Overview of the Pathways
Post-PCE Phase of the MD Curriculum

Contents (last updated 2/19/18):

I. Brief Summary of Pathways Post-PCE Requirements/Timing p. 3
   *Read this section in its entirety first!*
II. Notes on Advising and Sample Schedules p. 7
III. Advanced Integrated Science Courses (AISCs) p. 11
IV. Essentials II: Advanced Social and Population Sciences for Medicine p. 16
V. Clinical Electives, Sub-Internships, and the Clinical Capstone p. 17
VI. Scholarly Project Requirement p. 19
VII. HST and MD-PhD Students p. 20
VIII. MD-MBA, Other Masters Degrees, and Research Years p. 22
IX. Appendix: Pathway to Residency Timeline p. 24

As students in the Pathways curriculum at HMS anticipate the post-PCE period, they find themselves with many exciting options, chances to explore fields of interest, hundreds of elective opportunities, and more. The post-PCE phase is when many things that have been fuzzy become clear, and students have the incredible experience of becoming increasingly confident in their ability to take care of patients.

This prospect is likely both exciting and a bit daunting since the HMS curriculum is fairly prescribed from matriculation right through the PCE. As students embark on the new experience of creating a study card – and the process for all the add-drops that often follow – their advisors guide them through every step of the process. While this document – and the many information and advising sessions that are programmed in for each class – are inevitably focused on logistics and details, the most important thing to remember is that most students find the post-PCE phase to be the most enjoyable and energizing part of medical school, since they have the opportunity to tailor so much of it to their personal and professional interests.

It is important to remember that less than half of all students have any idea what specialty to choose when they finish the PCE, and generations of students have used the post-PCE period to help figure that out. For students reading this earlier in their HMS journey, please remember that all the details and logistics included here are not intended to cause stress that they should already be farther ahead than they are in narrowing down a specialty choice. Toward the end of the PCE, students are asked to submit preferences for how they wish to organize the first nine-month period after the PCE (October – June of Year III) through a phased set of electronic study cards that are due beginning in early August, and there are multiple advising sessions and class meetings organized well in advance of that time each year.

Appended to this document is also a “Pathway to Residency Timeline” detailing future class meetings and other events that are timed to ensure students have all the information they need to make choices well in advance of making any decisions. For example, since
selection of advanced clinical clerkships requires an understanding of what different disciplines expect in a residency application, we hold a series of residency program panels well in advance of when students need to submit preferences. These sessions, including more detailed information about how the Residency Match works, are organized in collaboration with PCE and clerkship directors to ensure all students are released from clinical responsibilities to come to TMEC on those evenings.

Most of the material in this document relates to Pathways students, although some of the information also relates to HST MD students and to the HST and New Pathway MD-PhD students who are still completing the PCE. Common requirements for all HMS students include the requirements to take and pass USMLE Steps 1, 2CS and 2CK, the requirement to take and pass the HMS Comprehensive Exam in the summer after the PCE is finished, and – for all students who matriculated in 2015 or after – the Clinical Capstone Course. There is also a section with information for MD-MBA students and other students doing combined degrees. Each section ends with a set of “frequently asked questions” (FAQs) about that topic.

Checklist for Reference: HMS Graduation Requirements for Pathways MD Students
Remember that all students should have at least two main goals for the post-PCE phase: to determine the specialty they wish to apply in for advanced training and to ensure they have a broad foundation in medical sciences.

Link to academic calendar found here: https://meded.hms.harvard.edu/academic-calendars

• Comprehensive Clinical Skills Exam: Summer after PCE
• Advanced Integrated Science Courses: 2 x four-week courses, at least one in Year III*
• Essentials II: 1 x four-week course, Year III or IV
• Clinical electives: At least 3 x four-week clinical electives at HMS affiliated hospitals
• Scholarly project:
  o December 31, Year III - Project/mentor proposal due for global health projects only
  o April 15, Year III - Project/mentor proposal due for all other projects
  o 2-5 months full-time SiM
  o March 1, Year IV - Final report due
• Sub-Internship in Medicine or Pediatrics – 1 x four weeks by July before graduation
• Clinical Capstone: 1 x four weeks – January, February, March or April, Year IV
• Full time enrollment each semester
• Steps 1, 2CS and 2CK required for graduation (further details for all of the above follow)

*These Advanced Integrated Science Courses are not required for MD-PhD students

I. Brief Summary of Pathways Post-PCE Requirements and Timing

USMLE (Passing Steps 1, 2CS and 2CK required for graduation):
  • Take Step 1 by December 31 of Year III;
• Take Step 2 CS by November 1 of Year IV;
• Take Step 2 CK by December 31 of Year IV.

Students finishing the PCE in September will generally take about six to eight weeks to study for Step 1, using either Oct-Nov or Nov-Dec to study, along with a week or two of vacation (USMLE exams can be scheduled for any day of the week except Sundays and holidays). At least one month of credit-bearing activity (typically in October or December) must be taken during the Oct-Dec quarter of Year III, such as a clinical elective or sub-I, Essentials 2, a SiM month, the Advanced Clinical Pharmacology course, or the HBS Medicine and Management Course (which is required for MD-MBA students and which runs part time through the second half of this three-month block – see below). Exceptions to this requirement for one month of credit-bearing activity may be requested from a student’s Advisory Dean for personal or academic/learning reasons, and these requests are considered for approval by the Advisory Deans as a group, to ensure fairness across Societies. Students are also permitted to take Step 2 before Step 1 only with the prior approval of their Advisory Dean; if approval is granted, the student is permitted to extend the Step 1 deadline until January 31 (see first FAQ below).

The **Comprehensive Clinical Skills Exam** is a 4-hour, 6-station OSCE designed to assess integrated clinical skills, including focused history-taking, physical exam with proper technique, communication and counseling skills, and demonstration of clinical reasoning through documentation of each clinical encounter, all in a professional manner. This required exam certifies clinical skills for the post-PCE level, prepares students for success in the Step 2 CS exam, and provides feedback to students at the end of the exam day. The Comprehensive Exam is scheduled over a period that spans the mid-June and beginning of the July blocks, ensuring that students can schedule it when not on their sub-internship month (students are given a morning or afternoon off from clinical electives and other courses to do the Comp Exam). The exam is required of all students in the summer after they complete the PCE.

**Advanced Integrated Science Courses** ("AISCs" – Section III): A minimum of two of these four-week courses is required; they are offered in January, February, and March. At least one must be taken in Year III. An overview of these courses is found in Section III below.

**Essentials II: Advanced Social and Population Sciences for Medicine (Section IV):** This required four-week course is taken in October or March of Year III or Year IV.

**Clinical Electives (Section V):** All students must complete at least three clinical electives at HMS-affiliated hospitals, in addition to the required sub-I and Clinical Capstone. No more than two electives with the same course number can count toward this requirement (e.g., cannot count the third of three months of neurosurgery). It is expected that most students will do more than the minimum number of clinical electives, along with other non-clinical electives, away rotations, international clerkships, etc.
Sub-Internship (Section V): The required four-week “sub-I” in medicine or pediatrics is taken after the PCE and no later than July of Year IV for all Pathways students (by August of Year IV for HST students). Sub-Internships are done at a different clinical site from the one where the PCE was completed. Note that the “required sub-Internship” is either the Medicine II or Advanced Pediatrics rotation, and all students (both Pathways and HST) must take one or the other (by July or August, respectively). Other advanced electives are sometimes referred to as “sub-I’s” (e.g., doing a “surgical sub-I” or an “GYN sub-I”): those are advanced clinical rotations where students are given more responsibility than on a typical clerkship, and students applying in those fields receive advice as to when these other “sub-I’s” should be part of their schedule, but none of those is required for graduation.

Clinical Capstone (Section V): All students must complete the Clinical Capstone course in January, February, March, or April of Year IV. The course involves three weeks of an advanced clinical elective that meets the criteria for direct patient responsibility, along with a required one-week professional development/transition to internship curriculum conducted at TMEC. For the three-week clinical component, students select from rotations such as emergency medicine, ICU electives, advanced surgery or OB-GYN, etc. – rotations where the student works up patients and writes the orders (which get co-signed by a physician) in the way they did in their sub-I in medicine or pediatrics. The Clinical Capstone prepares students to self-assess the areas of clinical work they should focus on as the enter their internship and ensures they have had direct patient care responsibility in the six months before internship begins.

Scholarly Project Requirement (“SiM” – Section VI): The deadline for proposal is April 15 of Year III and the final scholarly report is due March 1 of the final year. Students are encouraged to use an AISC or Essentials II to help identify a SiM topic and mentor if this has not already happened during the pre-clerkship or PCE phases of the curriculum. This timeline helps students choose courses, e.g., if a student is considering an Essentials-related SiM project (global health, social medicine, clinical epidemiology, health policy, ethics), it is advisable to do that course in October or March of Year III; if considering a SiM project involving cancer medicine, take the cancer biology AISC in Year III. Students typically have a minimum of two full-time months of SiM 500 on their transcript (unless they do their SiM through a master’s or PhD project), but they may have up to five months of full-time SiM and still be able to graduate in four years. Students who do a combined degree (masters or PhD) generally fulfill the SiM requirement by submitting the written product they produce for that other graduate degree.

Maintain Full-Time Enrollment: All students must ensure that they remain enrolled full-time for all eight semesters in the MD program at HMS in order to graduate. As students complete study cards for their next period of enrollment (typically done in approximately nine-month study card periods), they – with their advisors’ help – must ensure that the plan represents a strong approach not only to completing all graduation requirements and preparing for residency applications, but also that no lapses of full time enrollment occur (recognizing that a personal illness or family emergency can pull students away for periods of time).
Most students can meet all requirements and have up to **five to six unscheduled months** across the 19-month post-PCE phase, but they must be enrolled at least three months in every semester (Jan-Jun and Jul-Dec) to remain enrolled “full-time.” Only in the final graduating semester may a student be enrolled for only two months (eight weeks full time Jan-Apr), and this only if they are on track to complete their degree requirements. *Any semester in which a student is enrolled less than full-time, except for that final term, may affect financial aid eligibility.* Enrollment months may include not only clinical electives and sub-Is, but also SiM500 months, away electives at other medical schools, and non-clinical electives, such as the leadership course, advanced anatomy, medical Spanish, student-as-teacher, advanced clinical pharmacology, narrative medicine, and many others.

Students in the 5-year MD-MBA program should review their special program requirements carefully (see section on MD-MBA requirements). Students who complete other masters programs (MPH, MPP, MMSc, MBe) generally do these degrees in the academic year between their third and fourth year of medical school, so this does not affect any other requirements.

**Frequently Asked Questions:**

1. **Should I consider taking Step 2 before Step 1?**
   As noted above, students are permitted to take Step 2 before Step 1 **only with prior approval** of their Society Advisory Dean, in which case they are permitted to extend the Step 1 deadline until January 31. This requirement for the Advisory Dean’s approval is designed to ensure that students have carefully considered all of the implications of this strategy from the perspective of the residency application process.

   Most other medical schools that have frame-shifted the clerkship year earlier allow students to take Step 2 first, but benchmarking suggests that virtually no students do so. Taking Step 2 first sounds compelling to a student in the midst of clerkships, since it feels as if it might optimize the Step 2 score, given the overlap of content with all the shelf exams. This approach does not take into consideration all the clinical learning students do in advanced electives. More importantly, it means “losing” a month that could contribute to residency planning and application (since students otherwise typically fit in Step 2 during residency interviews and do not “lose” a critical pre-application month just studying for Step 2). Conventional wisdom suggests that taking Step 2 first “can only hurt you” in residency screening (i.e., the score is generally not a factor in the residency selection process unless it is already available and very low). The policy of “opt out only with approval from the Advisory Dean” allows for flexibility, but ensures students are not overthinking the advantages for their Step 2 score and losing sight of the fact that Step 1 is the only score that is used as a screen for residency interviews by programs who use such screens. Furthermore, if a student applying in such a speciality does not get the Step 1 score he or she hoped for, additional studying for Step 2 to produce a higher score can often mitigate this— but is only worth doing after the Step 1 score is known.
2. How do vacations work in the post-PCE phase of the curriculum?

The entire academic calendar in the post-PCE phase works just like the PCE calendar. The year is divided into 12 four-week blocks, with one week of spring break built in, one week of a summer vacation, and two weeks for winter break at the end of December. The calendars for each year are available on the Registrar's website: https://meded.hms.harvard.edu/academic-calendars

This means there is a “drift” through the year of when each four-week block actually starts – with the January block starting in early January, but the December block actually starting in mid-November, since it ends with two more weeks in December. Thus, whenever you see a course or clerkship referenced as “April” or “October,” you should be aware that it typically starts the end of the month before and finishes before the end of that month (more so as you move through the second half of the year).

In addition to those four weeks of vacation built into the academic calendar, most students leave several four-week blocks unscheduled, including one or two months for Step 1 study, one or two months of travel for residency interviews (although students also often fit interviews in during SiM research months), and other vacations. The calendar has enough flexibility for a student to take up to five or six unscheduled months during the post-PCE period (in addition to the four vacation weeks built in) and still graduate on time. As noted above, it is critical to maintain full-time enrollment, which means having at least three credit-bearing months in each semester (January-June and July-December), with the exception of the final semester, when two full time months are allowed if all degree requirements have been met.

3. Once I submit my study card and get the next phase of my schedule, may I request changes along the way?

Yes. Once study card assignments for each period are completed, students have the opportunity to request and/or make changes to their post-PCE schedules based on availability. The scheduling of clinical electives is usually more flexible than the scheduling of AISCs and the required medicine or pediatrics sub-internships:

- For AISCs and required medicine or pediatrics sub-internships, requests for add/drops are managed by the Registrar's Office and must be done at least 60 days in advance;
- For clinical electives, a schedule for monthly online add/drop requests will be made available, and these are usually submitted directly online.

II. Notes on Advising and Sample Schedules

Planning the post-PCE phase of the curriculum is one of the critical junctures at which our Society advising system is of the most use to all students. Not only do students have their first major opportunity to choose what they are doing from month to month, but there are an incredible number of possible experiences and sequences. All Society advisors are fully informed of the various student-specific factors that might play a role in post-PCE planning and how best to use these, on an individualized basis, to recommend possible choices.
The overarching goal of the advising program during Years III and IV is to help students create coherent multi-month tracks in order to accomplish the following aims, in approximate order:

- To explore their career goals in more depth than is possible in the pre-clerkship curriculum or the PCE
- As they narrow their specialty choices and ultimately select a clinical field, to shape their schedules accordingly to maximize learning opportunities and strengthen competitiveness for residency applications
- To round out their experience with electives and other activities that shore up areas in which they need more work, help to prepare them for internship, stimulate questions to approach in a SiM project, or simply be fun things to try out

An important advising meeting for all students takes place during the last third of the PCE year, when students discuss with their Society advisors their evolving career goals and how best to use the post-PCE phase to achieve these multiple aims. One example, among many, of how a student’s specific trajectory would help determine the appropriate sequencing of post-PCE activities relates to the timing of the SiM project months. Since, for most students, it is optimal for SiM research to be relevant to their desired career path, students unsure about their specialty interests immediately after the PCE might be advised to do more clinical electives earlier and their SiM project later, while students who are already committed to a particular specialty might do their SiM project earlier and more clinical electives later.

Besides the individual Society advising meetings, there are also class-wide meetings, specialty panels, and other sessions scheduled each year in which details about special cases such as the couples match, military match, early matching specialties, and the Canadian match are provided. There are also class-wide sessions with workshops on preparing a personal statement, a set of mock interviews, and discussions of strategies for preparing a rank list. In addition, HMS has designated a cadre of specialty advisors available to students in each field to to provide specialty-specific tips on the application process.

Following are mock schedules for five hypothetical students:

- **Hermione** starts out thinking she’s going into neurology, but switches to internal medicine. Her SiM is on health policy.
- **Harry** finishes the PCE fairly certain about orthopedic surgery and wants to do a translational research SiM in ortho.
- **Ron** finishes the PCE totally undecided – most likely leaning toward either psychiatry or pediatrics, but definitely interested in global health and wants to do a SiM project with Partners in Health in Rwanda. He decides on pediatrics.
- **Neville** knows it will be something “procedural,” and after a few explorations ends up going into OB-GYN, also with an interest in translational research.
- **Luna** has been enthusiastic about surgery since first year and plans to continue some basic science cancer-related research begun before starting medical school.
AISCs are shown in **red** and Essentials II in **green**.

<table>
<thead>
<tr>
<th>Month</th>
<th>Hermione</th>
<th>Harry</th>
<th>Ron</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct</td>
<td>Step 1 study</td>
<td>Clin elective: ortho</td>
<td>Essentials II</td>
</tr>
<tr>
<td>Nov</td>
<td>Step 1 study/exam</td>
<td>Step 1 study</td>
<td>Step 1 study</td>
</tr>
<tr>
<td>Dec</td>
<td>Clin elective: adv neuro</td>
<td>Step 1 study/exam</td>
<td>Step 1 study/exam</td>
</tr>
<tr>
<td>Jan</td>
<td>Clin elective: pedi neuro</td>
<td>Regenerative Medicine</td>
<td>Clin elective: peds</td>
</tr>
<tr>
<td>Feb</td>
<td><strong>Immunology</strong></td>
<td>Clin elective: SICU</td>
<td>Clin elective: psych</td>
</tr>
<tr>
<td>Mar</td>
<td>Essentials II</td>
<td>Medicine Sub-I</td>
<td>Neurobiology</td>
</tr>
<tr>
<td>Apr</td>
<td>Medicine Sub-I</td>
<td>SiM500</td>
<td>Clin elective: cardiology</td>
</tr>
<tr>
<td>May</td>
<td>Clin elective: nephrology</td>
<td>Away rotation: ortho</td>
<td>Peds Sub-I</td>
</tr>
<tr>
<td>Jun</td>
<td>Clin elective: rheum/Comp</td>
<td>Vacation/Step 2CK</td>
<td>Clin elective: GI/Comp</td>
</tr>
<tr>
<td>Jul</td>
<td>Vacation/wedding</td>
<td>Clin elective: endocrine/Comp</td>
<td>Vacation/wedding</td>
</tr>
<tr>
<td>Aug</td>
<td>Clin elective: derm</td>
<td>Away rotation: ortho*</td>
<td>SiM500/Step 2CS</td>
</tr>
<tr>
<td>Sep</td>
<td>Vacation/Step 2CK</td>
<td>SiM500/Step 2CS</td>
<td>SiM500: abroad</td>
</tr>
<tr>
<td>Oct</td>
<td>SiM 500/Step 2CS</td>
<td>SiM500</td>
<td>SiM500: abroad</td>
</tr>
<tr>
<td>Nov</td>
<td>SiM 500/Interviews</td>
<td>Unsched/Interviews</td>
<td>SiM500: return/Step 2CK</td>
</tr>
<tr>
<td>Dec</td>
<td>Unsched/Interviews</td>
<td>Unsched/Interviews</td>
<td>Unsched/Interviews</td>
</tr>
<tr>
<td>Jan</td>
<td>Clinical Capstone</td>
<td>SiM500/Interviews</td>
<td>Clinical Capstone</td>
</tr>
<tr>
<td>Feb</td>
<td><strong>Comput Medicine</strong></td>
<td>Immunology</td>
<td>Microbio/Infectious Dis</td>
</tr>
<tr>
<td>Mar</td>
<td>Women’s health elective</td>
<td>Essentials II</td>
<td>Microbio/Infectious Dis</td>
</tr>
<tr>
<td>Apr</td>
<td>Narrative Medicine</td>
<td>Clinical Capstone</td>
<td>Clin elective: ER</td>
</tr>
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<table>
<thead>
<tr>
<th>Month</th>
<th>Neville</th>
<th>Luna</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct</td>
<td>Step 1 study</td>
<td>SiM 500 (back to previous lab)</td>
</tr>
<tr>
<td>Nov</td>
<td>Step 1 study/exam</td>
<td>Step 1 study</td>
</tr>
<tr>
<td>Dec</td>
<td>Clin elective: cardiology</td>
<td>Step 1 study/exam</td>
</tr>
<tr>
<td>Jan</td>
<td>Translational Pharm</td>
<td>Cancer Biology</td>
</tr>
<tr>
<td>Feb</td>
<td>Clin elective: Gyn Onc</td>
<td>Clin elective: Surg Onc</td>
</tr>
<tr>
<td>Mar</td>
<td>Medicine Sub-I</td>
<td>SiM 500</td>
</tr>
<tr>
<td>Apr</td>
<td>Clin elective: interv rays</td>
<td>Medicine Sub-I</td>
</tr>
<tr>
<td>May</td>
<td>SiM500</td>
<td>Clin elective: SICU</td>
</tr>
<tr>
<td>Jun</td>
<td>SiM500/Step 2 CS/Comp</td>
<td>Vacation/Step 2CK</td>
</tr>
<tr>
<td>Aug</td>
<td>Clin elective: derm</td>
<td>SiM500</td>
</tr>
<tr>
<td>Sep</td>
<td>Vacation/Step 2CK</td>
<td>SiM500/Step 2 CS</td>
</tr>
<tr>
<td>Oct</td>
<td>Essentials II</td>
<td>Essentials II</td>
</tr>
<tr>
<td>Nov</td>
<td>Unsched/Interviews</td>
<td>SiM500/Interviews</td>
</tr>
<tr>
<td>Dec</td>
<td>Unsched/Interviews</td>
<td>Unsched/Interviews</td>
</tr>
<tr>
<td>Jan</td>
<td>Clin elective: fam med</td>
<td>Clin elective: Infectious Diseases</td>
</tr>
<tr>
<td>Feb</td>
<td>Comput Medicine</td>
<td>Clinical Capstone</td>
</tr>
<tr>
<td>Mar</td>
<td>OB/GYN “Boot Camp”</td>
<td>Microbio/Infectious Dis</td>
</tr>
<tr>
<td>Apr</td>
<td>Clinical Capstone</td>
<td>Clin elective: anesthesia</td>
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</tbody>
</table>
*This third ortho month, urged by student 2’s ortho advisor, is non-credit bearing. (Students are limited to no more than two clinical electives representing the same course in the same medical/surgical discipline. Students who choose to take more than two will not receive additional academic credit to meet clinical elective and/or unspecified elective requirements. Student Handbook Section 1.03: Course and Examination Requirements.)*

**Frequently Asked Questions**

1. **How should I think about the goals and objectives for my post-PCE curriculum?**

   As you go through the post-PCE phase of the curriculum, you of course have major goals around the choice of a residency field and successfully matching into a residency in that field. Please remember that in addition to those career-choice goals, you should be organizing your program of study to ensure you are meeting such curricular goals for the post-PCE phase as:

   **Medical Knowledge and Patient Care**
   - To solidify and expand knowledge in the biomedical and clinical sciences and improve the ability to use that knowledge in the care of patients
   - To assume increasing responsibility for patient care
   - To determine when a patient’s clinical condition is indicative of a serious and potentially life-threatening problem
   - To prepare for the next phase of medical training in a laboratory or clinical setting

   **Professionalism**
   - To develop an understanding of the responsibility and privilege associated with providing care for patients and to cultivate a sense of ownership for a patient’s clinical course
   - To apply ethical principles in the context of clinical care
   - To seek and make use of feedback

   **Critical Thinking and Inquiry**
   - To enhance curiosity through the pursuit of individually defined interests
   - To build upon the skills needed to pursue scientific endeavors and scholarly work
   - To refine critical thinking and clinical reasoning skills
   - To build upon the skills needed for self-directed learning, including the ability to identify gaps in knowledge and to use and evaluate resources in the medical literature

   **Interpersonal and communication skills**
   - To work with interprofessional teams in an effective and respectful manner
   - To communicate medical and scientific information to colleagues in a meaningful manner
   - To communicate medical information to patients and families in lay terms and in an empathic manner
• To communicate the uncertainty inherent in medical diagnostic and therapeutic approaches in a manner that supports the principles of high value care and shared decision-making

Organizational and Social Determinants of Healthcare
• To solidify and expand knowledge in the social sciences and improve the ability to use that knowledge in the care of patients
• To solidify and expand knowledge of the healthcare systems to enhance efficiency and quality of care while ensuring patient safety
• To care for patients representing a diverse population with sensitivity and respect

2. As I hit the mid-point of my PCE, how much pressure should I feel to figure out my preferences for the period following my PCE?
None! You do not have to decide about this until the final months of your PCE. If you are feeling pressure prematurely, please reread the introduction above containing the rationale for providing all this detail so far ahead of when you need it. This document and our class meetings are not intended to get you stressed about feeling you should already be farther ahead in career planning than you need to be. Remember that most students finish the PCE unsure of what they want to do, and there are multiple class meetings and advising sessions scheduled to assist you in a timely way.

III. Advanced Integrated Science Courses (AISCs)
Scientific research is at the core of evidence-based medicine and is transforming medical care at an increasingly rapid pace. Physicians have to evaluate new research advances, incorporate them judiciously into clinical practice, and provide leadership for new research into the most urgent patient needs. The Advanced Integrated Science Courses (AISCs) are designed to engage students in the critical two-way relationship between research and clinical medicine: How can curiosity about clinical experience and the formulation of key questions lead to new research progress? And how can an understanding of current research developments influence clinical decision-making and patient care?

The AISCs use flipped-classroom and other active learning methods as in Year I, while having an increased emphasis on self-directed learning. They are particularly distinguished by engaging with the frontier of *clinically-relevant research at the boundary of the known and the unknown*. Clinical or other experiential learning activities integrated into each course serve to illustrate underlying science principles and promote the development of scientific questions about the mechanism of disease, diagnosis or treatment. Students actively participate in scientific inquiry by identifying and exploring unsolved questions that interest them with faculty mentorship, culminating in a final product at the end of the course. The AISCs also help students develop generalizable skills: finding and evaluating research information, communicating about science to peers or patients, understanding how research influences patient care, and developing questions and ideas for scientific investigation and medical progress. The AISCs aim to enhance the
capabilities of students to work at the interface of clinical care and research, as first-rate contributors to the medicine of today and the coming decades, while providing an introduction to frontier research topics. These generalizable skills are more important as goals than the particular scientific area a given course uses to teach them.

Similar to Years I and II, the AISCs are graded on a satisfactory/unsatisfactory basis. A narrative assessment of performance is provided to each student. A typical course has both a final product and one or more smaller intermediate products (written or oral presentations) that together serve as the basis for assessment. The number and type of assignments vary by course (see FAQs, below).

Students are required to take two AISCs of their choice, at least one during Year III. Each AISC is offered once per year during January, February or March. During each four-week course, students should plan to devote their full-time effort to the AISC; although there may be blocks of unscheduled time, this time is critical for preparation, self-directed exploration, and development of original questions and work products. The following AISCs are currently planned for January, February and March of 2019; dates are still tentative, and other courses may be finalized in the months ahead. A final list of courses and months offered are posted by early July each year, well before study cards are due.

**Cancer Biology** (January)
*Course Directors: Randall King, Harold J. Burstein.*
A revolution in the scientific understanding of the cellular and molecular basis of cancer is transforming the science and art of clinical cancer care. The course emphasizes how the basic science of cancer biology underpins issues such as cancer prevention, screening, diagnosis and choice of therapy. Students review and deepen their understanding of basic principles in cell biology, genetics, and pharmacology in the context of cancer biology. Participation in multidisciplinary oncology clinics serve as a stimulus to identify basic science questions which students investigate throughout the course.

**Regenerative Biomedicine** (January)
*Course directors: David T. Scadden, William J. Anderson, David P. Steensma.*
Regenerative biomedicine aims to repair tissues and organs to restore normal function and is likely to become an increasingly important component of clinical medicine in the coming years. Hematopoietic stem cell transplantation is already in wide clinical use, while other regenerative therapies have entered the clinic more recently or are in clinical trials. This course explores the role of stem and progenitor cells in tissue homeostasis, how defects in this process can lead to illness, and the role of stem cell therapy in the treatment of disease. The course challenges students to think critically in the area of stem cell therapy and regenerative biology as it applies to clinical applications in stem cell transplantation, wound repair, and aging among others. Varied clinical experiences ranging from transplant medicine to geriatrics facilitate integration of basic science concepts and stimulate formulation of questions at the scientific frontier which is explored during the course.
Translational Biomedical Engineering (January)
Course director: David R. Walt.
Innovations in biomedical engineering are having a significant impact on healthcare. Advances in genomics technologies are transforming diagnostics/therapeutics, including personalized medicine. Prosthetic technologies are giving patients who have lost a limb the opportunity for near-normal lives. Robots, swallowed or injected, are changing surgery and diagnostics. Nanomaterials are being used as therapeutics and for new imaging modalities. In this course, students interact with faculty who have successfully translated their work to the private sector, and spend time in labs at the Wyss Institute where novel technologies are currently being developed. Students also meet with investors, visit startup companies to see how technologies are scaled and manufactured, and meet with business development and marketing groups. Student teams are then tasked with going into the clinic and developing a novel use case for technology. The course is designed to provide students with an understanding of the entire process from academic discovery to commercial and patient impact.

Translational Pharmacology (January)
Course directors: David E. Golan, Catherine I. Dubreuil, Donald M. Coen, Jagesh V. Shah.
There has never been a better time in science and medicine to discover and develop effective therapies for human disease. The Translational Pharmacology AISC covers principles of pharmacology, drug discovery, and therapeutic development from unmet need to drug deployment in the clinical setting. Through case studies of successes and failures in translation and group projects to propose drug development strategies from unmet need through clinical trials and pharmacovigilance, this course explores current topics in therapeutic discovery. Visits to clinics and biotech/pharma companies as well as meetings with patients and physicians in relevant therapeutic areas are utilized to further examine how unmet medical needs are translated into new clinical practices.

Computationally-Enabled Medicine (February)
Course directors: Isaac Kohane, Paul Avillach.
Computational approaches to analyzing large data sets and applying the insights derived to clinical decision making are central to the present and future of biomedicine. This course enables students to acquire a computational framework and toolkit for addressing this growing analytic challenge. Selected examples from genomics clinical decision making and from epidemiology informed by “big data” obtained from electronic healthcare data, claims data and even the social web serve as the basis for exploration of the computational framework. Mentored experiences at medical data science companies and state-of-the-art clinical diagnostics enterprises enable students to experience the application of and elaborate questions that can be addressed by computational biomedicine.

Human Genetics (February)
Course directors: Matthew L. Warman, David T. Miller
This course examines genetic principles and experimental approaches to address fundamental questions about human variation, health, and disease. By examining topics such as chromosomal disorders, genomics, gene therapy and forensic genetics, as well as participating in whole exome and whole genome sequencing analyses, students gain an
understanding of the scientific underpinnings and technology that drive advances in genetics. Clinical opportunities focused on the genetics of cancer, cardiovascular disease, birth defects, developmental disability, and neurodegenerative disease promote the development of scientific questions in order to deeply investigate how to use genetic technologies to diagnose and treat patients affected by a genetic disease and how to counsel patients who may be at risk for developing disease.

**Immunology** (February)
*Course directors: Stephanie K. Dougan, Michael L. Dougan.*
The basic science of immunology has resulted in an impressive array of new therapies over the past decade that have dramatically changed clinical outcomes in a wide range of diseases. Using four fundamental concepts as a framework (B cell development and antibody function, antigen processing and presentation, activation and regulation of adaptive immunity, and cell-cell communication), this course examines the immunologic foundations underpinning the rapid expansion of immune modulating therapeutics in clinical use. The course illustrates these concepts using specific diseases including primary immunodeficiency, allergy, rheumatoid arthritis, inflammatory bowel disease, and cancer as well as through integrated immunology-focused clinical experiences across a range of specialties. Clinical experiences and classroom discussions enable students to identify and explore questions that examine our understanding of how we can broaden the repertoire of immune therapies in the future.

**Metabolism, Nutrition and Lifestyle Medicine** (February)
*Course directors: Marie-France Hivert, Christopher Duggan*
A lifestyle with healthy nutrition and physical activity could prevent up to 80% of non-communicable diseases, and dietary patterns are the etiology for numerous acute illnesses in women, children and other susceptible populations. Recent advances in knowledge and technology are transforming the way that we integrate lifestyle into clinical practice. This course covers four major themes: 1) energy regulation, from undernutrition to overnutrition; 2) gene-nutrition/lifestyle interactions; 3) developmental origin of health and diseases; and 4) novel technological approaches in nutrition and lifestyle. Students have the opportunity to participate in a wide variety of specialty clinical programs, including weight management, diabetes care, hyperlipidemia, parenteral nutrition, neonatal and other intensive care units, celiac disease, intestinal failure, and others. Class sessions include students’ clinically-inspired questions, case discussions, journal clubs, and experiential learning. This AISC combines the expertise of multiple faculty members across HMS-affiliated institutions to offer students the opportunity to expand their knowledge and skills to integrate nutrition, physical activity, and other lifestyle behaviors in their future careers.

**Microbiology and Infectious Diseases** (March)
*Course directors: Cammie F. Lesser, Max L. Nibert.*
Despite our substantial progress in controlling infectious diseases through vaccines, therapeutics (e.g., antibiotics), and other public health measures, they continue to be a source of tremendous suffering and death around the world, especially in low-resource settings. This course explores the bidirectional interactions between the practice of clinical
medicine and basic/translational research in Bacteriology, Virology, and Immunology. Mentored experiences in clinical settings enable students to formulate and investigate specific questions at the interface between medicine and science. Focusing on antibiotic resistance, HIV/AIDS, the human microbiome and emerging viruses such as Zika, this course explores the challenges and possible solutions that infectious diseases will bring to the 21st century.

**Neurobiology** (March)

*Course directors: John Assad, Todd Herrington.*

The human nervous system is one of the great frontiers of modern biology. Current advances in neuroscience have transformed neurology from primarily a diagnostic specialty to one rich with therapeutic options. In this course, clinical experiences, in addition to neurology, incorporate radiology, psychiatry and neurosurgery. Topics include pain and sensory loss, the etiology and treatment of seizures, the disruption of cognitive function in neurodegenerative, neurodevelopmental and psychiatric disease, the role of functional neuroimaging in understanding brain networks, and the use of neurotechnology including deep brain stimulation to treat neurologic and psychiatric disorders. In this course, students deepen their understanding of basic neurobiology with a goal that they become inspired to contribute to scientific understanding and translate discoveries into novel therapies.

Note 1: Other courses may be added to this list and some months may shift; the final list (with all course descriptions and months offered) is published by early July each year, before study cards are due for the following year.

Note 2: AISC courses are not required for MD-PhD students, who may elect to take them as electives if they wish.

**AISC Frequently Asked Questions**

1. **How does an AISC differ from a clinical elective?**

   The goals and objectives of AISCs differ significantly from those of clinical electives. The goal of the AISCs is to promote an understanding of basic science concepts and to encourage scientific inquiry, while the goal of a clinical elective is to promote a deeper understanding of clinical medicine. For example, the goal of a cancer clinical elective is to learn about the diagnosis and treatment of various malignancies. In contrast, the goal of the cancer biology AISC is to explore how the scientific understanding of the cellular and molecular basis of cancer relates to clinical cancer care, to explore questions at the frontier between the known and unknown, and to consider how such questions might be answered. As such, the AISCs devote a significant amount of time to self-directed learning and deep exploration of a question of interest rather than teaching in depth about the diagnosis and treatment of cancer. The bulk of formal course time is spent in the classroom rather than in a clinical setting.

2. **How are the clinical experiences within the AISCs differ from a clinical elective?**
The clinical experiences within the AISCs are focused on identifying unanswered questions relevant to the patients encountered during the clinical experiences, rather than focusing on the comprehensive clinical care of a patient. On average, there are two half-day clinical experiences per week in a typical AISC. The clinical experiences vary by course, and typically span a number of different specialties or sub-specialties within a single AISC. Non-clinical experiences such as laboratory experiences or visits to industry are also utilized in some AISCs. Importantly, clinical experiences are integrated into the course through facilitated discussions at the clinical sites and at HMS focusing on the bidirectional interaction between basic science and clinical medicine.

3. I have never done basic science research previously; how will this impact my performance in an AISC?

The AISCs are designed to accommodate students at different levels of knowledge and experience in basic science research. Mechanisms for mentorship and feedback, as well as primers on the basic knowledge required for each course are built into the AISCs to enable students to explore a scientific topic and engage in the scientific process in an unfamiliar subject area. Performance evaluations take prior experience into account.

4. What does an AISC final work product look like?

The AISCs aim to encourage self-directed study and independent thought, and in keeping with this, each course has a creative final work product. Students are able to choose their own topic, within the broad scope of the course, based on their clinical experiences and developing professional interests. The format of the work product is set by each course, and some courses offer more than one option. Examples of final work products include a research proposal, an explanation for a patient about research relevant to their condition and clinical choices, a short review of progress and challenges in a research field, educational materials for students, or a newspaper article for the general public. Whatever the specific format, the work product provides an opportunity to develop and display the generalizable skills that the AISCs are designed to enhance: finding and critically evaluating research information; effectively communicating scientific information to peers or patients; understanding how research can influence patient care or clinical decision-making; and formulating good questions suitable for future research.

5. Can I use my third year AISC to develop my SiM project?

The AISCs are offered prior to the April 15 deadline for submission of the SiM project proposal in Year III. This is designed so that students may use the AISCs (and/or Essentials II) to develop their SiM project or inform a project already under development. During each AISC, students interact with a number of leading HMS scientists and clinicians with a focus in research, which can help you develop ideas or find mentors for your SiM project.

6. Is there be a cap on enrollment in individual courses? What if I don’t get my first choice?

Students are required to rank their top three AISC course preferences. First choices are accommodated whenever possible, although it is often necessary to cap enrollments to achieve a workable distribution of students across courses. Students who do not receive
their first choice AISC in Year III are given priority for that course in Year IV, unless they later indicate a different preference.

7. Will additional AISCs be offered in the future?
In addition to the first group of AISCs offered in 2018, additional AISCs have already been added for 2019, and we plan to develop additional courses into 2020. Potential areas being explored include social science topics such as health care policy and global health; as with the other AISCs, the focus would be on a deep and rigorous engagement with frontier research in those fields. However, planning for 2020 is still preliminary. If you have suggestions for a 2020 course, please feel free to contact the AISC Curriculum Directors (John Flanagan, flanagan@hms.harvard.edu; or Eli Miloslavsky, emiloslavsky@mgh.harvard.edu).

IV. Essentials II: Advanced Social and Population Sciences for Medicine

The "Essentials of the Profession" course in Year I introduced students to core principles of clinical epidemiology, health policy, medical ethics and professionalism, population health, and social medicine. That course taught students how to think critically about medical knowledge and how to understand the social and political contexts of health and health care in the United States. “Essentials II: Advanced Social and Population Sciences for Medicine” builds on this foundation and on the experiences students had during the PCE. What are the most important moral dilemmas of clinical care and how can they be addressed? How can health care systems and financing be reformed to optimize the value of care in the United States? What role does health care play as part of a broader system that works to achieve public health? Who is responsible for ensuring that patients achieve the best possible health outcomes? The course also includes a novel collaboration with Harvard Business School, where HBS faculty come to HMS to teach classic HBS cases on Value-Based Care.

“Essentials II” is offered in October and March of both Years III and IV – there are four options to schedule this course. Like the AISCs, it is graded on a satisfactory/unsatisfactory basis, with a narrative provided for each student. Required class sessions are concentrated in the afternoons, with students using the mornings to prepare for class, work on their final projects for the course, and other purposes depending on when they take the course and their specific interests. Students who plan to do their scholarly projects in any of the Essentials II disciplines should consider taking the course in October or March of Year III, so that they can use the time and mentorship provided by the course to make progress on their projects and develop their proposals. Since international SiM projects are due earlier than other projects, students considering an international SiM project are advised to take Essentials II in October of Year III (immediately following the PCE). Other students will complete independent or group projects relevant to the course and their interests. Students who take the course in March of Year IV, for instance, can concentrate on problems in medical ethics or health policy that they expect to encounter during their residency. Others can combine course work with clinical experiences where they can apply the perspectives of social medicine or population health.
Essentials II Frequently Asked Questions

1. How do I decide which of the 4 opportunities to take Essentials II is best for me?

Any of the four offerings (October or March of Year III or IV) is equally good, so this depends entirely on a) how the course fits into your educational plan and b) what other priorities might take precedence for you in one or more of those months. For example:

- If you are thinking of doing your SiM project in an area relevant to the course or have an interest in building these academic disciplines into your medical career in a significant way, it would make sense to prioritize taking Essentials II in October or March of Year III, as noted above (and more likely October if you are planning to do an international SiM project, since those proposals are due earlier).
- If, say, you are thinking about doing a SiM project in an area represented by an AICS offered in March (such as Microbiology and Infectious Diseases or Neurobiology), then you should choose one of the other offerings of Essentials II. You would have the opportunity to take any of the March AISCs in March of Year IV as well, if it is a subject of particular scientific interest (by not a plan for your SiM scholarship). Note that there are always fewer AISCs offered in March than in January and February, since March is one of the months when Essentials II is offered.
- The October Year IV offering is scheduled after all the residency applications are in and before most interviews begin, so if you are very unsure of what specialty you want and prefer to use additional earlier months to try out various clinical electives, October of Year IV might be a good option.
- As your residency plans evolve, you may discover other factors that will influence your choice. For example, you may be thinking that March of Year IV initially sounds like a good option, but over the rest of third year you might decide to go into OB-GYN, and your OB-GYN advisor may inform you of a course offered only in March of Year IV designed to prepare students for residency in OB-GYN (a few specialties organize such “boot camps,” which are highly valued). Once you decide on your specialty, you should inquire about the scheduling of such a “bootcamp” course in that field, so if it is held in March you could then schedule Essentials II in October.

The four offerings of this required course are designed to ensure that every student can schedule it as one among multiple priorities, so the key is working closely with your Society Advisor, since Essentials II must be taken in one of those four slots.

V. Clinical Electives, Sub-Internships, and the Clinical Capstone

Clinical Electives: HMS offers over 200 clinical electives, providing students with a rich menu of opportunities to explore almost any clinical field of medicine, usually with a choice of clinical settings for each. These are four-week experiences and often involve participation on a specialty consultation service, so that as the student on the endocrinology or the gastroenterology service, you will become part of the team that assesses patients when a consult in that area is called by medicine, surgery or other
services. Some of the clinical electives involve direct patient care (more similar to core clerkships during the PCE), as typically is the case when a student does an elective in the emergency room, an intensive care unit, and certain primary care electives. In these electives, the student is assigned primary responsibility for a set of patients and engages with their families and writes their orders. Every student is required to do at least three clinical electives at HMS affiliated hospitals during the post-PCE phase, but most students do many more than that as they explore areas of interest and then solidify their specialty choice, meet faculty to get letters of recommendation for residency, and continue to learn more medicine. A complete list of clinical electives is available in the course catalogue on the Registrar’s website: http://www.medcatalog.harvard.edu/.

Sub-Internships: All HMS students are required to do a four-week “sub-Internship” in either medicine or pediatrics. **Fall-entry PCE students are required to do the “sub-I” by the July before graduation, so that the evaluation can appear in the student’s residency application packet, and it must be done at a site other than the PCE site.** Spring-entry PCE students are given until August before graduation to complete their required sub-I. The complete list of these core sub-I’s may also be found in the course catalogue on the Registrar’s website: http://www.medcatalog.harvard.edu/ under “Core Clinical Clerkships” since they are the “Core Sub-Internships.” These rotations are unique because the structure of the clinical team is altered to enable students to act as the intern on the team. The student thereby has increased responsibility, and most students find that this month is crucial in preparing them for the multi-tasking and clinical decision-making that they will experience as an intern. The term “sub-I” is loosely used for certain other elective rotations where students are given more direct patient responsibility, but these “surgical sub-I’s” or “OB-GYN sub-I’s” usually still have the intern on the team, but with the student being entrusted with more responsibility. Since the structure of the clinical team (how many interns and residents are on each service) has to be scheduled well in advance for the required sub-I’s, student assignments to these sub-I’s at specific sites are always subject to availability.

Clinical Capstone: All students who matriculated in 2015 or after (including both Pathways and HST students) are required to take the Clinical Capstone in January, February, March or April of the year in which they graduate. This course involves three weeks of a “sub-I-like” rotation in which students have direct patient responsibility, interact with families, write orders (which get co-signed by an MD), etc. (in contrast to consult service rotations, and other less clinically-focused experiences). The full list of clinical rotations that are eligible for this will be built into the course catalogue well before study cards for that period are due.

The other week of the Clinical Capstone (three days during the first week and two days during the last week) is devoted to a classroom-based core curriculum that includes varied professional development activities, an OSCE focusing on complex communication skills, and opportunities to reflect on which clinical skills students should focus on further developing as they begin their internships, along with practical content to prepare students to start as interns (how to “pronounce” a patient when they die, how to establish code status, tips for maintaining one’s humanity as an intern, etc.).
The Clinical Capstone ensures that all graduating students have had direct patient responsibility during the last four months of medical school and are prepared for certain aspects of the transition to residency that have consistently been identified as challenges for interns. It is graded satisfactory-unsatisfactory.

Frequently Asked Questions:

1. **How do I decide which of the four months to schedule my Clinical Capstone?**

For most students, the schedule will depend primarily on other interests. That is, if a student has a particular interest in an AISC scheduled in February, or still needs to take Essentials II in March, he or she would schedule the Clinical Capstone in January or April. For some students, there are other constraints. For example, MD-MBA students who spend the spring term of their final year at HBS always take their Clinical Capstone in January, since they will be at HBS from February through graduation. In addition, there are a small number of specialties (such as Emergency Medicine and OB-GYN) that traditionally organize “boot camps” in March or April each year. Students who decide to apply for residencies in one of those specialties will know well in advance which months these special rotations are offered and decide to schedule their Clinical Capstone (and Essentials 2) during a different month.

**VI. Scholarly Project Requirement (Scholars in Medicine – SiM)**

**Topic:** Many students identify topics and mentors for their scholarly project by the time the PCE ends. Others seek a scholarly project once they complete the PCE and these students can take advantage of the AISCs offered in January, February, and March of their third year (with everyone required to complete at least one AISC during Year III) as well as Essentials II (offered in October and March). All of these courses encourage students to propose research questions and consider ways of answering them. This interchange, along with the opportunity to network for a project mentor, is very useful to students seeking to define a scholarly project.

The scholarly project may address any question or topic relevant to medicine or health, and students may approach these topics through any discipline. Many students do their scholarly work in basic science laboratories or clinical research groups. Others examine questions through the lenses of history, ethics, policy, health care delivery, global health, anthropology, literature, creative writing, musical composition or performance or art. Students who pursue master’s degrees while at HMS may use the required writing project in their Master’s program as their scholarly project.

**Mentor(s):** The scholarly project is a mentored experience. Students working in a research group setting would logically have the Principal Investigator (PI) or a faculty co-investigator in the group serve as mentor for the scholarly project. Students pursuing a
less traditional scholarly project might have two mentors, one in the clinical area and one in the scholarly discipline. Students should work with their Society research fellows, who will help students network to identify appropriate faculty mentors for their work.

**Timeline:** With the scholarly report due by March 1 of the student’s final year in medical school, students will need to carefully plan the time when they carry out their scholarly project. Students planning global health projects need to submit to the Scholars in Medicine Office (SMO) their project concept and on-site mentor no later than December 31 of their third year. All other students will submit their scholarly project concept and mentor to the SMO no later than April 15 of their third year. Once approved, the student writes a full proposal that describes the research or project question, mentor, a feasible project design, and timeline. Proposals must be approved by SIM faculty prior to the student beginning the project.

**The Report:** For students whose scholarly work consists of hypothesis-driven research, the scholarly project report will take the form of a scientific manuscript. The SMO has several scholarly report templates (see the collaborate page URL under “Resources” below). If students have submitted a manuscript or published a paper on their scholarly project already, they may include the submitted manuscript or the published paper as their report. In these circumstances, if the student is not first author the report should also include a few pages summarizing the research gap the project addresses, the student’s role in the project, and the implications of the findings for research, practice or policy. Students enrolled in joint or dual degree programs (e.g. MD along with MPH, MPP, MBA, M.Ed, etc.) generally must complete a written product as a requirement for the other degree. The student may submit this product for their scholarly project report.

**Credit and Funding:** Students may dedicate up to five months on their academic calendars to their scholarly project. Students can obtain credit for these months by registering for SIM 500. The SIM months do not have to be contiguous (a student could take two months in spring and one the following fall). Students who take a fifth year for research do not need to sign up for SIM 500 credit but may request funding from the SMO. For students with meritorious applications for funding, the SMO provides $1250 per month; the mentor is expected to match this contribution. In addition, travel funding is available for students with projects outside of New England. Each HMS student is required to watch two online videos that present foundational material on IRB procedures and on Responsible Conduct of Research. Those working abroad are required to watch an additional online video that summarizes key principles and procedures for global health work.

**Honors in a Special Field:** Students may pursue Honors in a Special Field. This program involves writing an Honors Thesis and then defending the thesis before three HMS faculty members in an oral defense held during the spring months prior to graduation. The Honors thesis may be an elaboration of the scholarly project report or it may be done in an entirely different content area. Students interested in this program may sign up through the SMO in the fall before they graduate.
Resources: Many resources are available to help students identify topics and mentors for their scholarly projects. Perhaps the best source is one of your Society Fellows, who enjoy helping students to identify suitable projects and mentors. All of the relevant forms that facilitate the processes noted here (scholarly project proposal, report, application for SIM 500 credit) can be found at http://collaborate.hms.harvard.edu/display/scholarlyproject. Behind all of the paperwork is a delightful, knowledgeable staff in the SMO in TMEC 347. Feel free to reach out to Kari Hannibal, Marcie Naumowicz, and Jasmine Stecker to clarify any of these processes. Also, feel free to reach out to the SIM Director, Dr. Jeffrey Katz (jnkatz@partners.org).

VII. HST and MD-PhD Students

HMS holds two class meetings each year to review the material in this document in detail and answer questions: one in the early spring for fall-entry PCE (mostly Pathways) students, and one in the early fall for spring-entry PCE (mostly HST) students. All students are given that evening off from their clerkships to attend this mandatory meeting. Much of the information in this document is specific to Pathways students, but all information relevant to HST students is noted, and information tailored for HST students is provided at the early fall meeting each year. These meetings are designed for students in the last half of their PCE year, as they start to consider their post-PCE schedules.

The most obvious differences for HST students in the post-PCE phase is that all HST (as well as returning New Pathway MD-PhD) students are not required to take Essentials II or any AISC courses for graduation. Subject to availability, these courses may of course be taken as electives, but they are not required. All HST and MD-PhD students have also already satisfied the Scholarly Project Requirement before the PCE, but they are, of course, encouraged to do additional research in the post-PCE phase if they would like to do so (for example, if they wish to submit theses for Honors consideration).

What is not different is that all HMS students are required to take the Clinical Capstone course in one of the last four months before graduation (Jan, Feb, Mar, or Apr) and to remain fully enrolled in each semester after re-entering the MD curriculum. Deadlines for the Match process are also the same, which means that students in these groups have slightly amended timelines to enable them to fill out their residency applications by September of their graduating year.

**HST 4-year students** entering the PCE in April will complete their PCE by the end of March 2018. It is recommended that this group study for and take USMLE Step 1 by the end of April 2018 to maximize the number of months of elective rotations prior to applying for residency, as discussed at their class meeting held before they entered the PCE.

**HST 5-year students** who do a research year before entering the PCE in July have already taken Step 1. They are required to participate in tDP groups from April-July while they are completing their research year. If they have completed the two month ACE rotation at Mt.
Auburn Hospital before their research year, then, during the 9 months of the PCE from July through March, these students have one month of time during the Medicine core rotation when a clinical elective, or (if available) a one-month required PCE clerkship (psychiatry, radiology or neurology), may be substituted for the out-patient ambulatory experience. These 5-year students must complete all three of those one-month rotations by the end of November of Year IV.

**MD-PhD students** entering the PCE in April have also already taken Step 1 and have similar post-PCE expectations as the 5-year HST students above. They are also required to participate in tDP groups starting in April even if they are completing their research work and not entering their first clerkships for one or more months. Depending on when these students start clinical rotations, they will have between 9 and 12 months of the core rotations by the end of March. These students must also complete all three one-month rotations by the end of November of Year IV.

Again, detailed information about the post-PCE phase for these groups is covered at the early fall class meeting, as these students enter the second half of their PCE.

**VIII. MD-MBA, Other Masters Degrees, and Research Years**

Most students who complete a masters degree along with their MD insert this extra degree between their third and fourth years of medical school. Students typically finish their third year in July or August, go into the Masters of Public Health (Harvard T.H. Chan School of Public Health), Masters of Public Policy (Harvard Kennedy School), Masters of Bioethics (HMS) or other degree in late August/early September, and then finish that other degree in May, so they “gain” an extra summer and actually end up with a few extra months in which to complete the MD requirements, giving them added flexibility. Some degrees, such as the MMSc in Medical Education and the MMSc in Global Health Delivery Science involve additional expectations for a research thesis, and so students have a slightly more constrained schedule by completing both the MD and MMSc-Med-Ed or MMSc-GHDS in five years. Since almost all masters degrees require a scholarly product, arrangements are made for this scholarship to fulfill the HMS SiM requirement, so these students are not expected to schedule additional SiM months (although they may if they want to pursue additional research or perhaps apply for Honors in a Special Field).

The accelerated MD-MBA joint program is a special case, and students who pursue the MD and MBA program in five rather than six years are committed to additional schedule constraints for most of their post-PCE requirements. Following the PCE, they use October to study for Step 1 and then take Step 1 at some point in November or December, while they have already started the Medicine and Management course which runs in November and December (and which includes some Step 1 study time built in). During that required course, students receive approval for their SiM proposal, along with the possibility of completing an on-line course requirement for HBS as well.
Because the five-year MD-MBA program involves a full year at HBS starting in August (about a year after the PCE) and then an additional full semester at HBS, students in this program have to work closely with their advisors to meet all graduation requirements. Many of the constraints are determined by whether the additional semester is done in the fall or spring of Year V. For example, if MD-MBA students take their final semester at HBS from February until graduation of their last year, they are required to take the Clinical Capstone in January. Since they are then unable to take an Advanced Integrated Science Course in their final year, they would also need to take two AISCs and not just one in the months immediately following Medicine and Management in Year III. This still gives them two opportunities to schedule Essentials II: March of Year III and October of their final year.
Sample MD-MBA Schedule for 5-year joint degree program:

<table>
<thead>
<tr>
<th>Year III ('17-'18)</th>
<th>Year IV ('18-'19)</th>
<th>Year V ('19-'20)</th>
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</thead>
<tbody>
<tr>
<td>July</td>
<td>Clin elect: adolescent med</td>
<td>Medicine Sub-I</td>
</tr>
<tr>
<td>Aug</td>
<td>Unsched: vaca/Step 2CK</td>
<td>Clin elective: ER/Step 2CS</td>
</tr>
<tr>
<td>Sep</td>
<td>HBS</td>
<td>Clin elective: derm</td>
</tr>
<tr>
<td>Oct</td>
<td>Unsched: Step 1 study</td>
<td>HBS</td>
</tr>
<tr>
<td>Nov</td>
<td>Med&amp;Mngmnt/Step 1</td>
<td>Clin elective: adolesc psych</td>
</tr>
<tr>
<td>Dec</td>
<td>Med&amp;Mngmnt/Begin SiM</td>
<td>Unsched: Interviews</td>
</tr>
<tr>
<td>Jan</td>
<td>Cancer Biology</td>
<td>Unsched: Interviews</td>
</tr>
<tr>
<td>Feb</td>
<td>Genetics</td>
<td>Clinical Capstone</td>
</tr>
<tr>
<td>Mar</td>
<td>Essentials II</td>
<td>HBS</td>
</tr>
<tr>
<td>Apr</td>
<td>Clin elective: MICU</td>
<td>HBS/Submit SiM</td>
</tr>
<tr>
<td>May</td>
<td>Clin elective: primary care</td>
<td>HBS</td>
</tr>
<tr>
<td>Jun</td>
<td>Clin elect: MICU/Comp</td>
<td>HBS</td>
</tr>
</tbody>
</table>

Note: this is just a sample – some MD-MBA students take Step 2CK during their fifth year, and some do their last semester at HBS in the fall rather than the spring. In the sample schedule above, the student meets all MD and MBA requirements in five years by finishing the PCE, spending October studying for Step 1, taking Medicine and Management in November and December while taking Step 1, and then doing two AISCs in January and February, followed by Essentials II in March. This still gives them April through August before the RC year and June through December after to do clinical electives and the like. But this accelerated program clearly places the most pressure on students to ensure that they sign up for courses with great care and attention to constraints on their schedule.

Note on MD-MBA Program: The above only applies to students doing the accelerated five-year MD-MBA curriculum. Students who elect to do the full two-year MBA and complete both degrees in the standard six years simply follow the usual MD schedule during the four years they are in the MD curriculum, entering HBS after completing three full years at HMS.

Pathways students who take a year out for research (either in the US or abroad) generally do this for the academic year between their third and fourth years of the MD curriculum. These research years enable students to pursue a research project even more deeply, which also produces their SiM project. Thus, students who do a year out for research typically do not need additional SiM months in their schedule. Funding for research years is organized through the Scholars in Medicine Office (SMO), and usually involves matching funds from SMO and the student’s research mentor. Various foundations and the Howard Hughes Medical Institute also fund research years for many HMS students, and information about those applications is shared by the SMO months in advance of deadlines (which are typically January of Year III). Interested students should contact SMO for further information on research year opportunities and funding.
IX. Pathway to Residency Timeline

Road to Residency

Timeline: 2018

March
- March 5
  Class Meeting on Years 3 and 4

April

May

May - July
- Meet with Society Advisor

June

July
- Study Cards Due

August
- Class Meeting: Approach to Step 1

September

October
- October to December
  Take Step 1
  1 Clinical Elective

November

December
Road to Residency

Timeline: 2019

**January-March**
- Identify Specialty Advisor
- Meet with Society Advisor

**February**

**March**

**April**

**May**

**June**

**July**

**August**
- Submit application

**September**
- MSPE goes into ERAS

**October**
- Interview Tips Session
- Mock interview Session

**October – January**
- Interview at Programs

**Class Meetings**
- The Year Ahead
- Specialty Panels
- Residency Application Process

**May – August**
- Meet with MSPE writer

**July- September**
- Work on application

**Summer**
- Work Early Match

**Class Meetings**
- Personal Statement
- Letters
- CV
Road to Residency

Timeline: 2020

- **January**: EARLY MATCH DAY!
- **February**: Enter Match List
- **March**: MATCH DAY!!
  - Feb – April: Complete Graduation Questionnaire
- **April**: GRADUATION!!
- **May**: TO RESIDENCY!!
- **June**: Interviews

Class Meeting: Rank list