I. Summary of the M.D.-Ph.D. Program Curriculum

Introduction
Traditionally, M.D.-Ph.D. students at Harvard and MIT were educated by means of a composite curriculum, in which most of the New Pathway or HST medical curriculum was fused to a standard program of graduate study, with little integration. In recent years, a new strategy for M.D.-Ph.D. education has been developed, which was fully implemented for the class entering in July 2000. The new approach is based on the philosophy that M.D.-Ph.D. students should have a unique identity, and that they should be educated as physician-scientists throughout their time in the program. As described below, the new, integrated curriculum encourages students to participate in the scientific activities of the graduate programs from the beginning of their M.D.-Ph.D. student careers. Medical and graduate coursework are undertaken simultaneously, with the goal of finishing all or nearly all classroom time by the middle of the third academic year. The central portion of the curriculum still focuses on full time thesis research, but students have new options for meaningful clinical experiences during that period. Better preparation beforehand, and new opportunities to learn about postgraduate training and careers for physician-scientists, should enhance the final, clinical years of the program.

This integrated approach has several major advantages. First, students learn to see problems from the perspective of physician-scientists from the beginning of their doctoral education. They have stronger ties to their graduate programs, and more access to their resources. Transitions among different phases of the program are smoothed by integration, and most students should be able to complete the requirements for both degrees in a shorter period of time.

The New Curriculum
Beginning in July 2000, entering students have begun the program during the summer by taking a new course in Molecular Biology of Human Disease concurrently with their first laboratory rotation. This course brings the class together as a unit, and introduces students to the concept that they are physician-scientists who should consider both basic and clinical aspects of the problems they encounter. In the fall, students declare a non-binding affiliation with one of the Harvard or MIT Ph.D. programs, and they participate in the activities developed for students in that program. At the same time, they are divided into two groups, following either the New Pathway or the HST medical curriculum. While carrying out their pre-clinical medical studies, they are expected to take an average of one graduate course each term towards the completion of course requirements for their Ph.D. degrees. Accommodations are made in the pre-clinical course schedule to facilitate this. The graduate program head or his/her designee assists students in their selection of appropriate graduate courses, and the M.D.-Ph.D. advisor acts as a facilitator to try to resolve scheduling conflicts. A second laboratory rotation is done during the summer between the first and second years. After this rotation, students are encouraged to decide on a thesis lab. Some students, however, may require a third graduate rotation later. Most or all of the graduate course requirements should be completed by the end of the second spring. The third summer, between the second and third years, is used for a core clinical rotation in medicine or pediatrics. Thereafter, students participate in full time graduate school activities until their coursework, preliminary qualifying exam, teaching requirement, thesis submission and thesis defense are completed. They also have the option of participating in credit or non-credit clinical courses aimed at providing a view into the role of physician-scientists in medical subspecialties; these courses should not require a substantial time commitment and should not limit the amount of time spent on laboratory work. Near the end of this graduate period, students are strongly encouraged to take an optional, longitudinal course in clinical medicine to hone their skills prior to returning to clinical clerkships. Once they return to clerkships, continuity in scientific exposure is maintained through special programs designed to bring M.D.-Ph.D. students together with M.D.-Ph.D. residents, fellows and faculty in Harvard teaching hospitals. We expect that, through this new curriculum, the requirements for the M.D. and Ph.D. degrees will be completed in an average of seven to eight years. This is less time than was required in the past; under the old curriculum, students spent eight and a half years, on average, working for both degrees.
II. Sample Curriculum (as of 7/00) 
Harvard-MIT M.D.-Ph.D. Program

Summer 1: Molecular Biology of Human Disease
Lab rotation
Establish affiliation with graduate program

Fall 1: HST or New Pathway curriculum
One graduate course (replacing a pre-clinical course, where feasible, e.g., DMS Genetics 201 for HST 160)
Participation in graduate program activities (poster sessions, journal clubs, seminars)

Spring 1: HST or New Pathway curriculum
One graduate course (replacing a pre-clinical course, where feasible)
Participation in graduate program activities

Summer 2: Lab rotation

Fall 2: HST or New Pathway curriculum
One graduate course (replacing a pre-clinical course, where feasible)
Formal application to graduate program

Spring 2: HST or New Pathway curriculum
Introduction to Clinical Medicine/Patient-Doctor II
Step 1 USMLE

Summer 3: Core clinical clerkship in medicine or pediatrics (2 months)

Fall 3: Graduate course(s) or teaching assistantship as required
Work in thesis lab (or rotation, if still undecided)
Preliminary Qualifying Exam (PQE)* if feasible

Spring 3: Graduate course(s) if requirements not yet fulfilled
Lab rotation or work in thesis lab
PQE* if not already completed

* The preliminary qualifying exam (PQE) should be taken as early as possible. Students must have core preparation in subjects relevant to their graduate program, but need not have fulfilled their entire graduate course requirement. Neuroscience, Immunology and Virology students in the Division of Medical Sciences (DMS) and MIT Biology students base part or all of their PQE exams on their thesis research; they will take the exam later than students will in some other programs.

Summer 4: Thesis research
First meeting with Thesis Advisory Committee

Fall 4: Thesis research
(Optional longitudinal experience in sub-specialty medicine)

Spring 4: Thesis research
(Optional longitudinal experience in sub-specialty medicine)

Summer 5: Thesis research

Fall 5: Thesis research
(Optional longitudinal experience in sub-specialty medicine)

Spring 5: Thesis research
Longitudinal course in clinical medicine and/or one-month course in ambulatory medicine or pediatrics
Summer 6: Thesis research

Fall 6: Thesis writing and defense
Begin clinical clerkships

Spring 6: Clinical clerkships
M.D.-Ph.D. mentoring program within the hospitals

Fall 7: Clinical clerkships
M.D.-Ph.D. mentoring program within the hospitals
Apply to residency programs
Step 2 USMLE

Spring 7: Clinical clerkships

**NEW POLICY:** M.D.-Ph.D. students are no longer required to wait until completion of the M.D. requirements to receive the Ph.D. degree. Once all requirements for the Ph.D. degree have been completed, including thesis defense and submission of the bound thesis, M.D.-Ph.D. students may choose to receive the Ph.D. degree and participate in the commencement activities with their Ph.D. graduating class. This means that students electing this option must inform DMS, GSAS, or MIT officers and M.D.-Ph.D. Program Office of their plans.
III. Medical Curriculum Requirements for M.D.-Ph.D. Students
(as of 7/00; subject to change)

All Year I and Year II pre-clinical courses are required for M.D.-Ph.D. students, with the following exceptions: M.D.-Ph.D. students are exempt from the requirement for a social medicine course, although a social medicine course may be taken as an elective. Instead, the social medicine requirement is replaced by the Responsible Conduct of Research course (or its equivalent) that is required of all Ph.D. students on NIH training grants.

New Pathway students are required to take the clinical epidemiology course that is ordinarily offered in the spring term of year I. However, first year M.D.-Ph.D. students may postpone this course and take it later, during the Ph.D. thesis work. There are two potential advantages to postponement of the clinical epidemiology course in this way. First, it allows students to take an afternoon graduate course in the spring of year I. Second, it provides students with an exposure to clinical research methodology at a time when the students are otherwise immersed in basic research. Students should complete an official Drop/Add form at the HMS Registrar’s office if the decision is made to postpone the course.

The following Year III and IV courses and exams are required of all M.D.-Ph.D. students:

<table>
<thead>
<tr>
<th>Courses</th>
<th>Exams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicine I</td>
<td>3 months*</td>
</tr>
<tr>
<td>Surgery</td>
<td>3 months</td>
</tr>
<tr>
<td>WCH</td>
<td>3 months*</td>
</tr>
<tr>
<td>Radiology</td>
<td>1 month</td>
</tr>
<tr>
<td>Neurology</td>
<td>1 month</td>
</tr>
<tr>
<td>Psychiatry</td>
<td>1 month</td>
</tr>
<tr>
<td>Medicine II</td>
<td>1 month</td>
</tr>
<tr>
<td>Clinical elective</td>
<td>1 month**</td>
</tr>
<tr>
<td>Total clinical months</td>
<td>14 months</td>
</tr>
</tbody>
</table>

*Students who take the 2-month core clerkship in medicine (or pediatrics) between years 2 and 3 will be required to complete 1 month of ambulatory medicine (or obstetrics and gynecology) or the equivalent at a later time.

**In the last semester of Ph.D. work, M.D.-Ph.D. students are given up to 16 credits towards the 20 “Unspecified” credits that are required for the M.D. degree. Unspecified credits can be clinical or non-clinical (i.e., research). This leaves a minimum of the 1 required clinical elective month listed here.

M.D.-Ph.D. students are not required to take an Advanced Biomedical Sciences course.

The Patient-Doctor III Commons course (IN750M.J) and the Primary Care Clerkship (AC700M.J) are elective courses for M.D.-Ph.D. students.

As outlined in the course requirements above, in addition to the core clerkships, one clinical elective is required. This gives a student 14 clinical months. This meets the minimum clinical month requirement for licensing in the Commonwealth of Massachusetts. However, please note that licensure in the State of California requires 18 clinical months. Patient-Doctor II or ICM will count for 2 clinical months towards California licensure requirements, but students who desire licensure in California must take 2 additional clinical elective months beyond the required minimum. Lastly and very importantly, California has a new Family Practice requirement. At present, 4 HMS courses meet the criteria: the longitudinal Primary Care clerkship, AC505M.40, ME528M.40d and ME536M.6.

For M.D. licensure purposes, HMS must be able to document 4 years of full time residence in medical school. If necessary, joint registration between HMS and the Ph.D. program in the last semester of Ph.D. work will count towards this residency requirement.
Other things to think about while planning the transition between thesis research and the remaining clinical clerkships:

• Currently, students are strongly advised to return by October to allow the taking of the 3 major clerkships (WCH, Med I, Surg). Students who enter the M.D.-Ph.D. Program in 2000 and later will have more flexibility in their return date.

• Med I, Surgery and WCH are “third” year clerkships. Please note that only 1 of these clerkships can be deferred to the final year of medical school. The deferred clerkship must be taken either in the Jul/Aug/Sep or Oct/Nov/Dec quarter. No three-month clerkships can be taken in the Spring of the final year. All one-month core courses must be taken by March of the final year.

• Students should plan on taking at least 1 month off (usually December or January) in their final year to accommodate residency interviews.

• When to take the USMLE Step II exam? The exam is now a computer-based exam that is offered throughout the year. M.D.-Ph.D. students are usually advised to take the exam in the late fall of their final year, because a passing grade is required for graduation. Students should discuss with their advisor when to take the exam.
IV. Additional Policies for MSTP-funded Students

M.D.-Ph.D. students funded by MSTP must be engaged in academic studies throughout the 12-month period of their appointment. During the summer months students are expected to complete laboratory and/or clinical rotations. Any unrelated activities of more than two weeks duration require the approval of the program director, the M.D.-Ph.D. advisor, and (when applicable) the thesis advisor.

All MSTP-funded students who entered the program in 1999 or later must take Step I of the USMLE before the fall of their third M.D.-Ph.D. year. The Division of Medical Sciences will not allow M.D.-Ph.D. students to matriculate in graduate school unless they have completed this requirement. Students who do not pass the examination should meet with their M.D.-Ph.D. Program advisor and the M.D.-Ph.D. Program director as soon as they are informed that they have failed the examination.

Successful completion of Step II of the USMLE is a requirement for graduation.

All students funded by NIH training grants (MSTP, NRSA, others), for any portion of their education, are required to take a mandatory course on ethical conduct for sciences (the Responsible Conduct of Research course or its equivalent). Virtually all M.D.-Ph.D. students fall into this category, regardless of whether or not they receive MSTP funding. This is also a requirement for all DMS students, and a suitable course is offered every other year through DMS. The M.D.-Ph.D. Program office can help non-DMS students enroll in a course that will meet this requirement.

All students who expect to receive MSTP funding during their final two years of M.D.-Ph.D. training must successfully defend their Ph.D. thesis prior to returning to medical school to complete their clinical clerkships.

NEW POLICY: M.D.-Ph.D. students are no longer required to wait until completion of the M.D. requirements to receive the Ph.D. degree. Once all requirements for the Ph.D. degree have been completed, including thesis defense and submission of the bound thesis, M.D.-Ph.D. students may choose to receive the Ph.D. degree and participate in the commencement activities with their Ph.D. graduating class. This means that students electing this option must inform DMS, GSAS, or MIT officers and M.D.-Ph.D. Program Office of their plans.
V. FAQ’s and Practical Advice: A Primer for M.D.-Ph.D. Students & Advisors

The first years of the program

Why do new students have to begin in July, rather than September?
M.D.-Ph.D. education requires a long training period, with a focus that differs from either medical or graduate education. In recent years, M.D.-Ph.D. education at Harvard has typically required close to nine years. We strongly believe that this is too long, and that the period of training can be shortened if an attempt is made to increase the efficiency and focus of the training. For this reason, we now require M.D.-Ph.D. students to begin the program in July, rather than September. There are no exceptions to the July start. We anticipate that the extra two months at the beginning will result in at least one year of time saved later on.

There are several clear advantages of this new approach. First, the M.D.-Ph.D. students have an opportunity to come together as a class, and get to know each other before they are divided by HST and New Pathway curricula. Second, they are introduced to the scientific community at Harvard and MIT before other entering M.D. and Ph.D. students, allowing them to get to know faculty and current students early on. Third, they all take a new course in Molecular Medicine that gives them a broad perspective on career possibilities and areas of investigation open to physician-scientists. They also have an opportunity for increased interaction with faculty affiliated with that course, with the M.D.-Ph.D. Program, and with the various graduate programs. Finally, they complete one of their required laboratory rotations during the first summer, fulfilling a graduate program requirement and making a first step towards finding a thesis lab.

To optimize the yield from the summer experience, and to give newly accepted applicants in-depth exposure to our program, we host a recruitment/orientation weekend in April each year for those students offered MSTP (“first cycle”) positions.

When and how must the choice of graduate program be made?
Effective for the class entering in 2000, M.D.-Ph.D. students are required to declare a provisional graduate program affiliation during the summer or fall of their first year. The purpose of this affiliation is to allow M.D.-Ph.D. students to become part of a graduate program, and take advantage of its activities, advising and resources prior to beginning thesis work. Graduate program affiliation should also aid students in selecting appropriate graduate courses to take during their first two years in the M.D.-Ph.D. Program.

We recognize that the interests of students may change as they progress in the program, and that [rarely] graduate programs may feel that interested students are not a “good fit” for them. For these reasons, the choice of graduate program is non-binding for both the student and the program, until the student formally applies to the graduate program. In most instances, however, we expect that the initial decision will be the same as the ultimate choice of graduate program.

It should be noted that the M.D.-Ph.D. Program and its students have a particularly well-established relationship with graduate programs within the Division of Medical Sciences, with the Harvard Biophysics program, and with the Department of Biology at MIT. More work may be required to maintain efficient progress through the program for students pursuing graduate study in other Harvard and MIT graduate programs. M.D.-Ph.D. Program advisors may be especially helpful for students interested in other Ph.D. programs.

What is the process for finding and registering for lab rotations?
Laboratory rotations serve several purposes. Most importantly, they allow students to “try out” prospective thesis labs before making a firm commitment. They also allow laboratory advisors time to determine whether interested students will fit well into their laboratories. In addition, they allow students to sample research areas and methodologies that they have not previously been exposed to. However, the choice of rotations should be focused, with the primary goal being to find a thesis lab. It is important to choose wisely, because it is counterproductive to undertake a large number of lab rotations. In general, students should be in a good position to decide on a thesis lab after two rotations; some students will require an additional rotation (or rarely more).

It is important for M.D.-Ph.D. students to solicit advice from the head of the graduate program in which they are interested (or her/his designate) prior to their first rotation. Often, graduate programs will not accept rotations done in labs outside their faculty. Some HMS faculty members are not affiliated with any graduate program, and are
therefore ineligible to have graduate students carrying out thesis work in their labs. The number of required rotations and the possible sites for rotations vary among graduate programs. Students should discuss rotation possibilities with their M.D.-Ph.D. Program advisor, the M.D.-Ph.D. Program directors, and representatives of their graduate program of interest to be certain that they are making a good choice.

Rotations generally range in length from 6 weeks to four months, with an average length of 2.5-3 months. Rotation advisors expect students to have a regular presence in the lab, but they understand that students are often taking courses at the same time. It is not necessary to complete a project during the rotation. Most advisors are happy to have rotation students (Ph.D. and M.D.-Ph.D. students), but at times they will not have rotation slots available, because of prior commitments to other students, limited space, limited funding, sabbatical plans, etc. It is important to understand that rotation advisors recognize that rotating students are usually not very productive. The incentive for advisors to host rotation students is that a fraction of them will end up choosing the advisor’s lab for their thesis research. The rotation period is a trial relationship for both the advisor and the student; if the student does not show interest and enthusiasm s/he may not be offered a position in the laboratory.

To obtain credit for rotations, students should obtain and complete a rotation registration form from the Division of Medical Sciences office. This form must be submitted for any rotation done within the Division of Medical Sciences; it is helpful to submit it for non-DMS rotations also, because it provides a written record that the rotation was done. It needs to be signed by the rotation advisor, and by a representative of a graduate program. The representative of the graduate program is either the program head or her/his designate. As a backup, the rotation form can have the signature of the M.D.-Ph.D. Program director in place of the graduate program representative. For rotations in non-DMS programs (e.g., MIT Biology), students should ask the appropriate graduate program representatives whether an additional form is required. Students should also provide the M.D.-Ph.D. Program office with copies of their rotation forms.

How will courses be chosen in the first two years?
There is little variation in the medical curriculum for HST or New Pathway students. M.D.-Ph.D. students have a slightly smaller medical course requirement as compared to M.D.-only students (see Medical Curriculum Requirements for M.D.-Ph.D. Students). Designated M.D.-Ph.D. advisors from the four New Pathway societies or from HST can assist in decisions about medical courses.

In contrast, there is considerable variability in graduate course requirements. M.D.-Ph.D. students should attempt to take an average of one graduate course during each of their first three semesters. This is best done in consultation with an advisor from a graduate program – usually the program head or her/his designate. A small subset of medical courses, including New Pathway Pharmacology, HST Immunology, HST Neuroscience and HST Genetics count for credit in some graduate programs. If there are questions about graduate course requirements that cannot be answered by representatives from the graduate programs, or if students have doubts about which graduate program they would like to join, they should meet with the M.D.-Ph.D. Program director for advice.

In some cases, there will be scheduling conflicts between medical and graduate courses. The M.D.-Ph.D. Program advisors designated by each society are helpful contacts for trying to work out creative solutions to these problems. While it will not always be possible to fit in required graduate courses, we are committed to trying to help students do so.

How do first and second year M.D.-Ph.D. Program students receive credit for graduate courses?
Students should include both the medical school and graduate school course numbers on their study cards. The study cards should be submitted to the M.D.-Ph.D. Program office. The cards will then be reviewed and redirected to the Registrar’s office. The Registrar’s office will arrange for students to receive ordinal grades for the graduate courses. The graduate courses will also be credited on future graduate school transcripts.

What are DMS quarter courses? (Explanation by Dr. Patricia D’Amore)
A quarter course is a half semester (seven week) course that focuses on a specific topic, usually in the area of expertise of the faculty. Some courses are run by two faculty members who have complementary interests.

The class meets for one 2 hour session per week. Meeting times usually are arranged at the initial session for convenience of faculty and students.
There are optimally 5 to 10 graduate students from DMS. If space permits medical students and postdocs may enroll with the faculty's permission. Everyone is required to read the assigned papers, and no auditing without participation should be allowed.

From 2-4 related papers are assigned for each session. Sometimes these include a review article for background along with the primary papers. Some sessions start with a short introduction by the faculty or a designated student.

Quarter courses composed of primary lectures are also offered and differ from standard full semester courses in that they deal with a specific focused topic.

**Why do a core clinical rotation before beginning thesis work?**

As part of the new curriculum, M.D.-Ph.D. students entering in 2000 and later are required to complete a core clinical rotation in the summer between the 2nd and 3rd years.

There are several advantages to completing one clinical rotation prior to thesis work. It allows students to consolidate their preclinical coursework with a practical experience, and to continue on with their original medical school class for a few more months. It introduces students to the culture of the wards, facilitating the transition from thesis work to clinical work later. It equips students for a more sophisticated longitudinal clinical course experience. It may give students a better sense of which clinical areas to consider for residency. It may help put thesis work into a broader perspective. And, finally, it adds flexibility in scheduling later.

Some students have worried that it will compromise their future residency applications to have their core medicine or pediatrics rotation years before. This is unlikely. Residency programs are aware of the unusual path taken by M.D.-Ph.D. students, and will almost certainly take the course of study into account.

Students who do well in this summer core rotation are advised to ask their attending physician(s) to write a letter of recommendation to be placed in the student’s file, as these recommendations may be more difficult to obtain later.

**What is a preliminary qualifying exam, and when is it taken?**

The preliminary qualifying exam (PQE) is an exam taken by all Ph.D. students to demonstrate that they have achieved competence in their field of study. The nature of the exam varies from program to program. It typically includes both a written portion (often a research proposal) and an oral defense. Each year, a few students do not pass; a larger number receive “conditional pass” grades requiring them to undertake additional work. This is an important landmark, because few students make significant accomplishments towards their thesis research before passing their PQE. It is advantageous for students to take the PQE as early as they feel they can achieve a “clear pass.”

**What are the expectations during the period of thesis research?**

Thesis research involves a contractual agreement between the research advisor and the student. Students are expected to work in the lab full time, with minimal other commitments (generally restricted to teaching assistantships and longitudinal clinical courses). In return, thesis advisors devote time and effort to teaching students how to think about science and carry out experiments. This is a critically important part of education as a physician-scientist. It is important to choose a thesis advisor with whom you can have a good, productive relationship. S/he will be called upon to give recommendations for you for many years after you finish in his/her lab. At the end of the thesis research, students write and defend their doctoral thesis. This is a complex process; it is important to leave sufficient time not only for writing the thesis and preparing the defense, but also for making corrections and attending to administrative requirements after the defense.

**What is a Thesis Advisory Committee?**

The Thesis Advisory Committee (TAC) is a group of three or four faculty members, in addition to the thesis advisor, who take formal responsibility for overseeing a student’s thesis research. Usually the student chooses the members of this committee. It is advantageous for the student to choose faculty members with whom s/he feels comfortable. TAC members are the student’s advocates. They can help deal with problems that arise between the student and the thesis advisor. In addition, they can provide useful advice to guide students (and advisors) towards the successful completion of the thesis project.
We strongly recommend that M.D.-Ph.D. students choose at least one TAC member who has a profound understanding of the issues facing M.D.-Ph.D. students. S/he does not necessarily have to be an M.D.-Ph.D., but s/he should be sympathetic to M.D.-Ph.D. education. The M.D.-Ph.D. Program directors are happy to assist in identifying faculty members who can serve in this regard.

How do the requirements for M.D.-Ph.D. students differ from requirements for M.D. or Ph.D. students?
Medical curriculum requirements differ for M.D.-Ph.D. students in that they are not required to take a course in social medicine, Patient-Doctor III or a primary care elective. M.D.-Ph.D. students are required to do only 14 months of clinical clerkships. Graduate program requirements may also differ for M.D.-Ph.D. students. Frequently the number of required courses and rotations is lower, and some medical courses cross-listed in the DMS catalog may count for graduate credit. It is important, however, to check with the graduate program about specific requirements.

What are “second cycle” M.D.-Ph.D. students, and when is it appropriate for “second cycle” students to apply for MSTP funding?
A medical student in the New Pathway or HST program who enrolls simultaneously in a Harvard or MIT graduate program is considered to be a full member of the M.D.-Ph.D. Program at the time that student enrolls in the Ph.D.-granting program. All such students are encouraged to inform the M.D.-Ph.D. Program office immediately upon their acceptance into graduate school. “Second cycle” M.D.-Ph.D. students are eligible to apply for MSTP funding for the final two years of the M.D.-Ph.D. program (i.e., for the years during which clinical clerkships and electives are completed). Beginning in 2003, applications for such funding will not be accepted until a significant portion of the Ph.D. thesis research has been completed.

Transition from thesis research to clinical clerkships

How does a student maintain his/her clinical skills during the period of thesis research?
The M.D.-Ph.D. Program has helped to develop the Longitudinal Course in Clinical Medicine (LCCM). The goal of this course is the re-introduction and consolidation of clinical skills. It is designed principally for M.D.-Ph.D. students who have been involved in research for a protracted period. The LCCM is offered in two eight-week blocks each year, in the spring and the fall. At present the course is optional, but discussions are underway to decide whether it will be required of all M.D.-Ph.D. students in the final year of graduate research, prior to returning to clinical clerkships. There are several features of the course that have proven popular with M.D.-Ph.D. students. One morning during each week of the course, the LCCM students attend the morning work rounds of an assigned BWH General Medical Service Team; the students are supervised on rounds by the medical resident in charge of the inpatient team. This experience both serves as an excellent opportunity for the student to be exposed first-hand to inpatient clinical management issues, and provides a mechanism for students to be assigned patients to "work-up" for subsequent discussion with their clinical preceptor. The preceptor also provides bedside clinical teaching to demonstrate key features of the patient's history and physical exam, and evaluates written "work-ups" prepared by the student. Typically, these preceptors are clinical faculty as well as physician-scientists; each preceptor supervises one or two students. Weekly plenary sessions involve all the students, covering a variety of topics, including a re-introduction to the clinical history and physical exam as well as interactive case discussions presenting common clinical problems (fever, chest pain, abdominal pain, renal failure). Senior clinicians at BWH lead these weekly sessions. The course directors are Thomas Michel, M.D., Ph.D., and Maria Rupnick, M.D., Ph.D., both of whom are cardiologists and basic researchers. They are pleased to respond to student questions about the course.

With the implementation of the new curriculum, the LCCM course will gradually evolve to a more advanced clinical experience, to accommodate students who will have taken their core medicine or pediatrics rotation prior to thesis research.

In addition to the LCCM course, Dr. Thomas Michel is overseeing the development of more focused clinical experiences to introduce M.D.-Ph.D. students to sub-specialty topics and settings. These experiences are optional, but will require a commitment of approximately one half day per month for six months. They will allow students to sample a wide range of areas that are frequent career choices for M.D.-Ph.D. graduates. The goals of these experiences are to enhance clinical skills and to provide information that will help in residency decisions later.
Get to know some key people
Students should get to know the faculty and staff associated with the M.D.-Ph.D. Program. In particular, Dr. Chris A. Walsh, Director, and Ms. Linda Burnley, Director of Administration and Finance, are available to assist in selecting those key people most familiar with advising M.D.-Ph.D. students. The Program maintains an up-to-date list of “Key Contacts” who are excellent mentors for students seeking career advice. Society advisors and masters are also excellent contacts for students. Each Society has appointed specific faculty to help advise M.D.-Ph.D. students as listed below.

Cannon Society: Gordon J. Strewler, M.D., Master  
[new M.D.-Ph.D. student advisor to be designated]

Castle Society: Orah S. Platt, MD, Master  
Alan Michelson, M.D., Ph.D.*

Holmes Society: Augustus A. White, III, M.D., Ph.D., Master  
Keith Blackwell, M.D., Ph.D.*

HST Society: Joseph Bonventre, M.D., Ph.D., Master  
Martha L. Gray, Ph.D., Co-Director  
Lee Gehrke, Ph.D.*  
Andrew Lichtman, M.D., Ph.D.*  
Richard Mitchell, M.D., Ph.D.*

Peabody Society: Ronald Arky, M.D., Master  
Stephen Blacklow, M.D., Ph.D.*  
Rosalind Segal, M.D., Ph.D.*

*Designated Advisor for M.D.-Ph.D. Students.

In her role as Associate Dean of Students, Dr. Nancy Oriol is also available to assist students in making the transition from thesis research to full-time clinical clerkships. She has the responsibility for coordinating the recommendation letters for internship. Ms. Terese Galuszka, HMS Registrar, needs to know when the return to clinical clerkships is planned. It is advisable to make an appointment to meet with Ms. Galuszka to make sure that the requirements for graduation are understood and can be met in a timely manner. Students should also keep the M.D.-Ph.D. Program advised on their academic progress and plans. Students are required to report their progress on an annual basis and to make sure that the program is informed of any changes throughout the year from the plan that had been submitted with their annual written progress summaries.

When is the best time to return to clinical clerkships?
At face value this seems like a simple question, the answer to which may be, “whenever students are finished doing their thesis work.” Although each student presents a unique case, there are some helpful guidelines that generally apply to all students.

First, although there is considerable anxiety about this transition, it goes very well in virtually all cases. The issues are more perceived than real, and most students acclimatize to life in the clinical services quite well, quickly catching up with their regular program peers.

The next question is: when does the student expect to graduate? While most students wish to graduate in June, it is important to remember that there are also graduation dates in November and March. Students should discuss graduation dates and fulfillment of requirements with Linda Burnley and Terese Galuszka.

Once a student has decided what year and month to graduate, the next question is: what are the core rotations required for graduation and which additional electives would the student like to take? The answer is slightly different for New Pathway and HST (see Medical Curriculum Requirements for M.D.-Ph.D. Students), and may depend on the student’s level of interest in postgraduate clinical training.
Consideration should also be given to time for “away” rotations, vacation, thesis writing and interviewing. While it is not a formal requirement, often a student’s candidacy for residency programs outside (and inside) the Harvard system is enhanced by doing rotations at institutions that the student is considering as his/her preferred program for postgraduate training. Finally, students should take into account their ability to complete the necessary core rotations in time for residency applications. A composite “Dean’s letter” (see below) is an important part of the application; it is typically written during the summer or early fall of the last year. [It is highly recommended that students rely on the advising networks to discuss any extenuating circumstances that may result in a lengthening of the time needed to complete the thesis. This is when an ongoing connection with a ‘key contact’ or mentor, in addition to the thesis advisor, can be particularly helpful. Because the transition from the thesis lab back to clinical clerkships can be difficult for some students, the ‘key contacts’ can be especially helpful during this time.]

Students are not permitted to write and defend the Ph.D. thesis during clinical clerkships. Students are best prepared to write the thesis at the end of their graduate work, and everything possible should be done to finish all thesis requirements before returning to clinical clerkships.

Here are some additional guidelines regarding the current clinical curriculum schedule:

- At present, it is best to start rotations no later than October, if possible. Students who take one core clinical rotation before their thesis work will have more flexibility for later starts. Students interested in residency programs with early matches (e.g. Neurology) need to consider the fact that they must complete key courses earlier.

- It is important to be aware that the state of California requires more coursework for licensing than other states; students considering California for residency and/or jobs should consult with the Registrar.

If a M.D.-Ph.D. student returns in October or later, won’t the other students have been in rotations longer and be more “up to speed?”
There is usually some anxiety about starting rotations with students who are not only fresh out of second year, but have already completed a few months of rotations. Returning M.D.-Ph.D. students should be reassured that after about a month, most M.D.-Ph.D. students, even those away for a long time, will find themselves up to speed and cruising along at the same rate as their peers.

Many students opt for a one month core rotation rather than medicine, surgery or WCH when they first return. However, rotation supervisors and attendings understand that M.D.-Ph.D. students have had a unique experience, and students should not worry if they are assigned a three month core course immediately upon their return.

What is the Dean’s Letter?
Residency programs request a composite “Dean’s Letter” of recommendation for each applicant. This letter summarizes the student’s strengths, and describes how the student performed in all rotations completed by the time the letter is prepared. Students should seek advice from program advisors and others to plan the timing of clerkships, in order to be in a strong position at the time the Dean’s Letter is written.

Are extra elective courses useful?
Clinical electives offer an opportunity to be exposed to a broad array of clinical areas. They may facilitate career choices as well as supply skills and perspectives that will be useful later in a student’s career. However, electives are not an essential part of predoctoral medical education, and there are many opportunities for enriching experiences later, during residency. It is important to bear in mind that licensing regulations are set down by state boards and differ between states. If students wish to take the minimum number of rotations and also wish to do postgraduate medical training in a specific state, it is worth checking the licensure requirements of that state.

Remember the USLME Step II.
Some students have had difficulty with this exam after returning from their thesis research. It is necessary to pass Step II in order to graduate from medical school, and to start as a house officer. Step II of the USMLE is more difficult than its predecessor, NBME II.

The USMLE has recommended that medical licensing authorities require the completion of the USMLE Step series 1 to 3 within a seven-year period. In the past, some M.D.-Ph.D. students have needed an extension of this time period; requests to NBME for such extensions have been routinely granted. In an apparent change of practice, the
NBME/USMLE recently took the position that rules concerning time limits are established by the various state medical boards and that it is these boards that should respond to requests for waivers. Currently the rules relating to time limits and number of attempts at each of the 3 Step examinations vary greatly among the 50 states and Puerto Rico. Most states have reported that they will not waive the 7-year requirement, even, presumably, for M.D.-Ph.D. students or graduates. Only about 17 states have confirmed that they have provisions for an extension for M.D.-Ph.D. students; however, a number have stated they would consider provisions for extension but not until the USMLE Composite Committee makes a recommendation.

The Federation of State Medical Boards (FSMB) and NBME Composite Committee, which includes representatives of the states as well as the NBME, have discussed at their last two meetings the topic of recommending that individual states allow for routine extensions of the 7-year Rule for M.D.-Ph.D. students.

If you are likely to require more than seven years between Step 1 and Step 3, you should discuss this matter with the M.D.-Ph.D. Program office.

If a student finishes M.D. and Ph.D. degree requirements earlier than June, are there any possibilities for starting residency early?
Opportunities for starting residency early rarely exist, and are offered on an irregular basis. There are two general types. First, someone has unexpectedly left a residency program so there is a slot that needs to be filled. (Keep in mind that early departure rarely occurs in the best programs). Second, programs in Medicine, Pediatrics or Pathology that have research residencies often start people at odd times of the year. If students find themselves in the situation of finishing early and know which residency they want to do, it never hurts to ask about the possibility of starting early.

Transition from medical school to residency

Are there any ways to continue research during residency?
It is generally agreed that it is impossible to continue bench research in a meaningful and productive way while serving as a full-time house officer. There are special programs that afford residents blocks of time to do basic research. These programs are best suited to people who wish to continue work in the same area, and preferably the same lab, as they did their graduate work. For the right person in the right situation, these programs are an excellent way to decrease the negative impact of the break in research time created by clinical training. For the wrong person they are lessons in frustration and futility. Anyone considering a research residency should get in touch with a prior graduate who has completed one of these programs in order to determine if it may be appropriate.

Should a student consider short-tracking?
 Anyone who is graduating from the M.D.-Ph.D. Program and going into Medicine or Pediatrics should consider the possibility of short-tracking, i.e. completing two years of house officership and then going into a subspecialty fellowship that includes research. It is important to note, however, that short-tracking is not available at every institution because it must be endorsed by (and often arranged by) the Department chairperson.

A major issue with short-tracking is that students must know early in their internship what subspecialty they will be choosing.

If a student is interested in short-tracking, s/he should take some time as a medical student to explore the particular sub-specialty s/he is interested in pursuing. For example, a formal rotation in the sub-specialty field may be appropriate. Also, the student may arrange to speak with a fellowship program director. For programs outside of Boston, it may be possible to arrange these discussions to coincide with residency interviews. These steps are particularly helpful because a new intern may feel a great deal of uncertainty applying within the first six months of internship. In addition, looking into fellowship programs as a medical student will help in deciding where to go for fellowship training, since the time available for such introspection may be unavailable as a house officer.

When does a student need to look into postdoctoral research opportunities and funding?
Although this is not a frequently asked question, it is good to begin planning early. Competitive labs may have a one to two year waiting list for postdocs. Fellowship applications must typically be submitted 6-12 months prior to the start of funding. Although many postdoctoral positions come with an offer of funding, especially for the first year or two, salary support is usually better with individual fellowships. Often fellowship applications cannot be
submitted prior to starting in a postdoctoral lab. M.D.-Ph.D. students ready to graduate can request and receive important information about timetables for looking for postdoctoral positions and applying for fellowship grants. A booklet is available from the HMS Sponsored Research Office on federal and non-federal sources of fellowship funding. Students should seek information about mentored physician awards (K08’s) and National Research Service Awards (NRSA’s) as well as grants from private foundations.

What is the impact of M.D.-Ph.D. Program curricular changes on students who began the program before 2000? Although students who entered the program before 2000 will not go through the same curriculum as students in years 2000 and later, they can benefit from the planned changes. Students who entered in 1999 were encouraged to seek out advice from a graduate program that fit with their interests, and to try to take graduate courses during their preclinical years of medical school. Students who entered in 1998 and 1999 had the option of doing a core clinical rotation in the summer between the second and third years. Students currently doing thesis work should consider taking the LCCM course and the longitudinal experiences in sub-specialty medicine currently being developed. All M.D.-Ph.D. students who have returned to clinical clerkships are encouraged to take advantage of the M.D.-Ph.D. mentoring programs within the hospitals as they become available.

This Advice Primer for M.D.-Ph.D. Students was developed with the input of several key contributors and is updated regularly to reflect changes. Please forward any comments or suggestions to: mdphd@hms.harvard.edu

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