in the Holy Cross Premedical Program (see below), or although

admitted to the program, want to focus on other curricular options. These students should enroll in an English or a calculus course during the first year. During the second year, these students should begin the sequence of required science courses as described in the three-year path above.

For students who are not yet premedical students but want to be...

Students not yet in the Holy Cross Premedical Program can still take required premedical courses. They should, for example, enroll in an English or a calculus course. During sophomore year, they should register for basic science courses required by medical schools.

At the end of each spring semester, students can apply to the College's Premedical Advisor for entry into the Premedical Program. During the past five years, the Premedical Advisor has admitted many students to the Premedical Program. Students are selected for entry into the program based on their performance in relevant premedical courses. Interested students should contact, Professor Andrew Futterman, the College's Premedical Advisor, at ext. 2533.