

General Information about MD-PhD Programs (MSTP Programs)

Contents

MD-PhD programs	2
MD-PhD training.....	3
Typical career path of a MD-PhD.....	4
Admissions	4
Application process.....	5
Four general areas for admissions evaluation	7
Medical Scientist Training Program (MSTP) – Overview	8

Description of MD-PhD programs

Source: National Association of MD-PhD Programs

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 - "bench to bedside." 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.

MD-PhD programs

Advantages of pursuing an MD-PhD

MD-PhD training organizes the experimental and clinical thinking of the physician-scientist. This synergy enables a physician-scientist to recognize new ways that clinical care or the goal of understanding disease mechanisms will benefit from research and to mount the appropriate effort. Likewise, the synergy achieved in dual-degree training enables the physician-scientist to see how the results of research discoveries and insights can be converted into clinically significant outcomes.

Physician-scientists are needed so that the achievements of basic science laboratories and other focused research efforts can be translated into active clinical practice. However, the financial pressures on MD-only graduates are so great that few physicians choose to spend the time necessary to obtain research training after medical school. In order to address this issue, most MD-PhD programs pay candidates a stipend and tuition scholarships during the training years. The financial support for those willing to undertake MD-PhD training recognizes the additional time that a student must spend in training for this career. The extent of this support varies among programs. For example, some programs only support U.S. citizens and permanent residents.

Importantly, in dual degree training, the graduate degree is equivalent to a PhD-only degree. Recent studies have shown that the MD-PhD physician scientist is more successful in developing research programs that are nationally funded than either the PhD or MD scientist, attesting to the quality of students pursuing the dual degree and the training that these students obtain (JAMA. 2007;297:2496-2501).

Differences between an MD-PhD program, a combined degree program and an MSTP program

There is no difference. 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. About one-third of all MD-PhD Programs are MSTP. *Refer to section for MSTP Programs at the end of this brochure.*

Laboratory and non-traditional research areas

The fields in which a MD-PhD can pursue their PhD portion 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 discipline 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 policy, sociology or the history of medicine. You should check before you apply to see what is actually offered at any particular school. More information on MD-PhD programs in the social sciences can be found at the American Physician Scientists Association: www.physicianscientist.org/careers/training/md-phd/ssh

Alternative ways to become a physician scientist

There are alternative methods to becoming a physician scientist. Some schools will consider you for transfer into their MD-PhD program after you have completed a year or two of medical or graduate school at the same university – although be aware there are financial implications to transferring. The rules and requirements vary from school to school. 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 nationwide, most people who make the decision to become physician-scientists while still in college think hard about doing both degrees.

MD-PhD training

MD-PhD training 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) their 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.

Program duration

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). A couple of issues are worth keeping in mind. First – and most importantly – the goal is to train you to be a physician-investigator. That takes time to do right. The biggest variable is the time needed to complete a thesis project. You will want to do a first class project that will set a pattern for your career. Second, keep in mind that the average

time to complete a biomedical PhD in the U.S. is about 6 years, combined with 4 years of medical school. Doing both degrees in less than 10 years is possible because of overlap in coursework and tailoring programs to fit the needs of the physician-scientist. You will want – and need – to be focused and efficient.

Training duration post MD-PhD conferral

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
Clinical or Post Doctoral Fellowship (optional)	3-4 years

For most people the “postdoctoral fellowship” includes another year or two of clinical training, followed by a return to research for two or more years. So the total before you get your first job can be 13 or more years beyond college. You will 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.

Typical career path of a MD-PhD

Most end up with a career in which 75-80% of their time is spent on research. The research may be lab-based, translational (learning how to better integrate basic research in science with meaningful patient care) or clinical. The remainder of their time may be split between clinical service, teaching and administration. 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.

Admissions

Ideal applicant

College graduates (or soon-to-be graduates) who seek to become physician-investigators and whose commitment to doing research requires graduate school (PhD level training). This includes men and women who made the decision to become biomedical researchers while in college as well as those who have known since kindergarten.

Applying early

Apply early! Some programs have deadlines in October. However, do not wait for deadlines – apply as early in the cycle as possible. Also, plan to take the MCAT prior to the summer before you apply so that the scores are back and can be submitted with your application. The majority of interview slots are filled by early in the fall so the process is much more competitive than for MD only admissions.

Medical schools that offer MD-PhD training

More than 100 U.S. medical schools have an organized MD-PhD program. As you look at programs you should ask yourself what will be the best fit and you should ask the program director what they consider the strengths and weaknesses of their program, including program size. The disciplines in which PhD training is offered vary from school to school, so make sure you ask. The most complete list of MD-PhD programs can be found on the AAMC website: <http://services.aamc.org/currdir/section3/degree2.cfm>

Size of Program and the Number of admitted students

MD-PhD programs vary enormously in size – from smaller programs that take 1 or 2 students per year and might have a total enrollment of a dozen, to very large programs that might take 20 (or more) new students per year and have a total enrollment of 150+.

Application process

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 (including writing 2 additional essays), and then to provide additional information as part of a secondary application.

The importance of clinical experience

Clinical experience is very important to obtain prior to applying to medical school. Medical school admissions committees take that as evidence of commitment to the profession and as a predictor that you will do well in the clinical portions of your training and career.

The GPA and MCAT scores needed for admissions

This varies among the MD-PhD programs. All of the medical schools will want to be as sure as possible that you can handle the load of work involved in doing medical school plus graduate school. MCAT scores and your college GPA provide one way of predicting how you will do, but only one way. Average MCAT and GPA scores for combined degree program applicants are generally higher than MD only applicants. Average numbers for those accepted varies from school to school.

The GRE

Medical schools require the MCAT, not the GRE. But some schools will want both for combined degree applicants. Be sure to ask each prospective school about their policy.

International students and application issues

Being an international student can complicate things. Some schools will not consider applicants who are not U.S. citizens or permanent residents of the United States, in part because NIH training funds are only available for U.S. citizens and permanent residents. If you are a non-citizen who went to college in the U.S., evaluating your credentials is easier for admissions committees than if you did your college work outside of the U.S. Nonetheless, some MD-PhD programs will consider your application despite these obstacles. The only way to be sure is to ask each program that you are considering.

Deciding where to apply

Some applicants have decided that they want to work in a particular field. For them, choosing where to apply is defined by where there are faculty members in a critical mass that work 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 the choice will be defined by issues such as reputation of the school (hopefully not based solely on the U.S. News and World Report!), the success of the graduates of the program (be sure to ask!), and geography. Schools range in terms of difficulty of gaining admission.

Admission as “MD only” if not accepted as a MD-PhD candidate

Often medical admissions committees will consider an applicant for an “MD only” applicant if they are not accepted as an MD-PhD candidate, but not necessarily automatically. The wisest thing to do is to ask them what their policy is and let them know whether you might be willing to consider an offer to enter as a medical student – perhaps with a plan to apply for transfer into the MD-PhD program in the future.

Four general areas for admissions evaluation

1. Evidence of Academic Success

Determining criteria will include your GPA and MCAT scores, but will not be limited to them. Committees will undoubtedly consider where you went to college and the 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.

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, 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 letters are from the faculty member or other senior investigator with whom you worked. They should comment on your talents, skills, and potential for success as an independent investigator. It is very helpful if they can compare you to other students with whom they have worked. Such a letter is not necessarily 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 caregiver. Medical schools know this and allow you to submit more than one recommendation.

4. Plans for the Future

Since training to be a physician-investigator is 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 an MD. Your goal as a trained physician-investigator should be to spend at least 75% of your time on research. You need not know the specific problem you want to work on at this point (many people don't), 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.

Medical Scientist Training Program (MSTP) – Overview

Source: www.nigms.nih.gov/Training/Mechanisms/NRSA/InstPredoc/PredocOverview-MSTP.htm

The need for investigators who are well trained in both basic science and clinical research has long been recognized within the biomedical science community. To help meet this need, in 1964 the National Institute of General Medical Sciences (NIGMS) established the Medical Scientist Training Program (MSTP). This program encourages and supports the training of students with outstanding credentials and potential who are motivated to undertake careers in biomedical research and academic medicine. MSTP students participate in an integrated program of graduate training in the biomedical sciences and clinical training offered through medical schools. Graduates receive the combined M.D-PhD degree, and the majority of them pursue careers in basic biomedical or clinical research.

The MSTP currently has 40 participating programs involving 45 degree-granting institutions with a total of 933 trainees. (There are approximately 75 medical schools that do not have NIGMS MSTP training grants but that also offer opportunities for MD-PhD studies.) MSTP participants may choose from a wide range of research training programs in the biological, chemical, or physical sciences. Other disciplines in which MSTP participants can pursue graduate study include the computer sciences, social and behavioral sciences, economics, epidemiology, public health, bioengineering, biostatistics, and bioethics. For a list of participating MSTP programs go to:

www.nigms.nih.gov/Training/Mechanisms/NRSA/InstPredoc/PredocInst-MSTP.htm

Mechanism of Support

MSTP grants are made to universities and their medical schools, which are responsible for program operation and trainee selection. About 170 positions for new students are available nationwide each year. Awardee institutions also support additional students using funds from other sources. Selection for admission is highly competitive. For those selected, the program provides a maximum of 6 years of support, although an individual's course of study for the combined degree may take somewhat longer. All institutions identify other sources of support for a trainee's additional years of study. Trainee support provided by an MSTP grant includes the following:

- stipend;
- tuition allowance
- health insurance; and
- modest sums for travel, equipment, and supplies.

Many institutions supplement the basic stipend provided by the MSTP grant. Continued support for an individual student is subject to annual renewal based on the trainee's

satisfactory performance in the program and the institution's successful competition for funds at the time of grant renewal every 3 to 5 years. Since MSTP grants are a type of National Research Service Award, trainees must be citizens or non-citizen nationals of the United States or have been lawfully admitted for permanent residence (i.e., possess an alien registration receipt card I-151 or I-551). Trainees incur no payback obligation. Some programs give financial incentives to students who are awarded their own fellowships.

Individuals who wish to enter the MSTP should contact the program office at the participating institution(s) of their choice directly for curriculum information and admission requirements.