Advice for applicants to MD-PhD programs

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There are lots of ways that people who would like to be both a physician and a scientist learn about MD-PhD training programs. However, you arrived at the point where you are considering it, separating fact from fiction is important. Reading this FAQ is one way to do that, but it should not be the only way that you find out what you need to know before diving in. Take a look at some of the sources cited in the FAQ and be sure to read the Disclaimer at the end.

What is the purpose of MD-PhD training?

MD-PhD programs provide training in both medicine and research. They are specifically designed for men and women who want to become research physicians, also known as physician-investigators or physician-scientists. Graduates of MD-PhD programs often go on to become faculty members at medical schools, universities and research institutes such as the NIH. Regardless of where they eventually end up, MD-PhD trainees are being prepared for careers in which they will spend most of their time doing research, not just taking care of patients. It is a busy, challenging and hugely rewarding career that offers opportunities to do good for many people by advancing knowledge, developing new treatments for diseases and pushing back the boundaries of the unknown. A study of what has happened to MD-PhD program graduates from 24 schools appeared in Academic Medicine in 2010 (Brass, et al. Acad. Med. 85:692, 2010) and is worth reading not only for the data set, but also for the discussion of what they data mean.

What is the difference between an MD-PhD program, a combined degree program and an MSTP program?

None. Programs designed to train physician-investigators go by all of these names. For the most part, the terms are interchangeable, although at some schools "combined degree" programs can include MD-JD and MD-masters programs as well. The NIH uses the term "MSTP" to refer to schools that have been competitively awarded special training funds to help support MD-PhD candidates. There are currently 43 NIH-funded MD-PhD programs.

A list of MSTP-designated programs can be found here on the NIGMS website:
http://www.nigms.nih.gov/Training/InstPredoc/PredocOverview-MSTP.htm.

A list of most of the active MD-PhD programs in the U.S. can be found here:
https://www.aamc.org/students/research/mdphd/applying_md-phd/61570/mdphd_programs.html

Are MD-PhD programs limited to those interested in laboratory research?

The answer varies from school to school. Not all schools offer PhD programs in all disciplines and, even if offered, medical schools may limit the disciplines that can be combined with MD training The vast majority of MD-PhD students receive their PhD in a biomedical laboratory disciplines such as cell biology, biochemistry, genetics,

immunology, pharmacology, neuroscience, and biomedical engineering. The names of departments and graduate programs vary from school to school. At some schools, MD PhD trainees do their graduate work outside of the laboratory disciplines in fields such as economics, epidemiology, health care economics, sociology, medical anthropology or the history of science. You should check before you apply to see what is actually offered at any particular school.

Although there is no fully up to date and reliable list of which MD-PhD programs offer training in which graduate disciplines, a place to start is at the website of the AAMC MD-PhD section (which is a good source for other types of information as well):
https://www.aamc.org/students/research/mdphd/

Are there other ways to become a physician-scientist?

In short the answer is "yes." MD-PhD programs are a great choice for people who decide early that that they want to be physician-investigators and have built they necessary track record of academic success and research experience before they apply. Not everyone does this, however, either because they didn't learn about the option early enough, decide in time or have an academic record (including MCAT scores) that presents no obstacles. Not finding out early enough turns out to be a common problem. Pre-health advisors at many institutions tend to know much less about MD-PhD training than MD training - not surprisingly since only 3 or 4% of medical school applicants in the U.S. every year apply for MD-PhD training. As a result, some people choose (or are obliged) to do MD-PhD training in series, rather than parallel - finishing one degree and then starting the other. The disadvantages of this approach include the longer time to finish training and the likely need to cover the cost of medical school on your own.

Some schools will consider you for transfer into their MD-PhD program after you have completed a year or two of medical school or graduate school at the same university. Although it is very rare that an MD-PhD program will consider accepting a medical or graduate student from a different school, it does occasionally happen when faculty move from one institution to another and want to bring their students with them. The rules and requirements vary from school to school.

Other programs worth checking out include the NIH MD-PhD program that provides support for the PhD phase at the NIH campus or in Oxford/Cambridge, with the MD training taking place at one of the participating MSTP-designated programs. Note that not all of the MSTP programs have chosen to participate, so if you have your heart set on a specific medical school, you should be sure to ask..

http://mdphd.gpp.nih.gov

Another option is to complete medical school and residency training before doing an extended period of supervised research. That used to be the main path for preparing physician-scientists, but with the increase in the number of MD-PhD training programs nation-wide, most people who make the decision to become physician-scientists while still in college think hard about doing both degrees.

Do I really need a PhD to do research?

Medical school by itself does not provide training in how to do research. At some point you will need that piece of your education if you intend to become a physician investigator. As noted above, in years past it was not uncommon to learn how to do research by doing an extended postdoctoral fellowship after (or instead of) a clinical residency. The total time is not necessarily shorter, the costs for you (especially medical school tuition) are likely to be much higher and you will miss the coursework and formal training in research methodology that are part of a good graduate program. If you are ready to make the commitment before starting medical school, MD-PhD programs offer many advantages.

How does MD-PhD training work?

The answer varies from school to school, but typically students begin with two years of medical school, switch to graduate school in the third year of the program, then return to finish medical school after completing (and defending) the thesis research project. At a growing number of schools there has been an increasing emphasis on integrating the MD and PhD parts of the training with graduate school courses during years 1 and 2 and clinical experiences during graduate school. Be sure to ask how things are organized at schools that you are considering. In programs leading to a PhD in laboratory science, MD-PhD trainees usually spend the summer between the first and second years of medical school working in the laboratory of the faculty member that they are considering as a potential thesis advisor. Some programs ask students to do one of these "lab rotations" in the summer before starting medical school classes as well. When fulltime clinical training begins varies among programs. Depending on the particular school, MD PhD trainees may have anything from casual clinical experiences during the first two years of medical school to extensive fulltime clinical rotations lasting six months or more. Depending on the number of clinical months completed before starting the thesis research, students returning to medical school will need 1 to 2 years to finish their training and meet the requirements for medical licensure. The goal is to complete an MD-PhD program in 7 or 8 years. Numbers from across the country show that some students finish in 6 years, while others take 10 years (or more). However, the average currently is 8 years (see Brass, et al. Acad. Med. 85:692, 2010).

How long does it take to complete training after an MD-PhD program?

Corny as this may sound, the process is never really finished. Your education will continue throughout your career. A more pragmatic answer is that the process began in college (or sooner) and will extend beyond medical school and graduate school as you complete your post graduate education. Here are some typical numbers:

MD-PhD program 7-8 years
Residency 3 years
Post doctoral fellowship 3-4 years

For most people the "postdoctoral fellowship" includes another year or two of clinical training, followed by a return to research for 2 or more years. So the total before you get your first job can be 13 or more years beyond college. You'll be in your 30's! That means that you have to be sure that this is what you want to do and you have to be able to

enjoy the process as it unfolds.

What happens to the graduates of MD-PhD programs?

Most end up with a career in which most of their time is spent on research. The research may be lab-based, translational or clinical. Most end up at academic medical centers, research institutions like the NIH or in the pharmaceutical/biotech industry. Most, but not all, do clinical training for several years after completing medical school and many find that their MD-PhD training makes them particularly appealing to residency programs at top institutions. See: Brass, et al. Acad. Med. 85:692, 2010.

How do physician-investigators spend their time?

The answer to this varies depending on what type of career they have chosen. A physician-investigator who is a faculty member at an academic medical center will typically spend 75-80% (or more) of his or her time doing research. The remainder may be split between clinical service, teaching and administration.

How do I apply?

The process varies from school to school. Some schools have a separate MD-PhD admissions committee that will screen your application and coordinate the interview and admission process. Other schools consider MD-PhD applicants only after a decision has been made about MD admissions. Finally, some schools consider students for the MD-PhD program only after they have completed a year or more of medical school. Schools that subscribe to AMCAS will ask you to indicate your interest in an MD-PhD program and then to provide additional information as part of a secondary application.

When do I apply?

Most people apply after finishing their junior year in college, but a growing number of applicants finish college and work for a year or more before applying. Some people use the time after college to take courses needed for medical school admission (if they've not had them already) or to gain more laboratory research experience. Some people simply weren't ready to make a decision about their future career and postponed choosing beyond the finish of college.

What do admissions committees look for?

The answer to this question clearly varies from school to school, but some basic principles apply. In general the admissions committees will look for the following four things: evidence of academic success, relevant research experience, letters of recommendation from people who know you well and your plans for the future.

1) Evidence of academic success using criteria that will include your GPA and MCAT scores, but not be limited to them. They will undoubtedly consider where you went to college and what types of courses you took. They will not necessarily be dismayed if you got off to a slow start, as long as you did well later. They will place the greatest emphasis on courses that are relevant to your chosen area of graduate

school training. I have not encountered anyone who seriously believes that the MCAT tests your ability to be a physician-scientist, but programs use MCAT scores in a variety of ways, including seeing how you compare to the national pool of applicants and predicting how you will do on the numerous standardized tests that all of us have to take in medical school and in the process of maintaining our medical licenses.

2) Relevant research experience. If you plan to get a PhD in one of the laboratory sciences, then prior laboratory experience counts heavily, particularly if you spent a year or more in the same laboratory. Summer laboratory experience can be helpful, but summers are short. Whenever possible you should try to do research during the academic year or at least spend multiple summers in the same lab. For those of you planning a PhD outside of the laboratory sciences, seek equivalent experiences. The idea is to be sure you like it and to create a track record upon which your past performance can be judged and your future success predicted.

3) Letters of recommendation. The most important letter(s) are from the faculty member or other senior investigator with whom you worked. The letter should comment on your talents, skills, and potential for success as an independent investigator. If you are working with a senior faculty member, it is very helpful if they can compare you to other students with whom they have worked. Note that such a letter is not necessarily the most appropriate for an MD-only application. MD-PhD program admissions committees are usually most interested in your talent and ability as a scientist, not as a future primary care-giver. Fortunately, medical schools know this and allow you to submit more than one letter of recommendation.

4) Your plans for the future. Since training to be a physician-investigator is so costly in terms of your time and the school's resources, your career goals should be compatible with MD-PhD training. Becoming a full time practitioner is a laudable goal, but doesn't require a PhD in addition to a MD. Your goal as a trained physician-investigator should be to spend at least 75% of your time on research. You do not need to know the specific problem you want to work on at this point (many don't and it is likely to change), or with whom you would like to train, but your commitment to becoming an investigator should be clearly communicated and you should have given thought to what will be required.

How should I decide where to apply?

Some applicants have decided that they want to work in a particular field or with a particular faculty member. For them, choosing where to apply is defined by where that faculty member works or where the field is best represented. Most applicants have only a general idea of what they might want to work on in the future and know that their interests are likely to evolve as they are exposed to new things. For them choice will be defined by issues such as the reputation of the school (hopefully not based solely on US News and World Report!), the success of the graduates of the program (be sure to ask!), and geography. Schools range in terms of the difficulty of gaining admission. The directors and non-faculty administrators of MD-PhD programs nationwide are a large pool of resources that you can tap. Most of us get e-mail from future applicants all of the time. Take advantage of our willingness to talk with you. Ask questions about the things

that are important to you.

Final thoughts and a big disclaimer

The author of this FAQ has had considerable relevant experience as a former MD-PhD student, physician-scientist, professor of medicine, MSTP director at the University of Pennsylvania, and colleague of numerous other MD-PhD program directors. However, I am only one person and you should seek advice from more than one source. The AAMC MD-PhD website cited in the article is a great source. It has an FAQ of its own that overlaps with this one. You should also talk to knowledgeable faculty at your own colleges and find ways to meet physician-scientists who can be mentors and role models. This is one of the most rewarding careers in the universe, but find out as much as you can before you decide to dive in - then do it!

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