

Tufts University
School of Medicine &
Sackler School of
Graduate Biomedical
Sciences

MD/PhD Program

Student Information Manual

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Introduction

Welcome to the Tufts University School of Medicine MD/PhD Program! It is a long and complex journey, but hopefully a rewarding one as well. This manual is intended to be a useful guide as you progress through all the different stages of the program. It was an initiative created by your fellow MD/PhD students because we felt that, given the uniqueness and complexity of the program, current Tufts University School of Medicine and Sackler School graduate student handbooks did not fully address the needs of our program. We needed a way to communicate specific information about our own unique track to share with future students. The manual is broken down into each of the different medical and graduate school years of the program. It will describe different requirements of the program, but will also give tips on how to plan and do well at each stage of the process, along with miscellaneous tips like housing suggestions and useful study resources. It was advice that was collected from students from all different stages of the program and was assembled into this unified guidebook. The hope is that this manual will continue to be improved and amended and be useful to current and future students of the MD/PhD program.

-Lidia Park and Alex Neil, MD/PhD students

M1

Getting Settled:

One of the bonuses of going to Tufts Med is its location in Chinatown. The school is accessible via almost every T line (Green, Red and Orange) and several bus lines. Students have multiple options for apartment rental in the Boston area. Some places to consider include:

1. Posner Hall: Located down the street from the Sackler building. Posner is affordable (about 1k/mo including utilities). Each floor has a kitchen (not recommended if you like to cook) and residents share bathrooms, typical of dormitory living.
2. Chinatown: Affordable and close to school.
3. Southie: Popular amongst Tufts students, but increasing in price. There are several buses that go from South Boston to school.
4. Back Bay, Beacon Hill, North End: These Boston neighborhoods are historic but slightly pricier. Back Bay and Beacon Hill are within walking distance of Tufts. Beacon Hill apartments tend to be cramped.
5. Cambridge, Somerville, Medford, Arlington: Located across the Charles River from Boston, these independent cities are home to a lot of graduate students. Apartment rentals range from cheap (Medford) to relatively expensive (some areas of Cambridge). Look for rentals close to the red line for an easy commute to school.
6. Jamaica Plain, Roxbury, Dorchester: Boston neighborhoods that are generally cheaper to rent in. School is easily accessible via the orange line. These areas have a lot of green space thanks to the arboretum and emerald necklace parks.
7. Fenway/Kenmore, Brookline, Allston, Brighton: Located along the green line (a notoriously slow trolley system that stops at red lights), these areas range from upscale (Brookline) to cheap undergrad-oriented rentals (Allston/Brighton).

The following resources are helpful for finding a place to live: Craigslist, your incoming MD class Facebook group, and the “housing” forum, which can be accessed by logging onto TUSK.

Some useful tips for finding a place

Take advantage of the summer before starting class (i.e. when you are doing your 1st lab rotation) to explore the area. You get to be there at least a month before the regular med students do, so use this time to find a good place. There are a lot of college students who are looking for summer sublets (see Craigslist), so you can find a pretty affordable place to stay for a couple of months while rotating, and then use the rotation time to find a more permanent place to stay. Also, think about the importance of having basic necessities nearby when picking a place to live, i.e. proximity to grocery, pharmacy, T stop, gym, etc.

Getting Around:

If you use the T or buses, save the receipts for your Charlie Card purchases from the summer before M1, which will be reimbursed at the Bursar’s Office on the first floor of the Posner Building. Starting in the fall Charlie Card semester passes will be available at a 25% discount via the Bursar’s Office (look out for an email from them at the start of each semester).

Getting a Physician/Medical Care:

Harvard Vanguard Medical Associates - www.harvardvanguard.org

Copley: 165 Dartmouth Street Boston, MA 02116 Phone: 617-859-5000

Post Office Square: 147 Milk Street Boston, MA 02109 Phone: 617-654-7000

Kenmore: 133 Brookline Avenue Boston, MA 02215 Phone: 617-421-1000

Cambridge: 1611 Cambridge Street Cambridge, MA 02138 Phone: 617-661-5500

Tufts Medical Center – General Medical Associates - www.tuftsmedicalcenter.org
800 Washington Street Boston, MA 02111 Phone: 617-636-5400

Beth Israel Deaconess Medical Center (Boston) - www.bidmc.org
294 Washington Street, #219 Boston, MA 02108 Phone: 617-426-5500

Massachusetts General Hospital Walk-In Unit - <http://www.massgeneral.org/appointments/walkinunit/>
Offers care and immunizations for patients (18 and over) that are unable to see their regular physician or are without a regular physician in the Boston area. Wait times are usually very minimal, and once you register with the hospital and create a patient ID on your first visit, it's very easy to be seen by the physicians on call.
15 Parkman Street, Suite 108 Boston, MA 02114 Phone: 617-726-2707

Tufts Medical Center's Employee Health Services

Health Sciences students can use Employee Health Services for immunizations and titers. Appointments are required and students must pay out of pocket for these services. *TB testing is not currently available.*
Farnsworth 6, 171 Harrison Ave Boston, MA, 02111 Phone: 617-636-5480

Walgreen's Pharmacy - <http://www.walgreens.com/pharmacy/>

The location listed below offers Routine & Travel Immunizations such as MMR, Varicella, Tdap, Influenza, and more. *TB testing is not available. If using the student insurance, specify to Walgreens that billing should be through your medical coverage, not pharmacy coverage. It will not be covered if processed under pharmacy coverage.*

24 School Street Boston, MA 02108 Phone: 617-372-8156

CVS Minute Clinic

Practitioners provide treatment, health screenings, and vaccinations. <http://www.minuteclinic.com/> Please check cost of treatments before making an appointment. (Cost of TB test and reading is \$56.00)

Cambridge

36 White St

Cambridge, MA, 02140-1449

Phone: 617-876-5519

Medford

85 High St

Medford, MA, 02155-3825

Phone: 781-396-4770

Summer Lab Rotation (pre-M1)

Students generally start arriving in June, with the deadline for starting summer rotations being the annual MD/PhD retreat in the first week of July. Any unique circumstances can be discussed with Dean Naomi Rosenberg, PhD or James Schwob MD, PhD ("Naomi" and "Jim"). Although some students already know who they will rotate with when they arrive, most students spend their first week in Boston settling in and having meetings with potential summer rotation labs. It is good to arrive with a general list of PIs who you are interested in rotating with. This requires a little bit of research which can be done here (<http://sackler.tufts.edu/Faculty-and-Research/Sackler-Program-Faculty>). If someone's research description seems interesting google their name + "Tufts lab" & check out their research website (e.g. <http://sackler.tufts.edu/Faculty-and-Research/Faculty-Research-Pages/Leon-Reijmers>). Your best bet for understanding the lab's current direction is to read the most recent publication from the group (make sure the PI is the last author). This also helps you sound competent when making a first impression. Share your list of potential rotation labs with Naomi and Jim. Sometimes, extenuating circumstances make a rotation not possible in the first year (e.g. there is currently not space in the lab, the PI will be traveling etc.) but there is almost always the opportunity to rotate there following M1. The goal of the rotation is not to produce a scientific breakthrough, it is to evaluate whether you think the lab is a good fit for you (see "Choosing a Lab").

Ask a lot of questions and get to know the other members of the lab. The graduate students in the lab are the best source for understanding what working there is like. Some PIs will ask for a written summary of what you did for the summer (and maybe even a presentation). Again, don't worry about producing dramatic results. This is a good way for you to demonstrate your ability to think scientifically and showcase your writing ability.

M1 classes

The first year of medical school starts with a week of orientation where you will get to meet your classmates and take part in a lot of fun social activities. M1 is primarily lecture-based learning of "medical foundations," hands-on work in the anatomy lab, problem-based learning (PBL) in small groups and public-health/ethics-oriented "red-block" in the spring. First year classes also include clinical courses on interviewing patients and the physical examination. The biggest/most time-consuming course during first year is anatomy, so be prepared for that when it starts. Talk to your peers and upperclassmen on the best studying methods. Everyone has different methods of studying, and you will have to figure out what works best for you.

First and second-year of medical school are graded on a purely pass/fail basis, with performance mostly evaluated via computer-based multiple choice exams. Failing one class in first year is not the end of the world. There is time allotted to make-up for courses by re-taking exams later in the year. Just be sure not to fail several courses, as there is a limit to how many exams you can fail before having to repeat 1st year and/or being dropped from the MD/PhD program.

The number of resources available in M1/M2 is seemingly endless and what is useful to one person may not be so for another. Take advantage of the early, "easy" courses of M1 to figure out strategies that work best for you. Useful resources to consider (use some, all, or none at your discretion):

- flash card decks (via Anki)
- study guides compiled by previous classes (see class Dropbox)- although be warned that sometimes info on other students' study guides may not always be accurate
- lecture videos/slides (on TUSK)
- syllabi (no need to pay for the paper version)
- Netter Atlas of Human Anatomy
- Moore Clinically Oriented Anatomy- especially clinical "blue boxes" in book
- Online anatomy course website
- Anatomy lab

Research Selective

MD/PhD students are excused from participating in clinical selectives (however they are free to participate in one if they would like). The goal of the research selective is to identify potential PIs for your second summer rotation. This rotation is often with a student's future PhD mentor. The selective starts with a conversation with Naomi and Jim about which labs fit a student's interests/needs. One-on-one meetings with potential PIs will then be setup with the help of the MD/PhD administrative staff (Sara Abbott). Make sure you check out a PI's recent work before you sit down to talk with them. If you find a particular lab interesting, reach out to the lab members to get their opinions on life in that lab. If you are having trouble choosing a summer rotation lab, go to lab meetings to see which lab fits you best.

Clinical Implications of Basic Research (CIBR)

M1's and M2's are expected to participate in all CIBR meetings (these are not optional). In general, the role of students in the medical school years is to help dissect papers with their recently acquired medical knowledge. What have you learned about the disease being discussed? Is there important pharmacology to consider in this work? M1's in particular should pay close attention to the clinical case presented at the beginning of each CIBR as it will help develop clinical reasoning skills. Also pay attention to the format of the presentations, as you will be responsible for presenting in CIBR when you are in grad school. In general, each session starts with a clinical case (MMWR, case files from MGH, etc.) that is related to a research article (often it has been

NEJM CIBR articles, but can also include papers from other journals as well that have clinical relevance). Sometimes, students will bring in clinicians as well to talk about the article/case (this can be scheduled with the help of Gordon Huggins or individually). The CIBR sessions are meant to be a low-key way to help you stay on top of scientific techniques and exciting research and brush up on some clinical knowledge.

M1 pearls:

- Don't get your white coat embroidered (it will say the wrong graduation date)
- The only true physical exam necessities are a stethoscope and a reflex hammer (tuning forks and/or penlight can be useful too). Don't inscribe your stethoscope with MD PhD.
- MD/PhDs do not need to complete CSL (Community Service Learning)
- MD/PhDs do need to complete SAT modules (Student as Teacher) – look out for emails
- If you have time, participate in PhD-oriented events – they often have free food and beverages and can help you scope out potential labs.

M2

Clinical Apprenticeship in Primary care (CAP)

CAP is a weekly opportunity to see patients in a primary care clinic during second year. Choose a CAP site based on commute and what you hear from other students. General advice regarding CAP tends to focus on being an active participant. Volunteer to do anything that needs to be done in the clinic. Use your competency cards as a way to get quality teaching time with your preceptor (don't procrastinate). Practice interviewing, patient presentations, and the physical exam whenever you get a chance – this is what will prepare you best for clinical rotations.

M2 Classes

Classes in the second year of medical school are organized by organ system (pulmonary, renal, cardio etc.) and focused on physiology, pathophysiology and pharmacology. Classes in M2 are a bit more “clinically relevant” and more intensive than M1. Keep going to CIBR. Continue to hone your study habits for the tests in M2, this will help you as you prepare for Step 1 (see below).

Research Selective (Round 2)

The goal of the M2 research selective is to settle on a lab for your PhD or a third rotation. If you feel like you are unsure about doing a thesis in the labs you have done rotations in, do not hesitate to do a third rotation! Many students do another rotation after M2, and it is not the end of the world or a waste of time. This is an important decision and it is best to be informed as much as possible. It is important to use meetings with Naomi and Jim in M2 to speak frankly regarding what you are looking for in a lab. Try and figure out your thesis lab/summer lab by December. The M2 research selective is NOT a time to conduct extensive experiments (although it is sometimes billed that way). If you have chosen your thesis lab, start attending their lab meetings and talking to your PI about potential projects.

USMLE Step 1

The Step 1 exam is first part of the medical licensing exam series (Step 2 is taken at the end of M3, Step 3 is taken in residency). Its primary importance lies in the fact that it is the one exam judged on residency applications. Residencies do take Step 2 scores into account, but it seems that Step 1 is somehow more important, so take it seriously. There is anecdotal evidence that you can make up for a poor Step 1 score with a good Step 2 score; however, there are certain Step 1 cutoff scores used for each specialty in the primary evaluation of applicants.

An informational meeting regarding Step 1 of the boards is organized by the dean's office after winter break, so do not stress about getting all of the necessary information in terms of registering, setting up your test date etc. (this will all be made readily available to you). You will get to take a practice Step 1 exam organized by Tufts that you are not expected to study for, but will give you a chance to see where you stand going into studying. Much like M1/M2 classes, there are a plethora of study resources available for Step 1 and it is up to you to figure out which ones work best. The following resources are widely considered to be “high yield”:

- Pathoma – recorded lectures covering oft-tested disease pathology, this pairs well w/ M2 classes
- First Aid – the definitive guide to Step 1. You should own this book.
- USMLE World Question Bank – high quality practice questions with informative answer keys.
- Lange Pharm Flash Cards – useful for regular review throughout M2 and leading up to the test
- Lipponcott micro cards, Sketchy Micro
- Dubin's Rapid Interpretation of EKGs- helpful for Cardio. Useful especially on medicine rotation.

Everyone has their own study method, and the key is to find the method that works for you as soon as possible. You will get about 1 month off at the end of the school year devoted to purely studying for Step 1, but

do not use this as an excuse to slack off during the school year. In general, try to keep up with the material during the school year, using whatever method works for you (lectures, First Aid, etc.), and make sure you understand the basic concepts before going into the study period. There is not enough time to try to understand basic concepts (ex. Renal physiology) during the boards studying time. It is really a month of just pure memorization of as much material as you can fit in that time frame.

Step 1 Study Period

During the boards study period, keep the following tips in mind: Plan, plan, plan your study schedule at the very beginning. Make sure you are studying at a good pace so that you aren't cramming at the very end. Stick to your study plan as much as possible during that time, but allow for some flexibility in case things come up or take longer than usual. Include time to take 1 or 2 practice tests if necessary, and study the wrong answers carefully. Also don't forget to take care of yourself during that time (get enough sleep, food, exercise, etc.). Give yourself a break 1-2 days before the exam. You deserve to relax after a year of intense studying, and you probably aren't going to learn a ton of more information the night before the test. Get a good night's rest the night before, and pack a good lunch. After the test, relax! Don't worry about the results, just focus on your first clinical rotation which is right after Step 1 (see below).

Choosing a Lab

Size

Small labs tend to be close-knit communities with more PI oversight. It is easier to get your PIs attention, but resources and advice may be lacking when trying a new assay or intralab collaboration.

Large labs tend to be well-funded with less PI micromanagement. If you are an independent worker, large labs can be a good fit. There are more opportunities to collaborate with labmates.

Colleagues

Get to know the members of a lab while you are rotating. Will they be there when you join? Are there senior students/postdocs who will be able to train you and help troubleshoot your experiments? Pay attention to red flags in terms of lab morale. If the postdocs and students in the lab aren't happy, it is usually a sign of something going on, and it is unlikely to change when you join. A good, often overlooked resource to talk to is MD/PhDs and grad students who not only are currently in the lab, but also who have rotated in that lab in the past, as there are subtle reasons why students join certain labs and not others. Naomi's office will have a list of where the MD/PhDs (and likely other grad students) have rotated so you can reach out to these people and get their perspective as well.

Project

You should be excited about the research you will be doing in the lab (otherwise it will be a rough four years), but be open-minded. Sticking to a field you're familiar with may or may not be in your best interest depending on what is available at Tufts. There are many fascinating things to study at Sackler. If you don't want to do animal work, make that clear to Naomi and Jim. Your relationship with your boss is, for the most part, more important than your actual project in the lab.

Thesis Advisor

You will hear it time and time again. **Your thesis advisor is the most important aspect of choosing a lab.** Every PI has their own style and duties outside of the lab and funding. It is immensely important that you get along with your thesis advisor on a personal level, not just an intellectual one. Your styles and personalities have to match. Make sure that you enjoy working with and talking to this person because this is the person you will turn to in times of great stress. You want them to be on your side and looking out for you (i.e. want you to finish in 3-4 years). Evaluate your own preferences regarding independence (Do you want to design your entire project? Do you want your PI to design it for you?), involvement (do you want to show your PI your data daily? monthly? annually?), & availability (does it matter if your PI is often not in lab? How do you want to communicate with your PI?).

Other factors

- Publication history – an indicator of lab “health”

- Funding status- what funding does the lab have currently, and for how long? Does the PI have other grant applications in the works?
- Alumni status – where have graduates of the lab landed? Where have MD/PhD's (if any) matched?
- History of training MD/PhDs – familiarity with the program is helpful (especially for F30 applications)

An extra rotation to find the right lab for you is acceptable and highly recommended if you are still unsure of where to go. Students have done 3rd rotations before, and you are not losing a lot of time by making sure that a lab is the right fit for you in the long run. In addition, even once you've committed to a lab, if you are finding that a lab situation is not working for you for whatever reason, do not hesitate to talk to Naomi and Jim ASAP. The sooner that you resolve the issue and find another lab situation, the better you will feel and the less time wasted. There have been occasions of MD/PhD students switching labs during their PhD, and it is not the end of the world. Ultimately, finding the right lab and mentor that gives you the right training to be a PhD is more important than graduating in 3 years. An extra year or 2 in grad school is not going to be to your detriment in terms of residency/postdoc application. You are already investing a lot of extra time to do this dual degree, so make sure that it is worth it.

First Clinical Rotation

For the first clinical rotation, you will enter a lottery separate from the MD class for just the first 6 week rotation of spring. You will be contacted about this lottery via email. The options for this rotation are Pediatrics, OB/GYN and Psychiatry. Choose a rotation in a field that you are not particularly interested in for residency, since it is less likely that you will match at a residency program that you did a clinical rotation 5 or 6 years ago from the time you apply for residency. Read about potential sites in the clinical handbook and choose one that suits what you want out of your rotation. It can be helpful to talk to older students about their sites. There is a one week orientation before rotations start, which is a fun, low-stress time to hang out with classmates and learn some procedures that medical students commonly perform. While on the wards there are a few important rules of thumb. Be proactive, helpful, and enthusiastic. There can be a lot of conferences which pull you away from patient care and interacting with the intern/resident/attending - try to be available to your team as much as possible (do not rely on their paging you) and try to avoid missing or needing to leave attending rounds. There is a fine line between eager and annoying; ask to do stuff, but be respectful of residents/doctors/nurses' time and if they say "no" don't ask again. Always be respectful of nursing, medical assistant and physician assistant staff (this should not be difficult). Practice writing notes and presenting--even if you don't need to do one for a patient it is a good exercise. Remember that your case presentations should be complete (more so than the typical intern presentation). You should try to have as complete an understanding of your patient as possible and avoid taking on too many patients that might expose some knowledge gaps. Develop a system of note cards or other approaches to collect patient data so that it is available to you when you need it. You will likely go back to this system in M3/M4 - ask the interns what they do to manage all the information for their patients. Probably one of the worst things that can happen as an M3 is for you to appear unaware of important patient issues and you should avoid that at all costs. Ask questions and get feedback from your residents/attendings. Lastly, don't forget to study for the shelf- talk to older students about useful study resources for the wards and shelves. See also the section on tips for M3/M4 below for more advice on doing well on the clinical rotations.

M2 pearls:

- Take a vacation! Before you start in the lab, take some time off. Between Step 1 and your first rotation you deserve/need it. Most PIs will be very understanding of this.
- Don't waste your money on a year-long UWorld subscription. A 3-6mo subscription is usually enough, unless you intend to follow along with the class material during the year.
- Follow along with the M2 classes in First Aid and Pathoma.
- It is okay to tell your future thesis advisor "See you in June!" as you start gearing up for Step 1. You are not expected to be present in the lab during your studying or clinical rotation.

Choosing a PhD Program

For most students, there will only be one option for a PhD department/program affiliation at Sackler. However, some PIs hold multiple program appointments and MD/PhD students in their labs can join any program which they hold a position in. It is worth exploring the environment of various programs when making a choice. What are the journal clubs like? How many students/Pis are there that share your research interests? Is the program acquainted with dealing with students on multiple campuses (for those doing research in Medford, Grafton or Bar Harbor)? It is wise to make a choice based on the content of your potential thesis-work as aligning your program with your research focus will allow you to reap the most benefit from seminars, journal clubs and committee meetings. Students may also consider the number of classes required by a department/program during G1. Due to the accelerated nature of the MD/PhD program, cutting back on classes during G1 can free up time in the lab. Also picking a program that has an on-topic qual exam could potentially save time as well (see “Qualifying Exam” section below).

Grad School Classes

You will receive an email (probably during your Step 1 studying time) to register for classes for the summer and fall of G1. Most students will register for their program’s journal club, seminar, student presentations, graduate research and CIBR every semester. In the summer, the only thing you need to register for is graduate research. G1 will also include some program-specific didactic courses that are outlined in the student Program Guide for your program. These can feel time-consuming but they are also informative and a good way to get to know your PhD classmates. Remember that starting in grad school, you will be responsible for presenting in CIBR (see “Clinical Implications of Basic Research” section above). Check the Sackler Catalog edition of the year that you start grad school to make sure you are fulfilling all of your requirements. This is because the requirements may change slightly for each class year, but you will be held responsible for the requirements specific to your class year (i.e. the year that you start grad school). If you have any questions, just email your program director, Naomi’s office, or Beth Storrs (registrar’s office).

Thesis Advisory Committee Meetings

All MD/PhD students are required to have biannual thesis committee meetings beginning in G1. This means you need to have your first meeting before winter break. This may differ from the requirements of your program, but all MD/PhDs are expected to have a thesis committee meeting in the fall semester. When forming your committee seek out the advice of your thesis mentor. They usually will have a list of people they think are suited to serve on your committee. Requests to serve on a thesis committee should be presented in formal emails. You are asking someone to devote a significant amount of their time and energy into your education. Once your committee is formed, the best way to get them into one room at the same time is to send out a doodle poll. Having food/snacks at your meeting is a good way to put your tired, hungry committee members in a good mood at the start of the meeting, and is an unofficial “requirement” for some professors at committee meetings. Most programs have specific instructions for how to conduct your committee meetings and what sort of information should be sent to the committee beforehand (committee report). Be sure to have your committee fill out and sign your “TAC evaluation form” at the end of the meeting. This must be sent to the registrar to receive credit each semester. In addition, once a year (every other meeting) you will need to discuss your IDP (Individual Development Plan) with your committee. Forms are available here: <http://sackler.tufts.edu/Student-Life/Information-for-Current-Students/Student-Forms>. Finally, your thesis committee is not set in stone once it is formed. You can add additional members as the project develops and also at the time you defend. You will be required to have an examiner from a non-Tufts institution (an external examiner) at the time when you defend your thesis.

Qualifying Exam

Each program has a different schedule for the qualifying examination but all MD/PhDs are expected to complete their exam by the Fall of G2. This deadline allows students to apply for F30 grants starting with the December submission date during G2. It can be helpful to start thinking about quals early on in G1 as this allows students to take advantage of built-in opportunities to start researching their topics in depth (e.g. choose a paper for journal club or write a mock grant proposal for a didactic course on your potential quals topic). For the most part, quals are handled on a program-by-program basis. Talk to your program to figure out the exact logistics/requirements of the exam and especially with whichever committee members you are permitted and expected to interact.

Some general points/tips to consider during quals:

- In general, most students are not required to do a lot of lab work during the qual preparation time, so do not be afraid to set aside a couple of months to work on your proposal/exam.
- Take advantage of your knowledge from M1 and M2 to focus on pathophysiology that interests you (if you have off-topic quals).
- The more you interact with and get feedback from the designated member(s) of your qualifying exam committee before your actual defense, the better off you will be. Try to find someone on your examination committee (if you get to choose) who you can easily approach for help.
- If your quals are “on-topic”, use the opportunity to draft out an F30.
- Present your oral exam part to as many people as possible to get feedback and practice thinking on your feet (lab members, classmates).
- In general, do not propose a screen for your qual (even if your qual is on topic and your project is based on a screen). Have a hypothesis-driven project with specific aims to answer that hypothesis.
- Read up on the background for your project as much as possible so that you can answer questions from the committee during the exam. One piece of advice on background reading, though: don't try to read about every single little thing in your entire field. There's so much potential material to read that you can easily be distracted by and tempted to read up on, but you only have a finite period to prepare for the qual. Focus your reading (at least for the qual) on all the things that are pertinent to your specific project (methods, rationale, etc) as the questions will be mostly on those specific things that come up in the proposal/presentation. You can do that other broader reading later (post-qual).

G1 Pearls:

- Your experiments are not going to work on the first try. Plan accordingly and don't let it get you down. Be proactive in driving your project, but also be prepared to move on to different projects if experiments don't pan out.
- You might not have a ton of data for your first committee meetings, but you should clearly present your proposed ideas - explicitly state and identify controls and hypotheses.
- Presenting a rotation poster at the retreat after M2 is expected. After G1 year, poster presentation for the retreat is required every year during your time in grad school.
- It is not uncommon to get a “provisional” pass on quals, with revisions to work on post-exam. Don't worry about it. Just do the revisions and be done with it.

Monday Night Dinners

G2 students are responsible for organizing the Monday Night Dinner seminar series. These happen about once a month, barring the one month when G2s are away on family medicine rotation (see section below). The goal of Monday Night Dinners is to invite a successful physician scientist to share advice with students in an informal environment. Successful organization of a Monday Night Dinner usually goes in the following order:

1. Find a speaker - Don't set a date before you have a speaker as it is easier to accommodate the speaker than forcing them into one date. You will have to reach out to at least 3 or 4 people before finding someone who is available and willing to talk. Try not to invite former speakers (we will compile a list of previous guests). There is a formal invitation template that you can use (ask an older classmate for this). It is good to get a mix of different speakers (professors, residents, etc.) to get a mix of ideas and backgrounds.
2. Set the date and time - once the speaker has agreed to a date/time reach out to Jessica Wang-Strykowski to get a room reserved for an hour. Also get her to email the program with the date/time/location. Make sure that there is a reminder on the day of the dinner as well.
3. Organize Dinner - You have a \$200 budget. Taiwan Cafe is a generally safe bet in terms of cost and food (there is an excel spreadsheet with a template order), but feel free to mix things up as long as you stay within budget. Contact the restaurant the week beforehand. Buy plates/drinks from a grocery store at the beginning of the year and use them throughout.

Make sure to do a nice introduction of the speaker beforehand (lookup their CV info on their lab website or email them for one before they come). Traditionally, the first Monday Night Dinner (fall) is usually a sit-down session with Naomi, Jim, and Gordon with all the MD/PhDs to talk about general issues for the program as a whole, and the final Monday Night Dinner of the year in May is a Q&A session with the M3/M4 students. Talk with Naomi/Jim/Gordon to schedule a date that works for them for the first dinner, and talk with Gordon to schedule a time that works for the M3/M4s for the last dinner. The other Monday Night Dinners in between are more flexible in structure (see below).

Recommendations for future Monday dinners: As of this writing, the historical Monday Night Dinner routine of inviting guest speakers and doing Q&A has been getting a little stale (many guests say pretty much the same thing in terms of career advice). There has been a recent push among a lot of students in the program to change the format of future dinners. One idea for making things less one-dimensional has been to include more science (rather than just career advice), with speakers presenting some of their work along with giving career advice. Another idea that has been put forward is to have some of the dinners be more informal social gatherings within the students of the program to promote more interaction and camaraderie within the program. However, the primary purpose of the Monday night seminars is informational rather than social. Instead of using the Monday night series for team-building activities, other opportunities for MD/PhD students to interact informally could be organized outside of the Monday dinners for the program as a whole. Future G2s will be responsible for making these changes happen.

F30/F31 application

You will receive an email in the spring of G1 inviting you to an F30/F31 grant writing workshop led by Naomi, Jim, Gordon, and Sara Abbott (who is in charge of helping with grant submission), and selected other faculty who have served as reviewers for fellowship applications at the NIH. The F30 is the type of fellowship that is limited to MD-PhD students and can support both graduate study and the last two years of medical school. The F31 (non-underrepresented applicant) only provides support for the graduate school years. Some NIH Institutes (for example, the neurology Institute, NINDS) only accept F30 applications from applicants at Schools that are not supported by an NIH MSTP training grant. These will accept F31 applications. The

choice of which NIH Institute to send the application depends on multiple factors to be discussed with Naomi, Jim and your PI.

The sessions (to which your PI is also invited) include a description of how study sections work, funding trends at the various Institutes, and what makes a good research proposal. There are three opportunities to submit an F30 every year - April, August and December. You must have completed your qualifying exam before submitting your F30. If you think you qualify for an F31 (for underrepresented minority students in science) talk to Jim and Naomi. Once you decide on a submission date, notify Sara Abbott and begin reaching out to potential writers for letters of recommendation. You will need 3-5 letters of recommendation (your PI will provide his/her own description of your accomplishments and potential and of the specifics of your training plan and do not count as letter writers; additionally, although your Program Director will also write a section on your education it is still OK to ask him/her). Most students need to ask their undergraduate mentor for a letter and at least one committee member for a letter. Make sure to ask your letter writers well in advance (1 month min.) so that they have ample time to write. If undergrad/grad transcripts are required, be sure to get those in advance as well.

The best resources for writing an F30/F31 are other (successful) grant applications. Older students in the program can provide you with their proposals to give a sense of what should be included for each section. There are MANY sections of an F30 proposal and it is important to be aware of all sections for a timely submission. It will take you longer than you expect to gather all of the necessary documents but many of them are simply templated from previous years and only require a little tweaking before going into your proposal. Importantly, you will need an Additional Education Information section that is written by Jim and the director of your PhD program. Be sure to notify them that you are submitting so they can get you the correct information. Writing the grant is a great way to get your ideas formalized. It is also an excellent opportunity to have your PI deeply consider your ideas and provide feedback. Also keep in mind that the F30/F31 is not the only way to get funding and that there are many funding organizations willing to provide fellowships to graduate students. Be sure to have your materials ready a week before the submission date so the university can review the proposal before submitting it (this is true of any grant, not just F30s).

Family Medicine

G2s will be required to do their family medicine rotation in the spring of their G2 year. The idea is to refresh your clinical knowledge and skills during your grad school years and to allow for some wiggle room in terms of when you return to M3. You will be contacted by the dean's office at the end of G1 to pick your family medicine site when the M2s are doing their lottery for M3, as you will be doing fam med with them the following spring. You will be asked to pick 3 sites, and you will be given preference for one of them. Read all of the site evaluations carefully and talk to older students who have done fam med already. Some sites are better than others for MD/PhDs (i.e. some preceptors are more understanding of the long break from med school and clinical "rustiness" of MD/PhDs than others). Jim sent out a poll to older students previously about where they did family medicine and whether they had good sites/preceptors, so he should have a list of potentially good sites. He should send you this list when it comes time to pick sites (or just email him if he forgets).

It will seem burdensome at the time to just stop your experiments for 4 weeks, but it is a requirement, and it is generally not recommended to try to get out of doing this rotation (some students have done it in the past, but it is very much frowned upon by the administration). Ultimately, it will not be a huge disturbance to your project. Let your PI know in advance that this is happening, and plan your experiments accordingly to be away from lab for a month to do this rotation. Talk with your PI and other lab members to figure out what needs to be taken care of before and during the rotation while you are away. If you have mice, for example, make sure someone is taking care of your colony while you are gone. If you have requirements for your program, such as journal clubs, be sure to let the necessary people know in advance so that you can plan around your month away. Most professors are usually pretty understanding although you should expect that they will make a few

comments anyway. In general, expect to spend very minimal time, if any, in lab, and instead focus on your clinical rotation.

Some tips for doing well on family medicine:

- Do the clinical refresher with Gordon. Talk with Gordon in January/February before your rotation to schedule at least a couple of sessions with him in clinic. Four sessions (each 1-1.5 hr) is generally what you need to get reoriented to clinical environment.
- Some people find it helpful to review some things before returning to clinic. There is not a great consensus on this as to whether or not this is helpful and what works best, but some students recommend reviewing the following to some extent: physical diagnosis syllabus, Tusk mobile medicards, and potentially First Aid. Use your best judgement on whether you think it is necessary for you to review any of this. You will inevitably feel rusty clinically no matter how much you prepare, so try not to sweat it too much.
- Just think of family medicine as a break from lab and try to enjoy the clinical experience as much as you can. Don't worry about your project while on clinic...your project will still be there when you come back, and this could be the one and only time you are exposed to family practice.
- Get the study guide from your M3 peers or from older MSTP classmates. Review it at least once before the exam.
- Study the didactics binder, but also pay really, really close attention to the didactics lectures. Write down and study everything Wayne Altman says in didactics because that is what he will test you on.
- Practice looking up clinical questions quickly for the second part of the exam. Be comfortable with using resources like DynaMed and BMJ clinical practice to find stuff quickly (which you probably will be doing anyway while in clinic).
- Be sure to complete all of the other assignments for family medicine (patient logs, PICO presentation, PACT reflection, 5 Wishes reflection assignment, home visit reflection, etc). There are a lot of them, and you have less time to finish them and study for the test compared to the regular M3s, so get them done as soon as possible. Schedule the home visit patient as soon as you can.
- Follow the usual tips for doing well on the wards/rotations as you did in your first clinical rotation (see "First Clinical Rotation" section above and M3/M4 sections below).

G3 and beyond

The later grad school years is when you can really focus on your thesis project, as by this time you will be done with most course requirements and qualifying exams. Students in their 5th year of grad school are required to do an ethics refresher course with Dan Jay, but it should not be a large time commitment. Use the extra time to advance your project and diversify/enhance your resume (ex. participate in conferences, grant applications, writing reviews, etc.).

Some things to consider during these years:

- Diversify your research- have at least 2 projects running (1 more risky, 1 less risky), just in case one of them fails. Come up with side projects/"secret" projects as a way of thinking outside of the box and furthering your research.
- Make the transition into knowing more about your project than your PI so that you become independent. Read, read, read as much as you can.
- Talk with your PI regularly and often about what your career/training goals are, as that will also help guide your timeline and involvement in things like writing grants and reviews.
- As you prepare your manuscripts, try to put your data into figure-like formats and then put those into a manuscript flow. That will help you to see where the holes are in your story and what experiments to focus on to finish the paper.
- Talk with your PI about the timeline for submitting manuscripts from your work. Use this timeline to figure out when you should be getting ready to defend (see "Preparing to Defend" section below).
- Consider using the extra time in grad school to explore potential residency options. M3 year is a busy time just trying to do well on the core rotations, but grad school gives you a little more time and freedom to check out different specialties. If there is a specialty that you are interested in for residency, approach department chairs and let them know of your interest. Alternatively, Gordon Huggins can also help facilitate that introduction between you and the necessary person. See if you can shadow doctors, participate in didactics or morning reports, or collaborate on a research project. This will be useful not only to get a better sense of that specialty and whether it is right for you, but will also be helpful for future letters of recommendation because you will have had a longer/deeper relationship with that attending physician than the regular M3s doing just a 6-8 week rotation.

MD/PhD Retreat

G3s are responsible for hosting the annual MD/PhD retreat in the summer. You will be working closely with Naomi's office (specifically Jessica Wang-Strykowski will be your go-to person) to organize things in the months leading up to the retreat. The retreat is always held the week immediately following the 4th of July at the Aidekman Arts Center, Tufts University, Medford. Naomi's office will help in reserving the spaces and food for the retreat. A guest MD/PhD speaker from the area needs to be invited to give a keynote talk about his/her career path as MD/PhD as well as his/her research. Faculty mentors will also need to be invited for the student breakout sessions (ex. Dean Kuhlik). The schedule for the retreat will also have to be prepared. This can vary slightly from year to year but usually includes the following: welcome/introduction by Jim (including M1 introductions), keynote speaker, upper G student talks (optional for older students but not obligatory; poster is required for all Gs and M2s), lunch, class breakout sessions, free time, poster session and awards. There is also limited room to try different activities to enhance the retreat. Examples of things done in the past include: poster scavenger hunt, ice breakers, speed/elevator talks. Talk with Naomi and Jim about what things can/can't be done.

Preparing to Defend

Very important point: You must submit and successfully defend your thesis before you can go back to the M3/M4 years of Medical School. Revisions can be completed subsequent to your return, although it is always advisable to revise sooner rather than later. Talk to your PI and committee a full year before you think you want to go back. Make sure that everyone is on the same page. Consider current projects and papers, planned experiments, and the M3 school calendar. Also consider if there will be outstanding manuscripts when you leave and if there will be someone in the lab who can take care of the revisions if needed. Get a firm understanding of what your committee expects of you before you leave, and reconfirm the expectations at every meeting afterwards.

1 year before defending: Present a thesis outline and schedule of upcoming experiments to your committee. Note when you plan on doing these experiments in the next year.

~6mo before defending: Identify an outside examiner for your defense. Talk with your PI about who a good person might be and make sure that they are available around the time you plan on defending.

After getting permission to defend: You will have ~3 months to write your thesis and prepare the defense talk. Have your PI and lab members read and edit your thesis, and practice your defense talk with the lab and anyone else willing to listen. Meet with Kathryn Lange to be sure that you understand the thesis formatting requirements and make sure you have the necessary forms completed for the defense. It is also helpful to look at example theses from previous grad students, but keep in mind that the formatting rules may have changed slightly since then.

Preparing for the return to M3

Talk with your thesis committee and mentor if you are planning on defending in the next year, as you also will need to prepare for the return to M3. Talk to Dean Kuhlik and Jim by early or mid-fall if there is even a possibility of you returning to M3 the following spring/summer. The lottery for scheduling rotations starts January, so it is better to have your name in the lottery process and rotations scheduled, even if you end up changing plans later. Better to start the process and drop out rather than trying to schedule after the January lottery. Keep in mind that you have some wiggle room in terms of when you can actually go back to third year because you have already completed 2 core rotations at this point (1st clinical rotation before grad school and family medicine). Also, you won't have the same elective requirements as the other M3s, which will also give you some more free scheduling time. However, it is best to try to return as close to the beginning of the clinical year (May/June) as possible. This will be to your advantage as you can start clinic when the regular M3s are starting clinic, who are just as unsure about the wards as you are at this point, and the knowledge gap will be less noticeable as well. The later you start in the year, the larger that knowledge gap will be, and the less scheduling free time you will have for things such as vacations, research elective to go back to lab and finish experiments/manuscripts, and Step 2 study time. Also, residency application begins in mid-September, so you will want to have enough time to figure out which specialty you want to go into and finish the necessary rotations to get recommendation letters for that specialty by that time. If you realize that you will be defending and returning to M3 late in the year, you may or may not consider waiting until the next cycle to return to M3. Ultimately, it is your decision when you want to return, but keep in mind that an extra semester/year will not necessarily hurt you. M3/M4 year and residency will still be there, and residency programs will not see an extra few months in grad school as a bad thing, especially if you have used that time to finish more projects and publish more manuscripts.

Some tips for the return to M3:

- Talk with Dean Kuhlik and the OSA about scheduling your rotations. The lottery is in January. Meet with Dean Kuhlik regularly and often to address all scheduling concerns/issues, including: vacation before return, time of M3 return, rotation order, site location, study time for Step 2 CS/CK, scheduling Step 2's, etc.
- Take part in the one week clinical orientation with the other M3s (required if you haven't completed this before)..

- Do the clinical refresher with Gordon ideally starting before you are given permission to defend and then a few more after defending your thesis and before returning to M3. Let him know well in advance when you plan on defending so that you can plan at least a couple refresher sessions before you go back.
- Vacation after thesis defense and before return to M3. This will be your last real break for a long time, and you deserve it after finishing your PhD.
- Get the Dropbox of M3/M4 resources from older MD/PhD students. These were study resources that were collected from previous M3/M4 students. These will hopefully be of use during the rotations as you are on wards or studying for the shelves.
- Some people find it helpful to review some things before returning to clinic. Again, as with family medicine, there is not a great consensus on this as to whether or not this is helpful and what works best. Use your best judgement on whether you think it is necessary to review anything. You will inevitably feel rusty clinically no matter how much you prepare, so try not to sweat it too much. All MD/PhDs go through the same process, and somehow it seems to work out eventually and we all end up matching pretty well.

M3

The M3 year consists of completing the core clinical rotations psychiatry, pediatrics, OB/GYN, family medicine, surgery, and medicine. You will have completed 2 of the core rotations by the time you return (1st rotation of psych/peds/OB and family medicine). There is also some elective time, and if you return to M3 year on time (around May), you will have some extra elective time compared to the regular medical students. Use that time for vacations, exploring specialties with elective rotations, and returning to lab if necessary. You also will take the Step 2 CK and CS exams between M3 and M4 or the beginning of M4. At this point, all of your rotations are graded (versus M1/M2 and most of grad school which are pass/fail). Your performance on the rotations will be what goes into the evaluation for AOA membership (the medical school honors society) and residency applications.

General tips for doing well on the wards:

- Accept the steep learning curve (particularly with being MD/PhD). Learn and study as much as you can in the short time, and realize that this may be the only opportunity you will ever have to experience that particular specialty.
- Make a study plan during each rotation. How/what are you doing to prepare for the wards/shelves? Ask around about what books to use to study with and see the M3/M4 dropbox of resources.
- Be aware of what the expectations of each rotation are. Some rotations (ex. surgery) will have several assignments/exams that count for a significant portion of the final grade, so be sure to do well on those as well as being on the wards. However, some rotations (ex. medicine) will have most of the grade be your clinical performance, so be sure to really step it up on the wards rather than focusing on studying random facts for the shelf.
- Talk with Dean Kuhlik and OSA about scheduling your Step 2 exams. Try to give yourself some study time if possible and make a plan. Keep up with your rotations because if you do well on the wards, that will help you to do well on Step 2.
- Be proactive! Be as helpful to your residents/attendings as you can. Take charge of your patients and follow through with their care.
- Get regular feedback from your residents and attendings. Be ready to adapt to each one's needs/desires.
- Be enthusiastic and confident.
- Don't complain about being tired or busy. No matter how tired and stressed you may be, your residents and attendings are working even harder than you are.

Step 2 CK/CS

This is the second part of the medical licensing exam. There are now 2 parts to the exam, a clinical knowledge portion (CK) and a clinical skills portion (CS). The CK part is like the Step 1 exam, a computer-based exam on your knowledge from M3 year and the core rotations. The CS part is a live, standardized patient-based exam. Talk with Dean Kuhlik and OSA about scheduling these exams. This is important especially for the CS portion, where there are limited test sites compared to the written CK portion. In general, use your time on the wards as preparation for these exams. Keeping up with the rotations will help you to do well on the Step 2s. Other study resources to supplement your preparation include the following: USMLE World Qbank, First Aid Step 2, CS handout from the OSA.

M4

The final year of medical school consists of the final required rotation of neurology and electives. There are 6 blocks of elective rotations, 2 required acting internships (sub-i's), and neurology. Rotations are still graded; however, most of the rest of your rotations as electives usually will not have shelves (a small number do, so be sure to check the requirements of your electives). This will free up your time to deal with the biggest part of M4, residency applications. Residency applications begin in mid-September, which is something to keep in mind in terms of returning back to M3 year. If you return to M3 year too late in the year, it makes scheduling your necessary sub-internships and electives for your specialty difficult.

If you haven't already decided what specialty to go into by the end of M3 year, you will have some time in the beginning of M4 year to try a couple of potential rotations to help decide. Once you have decided, the first part of the year will be devoted to completing rotations necessary to obtain your letters of recommendation for your specialty. In particular you need to complete the sub-internship in your chosen field in order to request such a letter and have its contents included in the Dean's letter, which will summarize your performance/potential as a house officer and will be finalized in mid-November. You will have a meeting with the OSA and Dean Kuhlik to help you figure out what elective rotations you need to complete for your specialty. This may include sub-internships, consult rotations, and away rotations depending on your specialty. Again, as with M3 year, your performance in the particular rotations you do for your specialty will directly affect your residency application and letters of recommendation.

Residency application

- Meet with Dean Kuhlik and the OSA regularly and often, especially in the beginning of the year as you prepare to apply for residency. Make sure to address all your concerns about where to apply and what requirements are needed for your specialty.
- Take your sub-i's and consults seriously. This is a really good opportunity to get to know your attendings better than M3 year and get letters of recommendation and advice on applications.
- There is a separate application process for away rotations. Talk with the OSA about whether you need to do away rotations or not and how many, as this is specific to each specialty and your individual goals. Be sure to figure out what the expectations for your away rotation are. Some specialties use the away rotation as a formal "audition" where you need to really show how good you are to the program, while some specialties use the away rotation more informally as a way for you to get to know the program and vice-versa. In general, try to do a consult rotation and not a sub-i as an away rotation.
- In general, apply for 1 residency specialty, maximum 2 specialties. Residency programs will not take you seriously if you try to apply to multiple specialties.
- Set aside some elective/vacation time for residency interviews. The OSA and Dean Kuhlik can help you figure out when to do this. Be prepared to talk about your PhD research and your clinical experiences at the interview. Read up on that particular residency program and be prepared to address why you are interested in that particular program.
- Find a clinical mentor for your specialty i.e. an attending physician in your field of interest. They will also help counsel you and potentially write a letter of recommendation.
- The vast majority of students will end up matching in their specialty of choice, and often in one of their top choices; however, if you don't end up matching, there is a second process for matching with programs that have unfilled residency slots. The OSA will help you by organizing that process immediately before Match Day.
- Enjoy the extra free time, particularly post-match. This may be the last real vacation time you have before becoming a fully-fledged doctor. Enjoy the school-run activities for your class.