Phase Ia Purple Book
A survival guide to the first year of medical school
# Table of Contents

Introduction ................................................................................................................................................. 3
Glossary of Abbreviations and Acronyms ................................................................................................. 5
Lecture Notes ............................................................................................................................................... 6
General Resources ...................................................................................................................................... 13
Module Written Exams ............................................................................................................................. 18
Portfolio ..................................................................................................................................................... 23
Self-Care .................................................................................................................................................... 26
Introduction to the Feinberg Curriculum .................................................................................................... 30
Science in Medicine Thread ....................................................................................................................... 31
Clinical Medicine Thread ............................................................................................................................ 34
   A. Clinical Education Center (CEC) Skills Sessions ............................................................................. 34
   B. OSCE’s ............................................................................................................................................... 37
   C. Individual Preceptorship (IP) ............................................................................................................ 38
   D. Education Centered Medical Home (ECMH) .................................................................................... 40
   E. Medical Decision Making (MDM) ...................................................................................................... 42
   F. Patient Perspectives Interviews ......................................................................................................... 44
   G. Clinical Correlations (CC) ................................................................................................................ 46
Health and Society (H&S) .......................................................................................................................... 47
Professional Development (PD) .................................................................................................................. 49
   A. Area of Scholarly Concentration (AoSC) ......................................................................................... 49
   B. Personal Transition to the Profession (PTTP) .................................................................................. 50
   C. Ethics Series ..................................................................................................................................... 50
Problem-Based Learning (PBL) .................................................................................................................. 53
Anatomy Lab ............................................................................................................................................... 56
   A. Anatomy Practical ............................................................................................................................. 59
   B. The Anatomy Closing Ceremony ..................................................................................................... 60
Mindset – A Note from the Authors ........................................................................................................... 61
Foundations I .............................................................................................................................................. 63
Foundations II .......................................................................................................................................... 67
Foundations III .......................................................................................................................................... 71
Cardiovascular Module ............................................................................................................................... 74
Pulmonary Module .................................................................................................................................... 78
Renal Module ............................................................................................................................................. 80
Musculoskeletal Module ............................................................................................................................. 83
Dermatology Module ................................................................................................................................. 86
Introduction

Dear Class of 2019,

Welcome to Feinberg School of Medicine! You’ve all worked incredibly hard to get to this point, and should be immensely proud of that accomplishment. We are sure that many of you have heard about some of the new challenges ahead: managing the waterfall of information, weathering the awkwardness of your first patient interactions, experiencing your first anatomy dissections, and of course, balancing life with medical school. While it is true that you will be pushed harder than ever before throughout your journey here, be assured that you can – and will – make it through the process!

With this book, we hope to make the transition easier for you all by providing some tips to help you avoid making the mistakes that we had to learn the hard way. In this sense, we envision that it will serve as a helpful resource for you to reference throughout your first year of medical school. This Purple Book is a new endeavor that we hope your class will continue to update and improve upon for future years so that it may be reliably passed down through future Feinberg generations.

Before we delve into further details, we’d like to offer one of our most important pieces of advice up front: do not lose the forest for the trees! Though it is easy to feel overwhelmed at times, keep in mind that you are now part of the Feinberg community, and that you WILL ultimately earn your MD. Despite the frustration, struggles, and pitfalls that you will inevitably encounter along the way, the simple truth is that if you take the time and energy to bring your best at every step of the journey, you will eventually learn everything you need to know to provide top-notch patient care. Along the way, you might occasionally feel as if nothing is sticking, and you might wonder if you will ever have what it takes to be an excellent physician. Rest assured that there are none among us who haven’t doubted ourselves at some point or another. These moments of uncertainty are completely normal, and should not be ignored or suppressed, but rather welcomed as a natural part of the process. During these times, keep close and rely on your dearest avenues of support – friends, significant others, family, and mentors – and you will no doubt succeed.

This institution is renowned for the high caliber of physician that it produces, and in four years, that will be you! Though the road ahead may seem long and treacherous from where you stand, trust in the countless others who have already travailed its path and who attest to the extraordinary, rewarding experiences that you’ll enjoy along the way. The volume of information that will be presented up front is certainly daunting, but keep in mind that the first two years of medical school represent only an initial pass through the material that you will one day use to save lives. Another pass will come when you study for boards, another during clerkships, and yet another as a resident. In fact, your learning will never really end; the path of a medical professional, after all,
truly is lifelong. With this in mind, we encourage you to work hard and devote yourself to your studies, but also to enjoy yourself along the way. Chicago is waiting!

We hope that you will find this book valuable. It is by no means an exhaustive resource, but we intend for it to complement the advice you will constantly receive from your peers, older students, and from the faculty.

Should you have any questions, please feel free to reach out to any of us at any time.

Best of luck!

Sincerely,

Authors of the Purple Book & the Class of 2018

Olga Alexeeva
Runjhun Bhatia
Roshni Bhatnagar
Gaurang Garg
Neil Lim
Sanket Shah
Taylor Sutcliffe
Sarah Uttal
Vanessa Welten

* Disclaimer: Please also remember that this is a book written for students, by students. The views and opinions expressed here represent those of the students and do not necessarily reflect the views or opinions of the administration ... but we agree on most things.
Glossary of Abbreviations and Acronyms

AoSC: Area of Scholarly Concentration
CBL: Case Based Learning
CC: Clinical Correlations
CEC: Clinical Education Center
CM: Clinical Medicine
CME: Continuing Medical Education
ECMH: Education Centered Medical Home
EIA: Ethics in Action
FCE: Focused Clinical Experience
FoCE: Foundations of Clinical Ethics
GRAT: Group Readiness Assessment Test
HPME: Honors Program in Medical Education (Northwestern Undergraduate Program)
HQPS: Healthcare Quality and Patient Safety
HS: Health and Society
ICE: Intermediate Clinical Ethics
IP: Individual Preceptorship
IRAT: Individual Readiness Assessment Test
MDM: Medical Decision Making
MSTP: Medical Scientist Training Program (MD/PhD Program)
OSCE: Objective Structured Clinical Examination
P=MD: Pass = Medical Degree
PBL: Problem Based Learning
PD: Professional Development
PDSA: Plan-Do-Study-Act cycle
PSP: Premedical Scholars Program (Northwestern Undergraduate Program)
PTTP: Personal Transition to the Profession
SAM: Synthesis and Application Module
SM: Science in Medicine
TBL: Team Based Learning
Lecture Notes

I. What is it? Why is it important?

At this point in your education, you are likely no stranger to taking notes during lectures, and you have probably developed a strategy for note-taking that works well for you. The bad news is that your strategy may need some adjustments in order to adapt to the pace and style of medical school lectures. The great news is that you’ll now be taking notes on material that is (usually) fascinating, useful, and highly relevant to becoming a competent physician, which makes the process that much easier to appreciate at 8 AM!

There are two main purposes of taking lecture notes. First and foremost, lecture notes are critical for helping you generate a lasting, long-term foundation for the knowledge you will need as a future physician. This aspect of note-taking is largely self-explanatory – as a Feinberg student, you will enjoy the privilege of learning directly from some of the most renowned experts in their field (some of whom literally “wrote the book” on the subjects at hand), and it is in your best interest to retain the wisdom they offer in order to later translate it into excellent patient care.

The second, more short-term goal, is to create a “study kit” that will assist you in studying for the module written exam. Your lecture notes, in combination with the lecture PowerPoint slides and associated lecture guide handouts, constitute the most utilized resources that students draw upon for consolidating knowledge for the exam. Though note-taking can occasionally grow tedious, it is helpful to think of taking notes as giving your future self a “gift,” and to approach the process with this mindset. Realize that regardless of how much you study throughout the module, preparing for an imminent exam will always be a highly stressful endeavor due to (if nothing else) the sheer volume of material that must be recalled. As a result, study time becomes an increasingly precious resource the closer an exam draws, and it becomes increasingly important for you to study efficiently by investing time into remembering only the most critical concepts.

It is absolutely vital to realize that unlike in undergrad, it is realistically impossible to learn everything presented to you – you MUST prioritize! Be cognizant of the fact that your future self will benefit most during exam prep from having a clear, organized set of
notes that distill the most important concepts from each lecture in a simple, easily readable format. Instead of madly racing to type out a professor’s speech verbatim during class, we recommend actively listening, trying to process and understand the relevant concepts, then rewriting the main takeaway message in your own words whenever possible. It is much easier to relearn material if the ideas are already translated into your own phrasing – otherwise, you’ll often waste time decrypting the professor’s word-for-word dictation all over again!

It is also worth mentioning that even though some of you may be accustomed to never reviewing your notes until exam time, **this strategy is far less feasible for success in medical school**. There is simply too much information to know – and while we concede that cramming to some degree is always possible, you will likely not perform nearly as well as you could otherwise, and your long-term retention (vitally important!) will suffer. Therefore, we highly recommend reviewing your notes periodically in order to facilitate long-term retention, easier recall, and to make life easier for your future self at exam time. In the days leading up to the exam, familiarize yourself with your notes and other materials that you plan on using so that you have the locations of the important concepts at your fingertips. Along the way, make notes of which lectures/ideas to prioritize for mastery, and which to defer for later. Knowing exactly how you intend to invest your review time far in advance will help avoid any unnecessary despair and last-minute panic due to lack of planning.

So far, we have recommended that you learn the material by creating your own notes: condense and synthesize lecture material, relate the big concepts together, etc. In addition to periodically reviewing your notes, **it is essential that you actively test your knowledge throughout the module**. Testing yourself, even before you think you know all the material, is the best way to learn and ensure long-term retention. You can find ways to test yourself through the provided “Guiding Questions” at the end of each learning guide, making flashcards for yourself, quizzing a friend on key concepts, or through some of the test bank questions that are discussed under the General Resources section.

Key Takeaway Points:

- Distill the most important concepts in your own words
- Periodically review your notes and key concepts from each lecture
- Actively test your knowledge and continuously mend gaps in understanding

II. Okay, taking notes is important. What works best in med school?

Unfortunately, there is no single “right” way of taking notes in medical school, as every individual benefits most from a different learning style. Our best advice is to take notes
in a way that works best for you given that most Feinberg professors click through PowerPoint presentations to deliver their lectures. You will almost certainly experiment with different ways of taking notes over the year, which is completely normal and expected. Here are some of the most popular strategies from our class to get you started:

- **Download the PowerPoint slides and write your notes in the “Notes” text box underneath each of the slides.**
- **Download the PowerPoint slides, and directly annotate and/or add to the text already on each slide, thereby creating an edited copy of the presentation.**
- **Use Growly Notes,** a program which allows you to take notes in text boxes next to the PowerPoint slides. Some consider this format of notes to be more visible and easier to scroll through. However, be wary that some people have had problems with Growly Notes crashing, which results in losing the notes!
- **Import a PDF of the PowerPoint slides directly into Microsoft OneNote (via the ‘print’ function).** The slides can then be freely annotated either directly on each slide or in the free space adjacent to it with typed and/or with handwritten text (if you have a PC with pen functionality). The ability to draw with a pen is particularly helpful for drawing out diagrams and annotating pictures with digital ink!
- **Handwrite digital notes on an iPad.** Note that you’ll need a stylus for this method. AmPen Hybrid stylus is an inexpensive stylus that glides well across the screen that many students recommend, but feel free to ask around for other pen suggestions.
- **Take notes on piece of blank paper or blank notebook.** Useful for those who want to have a completely separate reference when reviewing later on.
- **Annotate the learning guide handouts that accompany each lecture.** This method is useful for consolidating all of your notes along with the information in the learning guide, but it can be logistically difficult because of the limited free space/margins in the handouts themselves.
- **Transcribe notes directly into Flashcard apps, or create flashcards later based on your previous notes.** Creating a concurrent bank of flashcards can be very useful for those who study efficiently using this method. Two very popular apps for this purpose are Anki and Quizlet.
- **Annotate the First Aid textbook.** The First Aid book series is written as a study resource for Step 1, and it contains material that is tested on boards but not explicitly taught in lecture. This method benefits and suffers from the same
advantages and disadvantages as annotating the learning guide handouts, as the book doesn’t feature a large amount of free space in which to write.

- **Just sit back and listen for the big ideas**, which you can always write down later upon reviewing the lecture.

Many students use a combination of different strategies listed above. As long as you are organized and keep track of which methods you have used for which lectures, you should be fine mixing and matching as needed. Again, don’t despair if you find yourself switching back and forth between methods – it often takes months for new students to find their preferred studying method!

### III. Since lectures are recorded, should I attend lectures in person?

This is a highly controversial question, and based on who you ask, you will receive very different answers and passionate opinions. **The short answer is: it is ultimately your decision, and you should choose the option that best suits your needs after familiarizing yourself with the advantages and disadvantages of both options.** Think of this as the basic idea underlying “informed consent”!

**Attending lectures in person** offers numerous advantages. Experiencing lectures live is arguably the more engaging method of learning, as it affords students the opportunity to participate in real-time exchanges with the lecturer, respond, and ask questions. Those who don’t attend lecture potentially miss out on forming a dynamic connection with the most animated and passionate lecturers which cannot be adequately replicated via video. Indeed, many professors are lively lecturers who rely on feedback via audience engagement, body language, and eye contact in order to be most effective. We would also be remiss if we didn’t acknowledge that the Feinberg curriculum was designed with the intention that students would attend lectures in person whenever possible, and would rely the lecture capture system merely as a secondary reference. Feinberg lecturers are all volunteers who are not paid extra to teach, and the administration highly recommends that all students attend lectures (despite not being strictly mandatory) as a sign of respect for the experts who donate their time to our education.

However, it is also important to note that **many students espouse learning styles which are truly accommodated better by lecture capture**, as the technology permits viewers to pause, rewind, and speed up videos as needed. These functions are invaluable for processing lectures at one’s preferred speed for maximum note-taking effectiveness. Furthermore, the ability to watch lectures on one’s own schedule permits for flexibility for those with busy agendas, or for those who learn more efficiently at certain times of day. However, those who choose to rely primarily on lecture capture should again by wary of the fact that the service is not intended by the education leaders to be a substitute for attending lecture. Furthermore, the lecture capture service is not perfect,
and is susceptible to occasional technical glitches that accidentally cause parts of, or entire lectures to not be recorded. These technical failures occur sporadically, and should be acknowledged as an inherent risk by those who rely exclusively on the technology.

Again, at the end of the day, the choice is yours!

IV. Pro Tips

• Make a folder on your desktop that exclusively contains the materials that you will use to review for the exam. This way, all of your resources are in one place and ready for your use when the time comes.

• Have at least two sources of material in mind for when you return to review each important topic. This way, even if one source proves confusing or insufficient for your needs, you can reference the other. For example, you might use your handwritten notes along with the learning guides, or the PowerPoint slides along with First Aid, or any other combination that works for you.

• Actively test yourself throughout the module to find areas of strength and areas of weakness. It is too late to begin testing yourself the Sunday before the exam and expect to shore up deficits in knowledge. Plus, forcing yourself to recall a concept rather than passively reread it allows for greater long term retention.

• Understanding the words people are saying to you is half the battle in medicine! Medicine is essentially a new language, and you should absolutely look up any unknown phrases or acronyms being repeatedly deployed in lecture right away. This happens far more often than you might expect!

• If you are going to make flashcards, we suggest keeping them very simple. Refer to the document “Basic Anki Card Creation: The Complete Guide for Med School and the USMLE Step Exams” online. Here is the weblink: http://www.yousmle.com/basic-anki-cards-the-complete-guide-for-med-school-and-the-usmle-step-exams/

• Realize that some slides and/or lecture guides occasionally contain far much more detail than you need to know. The true challenge is identifying these particular lectures, and triaging accordingly. Remember, prioritization of the most important concepts is key! Completing practice questions (either the ones provided in learning guides, or ones offered in textbooks or online) throughout the block can help you judge whether a particular topic is being presented in
sufficient/excess detail. Board review books like First Aid are also typically very helpful in distilling the critical concepts necessary for Step I.

• Try not to feel overwhelmed by the number of resources that exist. Remember, just because a resource exists doesn’t mean you have to use it. Though you might feel uneasy if everyone else seems to be using a particular resource and you aren’t, remember that different people learn in very different ways. Don’t feel pressured to conform if what you’re doing is already working for you!

• Worthwhile outside resources are those that are engaging, help organize the material, enhance your enjoyment and understanding of the material, and/or allow you to more easily recall concepts. Feel free to try out new resources during the block while you are making a first pass at the material! However, we recommend not trying new strategies/resources right before the exam, unless it seems like it might be a very effective use of your review time. Charts, practice questions, flashcards, short videos, and condensed notes are examples of acceptable last minute resources. Very long videos and textbook chapters are significantly less useful in a pinch. Extra resources such as those listed above are intended to fill in the small gaps in your understanding of material, or to aid in organization and memorization where it is lacking. If lecture notes and slides already serve this purpose this for you, there is no reason to look beyond. You might still want to glance at First Aid if you wish, but everything else is only supplemental and not strictly necessary.

V. Keeping up the Pace: Study Strategies

As painful as it sounds, note-taking is not the only practice that you may be forced to slightly alter in order to be maximally successful in medical school. Indeed, studying effectively and efficiently might require very different strategies from those to which you were accustomed in undergrad. Unfortunately, as with taking notes, there is no one strategy that works for all students – in fact, the possible variations of study methods that exist are virtually limitless. Realistically, most students experiment with a variety of methods until they find the optimal approach. This can take quite a while, so don’t feel discouraged if it takes multiple modules for you to settle on a successful strategy!

Remember that everyone studies and learns differently, so we strongly suggest not preoccupying yourself with your classmates’ study strategies. It truly doesn’t matter if everyone else is studying in a completely different manner – if you feel that your approach is working for you, stick with it!

Although it is impossible for us to recommend any single strategy, we will provide a few general concepts for you to use as you like. It can be useful to divide your strategy for studying into two time periods: before lecture, and after lecture.
Before Lecture Suggestions:
• Read the Learning Guide for tomorrow’s lectures
• Read just the Learning Objectives for tomorrow’s lectures
• Skim tomorrow’s lecture slides ahead of time
• For certain lectures, it can be helpful (if you really, REALLY want to) to look through the assigned pre-reading.

After Lecture Suggestions:
• Review lecture slides
• Review learning guides and do the corresponding guiding questions
• Identify helpful YouTube videos online
• Reference textbooks as necessary
• Annotate notes with First Aid/Pathoma
• Make flashcards (if helpful)
• Organize and summarize notes
• Create quiz questions for yourself and friends
• Email professors with questions

Mix and match these strategies in a way that works for you! And lastly, please remember that there are numerous resources available to help you find the best way to study. Your college mentor or the deans in AWOME are fantastic people to reach out to for help. Also don’t forget about us M2’s – we’ve all been there, and would be more than glad to help!
General Resources

One of the first questions that incoming medical students always ask is: “What resources should I purchase, and when?” We’ll tackle that question right off the bat with the following list of resources that are universally acclaimed as excellent supplements to your medical education. We have broken the list into three sections:

- **First Pass Materials**: these resources will help provide extra detail or knowledge in case a concept is not covered sufficiently in lecture or in the learning guides.

- **Review Material**: these resources are available to help you develop a framework to understand how the big concepts in the module fit together and to hit on the key, must-know concepts. Many of these resources are intended for Step I studying, but please note that they do not exhaustively cover all of the knowledge you will be tested on during module exams.

- **Question Banks**: pretty self-explanatory, these will come in handy when you begin to practice clinical vignettes during the organ system modules. Use them early and often to test what you know. We have not provided an exhaustive list, so feel free to use our recommendations and also explore others.

Furthermore, in our subsequent discussions of each module, we will re-emphasize any resources that are especially useful for that particular unit. However, it should be noted that there are an almost unlimited amount of resources that exist – our list is far from exhaustive, and only contains those resources that are most frequently and consistently recommended due to their incredible value. Find resources that work well for you, and stick to them!

Lastly, don’t forget us M2’s! We are happy to discuss in further detail the resources we found particularly helpful and the best times to use them.

**First Pass Materials**

- **UpToDate**

  The doctor’s quick reference encyclopedia to any disease, medication, clinical symptom, or diagnostic puzzle. UpToDate, accessed through the Galter library site, is an invaluable resource that provides highly detailed, comprehensive guides and summaries of how to approach just about any clinical question you might have. Think of it as a peer-reviewed version of Wikipedia for diagnostic and treatment protocols, written using full medical jargon with doctors as the intended audience. Extremely helpful in learning about diseases, diagnostic approaches, and treatment regimens on the fly. In addition, it serves as a
fantastic jumping off point for research into any and all medical topics (for PBL presentations, for example)!

• **Robbins and Cotran: Pathologic Basis of Disease**

An absolute classic in medical school education, Robbins is an extensive overview of pathology for every organ module. This is a fantastic resource if you want to learn more about a disease or would like a secondary explanation to accompany what is written in lecture notes or learning guides. There are two versions of this book: “Big Robbins” or “Baby Robbins” – one is the textbook and the other is the condensed pocket companion. The material presented in the pocket companion often provides enough of an overview to understand most pathology, with the textbook providing even more background information and some useful pictures. The textbook is available through Galter and also has a useful search function!

**Recommendation:** The Robbins Textbook contains a great overview of pathology, but also a lot of information. The companion is more concise and manageable for everyday use. Use either strategically to learn more about difficult concepts. This is also a great resource for PBL presentations for both information and pictures.

• **Bates Visual Guide to the Physical Examination**

The Clinical Medicine curriculum at Feinberg comprises, in part, of your Clinical Correlation lectures, Clinical Education Center sessions, and OSCE examinations, the assessment and grading of which are based off the Bates examination method. You will have multiple OSCE’s throughout Phase Ia and Phase Ib and also at the end of each clerkship during your third year of medical school. As such, we highly suggest referring to the Bates Visual Guide to the Physical Examination or its pocket companion early and often and incorporating it as a key tool in preparation for the clinical medicine component of our curriculum. There is also an associated Bates textbook with a written overview of clinical examination skills. Please refer to the Clinical Medicine component of this book for more information and tips!

**Recommendation:** Utilize the Bates videos while preparing for each CEC session and also as a quick overview of your responsibilities for each OSCE.
• **Embryology**

Embryology is taught throughout Phase Ia and Phase Ib, with the first four weeks of development being covered during Foundations II and organ-system-specific embryology being covered at the beginning of its respective module. As embryology is often difficult to visualize, it will be useful if you become familiar with a few resources and then utilize them throughout your first two years. Here’s one that is well received; please refer to more information and tips in the Foundations II section of this book.

- **Simbryo:** A well-designed program created to aid students with visualizing embryological development – complete with trippy music, and lovingly created by Stanford’s medical school. Many students in the class found this to be an exceptionally helpful resource for deconstructing one of the most frustrating part of the module, and we highly recommend that you check it out!

The following is a link to Duke embryology, with their concise and clear explanations, and the Simbryo application for various embryological topics.

https://web.duke.edu/anatomy/embryology/embryology.html

**Review Materials**

• **First Aid for the USMLE Step 1**

Widely considered to be the keystone of USMLE Step I preparation, this is a favorite for boards preparation. First Aid provides very simple, concise summaries of the most frequently tested concepts on boards, along with helpful mnemonics. The majority of students will employ heavy use of First Aid during their M2 year while studying for Step 1. However, some students also purchase a copy early in M1 year and refer to it in conjunction with class notes while studying. While it is certainly not necessary to purchase this early, First Aid can be very useful as a supplement because it condenses material in a straightforward manner while providing insight into the depth of recall necessary for Step 1. In addition, it also summarizes material that is tested on boards, but not explicitly covered in class. That being said, be aware that it does not always cover lecture information in as much depth as is necessary for Feinberg exams, and should therefore not be used as a substitute for lecture!
**Recommendation:** An essential purchase for M2’s studying for Step 1. An optional supplement for M1’s who would appreciate a straightforward study resource that provides an early glimpse into future boards review.

- **Pathoma**

  Another Step 1 resource favorite that serves as a fantastic addition to lecture. Pathoma is comprised of brief videos of Dr. Hussein Sattar reviewing the most high-yield pathology for Step 1, organized by organ system. Dr. Sattar, an Assistant Professor at Pritzker School of Medicine, is a gifted teacher who specializes in presenting pathology in an easily digestible, intuitive manner. Your class should at some point obtain a discounted subscription which unlocks all Pathoma videos for online viewing. In addition, a purchase of Pathoma also arrives with an accompanying review book, which many students annotate and study from along with First Aid.

  **Recommendation:** View Pathoma videos as appropriate for each organ system, especially when highly recommended in the Purple Book. Watch the entire series at least once in preparation for boards. At minimum, purchase the entire series upon receiving the school class-wide discount during your second year!

- **Board Review Series (BRS) Physiology**

  A concise, high-yield guide to physiology, organized by organ system. Used by some students in conjunction with First Aid/Pathoma for a more in-depth review of physiology during Step 1 studying. Potentially useful as a supplement to studying organ systems in M1 year, though much less common.

  **Recommendation:** View/purchase as necessary as a supplemental resource for learning/reviewing physiology, potentially in M1 year for studying organ systems and/or in M2 year for Step 1 studying.

**Question Banks**

- **Board Vitals:** Available at [https://galter.northwestern.edu/](https://galter.northwestern.edu/). Provides over a hundred questions per organ system.

- **Access Medicine:** Available at [https://galter.northwestern.edu/](https://galter.northwestern.edu/). Provides varying numbers of questions per organ system.

- **First AID Q&A:** Provides boards-style questions. Recommended to wait until Step 1 studying to use these.
• **UWorld:** Must be purchased online at www.uworld.com. This is the most important question bank for studying for Step 1, with over 2200 practice questions that parallel the question style of Step 1. We recommend not using questions from this database until you are studying for Step 1!

"We’re probably looking at a double bypass, unless that wizard can hook you up again."
Module Written Exams

I. What is it, and why is it important?

The importance of med school exams cannot be overstated: in addition to measuring your knowledge, they are also the single most critical measure of your success as a medical student, as a future physician, and as a human being. Just kidding.

In all seriousness, written exams are integral for assessing your understanding of the material, and they are great tools for challenging you to apply knowledge and begin thinking like a future doctor. If you use them properly, they can also serve as fantastic learning opportunities that can help prepare you for higher-stakes exams in the future (i.e. Step 1), and for clinical clerkships, as well. While it is important that you do your very best on each exam, we’d urge you to keep in mind that individual scores reflect only your performance and preparedness for a single exam in an isolated setting – and that they do not speak to your intelligence, your aptitude as a medical student, and certainly not to your effectiveness as a future physician.

II. How are medical school exams at Feinberg similar to, or different from my exams in undergrad?

- **There is only one written exam per module.** Unlike undergrad, where there are typically mid-terms and final exams in a given semester, there is only one exam that students take on the very last day of a given module (e.g. Foundations 1, Cardiovascular, Pulmonary). This is most analogous to a “final exam,” with other differences. However, while there is only one written exam per module, it is important to note that there are other types of exams (e.g. OSCE exams, ethics exams) that may be scattered throughout the module, as well.

- **They are comprehensive across multiple disciplines.** In undergrad, a typical final exam assesses knowledge from an entire semester/quarter, but only from a single class at a time. Module exams test not only science-based material, but also material from Health and Society, Professional Development, and Clinical Medicine. This means that you must be prepared to answer questions from a very wide breadth of subjects by the time the exam rolls around.

- **However, while exams are comprehensive, they generally sample two questions from each lecture, taken from the learning objectives.** For example, on average, exams are 110-130 questions long. In 2014, the Foundations 1 exam contained 120 questions in total, covering approximately 63 total lectures across all topics – which means that there are usually around only 2 questions on average per lecture. This rule holds true for all other module exams, as well. The main point to take away is that with only 2 questions allotted per lecture, most
questions are designed to focus on “big picture” ideas and conceptual understanding rather than nit-picking on small, obscure details (though frankly, those do pop up more than we would like). Use the learning objectives to guide your learning!

- **Exams are long, but are fair for the length.** A typical exam is 3-3.5 hours long, which most students find is usually far more than enough time to complete the exam. That being said, make sure you use the restroom before starting, as only one male and one female are allowed to go to the restroom at one time once the test begins.

- **Exams are pass-fail, very few students fail.** The pass/fail cutoff for an exam is either 70% or 2.25 standard deviations below the mean, whichever is lower. More often than not, it’s the latter. The end result is that only a small handful of students (0-6) end up failing any one exam.

- **Performing poorly on, or even failing an exam is not the end of the world.** No matter how poorly you do, if you pass the exam, there are no negative consequences. Should you fail an exam, you will simply meet with the administration to discuss what happened, then you will be given an opportunity to retake the exam. Individual module exams (CV exam, FND I, etc) do not show up on your transcript to residency programs. Block grades (e.g. Foundations I, II, and III combined), however, do show up on transcripts. Failing one module exam in a block does not mean you fail the block; you have the opportunity to remediate the exam and there are other factors in the grading process (OSCE results, etc). More details on this process will be explained by the administration as it gets closer to the exam – don’t worry about it for now, just realize that failing one test is not a big deal!

- **After scores are distributed, students will be shown which question #’s they got wrong, but are not permitted to see the actual exam questions again.** Instead, students are provided with a list of “testing points” and a list of “learning objectives,” both of which correspond 1:1 to each test question and describe the main concept behind each. These lists can be used in conjunction with each other to help you learn from your mistakes without compromising the security of the exam. The other upside to this policy is that because the exams are not distributed, the same core exam can be reused year-to-year, and can therefore be continually improved based on results and feedback.

III. **Preparation**

- **It is our strongest recommendation that you not fall behind on the material.** There is simply too much to know – and to make matters worse, most material
builds on itself lecture-to-lecture and week-to-week, and staying up-to-date on material is critical for getting the most out of small group sessions like PBL and TBL. In addition, realize that there are only 4 to 6 weeks in a given module – thus, falling one week behind will not only mean that you’re missing out on 17-25% of the entire content of that unit, but it will also compromise your ability to understand upcoming lectures and maximally participate in small group sessions. Medical school is NOT like undergrad in this sense – cramming the night before the exam and expecting to do as well simply is not a viable strategy.

- In general, it is a good idea to study using the list of learning objectives that are provided to you in every lecture’s learning guide in order to discern the most important concepts. In fact, because every single exam question is tied to a specific learning objective in the learning guide, ensuring that you understand each of them ahead of time is an excellent way to study!

- It is also worth mentioning that if you run out of study time before the exam and cannot thoroughly review a lecture or two, don’t panic! Remember that there are usually only two questions tied to each lecture – in a test of > 100 questions, missing two isn’t that big of a deal. As a test-taking strategy, it might therefore sometimes be worth skipping a review of that last lecture and instead ensuring that you know the rest of the material well!

- Sleep! Don’t forget about this one. The exams are long and tiresome; make sure you have enough energy.

IV. Resources

Please see individual module sections for helpful resources specific to each one.

V. Pro Tips

- Do not spend too long on any one question – it might be thrown out! It is all too easy to accidentally get caught up on a single question and waste a large chunk of time on it. Resist this temptation at all costs! All multiple choice questions are worth the same amount of points, meaning that the time you waste trying to figure out one question could be better spent gathering more points on other questions. In addition to just being a solid test-taking strategy in general, this approach is given even more weight by the fact that on most exams, there is often at least one question that is thrown out. This means that the one question you waste 20 minutes trying to decipher could potentially be thrown out in the end!
• For questions that involve a clinical vignette, do not waste time reading the vignette in great detail! Vignettes are questions that provide a long, detailed patient history, then finally ask a question about it at the very end. These question types become frequent starting in the cardiovascular unit. It is very common for students to spend time reading the vignette in detail, only to discover that the actual question being asked is very simple. Before spending too much time deciphering a vignette, first read the last line of the vignette (the actual question) first to understand what you are being tested and what information from the clinical vignette will be necessary.

• Know Dr. Cochard’s histology quiz slides cold. Be able to answer his questions on the PowerPoint quizzes he provides, and you’ll usually be more than prepared to answer histology questions on the exam.

• Do not neglect to study Health and Society. The H&S questions comprise a significant part of the exam, and can offer a welcome respite from the complex science questions when you encounter them in the exam if you are prepared to answer them. The majority of students find that a single solid review of H&S lectures on the day or two prior to the exam is typically sufficient.

• Do not forget that clinical medicine questions integrate knowledge from lectures AND from CEC sessions. Just studying the CM lectures is not enough to do well – it is critical to be prepared to answer questions regarding the physical exam skills practiced with the standardized patients (as covered in the appropriate Bates readings and lecture guides associated with each session).

• Preparation for MDM (biostatistics) questions requires not only making sure you know how to do any calculation-based problems, but also understanding the underlying concepts covered during lecture. For example, ensure that you can explain the ideas underlying sensitivity and specificity to a classmate in addition to simply being able to construct a 2x2 table. Also remember that MDM is the one section of the test that has higher stakes than the rest – you need to score a cumulative 70% or higher on all MDM questions over all the exams in year 1 in order to move on! Keep an eye on your cumulative percentage over the year and ask for help if you are in danger of not meeting the 70% benchmark.

• For ethics questions, be prepared to write a short paragraph in response to an ethical dilemma using the vocabulary/concepts that you learned in class. These questions test your ability to reason and explain your thoughts, rather than your ability to simply recall/recognize facts.

• Realize that every single question on the exam MUST be tied to a corresponding learning objective in a learning guide. Therefore, use the
learning guide and its corresponding learning objectives to guide your learning in each lecture. Learning guides can also help clear up information from lecture; students often note that even when a particular lecture is unclear, the corresponding learning guide will often save the day and elucidate the most important pieces of information to know. They also usually feature a few practice questions that can help test whether you are truly grasping the material.

- **Practice questions provided by lecturers are few and far between, so do what you need to do to make sure you’re understanding the material.** In undergrad, chances were that you had plenty of problem sets, quizzes, and/or midterms to constantly test your understanding long before the final exam. Generally speaking, none of those resources (aside from the rare problem set) are provided by the school anymore – it is up to you to take responsibility and ensure that you are truly comprehending the lectures. Please see individual modules sections for suggestions for specific resources you can use!

- **Keep things in perspective, and don’t panic!** Please remember that at the end of the day, it is not worth stressing out too much over any module exam, written or otherwise. Feinberg’s exams are pass/fail for a reason – medical educators would much rather you focus on truly learning the material well rather than on being preoccupied with scores. Unless you have specific achievement goals, your exam performance relative to the rest of the class is 100% meaningless (and it is only a very minor contribution to AOA, if that is important to you). Also keep in mind that an “average” or even below average score among the best and the brightest here at Feinberg is not something of which you should be even remotely ashamed. **It is impossible for everyone to remain at the top of the class at every stage of academia, and scoring on par with a group of some of the most brilliant students in the country is a feat that should be celebrated and admired.** Do not let fear, anxiety, and panic during the exam prevent you from doing your best! If you are feeling stressed or anxious remember that the administration is here to help you – please reach out for guidance!
Portfolio

I. What is it? Why is it important?

Feinberg’s new curriculum trains and assesses its medical students based on eight core competencies intended to represent the essential attributes of an excellent physician. Students are continuously evaluated with respect to their performance in each of these competencies throughout all four years of medical school, which allows the administration to observe exactly how well individuals are developing as medical professionals over time. You, your peers, and all of your small group leaders will all be asked to constantly provide and receive feedback from each other at various times in the year to help facilitate this process. Every evaluation you receive from peers/faculty can be found here: https://fsmweb02.northwestern.edu/stsp/login.cfm.

Approximately halfway through your first year, you will be given the opportunity to reflect on all of your evaluations up to that point through the Portfolio. You will write a self-reflection of your self-perceived progress with respect to each of the eight major competencies, illuminating your personal strengths and weaknesses under each category. This reflection must cite specific feedback comments you’ve already received from peers and/or faculty in order to support your statements. The final part of the process is to formulate specific goals for self-improvement to work on during the time in between portfolio reviews. Though you will start the Portfolio in Phase Ia, you will continue to work on it at various times during all four years. During Phase Ia and Ib, you will have three “formative review” meetings with your college mentor, during which you will discuss your performance and progress towards your goals. At the end of Phase Ib, you will compile a summative review – a more comprehensive portfolio – which will be reviewed by the Portfolio Committee to determine whether or not you may advance from Phase Ib into Phase 2. Though students sometimes interpret the portfolio as yet another traumatic test to pass, we assure you that the process isn’t remotely as stressful as it might sound – in fact, the portfolio is designed to encourage you to take the time to seriously reflect on your own growth as a physician more than anything else.

Here are the individual competencies, with more information to be found on the medical school website:

1. **Patient-Centered Medical Care**
2. **Effective Communication and Interpersonal Skills**
3. **Medical Knowledge and Scholarship**
4. **System Awareness and Team-Based Care**
5. **Personal Awareness and Self-Care**
6. **Community Engagement and Service**
7. **Continuous Learning Quality Improvement**
8. **Professional Behavior and Moral Reasoning**
II. Preparation

Students spend vastly different amounts of time writing their portfolio self-reflection. The average time invested prior to the formative reviews varies from around 3 hours at minimum to around 12 hours at max, depending on a number of factors such as: how skilled of a writer you are, how much effort you wish to devote to the self-reflection process, and how polished you want your final product to be. Regardless of how these factors apply to you, realize that you will invariably need to set aside a large dedicated chunk of time to knock it all out at once. We highly recommend investing your best efforts into composing your portfolio during the first time around, as every successive portfolio builds upon the previous. Consequently, the more work you invest the first time around, the easier it is to simply add to it in the future. It is also important to keep in mind that a committee of faculty members will eventually review your summative portfolio to determine your eligibility to move on to Phase 2 – so take this project seriously!

III. Pro Tips

• **The portfolio is not a mere checklist** for you to show off how much you’ve accomplished. The process is intended to help you reflect meaningfully on your progress thus far. Though the competency approach may seem rigid, synthesizing and implementing critical feedback is an important trait to develop in any physician, as we should always be seeking to improve.

• Read through your evaluations when they are posted to the Portfolio site (link above) shortly after each module ends. **Use this immediate feedback as a barometer to gauge how well you are doing in certain areas**, and to diagnose any potential areas for improvement early on.

• Citing specific feedback comments in your portfolio reflection requires familiarity with the tagging system in the Portfolio site. Whenever you receive a feedback comment, you can digitally “tag” it so that you can later integrate it as evidence in your portfolio write-up. **Learn how to do this early on so you can tag important feedback as you receive them**, rather than wading through all of your feedback the night before your portfolio is due and trying to tag everything at once. You don’t need to cite every single comment – just the most useful and salient ones. Tag early, tag often. #tag.

• **This is one of those projects that should be absolutely be completed well in advance of the due date of your formative review.** As mentioned before, doing a respectable job on this endeavor takes considerable time; if you rush it, you will likely be asked to redo certain parts of it.
• **You will largely get out of portfolio what you put into it.** One could theoretically get away with committing only a minimum amount of work to his/her portfolio, but investing real effort and time into this project can actually be highly rewarding and valuable for you if you are interested in self-improvement. When you meet with your college mentor, we recommend using the time to highlight legitimate areas of your performance that you’d honestly like to improve. This way, your college mentor can assist you with developing personally meaningful goals and practical strategies for you to challenge yourself and grow.

IV. **Resources**

This is primarily a reflective process for yourself, so it is hard to suggest resources other than simply referring to your personal evaluations, or asking peers/faculty in person for additional feedback. If you are having difficulty with the process, ask your college mentor or Big Sib for advice and assistance. Feel free to contact your Big Sib or any upperclassman if you’re having difficulty deciphering the tagging system!
Self-Care

I. What is it? Why is it important?

It is a well-recognized, incredible stroke of irony that practicing physicians are too often found in the worst states of both physical and mental health. In some ways, it makes sense: those who become physicians tend to be those who value taking care of others before themselves. While this is a noble sentiment borne from nothing but good intentions, it is crucial to acknowledge that this practice can backfire to harm both physicians and patients alike. In the worst case scenario, physicians who are tired, malnourished, or in poor physical/mental condition may end up missing a diagnosis or mishandling a procedure. Doctors cannot provide the best possible patient care if they cannot take care of themselves first.

Even though you won’t be in charge of patient care as an M1, it is essential to begin cultivating a healthy mindset and good self-care habits at this early stage. Our best advice is to maintain proper perspective as you transition into medical school, and to be sure to cut yourself some slack! The daily life of the medical student will be unlike anything you’ve ever experienced before, and many of the demands of medical school will be completely foreign. Certain habits or lifestyle decisions that worked for you in the past may no longer work for you here, so don’t be afraid to let yourself settle into the process. Recall that there is an adjustment period when starting any new phase in life – and that just like with anything else, medical school truly does become easier with time!

Self-care is a critical component of staying happy and successful in medical school, and beyond. While the specific practices of self-care vary widely for different individuals, the core idea of devoting sufficient attention to nourishing both mind and body ultimately remains the same. Though we recognize that it can be easy to dismiss these ideas as a waste of time, we urge you to at least acknowledge and remember that maintaining one’s mental and physical health is critical to providing excellent patient care, and to preventing burnout down the road. Even today, the sad fact remains that medical students suffer from depression at a rate twice as high as the general population – a problem that is further compounded by the fact that many students simply aren’t aware that they are not alone in feeling profoundly anxious, secluded, or down.

In the face of such sobering statistics, it becomes increasingly important for medical students to consciously make self-care a high priority. The easiest way to begin this process is by engaging effective methods of stress-relief. Many students use exercise as a fantastic stress reliever, and devote time to work out. Others actively block off time to talk to friends and family outside of medical school. Religion, journaling, painting, meditation, reading, cooking, dancing, videogames, and playing instruments are all options, as are any other activities which relax and rejuvenate you in some way. We
strongly encourage you to experiment with different methods of self-care, and to see firsthand which activities works best as de-stressors for you. Medical school can overtake your life if you let it – in fact, one of the most common complaints among med students is that so many of their past hobbies fall by the wayside due to “lack of time.” Realistically speaking, we assure you that there is plenty of free time available to you even as a medical student (though you will certainly be busier than before). The true difficulty lies in not using the idea of “lacking time” as an excuse to avoid investing effort into maintaining relationships or activities. It often takes quite a while for students to stumble upon this realization, and it is certainly a piece of wisdom that we had been told early.

In any case, it’s important to remember that loneliness, depression, or feeling out of place are remarkably widespread feelings in medical school, and that combating these emotions is difficult to do alone. Should any of these sentiments sneak up on you, we urge you to reach out to your family, peers, Big Sibs, or the Deans. Opening up to your classmates will show you that you are not the only one who feels this way – especially as the year progresses and the novelty of medical school wears off. It cannot be emphasized enough that you must cut yourself some slack; you won’t always know how to handle situations that come at you, and that’s okay! Maintaining a strong sense of self-awareness and resiliency will help you overcome these difficulties when they do arise.

II. Pro Tips

- **Live high yield! Classes at Feinberg are pass/fail for a reason.** You will eventually need to know most of the knowledge you learn here in order to take good care of your future patients, but you certainly do not need to know all of it right now. Learn to recognize the most important concepts to target for long-term retention, and don’t feel guilty about leaving smaller details to be re-learned at a future time when they’re more relevant.

- **Set realistic expectations for yourself!** Be flexible when things don’t go according to plan or when you don’t meet a self-imposed deadline. More importantly, learn to forgive yourself for falling short instead of letting self-pity or guilt compromise your ability to move forward and learn from your mistakes.

- **Resist the temptation to let others dictate what is and isn’t an acceptable way to live your life.** In other words, don’t let your peers guilt you into changing your own methods of self-care! If you wish to spend an hour before a test visiting with a friend to clear your mind, then by all means, do it! If you know spending that hour would be more detrimental than helpful for your academic goals, then don’t do it. Figure out what works for you, and refrain from guilt-tripping
yourself for not conforming to whatever activities your classmates might be doing instead.

• **If it ain’t broke, don’t fix it!** If you’ve found in the past that you perform better on a full night of sleep or when you’re keeping up with a certain exercise routine, don’t give up those things in medical school. You’ve no doubt developed certain strategies for self-care that have brought you this far, and they will most likely continue to serve you well in medical school if you let them.

• **Sleep!** Get enough of it, because it will make your studying significantly more productive. Try not to do it during PBL.

• **To a certain extent, happiness is a conscious state of mind.** Choose to see the positive side of every situation, and maintain perspective of the larger picture. Be conscious and grateful of the many fantastic parts of your life, even if not everything is going exactly the way you want it to. Surround yourself with friends, and engage in activities that make you happy. And lastly, appreciate the fact that even though it might be miserable at times, there are countless others who would gladly switch place with you any time, and would give anything for the opportunity to become a doctor.

III. **Resources**

1. **Counseling and Psychological Services (CAPS):** Located in Abbott Hall, this department offers classes that explore meditation, mindfulness, adapting to stress, confronting loneliness, and dealing with depression. In addition to classes, CAPS offers many other services (including individual counseling) to help students deal with the intense stress that forms an indelible part of med school. CAPS can help everyone in some way, and we highly recommend paying them a visit.

   http://www.northwestern.edu/counseling/clinical-services/chicago-campus/index.html

2. **LA Fitness:** Students can get a discounted monthly membership to this gym, which grants access to all of their locations. They have classes like zumba, yoga, kickboxing that can be great stress relievers, and are even more fun with friends!

3. **Free museum days, free symphony days, free movies in the park** and so much more are all offered at various times throughout the year – plan ahead with websites like http://www.timeout.com/chicago.
4. **Free workouts** are offered at many of the local exercise studios. Research different studios and ask about any promotions. There are also free exercise classes in Millennium Park in the summer!

**IV. Key People**

- **The Deans**: Though they may seem intimidating, they really are there to help you. Try to dispatch of those lingering thoughts that meeting with a Dean is like going to the principal’s office when you pulled someone’s hair in third grade and were traumatized for life. Feel free to turn to them with any problem or issue, and they will be more than happy to lend an ear and help guide you.

- **Your College Mentor**: Is equally as glad to help you out if you’re having any issues at all with medical school or life in general.

- **Your Big Sibs and other upperclassmen mentors**: You name it, chances are someone’s gone through it before and has come out the other end. Feel free to reach out to us any time!
Introduction to the Feinberg Curriculum

With the exception of the first four months of M1 year during which you will learn the Foundations of medicine, the Feinberg pre-clerkship curriculum operates on an “organ block” schedule, meaning that students will focus all of their efforts towards learning about a single organ system at a time before moving on to the next. This means that over the course of 2-6 weeks at a time (depending on the organ system), you will develop a progressive understanding of:

1. **Science in Medicine**: The organ system’s development, anatomy, histology, normal function, dysfunction, and associated disease processes and their treatment.

2. **Clinical Medicine**: Clinical skills that are associated (either directly or indirectly) with the organ system.

3. **Health and Society**: Public health and other sociological topics usually related to the organ system.

4. **Professional Development**: Ethical issues usually related to the organ system (along with other miscellaneous topics dealing with growing as a professional).

For example, in the Renal unit, you will learn everything there is to know about normal and abnormal function of the kidney, along with how to perform the abdominal physical exam, the public health implications of chronic kidney disease, and the numerous ethical issues entangled within the logistics of kidney transplantation! As mentioned previously, the exceptions to this organ-based schedule are the first three modules of M1 year – called the Foundations units – during which you will pick up the basic knowledge and clinical skills that you’ll build upon for the rest of your time at Feinberg and beyond. Over the next part of this book, we will discuss further details regarding each of the four overarching threads (listed above) that weave throughout each module.
Science in Medicine Element

It is the Science in Medicine (SM) element – encompassing all of the physiology, pathophysiology, anatomy, histology, and development lectures related to the current organ system – that will occupy the bulk of your time for the first two years. In your science lectures, you will learn a huge breadth of scientific details and mechanisms that will serve as fundamental knowledge underlying the basis for clinical care. Look forward to spending the majority of your time studying material from this element!

I. Preparation:

- See previous section on “Lecture Notes,” including “Study Strategies.”
- See “General Resources”

II. Learning Formats and Supplements:

- **Problem-Based Learning (PBL):** PBL sessions unpack material from multiple elements and threads (not just Science in Medicine) and are sufficiently detailed to merit their own section. Please see the PBL section further on!

- **Team-Based Learning (TBL):** TBL sessions are helpful learning exercises that are occasionally interspersed within select modules to facilitate consolidation of lecture material and build problem-solving skills as part of a team. Not all modules will include TBL sessions, but you will appreciate the ones that do!

In a typical TBL session, students are first separated into groups. All students then independently take a short multiple choice Individual Readiness Assessment Test (IRAT) during the first part of the session in order to establish a knowledge baseline. In the second part, the students within each group will collaborate to work through the exact same assessment test – now called the Group Readiness Assessment Test – this time applying the combined knowledge of the team. In the end, the leader of the TBL session will walk through the solutions, and sometimes offer additional problems afterwards as a litmus test for students’ understanding. This exercise is not graded, and simply serves as an innovative way to learn from your peers and talk through tricky concepts together – thus, we highly recommend coming to these sessions fully prepared in order to maximally benefit!

- **Small Group Sessions (SGS):** Small group sessions, like TBL sessions, are learning opportunities that are sporadically interspersed within select modules to help students develop fluency with some of the more challenging concepts that arise.
Prior to each SGS, students will be assigned a case-based problem set (as pre-work) that they are expected to try complete to the best of their ability. During the sessions themselves, facilitators will guide groups of 20-30 students through the problem set and provide helpful strategies and tips for approaching or thinking about each case. These sessions represent invaluable opportunities to test your knowledge via application. **It is our strongest recommendation that you fully work through the problem prior to class, even if you are not able to solve every single problem.** Because these sessions are led by highly knowledgeable facilitators in smaller settings, they represent the perfect opportunity for you to identify misconceptions, bridge knowledge gaps, and ask questions that surfaced while you were attempting to solve the problems independently.

- **Audience Response Questions** (ARS questions) are interspersed within many lectures, and are incredibly helpful as learning tools. The lecturer will pose a multiple choice question to the class, and students will be invited to submit their answer choice via their response clickers. In addition to offering students a chance to see if they’re comprehending the lecture so far, **ARS questions also provide the lecturer with a snapshot of the class’s understanding as a whole** (which can then indicate if additional/repeat explanations are warranted). Thus, it is in every student’s best interest to always vote when given the opportunity!

- **Plenary Sessions** are multidisciplinary, integrative lectures that are designed to introduce broad concepts, provide roadmaps for upcoming lectures, and/or integrate and review past material. Plenaries typically do not have associated learning guides, as they are not intended to cover any new material in-depth. That being said, they can be incredibly useful keystone lectures that help students mentally organize concepts from both past and future lectures.

**III. Pro Tips**

- **DO NOT PROCRASTINATE!** Try to keep up with the material by watching or attending lectures as they roll out, and try to do a non-zero amount of studying every night. This helps keep the material fresh in your mind, and helps facilitate learning the next day’s lectures (since concepts build on each other). It is worth repeating that the sheer volume of material in medical school makes it inordinately difficult to cling to cramming strategies that worked in the past. Even if you do succeed at cramming to some degree, remember that this strategy is not conducive to long-term retention.

- There is a reason as to why review of the learning guides (and the learning objectives in particular) is a fixture of the almost every single study strategy example offered in the Purple Book’s study strategies section. Recall that all
exam questions are required to map to specific learning objectives – so if you have a handle on those, you’ve got a handle on the exam!

• Don’t be afraid to use the professors themselves as a resource! Most professors gladly and warmly welcome students’ questions both in the few minutes following their lectures, and via email or in person at ta later time.

• Reading PowerPoint slides over and over again is NOT an effective way to learn for the vast majority of students. We recommend ensuring that your learning has an active component to it – use question banks, make flash cards, do the guiding questions at the end of every learning guide, or quiz your friends!

“Actually, you’re my second patient if you count that cadaver in med school.”
Clinical Medicine Element

The best way to think about the Clinical Medicine Element is that it offers the most opportunities for you to feel most like a “real” doctor, early on! Through a combination of lectures, practical skill sessions, talks with patients, and other clinical experiences, you will slowly augment your clinical toolkit to include skills like history-taking, physical exam skills, diagnostic thinking, and clinical reasoning. Feinberg strongly emphasizes building these skills early on by affording you a multitude of ongoing opportunities for actual patient contact. While these opportunities are invaluable for hands-on learning, however, the “throw you into the deep-end” approach can be initially intimidating. Here, we’ll aim to offer some strategies to help you prepare for and gain the most out of your clinical experiences while simultaneously making them as painless as possible.

During the first two years of medical school, your entire class will be divided into one of two possible clinical skills groups, (A or B). Groups will alternate spending time either in the Clinical Education Center or with their Individual Preceptor (IP)/Education Centered Medical Home (ECMH), and will switch off every week. Students will be assigned to an Individual Preceptorship or an Education Centered Medical Home upon entering medical school, and can request to switch from one to the other between M1 and M2 years if they so choose. Please see the sections below on the CEC, IP, and ECMH for further information about what each entails!

A. Clinical Education Center (CEC) Skills Sessions

   I. What is it? Why is it important?

The CEC is home base for your practical clinical skills sessions. It is intended to serve as a stress-free environment where you will learn and practice clinical skills in small groups of students under the guidance of your preceptor (an attending at NMH). On most occasions, an M4 will also join in to help lead half of your group so that everyone can receive more attention and individualized feedback. Every session will be structured slightly differently based on what you are learning, but in a typical day, you will receive a pre-brief of your goals for the session, as well as a short run-through or demonstration of the basic skills for the day with your large group. You will then split into smaller groups headed by either the M4 or your preceptor, and each student will get a chance to practice one-on-one with a standardized patient (SP) while being observed. Standardized patients are highly skilled, paid actors and actresses who have been trained extensively to accurately portray real-life patients. Following each encounter, the SP, your preceptor, and your fellow group members will all provide feedback on your performance. After everyone has had a chance to practice, your large group will reconvene to debrief. Though giving and receiving feedback on the spot can sometimes
be unnerving, remember that the ultimate purpose of all constructive criticism is simply to help you improve!

II. Preparation

• Attire/Materials: Professional dress is required for CEC sessions. You must also remember to bring your white coat and stethoscope to every session. There are additional stethoscopes in the CEC and white coats if you forget them, but aim to always arrive prepared.

• Pre-work: We highly suggest investing time to read through the learning guide for the upcoming session, as well as to watch the recommended Bates videos on emerg (if applicable) before CEC. Some students also find it worthwhile to skim through the accompanying chapter in the Bates textbook. At Feinberg, the clinical curriculum is based on Bates, so the Bates videos and textbooks should constitute your default references for mastering CEC skills – particularly in preparation for OSCE’s (see below).

• Studying: Review the skills as described in the Learning Guides, rewatch the Bates videos, and practice on your friends! Students are allowed to reserve practice rooms in the CEC (which are stocked and organized to look exactly like real outpatient examination rooms) by emailing Marsha Yelen at any time. However, realize that it is by no means necessary to practice skills only in the CEC – rehearsing at home works just as well most of the time!

III. Pro Tips

• Come prepared and actually do the pre-work. Arriving completely prepared is absolutely critical for getting the most out of the time spent with your preceptor and the SP’s. CEC sessions potentially represent one of only a handful of opportunities to practice your skills in front of a physician preceptor before OSCE’s, so don’t waste them!

• Students are frequently confused by the fact that physical exam skills are sometimes presented differently in the CEC compared to how other physicians perform the same skills in “real-life” settings. In reality, there is unavoidable variation in how physicians choose to perform physical exam maneuvers, simply due to personal preference, adopted shortcuts, or time constraints. As a medical student, your responsibility is to learn the formal, thorough physical examination methods as they are taught in the CEC. When in doubt, remember that the official Feinberg curriculum – and therefore, the standards for all clinical skills examinations – is based off of the Bates methods.
• It should go without saying to always treat the SPs with kindness and respect, even when your preceptor is out of the room. It is important to remember that SP’s grant us the incredible privilege of permitting us to practice physical exam skills with them. SP’s are professionals, and all students should afford them the utmost professional courtesy. This includes avoiding gossip or talking amongst yourselves too much while completely ignoring the SP who is in the room with you. In general, act professionally in all areas of the CEC!

• Treat your CEC encounters as real patient encounters. The SP’s are trained to never break character, so you shouldn’t either if at all possible. It can be tempting to ask to start over or to turn to your peers for help if you get stuck during an encounter, but you should simply react to the situation as you would if it had occurred with a real patient. You can always ask for a moment to collect your thoughts if you need one. Remember, you are only a novice, and are not expected to be perfect, comfortable, or eloquent by any means! In general, your preceptors and SP’s will all be incredibly gentle and understanding while providing you with honest, critical feedback.

IV. Resources

• Bates’ Guide to Physical Examination and History-Taking

• Bates’ Videos posted on emerg

• Clinical Correlations lectures

“For years your teachers kept telling you to settle down and sit still. You can stop now.”
B. OSCE’s

I. What is it? Why is it important?

Objective Structured Clinical Exams (OSCE’s) are examinations (conducted in the CEC) which will test your competency with various clinical skills, history-taking, patient interaction, and performing elements of the physical exam. During an OSCE, you will interact with an SP who will engage you with a standardized case history; this format parallels what you would normally do in a typical clinical skills session, with the exception that it is more formal, and you’ll be videotaped and graded. No pressure! You will be informed about certain details of the case ahead of time, and the expectations for the maneuvers you must perform on the SP will be made clear. Your evaluations during these encounters form a significant chunk of your grade, so make sure that you are sufficiently prepared before walking in!

II. Preparation

• **Attire/Materials:** Wear and bring what you normally would to CEC and be sure to look professional.

• **Studying:** You should spend some time before the OSCE practicing with friends or running through the motions on your own. In particular, we recommend focusing on the skills that will be tested on the particular OSCE, and investing extra time into rehearsing any skills with which you are not as comfortable. Prepping for the OSCE will require variable amounts of time, depending on how well you learned the skills the first time around. In any case, expect to dedicate at least a few hours to preparing!

III. Pro Tips

• It is critical to actually go through the motions and practice the physical exam skills on real people when preparing for OSCE’s. **Watching videos and reading textbooks is no substitute for developing true muscle memory through hands-on repetition!** In fact, if you have time, we would even recommend practicing the verbal parts of the exam as well if you can anticipate what conversations might occur in the case.

• It can be helpful – though not strictly necessary – to **practice exam skills with your friends in the actual CEC rooms** in order to become more comfortable with the OSCE setting. Note that while practicing over clothing is fine, during OSCE’s and patient encounters, examinations should be done on skin. Feel free to sign up to schedule practice time in the CEC by emailing Marsha Yelen.
Read Bates and watch the assigned videos if you have forgotten the precise maneuvers for any physical exam skills since the didactic CEC session.

OSCEs can be stressful since you know you are being recorded and evaluated. Don’t panic! Treat the encounter as you would any patient encounter, and do your best to relax. Practicing multiple times before the exam helps ease this stress and build confidence. Like with any other Feinberg exam, realize that failing an OSCE is not ideal, but it is far from the end of the world – you will simply be asked to remediate part or all of the examination at a later time.

IV. Resources

- Bates’ Guide to Physical Examination and History-Taking

- There will be lectures that provide detailed information about what will be tested during each OSCE. Use those to your advantage!

- If you have any questions about OSCE’s, feel free to contact any of the clinical medicine faculty anytime. They are always more than happy to put your worries at ease and help you in any way they can.

C. Individual Preceptorship (IP)

I. What is it? Why is it important?

Regardless of whether students are assigned to IP or ECMH, the goal of each IP/ECMH session is to practice your skills in a real clinical setting with real patients. These opportunities truly form the core of Feinberg’s promise for early clinical experience, and are frequently regarded as many students’ favorite parts of M1 year (though individual experiences can vary drastically depending on the particular IP/ECMH). However, your experience will largely depend on how prepared you are for each session, and how much initiative you take to engage your patients – so try to make the most of each visit!

Students who are assigned to IP will develop their clinical skills while working one-on-one with a physician in a variety of possible locations from outpatient clinics to hospital ICU’s. Students in IP will spend their first two years in the program, and they may switch preceptors between M1 and M2 year. The primary advantage to IP is that students in the program will enjoy a highly mentored relationship with a faculty member, and have the opportunity to build a strong professional relationship over a long period of time. Preceptors can devote individual attention to their students, and can view their progress longitudinally while providing precise feedback at every visit. For many IP students, the first couple weeks of the program will involve mostly shadowing, but every doctor has
different expectations. As the year goes on and you acquire more knowledge, you should try as much as possible to increase your engagement with patients to practice your skills! Though different preceptors grant their students varying levels of responsibility and freedom with patient encounters, we highly recommend conferring with your preceptor to obtain as much patient exposure as possible in order to gain the most out of every visit.

II. Preparation

• **Attire/Materials**: Required attire may change depending on your particular IP/clinic, but in general, you should dress professional with your white coat, and always bring your stethoscope at a bare minimum.

• For each ECMH/IP encounter, you will be assigned a specific site visit goal to accomplish during your session. **Make sure that you know the goal of the day prior to arriving at your IP**, and bring any forms that you might need your preceptor to fill out. It is also generally advisable to let your IP know what the goal is when you arrive, so that he/she may point you towards any patients who may be particularly good to interview.

• Some clinics may require more preparation than others, but usually everything you need to do can be easily accomplished during the time set aside for IP. The total time you will spend in clinic will vary by the preceptor’s expectations. **Arrive prepared, having thoroughly reviewed any skills you have recently learned in your last CEC session!**

III. Pro Tips

• By far, the **most important piece of knowledge we can offer to those in IP is to be your own advocate!** It is your prerogative to speak up and ask your preceptor if you have questions or want more out of your IP experience. For example, you could ask for more feedback, to see more patients on your own, or to obtain more experience writing up notes in the electronic medical record system. Some IPs will not allow this, but there is no harm in asking and you stand to gain quite a bit of additional experience if they agree!

• If you are unhappy with your IP, **switching to a different preceptor is an option.** Don’t feel bad if this happens to you — sometimes preceptor-student relationships just don’t work out for various reasons. However, we recommend speaking with your preceptor first to voice your concerns and try to come to a compromise. If you have already tried to mend the relationship and are still unsatisfied with your experience, reach out to either Dr. Uchida or Dr. Heiman.
• Keep on top of your site visit goals! While you don’t have to necessarily complete a goal every time you attend IP, appreciate that these assignments can build up quickly if routinely ignored. We recommend trying your best to knock them out as they are assigned, and it will make the end of the block easier – you don’t want to be worrying about completing multiple site visit goals while also gearing up to study for the module exam!

D. Education Centered Medical Home (ECMH)

I. What is it? Why is it important?

Regardless of whether students are assigned to IP or ECMH, the goal of each IP/ECMH session is to practice your skills in a real clinical setting with real patients. These opportunities truly form the core of Feinberg’s promise for early clinical experience, and are frequently regarded as many students’ favorite parts of M1 year (though individual experiences can vary drastically depending on the particular IP/ECMH). However, your experience will largely depend on how prepared you are for each session, and how much initiative you take to engage your patients – so try to make the most of each visit!

In contrast to the IP students who will work one-on-one with a preceptor for two years, ECMH students will join a team of other students and an attending physician in the same clinic for all four years of medical school. ECMH experiences vary widely by clinic, but a typical first year visit will involve you pairing up with an M3 or M4 student to interview/examine patients together, then presenting the patient’s case to the attending physician (who will also conduct his/her own examination to make sure nothing has been missed). Students in ECMH will enjoy varying levels of freedom depending on the clinic and the attending – but it is worth noting that ECMH students are generally given more responsibilities (like giving oral presentations and writing up patient notes) and more opportunities for direct patient interaction compared to their IP counterparts. In addition, ECMH provides an excellent way to observe firsthand how team-based patient care works, which is helpful knowledge for your third year. The last benefit to ECMH is that those who participate for all four years of medical school are eligible to count the ECMH experience as elective credit once on the wards, as ECMH can be considered as a longitudinal “rotation” that is artificially spread out across four years. However, a notable downside is that ECMH visits generally take a significantly longer time than IP visits do, and can sometimes stretch out for far longer than the scheduled four hours on busy days. Each ECMH runs a little differently, so give yourself the first few months to adjust to your clinic’s specific flow and style!
II. Preparation

- **Attire/Materials**: Required attire may change depending on your particular clinic, but in general, you should dress professional with your white coat, and always bring your stethoscope at a bare minimum.

- For each ECMH/IP encounter, you will be assigned a specific site visit goal to accomplish during your session. **Make sure that you know the goal of the day prior to arriving at ECMH**, and bring any forms that you might need your preceptor to fill out. It is also generally advisable to let your attending or M3/4 partner know what the goal is when you arrive, so that they may point you towards any patients who may be particularly good to interview.

- ECMH students will need to **sign up for the specific weeks they plan to attend clinic** well in advance at the start of the year. The schedule will be given to you early in the year, so just input all those dates into the shared calendar (and your own calendar) ahead of time. In general, ECMH students are expected to attend clinic every other week when they are not in the CEC (just as IP students are).

- Though not a requirement, **it is extremely helpful to read up on your patients before walking into clinic**. The more you know about your patients before seeing them, the more prepared you will be during the encounter, and the more you will learn from the experience. Try to look up your patients at the start of the clinic day – or even the day before if you have remote access to your EMR – to research their background information or give yourself time to read up on a disease you may not have learned yet. Preparation for ECMH varies by clinic, so talk to the upperclassmen in your clinic to learn how to operate most effectively.

III. Pro Tips

- ECMH is the perfect time to apply knowledge you’re learning in class and practice specific physical exam skills! If you see a patient with an unfamiliar condition, take the time to look up the pathophysiology of the disease, even though this information isn’t directly related to patient care. It’ll be much easier to remember disease mechanisms if you can link them to a patient you’ve cared for in clinic – and this is a much more engaging way to ‘study’!

- The process of reading about a patient, leading the encounter, presenting to the attending, coming up with an assessment and plan, and writing up notes will get progressively easier as you learn more, so don’t feel intimidated in the beginning! ECMH largely represents a hectic, “throw you into the deep end” style of learning, so revel in the chaos and approach each visit with the intent of learning as much as you can! Ask your M3’s and M4’s as many questions as
you can possible generate, and take the initiative to ask for more responsibility as you feel more comfortable over time!

- Many (but not all) ECMH’s have a designated Team Educator each week, so feel free to refer to that person for medical questions related to your patients.

- **Your attending is most likely an extraordinarily busy clinician** who is also managing 4-8 students per clinic day. If you need a form filled out or have a question about site visit goals etc. try to give them a head’s up at the beginning of the afternoon or via email the night before. Again, ask the upperclassmen if you have questions!

IV. **Resources**

- ECMH Sharepoint website with Team-Specific folders containing schedules (log in with your netID/password):

  https://share.northwestern.edu/dept/FSM-ADM/AWOME/ecmh/SitePages/Home.aspx

E. **Medical Decision Making (MDM) Thread**

I. **What is it? Why is it important?**

While categorized under the Clinical Medicine element, the MDM section of the curriculum is most easily interpreted as the biostatistics and scholarly analysis component of your studies. As the name suggests, the MDM curriculum addresses concepts that assist physicians with making clinical decisions, such as how to critically evaluate scientific journal articles, understand and apply biostatistics, interpret epidemiology, perform cost-effectiveness analyses, and interpret the validity of clinical test results. While its dense, occasionally dry, quantitative nature can potentially make it a more challenging part of the curriculum, it is impossible to deny that MDM is critically important. Not only does MDM material show up on Boards examinations, but you will also regularly hear physicians refer to basic MDM concepts like sensitivity or specificity when trying to diagnose patients and subsequently make decisions that affect their care. Learning this material well truly is a crucial part of becoming a competent, informed physician!

II. **Preparation**

- **Pre-work**: Do your best to fully complete the required pre-work for each small group session — or at least enough time to make a solid attempt at answering the problems on your own. Problem sets are a helpful indicator of the most important concepts that will likely be tested, so it’s important to try to practice
on your own. That being said, try not to spend an inordinate amount of time
painstakingly agonizing over the required pre-work for each small group session,
as small groups are designed to give you plenty of time to ask questions and
clarify any concepts that stupefied you.

• **Studying:** The first critical point to remember is that *MDM is unique in that it has its own passing cutoff!* There will be a handful of MDM questions on each module exam, and you must answer at least **70% of these correctly (cumulatively, not on every exam) by the end of the year in order to pass.** Should you fall below this cutoff, you will be forced to remediate MDM before moving on to your second year. Thus, it makes sense to prioritize MDM material above other, less essential material. This separate cutoff can catch students by surprise – don’t let that be you! Be sure to devote enough time to this subject to achieve a passing score.

• You can always count on seeing **2-3 questions corresponding to each MDM lecture on the module exam**, so understanding the material well can grant a significant boost to your overall score.

• Unsurprisingly, **MDM material builds upon itself as the year progresses**, so establishing a robust foundation with core concepts early on will make more challenging concepts easier to understand later.

• Ensure that you can **efficiently** perform the calculations and **recall important definitions** from lecture and the problem sets. If you find that you are having a difficult time understanding the material, reference the assigned chapters. However, note that the problem sets are generally more important for studying compared to the textbook readings.

• If you don’t have a strong background in biostatistics, consider referencing the MDM textbook (Fletcher). The chapters are short and clearly written, and there are also many practice questions that parallel what is covered in class.

### III. Pro Tips

• **There were more MDM questions than expected** on the last written exam of our M1 year, which were presumably included to give students below the cutoff a chance to boost their cumulative score. However, realize that a larger number of questions can significantly push your score either up, or down! This means that you cannot neglect MDM material even towards the end of the year, even if you have a higher MDM percentage. That being said, try to build up a good MDM score earlier in the year (while the questions are based on relatively simpler material) to alleviate some of this additional stress leading up to the final M1 exam.
• **Keep a close eye on your cumulative MDM percentage throughout the year.** If you notice you are falling short of 70%, reach out for help early and focus more on MDM material! Dr. Terman or Hufmeyer, who are in charge of the MDM program, are always more than happy to talk and go over concepts one-on-one.

### IV. Resources

• The answer key to every MDM problem set is available for your review in AWOME after each small group session. Just email Dr. Katie Hufmeyer or Dr. Eric Terman to schedule a time to go in and review the material.

• Many concepts from MDM are also often explained very well online, so don’t be afraid to invoke outside resources in your studying!

• Medical Decision Making, 2nd edition by Sox, Higgins, and Owens.

### F. Patient Perspectives Interviews

#### I. What is it? Why is it important?

Patient Perspectives is a low-stress, multi-part, longitudinal assignment that stretches throughout your M1 year. You will be tasked with interviewing a total of five real inpatients at one of the nearby hospitals throughout the year and subsequently writing up what you learn. The purpose of these interviews varies; the first few, for example, will be targeted towards learning why the patient is in the hospital and about their experience with the health care system. As the year goes on, you will need to perform increasingly complex tasks, such as taking a formal history and/or performing a physical exam.

#### II. Preparation

• **Attire/Materials:** White coat and professional dress, just like CEC. Bring a pen and paper if you wish to take notes. Though it likely won’t be necessary, don’t forget to bring your NMH/hospital ID badge, just in case.

• **Suggested Time Investment:** The time it will take to finish a Patient Perspectives interview will vary, depending on how focused/efficient your interview is, and on your patient. Be prepared to spend anywhere from 30 minutes - 1.5 hours talking with the patient. As you pick up additional clinical skills, your assignments will also become more involved, and will likely take even longer on average.
• You will sign up for a day to go into the hospital and talk to a patient. Once there, the nurses on duty will help you figure out which patient might be interested in speaking with you. Be patient with, and extra kind to the nurses on service, as they are taking time out of their busy day to help you!

III. Pro Tips

• Though you likely won’t see your patients again after each visit, if you are interested in finding out what happened to them, you can ask the patient if they are comfortable with you looking up their chart at a future date. You MUST ask for their permission before you do access their record in the future in order to avoid a breach of HIPAA.

• Patients will frequently mistake you for a “real” doctor, and/or a member of their care team. You need to be absolutely clear in your introduction that you are a medical student, that you wish to speak to them for an assignment, and that you are NOT part of their care team. Avoid dispensing any medical advice, and remind patients that you are just a student and not a true doctor if they ask.

• Some patients will not want to talk to you for various reasons, and it is their right to refuse. Remember, many of these patients are very sick, and are understandably in no mood to humor a medical student who only wants to talk due to a homework assignment! Politely excuse yourself from a patient’s room if the patient does not want to be bothered. If this happens, simply return to the nurse’s desk and politely ask to see a different patient.

• Do your best to get a patient to open up to you, but if the encounter is not going well despite your efforts, you can always ask the nurses for a different patient.

• It is tempting to procrastinate on these interviews, but we recommend finishing them as early as possible. Aim to do these at least two weeks before they’re due, because a chunk of the class will wait until the last minute and collectively stampede the hospital in the span of a few days to get it done. When too many students rush the hospital at the same time, it becomes far more difficult to find a patient who is willing to talk to you, as many will have already talked to another student before you and will be in no mood to suffer through it again. Consider scheduling these for the week after an exam when your class load is lighter.

• Try to sign up at Lurie or RIC at least once, as the Patient Perspectives experience in these hospitals is very unique!
G. Clinical Correlations (CC)

I. What is it? Why is it important?

Clinical Correlations are clinical lectures that usually occur once a week, which typically expound upon the subject matter that will be covered in the upcoming CEC session. On many occasions, the lecturer will invite a real patient to come share their experience with a particular disease. As a result, these lectures tend to be some of the most inspirational, interesting, and worthwhile lectures. Instead of madly scribbling notes, we recommend sitting back and actively listening to patients’ stories, as this is where the true value lies.

Attendance to these lectures is mandatory, and for good reason! It is important to arrive on time and pay attention, as these patients are invited guests who have volunteered out of the goodness of their hearts to share intimate details of their lives solely for educational purposes. Remember to keep their stories confidential after the encounter.

II. Preparation

- **Attire and Behavior**: Wear your white coat and professional dress when a patient is present. This will be noted ahead of time on the schedule and in the learning guide for the lecture. To give patients and SP’s our full, undivided attention, students should close their laptops during lecture.

- **These lectures often introduce the topics covered in CEC, and usually contain highly testable material.** While it is not necessary to take notes while the patient is sharing his/her story, make sure to learn any material covered by the lecturer!

“Your symptoms are completely alien to me.”
Health and Society (H&S) Element and Related Threads

I. What is it? Why is it important?

The Health and Society element is designed to inform students about issues in public health and healthcare delivery from a personal, patient, community, and global perspective. There are four related threads that weave content throughout the modules: Organization & Economics of Medicine (OEM), Health Equity & Advocacy (HAE), Healthcare Quality and Patient Safety (HQPS), and Teamwork & Leadership (TL). Through lectures, hands-on community projects, discussions, and small groups, students will learn to apply environmental, behavioral, medical, and motivational principles to the management and prevention of health problems for individuals and communities. The major H&S projects in your first year will include:

• **Performing a Community Health Assessment** of one of Chicago’s neighborhoods to evaluate its health assets with respect to the four determinants of health (social environment, physical environment, health services, and individual behavior).

• **Performing a Health Risk Appraisal** (HRA) of your class as an aggregate whole by gathering biometric and laboratory data and assessing lifestyle factors.

• **Developing and implementing a personal Behavior Change Plan** (BCP), and tracking your progress in meeting your goals.

Though students are sometimes quick to dismiss Health and Society as a less vital part of the curriculum, the truth is that certain topics covered in this element are just as important as learning the scientific underpinnings of medicine. Physicians do not practice in a vacuum, after all – understanding the societal context in which we practice is a key part of being able to make a meaningful difference in the lives of our patients. For example, even the most brilliant doctor may fail to effectively “treat” a patient if he/she fails to recognize and address some of the personal, local, and systemic factors that prevent the patient from consistently taking his/her life-saving medication. In fact, one of the most frequent stories that we hear from M3/4’s is that some of the most frustrating challenges they encounter are related to issues that we discuss in Health and Society!

II. Preparation:

• While most H&S lectures are not required, those that feature patients as guests and those lectures that immediately precede small group discussion are usually mandatory. For those lectures with patients, don’t forget to wear your white coats!
III. Pro Tips

- There are typically a good number of H&S lectures integrated into each unit, which means that they represent a fairly significant chunk of the material tested on each exam. Don’t forget to pay attention and take notes!

- H&S is sometimes represented on exams in the form of short answer questions. Thus, make sure you understand the big picture take-aways from each lecture. It can sometimes be helpful to write out a “main point” summary for each of the lectures to phrase your ideas in case you are asked to do so on the exam!

- Many students find that at least one full run-through of the H&S slides on the night prior to the exam is very helpful and sufficient as a last-minute review.

- It is worth repeating: while it might be tempting to disregard the H&S thread as inapplicable to your future role as a doctor, don’t dismiss it as irrelevant. Future attendings will tell you that the actual practice of medicine is 10% science, and 90% concepts you were supposed to learn in H&S (though sometimes we can’t help but imagine that 80% of that is dealing with insurance problems...).

IV. Resources

- While not required, assigned pre-readings often contain very interesting articles and websites that can enhance your understanding of a particular topic.

- Many student-led groups at Feinberg provide opportunities for students to tackle health disparities and promote health advocacy in a practical setting with real patients in underprivileged areas. Keep your Heart Healthy, the Cook County Jail Health Literacy program, and Community Health Clinics are three such examples—volunteering with organizations like these are great ways to engage the local community while putting H&S lessons into practice!
I. What is it? Why is it important?

The Professional Development element is comprised of a large number of longitudinal classes designed to foster and facilitate your personal growth as a new member of the medical profession. It is an integral part of the curriculum which includes your Area of Scholarly Concentration (AoSC), Personal Transition to the Profession (PTTP), ethics classes, and medical humanities seminars, all of which provide instruction for varied set of skills that will prepare you to be a better physician.

A. Area of Scholarly Concentration (AoSC)

The AoSC is an independent research project that you will complete over the course of your time here at Feinberg as a mandatory component of the PD curriculum, unless you are a dual degree student. Students are free to choose from almost any area of investigation in medicine and health care, including clinical research, basic science, translational research, global health, community and family health, medical humanities, and the medical social sciences. The purpose of the AoSC program is to directly engage students in the process of conducting research through a mentored relationship with a Feinberg faculty member. There are also several AoSC lectures and small group sessions held approximately monthly during your first year that will cover important research topics such as authorship, the IRB process, and research integrity. You will remain in these small groups throughout your time at Feinberg, so you should feel free to rely on your small group leader as a source of advice, support, and guidance along the way.

• It is important to realize that the AoSC process is intended to be very student-driven, in the sense that students are expected to take ownership of their project, submit the project proposal and IRB, and obtain any necessary permissions before starting their project. However, students are also encouraged to rely on their AoSC mentors for guidance, structure, and advice throughout the process.

• On finding an AoSC mentor: our best advice is to take your time and find a mentor who best matches and understands your personality, interests, goals, and expectations. Although the administration provides recommended deadlines for making progress on your AoSC project, they understand that the research process is finicky and prone to inevitable delays and mishaps. We would recommend taking your time to seek out a highly compatible mentor instead of rushing to find one quickly just for the sake of having one – especially since poor compatibility sometimes compels students to switch mentors further down the road. Meet with a variety of mentors in person, and make sure to discuss any
topics that might represent points of contention, such as your goals, availability, expectations, authorship rights, and responsibilities.

B. Personal Transition to the Profession (PTTP)

PTTP classes meet in large groups by college for an initial introductory lecture, and then divide into smaller groups for more intimate discussion. Topics covered in PTTP include more personal, potentially controversial concepts in medicine such as burnout, cultural diversity, gender diversity, implicit biases, and more. Prior to each session, students write short blog posts relating to the weekly topic to be discussed, and are also tasked with commenting on two other students’ posts.

You will occasionally catch us lightly poking fun at PTTP as “share your feelings” time — but in all seriousness, PTTP serves a valuable purpose as a forum where it is safe to discuss sensitive topics that may be troublesome to unpack anywhere else. In some sense, PTTP sessions are one of Feinberg’s answers to the issue of medical student burnout, as we are encouraged to reflect on how we are handling certain themes like balance, relationships, and stress. Feel free to use these sessions to discuss any topics weighing on your mind, as discussions held in PTTP are kept strictly confidential.

C. Ethics Series

As the name suggests, the ethics series is designed to challenge students to think about how to resolve – or at least think critically about – the numerous ethical issues that physicians face every day. Due to the very nature of ethics and philosophy, you will almost certainly have some of the most fun, thought-provoking, heated debates you will ever have in medical school during some of these sessions!

- **Foundations of Clinical Ethics (FoCE):** Students will initially meet by college for a large group FoCE lecture, then divide into smaller groups for more intimate discussion. Students will learn about the basics of biomedical and clinical ethics, including the principles outlined in the Belmont Report, and how to employ principlism and casuistry as approaches for deconstructing ethical dilemmas. More importantly, students will then learn how to apply ethical principles to the classic philosophical issues encountered daily in the medical field. At the end of this set of classes, students will take an individual oral examination in which they are asked to interrogate all sides of an ethical dilemma using either principlism or casuistry, then take and defend a position. Students are graded on quality of their argument, and on their ability to reason through the dilemma using principlism or casuistry as a philosophical framework.

- **Intermediate Clinical Ethics (ICE):** These classes expand upon students’ basic ethics knowledge, and meet by college following the conclusion of FoCE. These
classes occur once or twice during each organ module in order to discuss more advanced ethical topics pertaining to the organ system being studied.

- **Ethics in Action (EIA):** These classes meet exclusively in small group format monthly in spring of Phase Ia. Prior to class, students will be asked to write up a very brief essay of an ethical issue (relevant to the week’s topic) that they encountered during their IP/ECMH. During the actual sessions, a preceptor leads students in discussions about their own personal encounters with ethical dilemmas while using the write-ups as launching points for discussion. The purpose of this series is to increase students’ awareness of the many ethical issues that arise even at this early stage in their training, and to encourage them to begin thinking about how they would personally reconcile them if they were the physician in charge.

- **Medical Humanities Seminars:** The medical humanities seminars are selectives (in that all students need to choose one) that meet in the winter of year 1. They meet for five sessions and include multiple humanities topics that are relevant to medicine, such as art and medicine, literature and medicine, etc. There are generally about 20 of these seminars and students choose based on interest and on schedule. All are small groups and include not only Feinberg faculty but also a number of visiting faculty from places such as the Art Institute of Chicago.

II. **Preparation (for all parts of PD)**

- **Attire:** Dress for all PD classes is casual. If you’re dressed up for another reason, there is no need to change. However, depending on your AoSC project, you might be expected to dress professionally and wear your white coat when working with your mentor.

- **Suggested Time Investment:**
  - **AoSC:** Depends on your mentor and project. During the first year, you need to find a mentor, write your project proposal, obtain IRB approval, and complete CITI training before the block research time in June. Following the end of M1 year in May, there are four weeks that are designated exclusively as AoSC time, although some students choose to spend 7 or 8 weeks during the summer on their AOSC. Students are then expected to devote at least 3 hours per week to their projects during their M2 year, and will have the option to take block elective time during their third year to continue working on it, as well.
  - **PTTP:** Less than 30 minutes to write a blog post and comment on 2 other posts.
- **FoCE:** 30 minutes to do your pre-readings for the small group sessions. This is essential to be able to contribute to the discussion for the day.

- **ICE:** 15-30 minutes to consider the week’s topic and do assigned reading.

- **EIA:** Less than 30 minutes to write your small weekly essay.

- **Studying:** Ethics will be covered on every exam in some form or another, though typically in short-answer format. Ensure that you can reason through ethical cases that are presented to you, and that you can thoroughly defend one side or another. Also make sure you are familiar with the big legal cases that are key turning points in medical ethics history. AoSC lecture material is also tested on exams, so don’t forget to run through the slides at least once, even if you aren’t in the AoSC program. Small group AoSC material is not covered on exams.

### III. Pro Tips

- **Again, take the time to find an AoSC mentor that you really like.** A strong, comfortable working relationship will be critically important as you begin serious work on your project, so you’ll want to find a mentor who has the time, patience, and knowledge to promptly answer your questions and actively guide you through the process.

- **PTTP is an extremely laid-back class.** Relax and talk freely with your classmates about anything that’s on your mind. Remember to keep your classmates’ stories confidential!

- **Knowing how to appropriately reconcile ethical dilemmas is incredibly important as a future physician, and even just as a medical student.** Pay attention in these classes, as they may save you from one day appearing before the Ethics Committee in the future for making a rookie mistake!

- **When studying for ethics, go through every single one of the specific cases you have discussed during that module, and fully analyze them with principilism and/or casuistry.** Talking them out with another student can also be very helpful!

- **When studying for the ethics oral exam, invest the time to review each case presented through FoCE, as the case presented during the exam will loosely mirror one of the historical cases.** Choose whichever method (principlism or casuistry) is easier for you to use, and relax. Remember – this exam will evaluate your ability to reason according to the approach you selected, and won’t test any minutiae of the cases.
IV. Resources

- Tod Chambers (director of the ethics classes) posts great summaries of his notes.
- AoSC small group leaders can answer any questions that you have, help guide students to the next steps, and even connect students with research mentors.
- There is a complete explanation of the AoSC program online at http://www.feinberg.northwestern.edu/education/curriculum/learning-strategies/area-scholarly-concentration/.

**Problem-Based Learning (PBL)**

I. What is it? Why is it important?

You have probably waxed poetic about how much you’re looking forward to PBL while applying to medical school, but have yet to figure out whether you’re actually fan of it or not. Fear not! While PBL does take up a significant amount of time, most students appreciate it (to varying degrees) as a unique learning experience that they would rather have than not. As you probably know, PBL is a learning format in which small student groups (of around eight) work through a patient case while filling in knowledge gaps that are illuminated along the way. It is an integral part of the curriculum that will allow you to not only apply classroom knowledge to case-based scenarios, but also to practice teamwork and delegation with your peers. Remember, medicine is a team sport!

Apart from deconstructing the case with your teammates and the help of your PBL group leader, perhaps the most taxing part of PBL are the associated presentations that you will deliver in almost every session. While working through the case on a given day, you and your team will come up with “Learning Issues,” which are topics pertinent to the case that your group has decided merit further investigation and/or explanation. Each student will typically adopt one learning issue to research at home, and will construct a presentation around it to be delivered during the next PBL session. As a result, you and your peers will also have the opportunity to develop your teaching/presentation skills in PBL, as well!

II. Preparation

- **Attire:** Casual, but no need to change if you’re in formalwear for other reasons.

- **Suggested Time Investment:** The amount of time you spend making your presentation can range anywhere from less than 30 minutes to 4 hours, depending on your personal preferences, the speed at which you can
research and compile information, and how much effort you wish to devote to it. There is tremendous variation in how much time different people invest into PBL, and this will ultimately be your choice. Remember that your presentations are primarily intended to teach your classmates about a topic, so design a presentation that will be memorable for your peers!

- **Studying**: PBL case questions are ubiquitous on every module exam, so don’t forget to study them and remind yourself what happened in the case! The most efficient way to do this is to study the summary learning issues and learning points handouts that are provided at the end of each case.

- **Examples of PBL Presentation Styles**:
  - **PowerPoint Presentations**: Avoid making boring, dense presentations that you yourself wouldn’t want to sit through! More pictures, fewer words. Keep it short and sweet— we recommend 5-7 minutes at max! Perhaps add some interactive questions to make sure your information is retained. Always show your sources!
  - **Chalk Talks**: These are presentations that are drawn out on the chalkboard and verbally explained either as they are drawn, or afterwards. This format is useful for describing mechanisms of drugs, explaining pathophysiology, and for presenting comparisons. Students have also used the board to draw pictures to help students learn and visually remember certain concepts (similar to the strategies employed by Sketchy Micro and Picmonic).
  - **Handouts or Pamphlets**: Write out “cheat-sheets” for your peers that you can verbally explain during your presentation. These are particularly helpful when you are tasked with condensing a difficult or complex concept, or if you need to organize a large amount of information in a simple manner. Consider sharing your handout with the rest of your class so that others outside of your PBL group can benefit from it, as well!
  - **Be creative, and come up with your own PBL presentation ideas!** Anything goes, as long as you adequately convey the point of your learning issues.

### III. Pro Tips

- **Everyone initially struggles with time management** when it comes to preparing for PBL presentations. It’s completely normal for your presentations to initially
take you more than a few hours to construct. Don’t worry – everyone gets more efficient with time!

• Some students find that it is **highly efficient to construct their next presentation immediately after receiving their next learning issue in each PBL session**. Your memory of the case will be fresh, and you won’t have to worry about doing any more work before the next session!

• Try to be as active as possible in PBL discussions, and especially **prioritize thinking critically about the case**. PBL is designed to help you prepare for the future when you’re on the wards, as they simulate on paper what it will be like to deal with mystery illnesses and work through a differential diagnosis in real life.

• **Enforce time limits on presentations.** Decide as a group what the time limit should be for presentations and stick to it (again, about 5 minutes is a good rule of thumb) – otherwise, you will quickly notice that the presentations will soak up far too much time.

• **PBL sessions are intended to be largely student-driven, meaning that you can (as a group) collectively decide how you want to use your time.** We recommend using learning issues as opportunities to fully develop whatever your group wants to get out of PBL time – whether that be learning more details about the case, or reviewing confusing material from lecture.

• **Your PBL mentor is meant to be a guide for keeping your group on track,** and for preventing you from straying too far away from the most relevant points of the case. Your mentor should NOT be monopolizing the discussion or continually interrupting students, as the discussions in PBL are intended to be completely student-led. Should this happen, we recommend providing the appropriate feedback so that the same problem does not occur again in the future.

• **Do not cite Wikipedia as a resource.** Public shaming for this transgression by your PBL mentor can be swift, merciless, and traumatic. We still have nightmares.

### IV. Resources

• Galter website provides students with access to numerous resources that should be sufficient for researching most learning issue topics. UpToDate is an excellent resource to get yourself started on a presentation, but do not use it as your only source. Other source favorites include primary literature from PubMed, textbooks from Access Medicine, and class lectures. Don't forget to cite your sources in your presentation!
Anatomy Lab

I. What is it? Why is it important?

At Feinberg, you will have the opportunity to participate in the full dissection of a cadaver (as opposed to simply viewing a *prosected* cadaver at other schools, where the cadaver has already been dissected for you). This means, of course, that you will be actively cutting into the cadavers, finding and identifying structures the old fashioned way, and essentially learning by doing. While performing a full dissection can certainly be unnerving, there simply is no better way to appreciate the holistic composition of the human body than to explore it in a hands-on fashion – and most students conclude that they are very grateful for the opportunity.

The anatomy knowledge you accumulate across multiple lab sessions will be primarily evaluated through your performance on anatomy practical exams. There are three such exams: one in the MSK/Derm module in May (M1), one in the Head and Neck Module in September (M2), and one in the Neurology Module (M2) in October.

While the importance of anatomy to a medical education should go without saying, we thought we’d share a quote to more eloquently reflect our sentiment:

> “Doctors without anatomy are like moles: they work in the dark and the result of their work is mounds of earth.”
> --Tiedemann: Heidelberg, 1781-1861

It should be noted, however, that we as medical students can often relate quite easily to said moles.

II. Preparation

We cannot properly emphasize enough the importance of preparing for each dissection ahead of time. If your group is insufficiently prepared, you won't know where or how to cut through the cadaver, let alone how to identify the structures you'll be responsible for finding. Due to natural variation in human anatomy, students frequently run into unforeseen obstacles that unfortunately make the process of identifying structures significantly more difficult and time-intensive. Because you will only have a limited amount of dedicated class time to accomplish the dissection goals for the day, it is in your best interest to come prepared in order to streamline the parts of the dissection that you can control to get the most out of the experience.

On a professional level, it is also important to come fully prepared to anatomy lab so that you know how to properly manage your dissection cuts in order to treat the bodies of the generous donors with the maximum amount of respect and dignity. Please
remember that our donors chose to provide us with the invaluable gift of their bodies for the purpose of our education; this is a privilege not to be taken lightly.

• **Attire/Materials:** Students will receive instructions as to how to purchase anatomy gowns (required) before the first anatomy lab. Every anatomy group should also have a set of the following resources in order to be prepared for each dissection. The majority of anatomy tanks will have old copies of the dissector and atlas available for your use, but you will likely want your own copies of them for your own study use at home. Double check if your tank has copies for your use ahead of time!

  ➢ **Anatomy Modules:** These are PowerPoints prepared by the Feinberg anatomy faculty which contain the details regarding everything you are responsible for knowing about a given dissection. Be sure to familiarize yourself with these slides, as they are powerful study aids. In addition, the Anatomy Modules and associated Learning Guides contain references to other outside resources that are helpful. Depending on what dissection you are doing, various online resources or textbooks may be more (or less) helpful.

  ➢ **Grant’s Dissector** is your instruction book for performing the actual dissection, and is absolutely necessary for knowing precisely how to cut the cadaver.

  ➢ **Grant’s Atlas of Anatomy** is your anatomy road map, and an invaluable supplementary tool. It contains high-quality, labeled photos of prosected cadavers to assist you with identifying the structures you are tasked with finding on your own cadaver.

  ➢ **Two sets of dissecting tools:** you’ll receive an e-mail about how to order these.

• **Pre-work:** Based on our anatomy lab experiences, we strongly encourage using any combination of the following strategies in order to be maximally prepared:

  • **Watch online third-party dissection videos of the upcoming dissection ahead of time.** These vary in their quality and in how well they parallel the Feinberg dissection curriculum, but they will demonstrate exactly what you will be doing in lab (and how to do it best). This will help you move through your dissection more efficiently, particularly if you’re having a difficult time spatially imagining cuts and structures from pictures or instruction texts alone.
• **Read the Anatomy Modules beforehand.** These are densely packed with tons of information, but it’s definitely worth investing the time to familiarize yourself with the pertinent structures before you dissect! The more you prepare for lab, the more you will learn from it. Some students even print these out and bring a copy to lab for reference.

• **Essential Anatomy 5.** This is a relatively inexpensive computer program which many students find extremely helpful for learning anatomy both in and out of lab. The program provides a touchscreen-friendly digital 3D reconstruction of the human body, complete with the option to add or remove overlays of muscles, nerves, arteries, veins, and lymphatics. Students who are visual learners — and those who struggled with stereochemistry back in organic chem — will benefit immensely from this unparalleled opportunity to see and manipulate the 3D interactive hologram of the human body. There is also a (paid) smartphone app analogue of this program which is just as helpful on the go!

### III. Resources:

If anything, students find themselves somewhat overwhelmed by the sheer number of resources available to assist them with anatomy. Try a few of them and see what works best for you, as everyone learns anatomy most efficiently in different ways. Reach out to your peers and mentors for other suggestions, too!

• **Netter’s Flashcards:** Expensive, but thorough. Useful for those who study efficiently from flashcards.

• **Netter books and images:** Very helpful for learning anatomy through labeled pictures/diagrams.

• **TeachMeAnatomy website:** True to its purpose, and very effective, at that. This is highly useful for consolidating many of the anatomy lectures, as well as providing great alternative explanations of the same concepts.

• **Essential Anatomy 5:** As described above.

• **BioDigitalHuman:** A suitable free substitute for Essential Anatomy 5.

• **Zygote Body:** Another substitute for Essential Anatomy 5, with fewer frills.

• **Anatomyguy.com:** Another alternative resource that uses cadaver materials and surgical footage.
• **Acland videos:** Videos of dissections (found through the Galter library site)

• **UMich Anatomy practical quizzes:**
  http://www.med.umich.edu/lrc/coursepages/m1/anatomy2010/html/courseinfo/mich_quiz_index.html

• **SUNY Anatomy Practical Quizzes:**
  http://ect.downstate.edu/courseware/haonline/quiz.htm

**A. Anatomy Practical**

The anatomy practical exam is a hands-on exam which tests on your knowledge of, and ability to recognize anatomical and histological elements. The questions on the anatomy practical will mostly be (very) short answer based – usually just a phrase/term – and will be directly related to specific anatomical structures tagged on cadavers or shown on medical images (X-rays, cross sections, histology slides, etc.). Every question will be part of a “station,” which will either contain a cadaver or an image. You may be asked to identify a structure, and/or provide some information about its innervation, function, or clinical significance. Students will rotate through each of the stations exactly once during the exam, and will be granted exactly one minute to answer the question at each station.

**I. Pro Tips**

• To excel on your anatomy practical exams, **visit the lab outside of the required lab time and appreciate the structural variation in other groups' cadavers.** Remember, you will be working with the same body all year, but no two bodies are exactly the same! Furthermore, identifying structures from textbook images is no substitute for actual physical identification – especially since the exam will be based on real cadavers. We would highly recommend spending at least a few hours in the anatomy lab to test your knowledge in the days leading up to your practical, either alone or with a small group.

• **Trace and memorize the locations and paths of all the blood vessels, nerves, and muscles in the body.** Don't just KNOW where they go; SEE where they go. Any tiny section of a muscle/nerve/artery may be shown to you as part of a practical question!

• Don’t start studying late – this material is no joke! **It takes a considerable amount of time to build and solidify your anatomy knowledge,** even for those who are adept at memorizing. The anatomy practical is, by far, the exam that is least conducive to cramming!
• **Netter’s Flashcards are very useful for assisting with mental organization**, as you can actually make stacks of body structure (flashcards) that belong together.

• **The Atlas is an excellent primary resource for studying** outside of the lab. Human bodies look vastly different from the idealized diagrams in Netter, which is why it is a better idea to favor the Atlas as a practical study tool when possible. However, Netter diagrams can be very helpful for learning basic anatomy as a first pass.

• **Everyone studies anatomy differently!** The following three strategies were particularly popular with different groups of students, so you may want to consider adopting one of them as your own:
  
  ➢ **Study the “idealized” anatomy (Netter images, cartoons) first**, and once you have a strong grasp of the “idealized” anatomy, begin applying it to your cadaver and others’ cadavers.
  
  ➢ **Start by learning all of the bones in the body, then add muscles on top, followed by nerves/vasculature.**
  
  ➢ **Organize muscles by compartment, as most of the muscles within a compartment will often share similar or related functions.** Once you know which muscles are in which compartment, prioritize understanding spatial relationships between structures (e.g. if you peel back the Flexor Digitorum Longus, what muscle is under it?) Grouping structures in a logical manner will make it much easier to memorize them! Once you’ve mastered the muscles, learn the nerves/vasculature by compartment, as well.

**B. The Anatomy Closing Ceremony**

The Anatomy Closing Ceremony is an end-of-year event where students and faculty honor our donors’ memory, and their wonderful contribution to our education. Donors’ family members travel from all over the country to Feinberg to hear us express our heartfelt gratitude to their deceased loved ones for their gift. Consider volunteering to be on the Closing Ceremony Committee to help plan this important event. Everyone is strongly encouraged to attend to pay their respects.
Mindset – A Note from the Authors

Before we dive into discussing the messy details of each of the specific modules, we thought that it might be helpful to take a moment to introduce the concept of “Mindset.” This is a psychological framework that most students haven’t heard of before, yet one that frequently surprises students with how extraordinarily helpful it can be for navigating the tough waters that lie ahead.

To introduce this idea, consider a famous experiment wherein a class of elementary school children was split into two groups and given a simple puzzle to solve. Whenever students in group A completed the puzzle, the teacher would praise their intelligence: “Wow, you are so smart to have solved that!” Whenever students group B completed the puzzle, the teacher would praise their effort, instead: “Wow, you must have worked so hard to have solved that!” The children in both groups were then given a choice for their next puzzle: they could either receive a new, more challenging puzzle to solve, or they could receive the exact same puzzle again. The results? The students in group A (who were told how smart they were) mostly elected to solve the same puzzle again. The students in group B (who were praised on their effort) overwhelmingly chose the more challenging puzzle, expressing great delight at the opportunity to learn something new – even at the risk of not being able to solve it.

The simple premise underlying “Mindset” is that individuals possess either a “fixed” or a “growth” mindset, owing to influences from their own personality, their experiences, and from the way they were raised. A person with a “fixed” mindset believes that one’s intelligence is something that is fundamentally innate, and thus immovable past a certain ceiling regardless of effort. This idea is intuitive to a certain extent – after all, one could argue that no amount of practicing could ever turn an amateur pianist into Mozart. In contrast, a person with a “growth” mindset believes that intelligence is fundamentally fluid and essentially limitless with sufficient passion, drive, and hard work. At their core, the two mindsets are simply different philosophies/perspectives, and neither is necessarily “correct.”

However, the potential pitfall lies with how one’s mindset can be unintentionally molded in a certain direction even from a young age, as evidenced by the elementary school study. For example, upon reflecting, many overachievers will often concede that they were always told as they were growing up that they were amazingly “smart,” “intelligent, “gifted,” etc. While such compliments are bestowed with only good intentions, the trouble is that children will often internalize these labels as a fundamental part of their identity – and subsequently become consciously or subconsciously fearful of losing that label. The result is that children who are frequently told how ‘smart’ they are begin to believe that their intelligence is fixed – and just like the group A children, they shy away from challenging themselves in order to avoid the possibility of failure and the risk exposing themselves as “less intelligent.” In contrast,
those who espouse growth mindsets and value the learning process above all else – like the kids in group B – will naturally gravitate towards harder and greater challenges, even at the risk of failure. Indeed, the growth mindset cherishes personal growth and “learning for the sake of learning” while simultaneously acknowledging failure as a mere stepping stone to help one improve (rather than as a conviction of inadequacy). The Group B children were encouraged to appreciate the effort and the learning process (instead of the label of “smart”) as the most valuable prizes to gain from the puzzles, and they reacted accordingly when presented with further opportunities for growth.

**So how does this apply to medical students?**

Most students are unaware of their bias towards a fixed or growth mindset until these concepts are spelled out in concrete terms. As a result, many medical students with fixed mindsets are not fully aware of their own psychological bias towards the notion of “fixed” intelligence and its oft-associated tendency towards risk aversion. Unfortunately, issues potentially surface when students with this mindset receive an average or below average score on an exam for the first time in their life. They interpret their score as an assessment of their unworthiness to be in medical school, as a deeply personal failure, or as a demoralizing rebuke of their lifelong self-perceived intelligence level. For these students, it is difficult to entertain the perspective that that scoring on par (or even below average) among the brightest students in the entire country is an extraordinary feat of which to be truly proud. It can be equally difficult to transcend the notion that test scores are a direct reflection of intelligence – and as a result, they begin to feel like an “imposter” in medical school and become mired in a cycle of self-doubt.

The good news is that one’s mindset can be changed over time with effort – and simply being aware of one’s mindset is the first step in the process for those who are interested in doing so. Upon hearing about the school experiment, many students find that they can identify with the experiences of the group A children and subsequently start consciously overriding the fixed mindset that they never knew they had. There are certainly advantages to approaching life from a growth mindset, after all. Consider that a student with a pure growth mindset would not perceive a single test score (no matter how low) as a unilateral dictum of their intelligence, but rather as a golden learning opportunity that they may capitalize upon in order to grow. They would step outside their comfort zone to ask mentors and peers what they could be doing better, to invest the time to meaningfully self-reflect on their mistakes, and ultimately redouble their efforts towards attaining their goal while embracing “failure” as a stepping stone to get there. Though it may take considerable effort and time to unlearn the mental habits associated with a fixed mindset, we believe that championing a growth mindset is one of the healthiest ways to approach medical school’s countless trials, tribulations, and pitfalls – and one that will serve you well both inside and outside the clinic.
Foundations I

1. Introduction

Welcome to your first module of medical school! Your first three blocks as an M1 are collectively referred to as "Foundations" I, II, and III — and for good reason. These modules are designed to provide you with a solid foundation in several basic categories of knowledge — genetics, cell biology, biochemistry, cancer biology, histology, and immunology — that you will revisit and build upon time and again in all of the organ system blocks ahead.

For many students, some foundations material will look very familiar. Certain topics will doubtlessly have been covered before in your basic science courses in undergrad and will seem like review – even more so for those who recently took more advanced biology courses. However, regardless of your science background, it is important not to underestimate the foundations block while kicking back for six weeks. In medical school, you will be expected to develop a deeper understanding of concepts which you may have covered only superficially in the past. At the same time, should you find yourself feeling overwhelmed and unsure of how you will ever retain all these pesky details that never seemed important before, don't panic! The more you can learn now, the better — but rest assured that the most important points will resurface repeatedly in the future, giving you multiple opportunities to repair, cement, or augment your foundational knowledge. You should absolutely try to do as best as you can with absorbing the material, but it is expected that you will not have mastered everything the first time through!

Foundations I is roughly divided into three sections: **metabolic (biochemical) pathways, basic cell biology, and genetics.**

1. **Metabolic Pathways:** Delving into biochemistry right off the bat can seem incredibly daunting – in part because it is the first subject you’ll learn in medical school, and more importantly, because it can be difficult to gauge the level of detail that you are expected to know for each of the many pathways you will cover. Allow us to put your fears to rest: straight-up memorization of all the biochemical pathways presented is NOT necessary in order to do well on this section. Instead, we recommend focusing on understanding the big ideas associated with each pathway, such as its purpose, regulation, key steps, and unique components. It is also important to closely examine any steps that are associated with particular diseases, and to be able to predict what might happen with a given pathway if one part of it along the way is disrupted. Do not waste time attempting to memorize every step and enzyme along the way – it is merely an exercise in futility!
2. **Cell Biology:** This section should be very familiar to most students from their pre-medical curriculum, and/or from the MCAT. Expect to see many old friends such as mitosis and meiosis yet again, but be prepared to learn certain aspects in significantly greater detail than ever before. In particular, this section will take you on a whirlwind tour of the cell – since you’ve seen it all before – in order to rapidly arrive at the real focus, which is an introduction to cancer biology. Our recommendation for this section is to **focus on building a thorough understanding of the cell cycle and its regulation** while paying particularly close attention to the **specific factors that are directly and indirectly responsible for tumorigenesis**.

3. **Genetics:** While the introductory lectures covering the basics of genetics – Mendelian inheritance, the Law of Segregation, etc. – will likely be a refreshing review for many, there will almost certainly be a few perplexing topics (such as imprinting and epigenetics) that will pose a challenge for those who haven’t seen them before. Solving genetics problems and answering questions based on complex-looking pedigrees can certainly be tricky, but rest assured that **these question types can be mastered simply by doing a multitude of practice problems**. Dr. Charrow provides a significant number of genetics questions both in his lectures and associated learning guides; make sure to complete all of these, and ensure that you understand all of the underlying concepts! Luckily, genetics problems are one of the easier resources to find online – so if you’re having a lot of trouble, we highly recommend searching for additional problems to tackle until you feel comfortable with the material.

II. **Pro Tips**

- **Above all else, recognize that the “foundations” you will need to forge are not merely limited to the foundations of medical knowledge.** Realize that you will tackle Foundations 1 concurrently with transitioning into your role as a medical student in a new, potentially foreign environment. As with any major life transition, adapting to your new circumstances can be frightening, stressful, taxing, and exhausting! This is a normal part of the process, and something that you certainly won’t be experiencing alone. **Learning to effectively balance your personal life along with your responsibilities as a medical student is a skill that takes time to cultivate**— in fact, many of us in our M2 year are still trying to attain that perfect harmony. The faculty is very aware of this, and has adjusted the course schedule accordingly to ease you into the process. Take the time to find your niche, make friends, and acquaint yourself with the many new resources around you. **Establishing a robust foundation for your personal life should arguably be your top priority**, as it will play a major role in helping you confront many of the challenges that lie ahead.
• It takes time for everyone to adjust to managing the veritable inundation of lecture material. Don't be afraid to experiment with different learning tools and styles! Note-taking, studying, and managing time may all require a different approach than they did in undergrad, and it takes time to find what works best for you. Start now by reaching out to M2’s, and by perusing this Purple Book to weigh various ideas of what works best for different people.

• It is well-recognized that most of the time, students who fail an exam in medical school usually do so not for lack of hard work or effort, but as a consequence of their dealing with personal/family issues outside of class. Though it is easy to dismiss the importance of self-care, we urge you to remember to prioritize your own health and well-being above all else. Adjusting to medical school is a struggle for everyone, but it is not a struggle that you must endure alone. If you find it difficult to reach out to friends, family, loved ones, or peers, remember that there are a significant number of resources available to you here for assisting you with any difficulties that arise. See our section on self-care!

• Biochemical pathways are almost universally frustrating to learn – even for those who were biochemistry majors. Again, do not dwell on memorizing every step! Focus on the key steps that were emphasized in lecture as particularly important – either from a clinical or pathophysiological standpoint. Invest time into remembering the inputs, outputs, regulatory steps, and key enzymes; structures and names of any other intermediates will rarely ever be important.

• Remember that the module exam covers more than just science! A huge chunk of the test will encompass material from Health & Society, Clinical Medicine, and Professional Development lectures and sessions, so do not neglect these threads!

• Frankly speaking, the Foundations modules are not intended to be fun. They’re designed to teach you all of the concepts that you need to know before getting to the fun stuff in the organ systems. If you find yourself hating Foundations and doubting your decision to go to medical school, hold off on dropping out until you get to organ systems, which is where the true journey begins.

III. Resources:

• First AID: Good for providing a general overview of foundational topics, and for helping point out the most important steps to know in given pathways!

• Khan Academy videos: These can be very helpful for learning biochemistry if you are finding class lectures particularly confusing or unhelpful.
• **Youtube videos**: These are particularly helpful for learning tricky concepts, reviewing lecture concepts that were not conveyed well, or for picking up useful mnemonics. Animations for physiological/pathophysiological processes are extremely helpful for those who have difficulty picturing them from pictures or words alone. We encourage you to explore, and to share any useful videos with the class – remember, you’re all in this together!

IV. **Key People**

• Rebecca Becker is the course coordinator for this unit, and should be contacted regarding any logistical questions!

• Dr. Adams is largely responsible for the biochemistry component of Foundations I, while Dr. Charrow is responsible for the genetics component. Both professors are highly approachable and very helpful, and you should definitely seek their guidance should you have questions on content.

“I hear reggae rhythms, disco drums, thumping hip-hop, toe-tapping western swing, and 80’s techno beats. I think your pacemaker is stuck on ‘shuffle’!”
Foundations II

I. Introduction

Congratulations on finishing Foundations I and making it through your very first module in medical school! Celebrate, sleep for 48 hours, burn your biochemistry notes (not really) – then get ready to buckle down for the sequel.

Foundations II continues your preparation for the organ modules with its emphasis on anatomy, embryology, and pharmacology:

1. **Anatomy**: Your first two anatomy dissections will cover the body wall and the thoracic cavity. This is your first exposure to anatomy, and they will serve as great opportunities for you to build good habits for approaching the more involved anatomy sessions in each organ systems. As mentioned in the anatomy section of the Purple Book, **it is absolutely crucial to walk into anatomy lab prepared**. See the section on Anatomy for more detailed tips on preparing for lab and studying anatomy!

2. **Embryology**: For many students, the hardest part of embryology is visualizing the rather complex ways in which familiar anatomical structures physically arise from a simple zygote. There are quite a few outside resources that are exceptionally helpful for picturing these intricate processes – check out our suggestions below! Another common source of frustration comes from the need to memorize the times at which important embryologic events take place. Knowing this timeline does have clinical significance, as disruptions during gestation will affect all of the concurrent development events also taking place!

3. **Pharmacology**: Pharmacology refers to the study of pharmacological agents (drugs) and their action on the human body. For most students, pharmacology is a new topic – and for this reason, there is a learning curve for mastering its important areas. However, building a strong foundation here will be useful in many of the blocks from here on out (particularly in the Renal module). Perhaps the most difficult aspect of this topic is the quantitative component of drug metabolism, which requires fluency with certain equations that can seem dry at times. Like with any math class, performing a large number of practice problems while ensuring that you understand the pharmaceutical concepts behind the equations is the key for success. **However, be sure to commit the equations to memory for the exam!**
Overall, the greater challenge of the Foundations II module lies with the segmented nature of the module. For many students, the transition from embryology to anatomy to pharmacology seems forced and artificial – and understandably so. This is simply due to the constraints of the Foundations modules, which must cover a certain amount of material within a predetermined amount of time. Instead of wasting energy and getting frustrated over the apparent lack of connections within the module as a whole, we would encourage you to simply focus on each of the three parts as if they were their own standalone section, and to learn each of them the best you can. Do not lose heart – the organ systems are just around the corner, and are far more cohesive!

II. Pro Tips

• Embryology is densely packed with an abundance of unfamiliar, strange-sounding terms such as “splanchnopleure” (an excellent name for a future child). Consider that part of becoming a doctor is learning the language of medicine!
In addition to diligently researching new terms when they pop up, some students find it helpful to create simple term-definition flashcards for any block that is vocabulary-heavy. **Building fluency with the language is a critical part of being able to follow along with future lectures!**

• As you probably observed in Foundations I, the primary focus of medical school is not on memorizing millions of small details. However, **there will always be certain details in every lesson that must be committed to memory**! Your task is to determine which key pieces of knowledge are worth memorizing. Good examples include drug names, the details of microbes, and, in this block, the timing of embryologic events. The best approach for ensuring long-term retention of such information is context and repetition: understand the big picture of what happens in each week, add in details as arise, and run through the material multiple times!

• For visualizing embryology, digital aids such as Simbryo allow you easily observe all of the complex folding taking place during various development stages. YouTube is also a great source for visual help or supplementary information. For example, here’s one such video that provides an overview of development that many people in our class found helpful:

  https://www.youtube.com/watch?v=rN3lep6roRI

• Pharmacology can be dry and overwhelming. **Since a significant chunk of it requires rote memorization, flashcards can be very helpful** (if you learn effectively from using them). Making flashcards during, or right after a lecture can be a very effective method of studying! If you can, we recommend creating them as soon as possible so that they can be reviewed as many times as possible whenever you have free time – while standing in line, riding the bus, etc.
• With enough practice, manipulating the pharmacology equations will become easy – at which point the true challenge becomes identifying which equation to apply, and when. Invest time to understand the concepts behind pharmacology in order to build intuition for tackling this issue! And of course, complete many practice questions as possible to constantly reinforce your problem-solving skills.

III. Resources

• Pharmacology practice problem sets: These practice problem sets are found on emerg, and are absolutely essential for learning how to approach pharmacodynamics. Developing an algorithmic approach to such problems will prepare you for other pharmacology-heavy blocks, as well.

• Dr. Silinsky’s PowerPoint slides: Dr. Silinsky’s lectures are universally well-received year after year, and are heralded as exceptionally clear and useful for studying. We highly recommend referencing his lectures as a primary resource!

• Simbryo: A well-designed program created to aid students with visualizing embryological development – complete with trippy music, and lovingly created by Stanford’s medical school. Many students in the class found this to be an exceptionally helpful resource for deconstructing one of the most frustrating part of the module, and we highly recommend that you check it out!

The following is a link to Duke embryology, with their concise and clear explanations, and the Simbryo application for various embryological topics.

https://web.duke.edu/anatomy/embryology/embryology.html

• Medical embryology – difficult concepts of early development: This is a video on YouTube that helps you visualize embryology with clay. Yet another valuable resource for visual/kinesthetic learners.

https://www.youtube.com/watch?v=rN3lep6roRl

• First Aid: Provides a straightforward overview of main concepts of pharmacology.

• Kaplan’s USMLE Step 1 Pharmacology Notes: These provide a slightly more detailed pharmacology overview than First Aid does.
• **Katzung Basic and Clinical Pharmacology**: The introductory chapters of this book are remarkably easy to read, brief, and not overly detailed. We recommend checking them out if you’re having difficulty understanding pharm lectures!

• **Katzung and Trevor’s Pharmacology Examination and Board Review**: This is another excellent resource for mastering the essentials of pharmacology. It’s shorter and more straightforward compared to the larger Katzung text, and comes with the additional bonus of providing practice problems!

• **Essential Anatomy 5**: A computer program and smartphone app that allows you manipulate a 3D interactive model of the human body in order to learn and review anatomy. This app will be your best friend in MSK and during Head and Neck—see the anatomy section for more details on it. If you’re having difficulties with anatomy, it’s worth purchasing now!

• **BRS Anatomy or High Yield Anatomy**: These are boards review books that summarize important anatomy concepts. In addition, BRS has practice questions available at the end of each chapter.

• **Essential Clinical Anatomy or Gray’s Anatomy for Students**: These books provide significantly more detail compared to any of the board review books. Most students who purchased these used them only as a secondary reference.

### IV. Key People

• Rebecca Becker is the course coordinator for this unit – please contact her with any logistical concerns!

• Dr. Cochard spearheads the focus on embryology, and will be a recurring lecturer throughout your first two years of medical school. He is a fantastic resource, and well-known for his patience and sense of humor. Get to know him early!

• Dr. Sil linksy oversees the pharmacology focus of Foundations II. He is widely regarded as a prodigious lecturer and excellent resource – feel free to contact him with pharm questions at any time!
Foundations III

I. Introduction

Welcome to the final block before organ systems!

Foundations III is an introduction to both immunology and microbiology, two topics that can be potentially very challenging (especially to learn together) if you have not covered them in the past. While immunology requires students to develop an understanding of the body’s fairly complicated defense mechanisms, the microbiology component of the module is a daunting undertaking in pure memorization. Managing the combination of concept- and memorization-heavy lectures at the same time can feel incredibly overwhelming, especially due to the sheer density of material packed into four weeks. In addition, you will have an ethics oral exam and an OSCE scheduled near the end of this unit, making cramming all but impossible. It is no secret that Foundations III truly represents the last, potentially most difficult hurdle to overcome before you’re able to enjoy a stress-free Thanksgiving and begin studying organ systems!

1. Microbiology: The best way to master the microbiology material is to use an organizational system to help you sort out and categorize all of the bacterial species in your head; we strongly suggest using the organization tree provided by Dr. Hauser at the beginning of his lecture series. The key take-home points for each infection are its classification (gram staining for bacteria, DNA/RNA genetic material for viruses, etc.), mechanism of pathogenicity (especially virulence factors), unique characteristics, clinical presentation, and treatment (less important at this stage). Knowing each species’ place in the organizational system makes it easier to then subsequently fill in its more specific key details. This strategy may not work for everyone, but if you’re feeling overwhelmed or confused, this is a recommended place to start. There were plenty of students in our class who approached the material differently, so always remember that the most important thing is to figure out what works for you!

2. Immunology: Immunology is an intensive subject that is densely packed with basic science concepts, so some students found it very helpful to watch Pathoma lectures or read learning guides before lectures particularly for this unit. Above all else, do not fall behind in any of this material, as there will simply be far too much ground to recover if you do.

II. Pro Tips

• As previously mentioned, organization of microbiology material is key! Determine where the organism fits in the larger scheme, then make sure you can
identify its unique traits, mechanism of action, clinical presentation, and
treatment (much less important for now).

- **Spaced repetition (revisiting material in spaced-out intervals) is critical to both learning, and long-term retention.** This is one of the most memorization-intensive units, and the material calls for multiple run-throughs in order to master. Don’t get discouraged if you can’t recall details after a first pass. Instead, try to read, rephrase, and repeat the information to yourself in different ways, thus keeping old material fresh as often as possible.

- The clinical presentations of many infections tend to be similar. Don’t worry too much about memorizing constitutional, nonspecific symptoms (e.g. fever, weight loss, headache) and instead focus on **key clinical manifestations that are unique to each bug** (e.g. honey-colored crusting indicates impetigo caused by *S. aureus*).

- **Try to memorize/learn information as it is taught.** If you devote too much time to organizing your notes or pooling resources, you’ll have less time to memorize later on. By now, you should have a good sense of how long it takes you to memorize, so you should plan ahead accordingly. Pick one or two resources that work for you (Sketchy Micro, lectures/learning guides, Clinical Microbiology Made Easy, etc.) and try to start memorizing as soon as possible.

- **There is a decent possibility that there will not be enough time for you to review all of the immunology the weekend before the test,** even if the material is more spaced out throughout the unit for your class. While it is highly conceptual, immunology also requires memorization of the detailed interplay between different soldiers of the immune system! Therefore, try to stay up to date with this material as it is dispensed. The immunology material also builds on itself, so it’s best to have reviewed the prior day’s lecture before attending future lectures. Keep in mind that just about everyone feels overwhelmed by immunology, so don’t be discouraged or let this stress you out—we simply want to give you a head’s up that this module is not to be underestimated!

- **Don’t get discouraged by the volume of information!** You will absolutely be able to learn this amount of material, no matter how daunting it may seem at first. Find a good strategy during the first week of the unit and stick with it!

### III. Resources

- **Sketchy Micro:** A series of 10-minute animated microbiology videos that each tell a story about a particular bug. Great for visual learners, or for those who learn by creating stories—especially since the stories can make it much easier to remember all of the pertinent details about each disease. Consider sharing a subscription with a few friends! If you find yourself having trouble memorizing
microbiology, we highly recommend giving this a try—there is a free example video available on youtube if you’d like to try it before purchasing. In your free time, we recommend retelling Sketchy Micro stories as a high-yield strategy to impress all of your non-medical student friends and to obtain dates.

- **Clinical Microbiology Made Easy**: An easily-digestible text that features a plethora of simple diagrams and memory tools for those who prefer a consolidated, straightforward resource.

- **Dr. Hauser’s bacteria organization table**: This will be provided during Dr. Hauser’s first lecture, and we strongly encourage that you use this while studying. Being able to write out this table on your own will serve you well!

- **Microcards**: These pre-made flashcards are great if you’re looking for a resource that contains all of the relevant information in one place for each disease. Excellent for facilitating spaced repetition, and learning on the go. This can definitely be shared among friends!

### IV. Key People

- Rebecca Becker is the course coordinator for this unit – please contact her for any logistical issues.

- Should you have any questions on microbiology, your go-to sources should be Dr. Hauser and Dr. Flaherty! Dr. Ramsey Feulihan is the go-to resource for immunology.
Cardiovascular Module

I. Introduction

Congratulations! You have survived Foundations, and have finally made it to your first organ module. The CV unit is a great module to start off with, as the heart connects all aspects of the body together. It is a glorified plumbing system at its core — but a rather important one. The CV module comes first in the CV, Pulmonology, and Renal block, and you’ll soon see that the three systems are critically tied together.

The first thing to know about the CV unit (and all subsequent modules) is that it is different from Foundations in a few important ways. This will be the first time that you approach the process of “learning an organ.” You will first learn how the organ normally works (the “physiology”), then learn about all of the ways things can go wrong (the “pathophysiology”). In order to understand the pathophysiology, you will first need to develop a solid grasp of the physiology!

It’s also important to note that the general order in which physiology and pathophysiology is taught can vary by unit. In the CV module, you will learn physiological concepts and their corresponding pathology in chunks. For example, lectures introducing normal cardiovascular electrical activity might be followed by lectures covering arrhythmias; similarly, lectures covering blood vessel physiology will segue shortly into lectures on hypertension and ischemic heart disease. On the other hand, the Renal and Pulmonology modules favor learning the bulk of physiology up front before delving into pathology for the remainder of the unit. The point to take away is that it can be helpful to glance ahead at the schedule of lectures to adapt your studying strategy for each module if necessary. For example, cardiovascular electrical activity is covered very early in the CV module — therefore, it is most helpful to read the Only EKG Book You’ll Ever Need early, then focus on the Lilly textbook later on when it becomes more relevant.

You will also have a prominent faculty member who will coordinate the module from start to finish; for CV, this will be Dr. Mutharasan. He will not only introduce the module to you, but he’ll also lecture throughout to make sure everything you learn fits cohesively into a larger framework. If you have any questions along the way, he’s the perfect person to ask for help.

II. Pro Tips

• Lilly, Lilly, Lilly! This book is an excellent resource for providing a detailed overview of just about all of the material that will be covered in this module. Lilly is an incredibly popular resource for this module because it is NOT like other textbook — it is a book written collaboratively by both medical students and
faculty that breaks down difficult concepts into highly digestible chunks. If there is one resource that we recommend for this module, it is Lilly. When to read Lilly is up to you — some suggest reading it as the module progresses, while others suggest skimming it over winter break to give you a preview of things to come. Just make sure you read it at some point!

- *The Only EKG Book You’ll Ever Need* is indeed, the only EKG book you’ll ever need. Learning how to read EKG’s is one of the more challenging components of the CV module, and you’ll likely need all the help you can get. This book provides simplified explanations of how to interpret EKG’s, as well as plenty of additional practice.

- Do not feel flustered or overwhelmed if you feel like you haven’t mastered EKG’s by the end of the module — no one fully understands it even by the end of the block. EKG’s take lots of time and practice to interpret at a high level, and we are only expected to know the certain foundational patterns that we learn in lecture. Real, in-depth practice with EKG’s will come during third and fourth year clerkships, as well as later in your career as physicians. Despite the high prevalence of EKG appearances in lectures, EKG’s are not nearly as heavily emphasized on the exam – know the key arrhythmias and their corresponding EKG patterns but do not overinvest a disproportionate amount of study time into this topic!

- If you want to have a completely guilt-free winter break, do NOT fall behind on the first two weeks of the module that occur before the break begins. It is not necessary to study “ahead” for the module during winter break, but you SHOULD know that **the module ramps up absurdly quickly when you return**, and the material gets exponentially more complex. Therefore, you should at the very least ensure that you have a solid grasp on the material covered pre-winter break before heading back into classes in January.

- The first five weeks of CV are packed full of material, but the flow of information eases up by the very last week in order to give you time to synthesize the material and connect the dots. Make sure you’re caught up by this point. **This last week of dedicated synthesis time is a luxury that is unique to the CV unit** (as it is the first organ unit, and the faculty knows that you will need time to adapt to this system), so enjoy it and make the most of it while you can!

- **CV pharmacology is arguably the most challenging subset of pharmacology you will face during Phase Ia due to the extensive list of drugs that are routinely employed to combat heart disease.** Take the time to learn these agents well now, as they are critical to know for patient care. Here are some tips:
  - Make flashcards for each drug and its mechanism. Pharmacology is memorization-intensive; there’s really no way around it.
o First AID has a succinct pharmacology overview at the end of each section.

o Dr. Mutharasan’s YouTube video series on pharmacology is a must-watch, as it provides a comprehensive, organized method of approaching and remembering CV drugs.

- Remember that from here on out, a large proportion of your exam questions will be heavily formatted as clinical vignettes. Please read more about this in the “Module Written Exams” section of the book for additional details, and start using some test prep resources outlined in the “General Resources” section of this book to get used to that style.

- Now that organ systems have started, it can be helpful to begin thinking like a clinician. Instead of exclusively focusing on the pathology when presented with a new disease, consider other possible diagnoses given a particular clinical presentation. After forming your differential diagnosis, think about what specific pieces of evidence from the case history and presentation favor one diagnosis over another. A common chief concern during CV, for example, is chest pain. Consider that chest pain is a key presenting feature in myocardial infarction, aortic dissection, heart failure, ischemic heart disease, and arrhythmias. You should be able to differentiate among these causes as the underlying etiology based on differences in how they present. As you learn more about other organ systems, you’ll be able to expand your differential diagnosis for chest pain (and every other chief concern) even further. You will develop these skills throughout your medical school education.

III. Resources

- **Pathophysiology of Heart Disease**: Without a doubt, your primary resource for this unit, edited by Leonard Lilly (Referred to lovingly as “Lilly”).

- **BRS Physiology**: A very high-yield book that covers the essential physiology for every organ system. This book is a crucial companion and reference as you progress throughout the organ modules.

- **The Only EKG Book You’ll Ever Need**: A Sparknotes-type guide for reading EKG’s.

- **Pathoma**: Excellent for learning pathophysiology!

- **First Aid**: Very useful for obtaining a general overview of the CV system as a whole.
• **Boron or Mohrman & Heller**: for those who would like more help with physiology

IV. **Key People**

• Rebecca Becker is the course coordinator for this unit, so please refer to her for logistical concerns.

• For questions regarding content or other concerns, refer to both Dr. Thomas (JXT) and Dr. Mutharasan.
Pulmonary Module

I. Introduction

Congratulations on making it through the Cardiovascular Module, and welcome to Pulm! By now, you have a few tests under your belt, and a general sense of how the organ systems are taught and tested. However, don’t worry if you’re still figuring out your own ideal way to study – the organ systems are still very new to you, and you’ll have ample opportunity to adapt your strategies over time.

The Pulmonary module, of course, will cover everything you’ve always wanted (and didn’t want) to know about the lungs. The majority of basic lung physiology is taught up front by one professor, Dr. McCrimmon. The rest of the module largely consists of specific lung diseases, such as asthma, COPD, and cystic fibrosis, as well as occupational diseases, infections, and cancers. Dr. Corbridge, the module leader, gives weekly plenary sessions to review the most important concepts from past lectures, and to preview material still yet to come. These plenary sessions are useful and highly recommended to attend, as they help tie the different parts of the unit together and provide an overall sense of much-appreciated cohesiveness.

II. Pro Tips

• The Pulm module is widely regarded as a welcome break following CV; this is a much shorter unit compared to CV, and many students generally perceive the material to be less conceptually challenging overall. However, do not become complacent in studying—realize that unlike in CV, there is no built-in time at the end of the module for you to synthesize and review material— as soon as the material ends, the test arrives!

• Dr. Corbridge does not use PowerPoints for the majority of his lectures and instead draws out his main points and works through practice problems using the Document Camera. Translation: bring something to write on during Dr. Corbridge’s lectures, because typing on a laptop might not be the most effective or efficient way to take notes.

• Work through Dr. McCrimmon’s practice problem set sooner rather than later so that you can get all of your questions answered in time for the exam. Also, be wary of some mistakes in the answer key! If you get an answer incorrect, make sure to check with your peer or Dr. McCrimmon before you get too frustrated.
• Your AoSC project proposal and 4th Patient Perspective interview will be due around the middle of this module, so try to stay on top of the material so that you aren’t too overwhelmed in the last two weeks of the unit before the exam.

• Feinberg offers a Focused Clinical Experience (FCE) with Dr. Corbridge as the preceptor, which is a wonderful opportunity to review Pulm material and get a better understanding for how it is applied clinically! This particular FCE comes highly recommended from past students, and we would definitely suggest signing up for this one if you have the chance!

III. Resources

• First Aid: For a general overview of the unit as a whole.

• Pathoma: Helpful for learning lung pathophysiology.

• BRS Physiology: Useful as a text reference for learning basic lung physiology.

• Equation sheet in the Pulmonary Course Pack: Know the bolded equations!

• Boron & Boulpaep Textbook of Medical Physiology: Another dedicated physiology text can help with the more challenging concepts.

IV. Key People

• Dr. Thomas Corbridge is the module leader, and an excellent resource for any questions or concerns throughout the module.

• Dr. Donald McCrimmon teaches the majority of lung physiology and is always happy to meet with students individually to review these concepts.

• Terry Long is the course coordinator for this unit, and should be contacted regarding any logistical questions.
Renal Module

I. Introduction

Get ready to meet the Beans of the Body!

The renal module promises to be one of the most fascinating, riveting experiences of your first year of med school – especially if when studying for the MCAT, you were entranced by the counter-current mechanism and always wished you could learn about every single molecular transporter along the entire length of the nephron. Look forward to acquiring a lot of knowledge that can make you feel like a “real doctor”: you will learn about titrating different IV fluids and calculating their dosages, how to read those mystifying labs that pop up occasionally in PBL, and even how to diagnose certain conditions simply by interpreting those numbers. However, the kidneys are infamously for being one of the more complicated organs of the body to learn, owing to the beautiful complexity of the nephron and all of its intricate regulatory mechanisms. The kidney unit can be roughly divided into four major sections:

1. Learning the functional anatomy of the nephron and its many adorable transporters.
2. Learning how the kidney regulates the body’s fluid/volume status.
3. Learning how the kidney regulates the body’s long-term acid/base balance.
4. Learning about major diseases of the kidney (with particular emphasis on diseases of the glomerulus) via interpretation of pathology, lab results, and urinalysis.

II. Pro Tips

• **Fluency with osmosis and tonicity is absolutely necessary** to establish very early on! Make sure you review these topics if you’re fuzzy on the details.

• There are a **significant number of new terms**, abbreviations, and names that will be introduced early in the module (Posm, Uosm, BUN, Creat, etc). Do not wait for lecturers to explain the term – if you do not know it, either ask or find out on your own soon after. Lecturers will often assume you know the terms, and will not explain them if you do not ask.

• **Understanding which ion transporters are found where in each segment of the nephron is critically important** to understanding the majority of the module which focuses on fluid balance and acid/base balance. Make sure you memorize these!
• Be able to explain specifically how each type of diuretic works to a friend. This is a great way to check if you have attained a basic understanding of the kidney’s transporters and its fluid-balance regulation. In addition, diuretics are a favorite test topic for boards!

• Ensure you understand the difference between “volume-deplete” and “dehydrated” early on. This is a key point which is not always made explicitly clear, but it is crucial for your understanding of the kidneys’ role in volume regulation.

• For the acid/base component of the kidneys, it is critical to review the acid/base balance lectures from the pulmonary unit. The two organ systems work hand in hand in this area, and it is incredibly helpful to review Dr. Corbridge’s lectures before the acid-base renal lectures arrive as a result.

• To learn acid/base – practice, practice, practice! There should be a ton of practice problems available to you in the lectures, learning guides, First Aid, and online. Pattern recognition is key – do as many problems as it takes for the approach to become second nature!

• There are lots of small groups and problem sets available in the renal unit – use them to your advantage! Keep up with the material so that you get the most out of the small group sessions. Ensure that you complete all of the provided problem sets, and that you understand the reasoning behind the answers for each question. These problem sets are crucial to understanding key parts of the unit, and should not be disregarded – do your best to complete the entire set! Don’t worry if you struggle with solving them right off the bat – these questions are difficult (even for residents!), and it requires time to master the right approach.

• For the series of lectures focusing on the pathology of diseases of the glomerulus (nephrosis and nephritis), we strongly recommend watching the Pathoma video covering this topic ahead of time. These lectures are notoriously complex, but the Pathoma videos do an excellent job of breaking down the relevant pathology, the underlying pathophysiology, and providing ways to remember the key points.

• Again, do not fall behind! The vast majority of the renal unit not only builds on earlier lectures, but also includes multiple small groups/problem sets, so falling behind here is highly detrimental.
III. Resources:

- **First Aid:** For an overview of most topics that will be covered in this unit, and for helpful mnemonics. Note that there are some topics in First Aid that will NOT be covered in this unit in as much detail (such as kidney stones or kidney cancer, which will be covered later).

- **BRS Physiology:** A complete, high-yield overview of pulmonary physiology.

- **Pathoma:** For a simplified breakdown of the pathology of the glomerulonephridities. For this unit in particular, watching the Pathoma videos is strongly encouraged.

IV. Key People:

- Dr. Paparello has historically been the Renal module director, but he may be transitioning out of his role. His replacement will undoubtedly be an excellent resource for answering questions!

- Rebecca Becker is the course coordinator for this unit – please contact her for any logistical concerns!
Musculoskeletal Module

I. Introduction

Welcome to the MSK unit! You’ve made it to the final module of your M1 year – and have no doubt forgotten what sunshine looks like in the process. Unfortunately, there are still some daunting hurdles you’ll have to clear before the summer. The MSK module is combined with the significantly shorter Dermatology module (which immediately follows the MSK material), and the final module exam will cover material from both. During the MSK/Derm module, you’ll have your third and final OSCE of M1 year, the anatomy practical exam, and of course, the final MSK/Derm written exam — so don’t throw out your coffee machine, just yet!

The MSK unit outlines the extensive mechanical system that supports and moves your body, as well as the dire consequences of what happens when the system is flawed or compromised. The MSK module is different from the units you’ve covered so far in that it does not focus on the activity of a single organ, but rather on the many disparate parts of your entire body that must work together in order to function properly. Students find this unit more or less difficult for this reason, depending on their learning styles. It can be particularly challenging, for example, for students who are more linear learners to connect the different movements, anatomy, and function of each of the different parts of the body together.

Nevertheless, there is plenty to look forward to learning in this module, and it will be particularly rewarding to finally be able to properly conduct portions of the MSK exam for patients you encounter in IP/ECMH. In addition to learning MSK basic science, you’ll also gain some valuable face time with faculty and staff of RIC, especially if you sign up for the optional ultrasound sessions (see more details below). You will also have the opportunity to learn quite a bit about the experiences of patients with disabilities, and even directly interview patients from RIC in one of your CEC sessions. Together, these experiences make the MSK module a challenging, but valuable way to end the year.

II. Pro Tips

• The MSK module goes hand-in-hand with anatomy, as you’ll be spending the majority of your time learning MSK concepts directly in lab with the cadavers. Make sure to reference the section on Anatomy Labs to ensure that you are sufficiently prepared to get the most out of each experience!

• As a direct consequence of the previous point, realize that “studying” for this module will often necessitate visiting the anatomy lab after-hours. The anatomy lab is open to students at any time, and we recommend planning
several trips (with or without friends) to examine the bodies further and cement your understanding of anatomy.

• Keep in mind that the first major hurdle in this unit is the anatomy practical, which arrives relatively early in the MSK/Derm schedule. Learning the anatomy of the entire human body below the neck is not an easy feat by any means, nor is it one that lends itself well to being crammed. Although MSK material is not nearly as conceptually challenging as information from other units, there is a massive amount of it – so study early and often.

• Don’t neglect to study the non-anatomical MSK lectures too! Many students fell into the trap of solely studying the anatomy lectures in order to prepare for the anatomy practical, then had to rush to cram all of the non-anatomy lecture material in the last weeks before the exam. Realize that the practical exam is a mere pit-stop in a much longer unit, and that it doesn’t make sense to metaphorically burn yourself out on running a single lap of the race. You won’t want to be catching up on old MSK material while trying to study for OSCE 3 and learning all of dermatology!

• A great way to constantly review the material is to think about how your own body is moving, and quiz yourself regarding the bones that support your various movements, the muscles that produce the forces necessary for movement, the nerves that control the muscles, as well as the vessels that supply the muscles. By the end of the module, you will have built up an excellent conceptual understanding of how all the parts of your musculoskeletal system coordinate to allow you to sit in your computer chairs and avoid the gym!

• The optional ultrasound sessions are a fantastic opportunity for you to learn directly from RIC faculty, try ultrasound for yourself, and to benefit from a more hands-on perspective of some of the anatomy you’ve been learning. These are two hour sessions wherein you will attempt to use ultrasound to pinpoint key anatomical landmarks on each other. Those of us who attended these events highly recommend them as a valuable learning experience!

III. Resources

1. Essential Anatomy 5: Repeated here as a key resource, as it is truly valuable and incredibly popular with students. A touch-screen-friendly digital 3D model of the human body, complete with the ability to selectively view layers of muscles, nerves, vasculature, and other systems. It also comes with critical functional information for each muscle, as well as the opportunity to quiz yourself! Can be purchased online for PC/Mac, and for smartphones.
2. **Netter’s Flashcards**: Expensive, but thorough. Useful for those who study efficiently from flashcards.

3. **TeachMeAnatomy website**: True to its purpose, and very effective, at that. This is highly useful for consolidating many of the anatomy lectures, as well as providing great alternative explanations of the same concepts.


5. **AnatomyGuy.com**: Provides helpful videos of cadaver dissections; popular for anatomy lab preparation.

6. **First Aid**: As always, provides an excellent overview of the system as a whole.

7. **Pathoma**: Not as critical for this unit compared to others, but helpful in particular for learning the bone tumors (which can be rather dry otherwise).

8. **Rohen’s Atlas and online quizzes**: The cadavers on the anatomy practical are not neatly color-coded like many of the anatomical diagrams you will see in textbooks and lectures. At the same time, it is incredibly important that you know how to recognize structures in a real body without the color-coding assistance. This is where Rohen becomes useful, as it provides high-quality, labeled photographs of real bodies that you can use to study for the days when you’d rather not visit the lab. Other resources for practicing anatomy for the practical include: UMich’s Anatomy practical quizzes as well as SUNY’s human anatomy quizzes. These are particularly recommended to do as review in the final days leading up to the practical.

http://www.med.umich.edu/lrc/coursepages/m1/anatomy2010/html/courseinfo/mich_quiz_index.html

http://ect.downstate.edu/courseware/haonline/quiz.htm

**IV. Key People**

- Feel free to contact Dr. Dagosto and Dr. Cochard for any questions throughout this unit, especially if they relate to anatomy! Dr. Ihm and Dr. Brown can also be good resources for MSK and Rheumatologic issues, respectively.

- The anatomy staff is an invaluable resource for both answering questions and assisting with finding structures during anatomy lab!
• Rebecca Becker is the course coordinator for this unit, so please contact her with any logistical matters.

Dermatology Module

I. Introduction

Don’t give up now – hang in there and finish strong, you’re at the final lap!

As mentioned previously, the Dermatology module is connected to the MSK module – and for good reason. It is a very short module at only two weeks long, and it goes hand-in-hand with learning about musculoskeletal disorders due to the nature of the skin and its role in the body. Many skin disorders – like systemic sclerosis, for example – affect both the skin and the musculoskeletal system, and can cause devastating motor impairment as a result. In addition to learning about the colossal variety of skin conditions from the innocuous to the debilitating, you will also enjoy multiple lectures about skin cancer that will instill a deep-seated paranoia about sun exposure – just in time for summer!

Despite the relative brevity of the module, the Dermatology unit is remarkably dense and full of unfamiliar terms that you will need to memorize, as well as pictures of lesions that you must be able to recognize. In Dermatology perhaps more than in any other unit, visual diagnosis is absolutely key – thus, being able to differentiate subtle differences among many different skin conditions is of utmost importance.

II. Pro Tips

• It bears repeating: don’t fall behind in MSK as you begin the Derm unit. This module requires a vast amount of memorization in a short period of time, and it will be extraordinarily taxing if you need to study a lot of MSK concurrently.

• Memorizing skin diseases takes time and repetition. The names of many conditions are long, tricky and many sound the same – why do you think dermatologists are paid so much? Knowing how to characterize and describe skin lesions (papule vs. macule, etc.) is an important foundational concept that will simplify your learning and assist with the memorization process, so acquaint yourself with the vocabulary early!

• Attending lectures in person for this unit can be particularly helpful – especially for lectures that are densely packed with photos of skin lesions. Recognition of specific skin features is critical for this unit, and it can sometimes be very difficult
to tell exactly what a lecturer was trying to point out about a specific photo when watching on lecture capture.

- **Realize that many disease names in this unit are very similar and can be easily mixed up on a test** if you’re not paying sufficient attention. Over the course of the module, pay attention to any instances where you may have mixed up similar terms (e.g. Pemphigus vulgaris vs. Bullous pemphigoid) and proactively develop a strategy to remember which is which. Many students find it helpful to create stories about specific diseases (similar to how Sketchy Micro operates) in order to remember key symptoms associated with the name. Try different strategies, and do whatever you must in order to not slip up on an exam when it counts!

- **Tests will almost always present a condition in the “classical” way you were taught.** Therefore, don’t sweat the small stuff – figure out the primary presenting symptoms of a disease, and be able to compare and contrast conditions by their main differences.

### III. Resources

- **Pathoma:** Provides very helpful diagrams to assist in establishing the basics.

- **Sketchy Micro:** Valuable to review if you have since repressed all of your nightmares about Foundations III, as many bugs that will make their triumphant return in this unit.

- **American Association of Dermatology’s Basic Dermatology Curriculum:** Available online. These are PowerPoints containing high-yield information about the most important Derm diseases!

### IV. Key People

- Dr. Maria Colavincenzo is the program director, and a fantastic resource for any general questions.

- Rebecca Becker is the course coordinator for this unit, so please contact her for any logistical questions.

- Other dermatologists: spending an afternoon shadowing a dermatologist in the Northwestern Dermatology clinic can be immensely helpful for learning this unit. Seeing the conditions firsthand will make them stick!