From Soup to Nuts

Section Leader's Survival Guide

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Course Objectives

Short version

The GTS course is the central, unifying course for the preclinical training at JHSOM. It begins in the middle of the first year and continues until Spring of the second year. Detailed, formal course objectives are listed below. For planning purposes, the following key points should be kept in mind:

- The GTS course encompasses the fields of physiology, pathophysiology, pharmacology, pathology as covered in a more traditional medical school curriculum, and the scale range from genetics to sociology.
- Special emphasis is placed on:
    - Genetic variability between patients which affects health, disease risk, or response to therapy
    - Environment/patient interactions and their health effects
    - Individuality, rather than comparisons between prototypical "normal" and "ill."
- Biomedical and behavioral horizontal strands should be incorporated where appropriate
- Passive lecture time should be minimized
- Active and small group learning is preferred

Complete Course Objectives

Students completing Genes to Society should be able to:

A) Define the normal structure and function of the human body as a basis for understanding health, disease, and treatment… now and in the future...

1. GENETICS & MOLECULAR BIOLOGY: Identify the major genes, gene products, and molecular biomechanisms underpinning normal structure and function of the human body, discussing their role in current and future understanding of health, disease, and treatment.
2. ANATOMY, HISTOLOGY, & CELL BIOLOGY: Label the gross anatomic components of the human body, both pathologically and radiographically. Name the cellular and sub-cellular components of each organ system, describing their structure and function.
3. PHYSIOLOGY: Discuss the functional and integrative relationships both (i) between sub-cellular components of individual organ systems, and (ii) across different organ systems, as a basis for understanding both organ-system specific and multi-system diseases.
4. DEVELOPMENT & AGING: Describe the key principles and mechanisms that govern development and aging of the human body and discuss their relationship to pediatric and adult health, disease, and recovery of function.

B) Identify major disorders affecting the human body and their impact, emphasizing scientific foundations of diagnosis and treatment…

5. NOSOLOGY: Categorize human diseases and syndromes by (i) etiology, (ii) pathology, (iii) pathophysiology, and (iv) phenomenology, recognizing key disorders as "Common," "Catastrophic," or "Clarifying." Analyze the relationship between "health" and "disease," recognizing the spectrum of variability in both "wellness" and "illness," and its genetic underpinnings.
6. DISEASE (PATHOLOGY & PATHOPHYSIOLOGY): Recognize and describe the molecular, cellular, and tissue pathology of major human diseases. Describe important pathomechanisms of disease, and, where possible, the relationship between mechanisms and clinical manifestations.
7. PATHOGENS (MICROBIOLOGY) & EXTERNAL FACTORS: Identify major infectious pathogens, toxins, and physical causes of disease in the environment, describing the mechanisms by which their interaction with the normal human host lead to disease and form a substrate for treatment.
8. DIAGNOSIS (REASONING & TESTING): Apply knowledge of pathoanatomy and pathophysiology to logically approach bedside disease localization and etiologic identification. Discuss the role of laboratory and imaging-based diagnostic modalities in the evaluation of human disease, emphasizing appropriate test selection and interpretation of results.
9. TREATMENT (PHARMACOLOGY & THERAPEUTICS): Apply knowledge of pathophysiology and pharmacology to rationally approach disease prevention and treatment. Describe general preventive and treatment strategies ('common'), initial management ('catastrophic'), and mechanistic underpinnings ('clarifying') of therapy for key disorders, emphasizing pharmacologic, electromagnetic (radiotherapy, etc.), mechanical (surgical, endovascular, manipulative, etc.), restorative (genetic, regenerative, prosthetic, rehabilitative, etc.), and behavioral interventions.
10. IMPACT (SOCIOLOGY, EPIDEMIOLOGY & PUBLIC HEALTH): Estimate the impact of disease on patients, families, and society through an appreciation of both individual and societal burden, identifying ethical, medicolegal, economic, and public policy issues that surround treatment of human disease around the world. Assess the influence of social forces, public perception, and personal values on human health and healthcare delivery.
11. MEDICAL RESEARCH: Demonstrate a working knowledge of research methods related to mechanistic and evidence-based understanding of human disease and its treatment. Apply knowledge of basic and clinical research to envision new approaches to diagnosis and treatment of human disease.

C) Develop and demonstrate the core skills required of all physicians essential to effective medical problem solving, communication, and lifelong learning…

12. LANGUAGE OF MEDICINE: Demonstrate appropriate and effective use of medical terminology related to the science of health and disease across organ systems, as a foundation for professional communication.
13. PROBLEM-SOLVING & COMMUNICATION: Demonstrate problem-solving skills, teamwork, and appropriate professional attitudes and behaviors through the processes of small group, team learning, and peer teaching.
14. HEALTH SCIENCES INFORMATICS & LIFELONG LEARNING: Utilize appropriate tools for seeking, evaluating, and organizing medical knowledge and scientific evidence, while demonstrating an awareness of the behavioral attributes of self-directed, life-long learning.
15. LEADERSHIP & EXCELLENCE: Cultivate personal qualities and critical thinking skills essential to leadership and excellence in medicine, including using gaps in scientific knowledge (medical ignorance and medical error) as a motivator for change, tempering scientific skepticism with realism, and self-awareness and reflection in the learning and leadership process.

Contact information

Course Leadership

Title	Name	Responsibilities	Contact
Associate Dean for Curriculum	Patricia Thomas MD	Overall curriculum management	pathomas@jhmi.edu
GTS Course co-Director	Henry Fessler MD	GTS buck stops here.	hfessler@jhmi.edu
GTS Course co-Director	Michael Borowitz MD	Unless it stops here	mborowit@jhmi.edu
Assistant for 1st year GTS sections	Theo Karpovich	Manages Blackboard, Oasis, prepares handouts, keeps attendance records, grades	karpovic@jhmi.edu
Assistant for 2nd year GTS section	Terri Hennel	Manages Blackboard and Oasis content, prepares handouts, keeps attendance records, grades	thennel1@jhmi.edu
Assistant Dean for Academic Computing	Harry Goldberg PhD	Oversight and troubleshooting for classroom technology, preparation of electronic media	goldberg@jhmi.edu
Academic computing instructional designer	Susan Mrozowski	Blackboard software support, teaching technology support	smroz@jhmi.edu

Note: I am happy to meet with any section leader to discuss planning or execution of their section. Contact me at hfessler@jhmi.edu. If you are new to the course, count on it.

GTS Sections

GTS Block	Section	Leader(s)	Contact(s)
Year 1			
1	Immunology I	Jonathan Schneck	jschnec1@jhmi.edu
	Microbiology/ID	Khalil Ghanem	kghanem@jhmi.edu
	Heme/Onc	Michael Borowitz (section leader) Richard Ambinder Robert Brodsky William Nelson	mborowit@jhmi.edu rambind1@jhmi.edu rbrodsky@jhmi.edu bnelson@jhmi.edu
2	BMB	Dean Mackinnon	Dmackin1@jhmi.edu
	Nervous system/ Special Senses	Nicoline Schiess	Nscheis1@jhmi.edu
Year 2			
3	Pulmonary	David Hager	Dhager1@jhmi.edu
	Nephrology	Derek Fine Michael Choi	Dfine1@jhmi.edu Mchoi3@jhmi.edu
	Cardiovascular	Edward Kasper Thomas Traill	ekasper@jhmi.edu ttraill@jhmi.edu
4	GI/Liver	Michael Goggins	mgoggins@jhmi.edu
	Endocrine	Fredric Wondisford	Fwondis1@jhmi.edu
	Reproduction	Stephen Schatz Ann Lawler Isabel Green (section leader)	Sschatz3@jhmi.edu alawler@jhmi.edu Igreen5@jhmi.edu
	Musculoskeletal/ integument/ Rheumatology	Edward McCarthy Sewon Kang Alan Gelber (section leader)	mccarthy@jhmi.edu swk@jhmi.edu agelber@jhmi.edu

Weekly schedule template

The times available to GTS are shown below; schedule will vary for exams and university holidays. Times marked "GTS" may be used any combination of teaching methods or as free time for e-Lectures, preparation, and studying. Times not designated for GTS should not be used for any scheduled course activities. These times can be used for required e-Lectures or readings, but be considerate of time needed for any such assignments. Limit to <2 hours/day, as students will also be studying and working on other assignments and projects.

<table>
<tr><th colspan="6">Year 1 and 2</th></tr>
<tr><th>Start</th><th>Monday</th><th>Tuesday</th><th>Wed.</th><th>Thursday</th><th>Friday</th></tr>
<tr><td>8:00</td><td rowspan="4">GTS</td><td rowspan="4">GTS</td><td rowspan="4">GTS</td><td rowspan="4">GTS</td><td rowspan="4">GTS</td></tr>
<tr><td>9:00</td></tr>
<tr><td>10:00</td></tr>
<tr><td>11:00</td></tr>
<tr><td>12:00</td><td>Lunch</td><td rowspan="5">Longitudinal Clerkship</td><td>Lunch</td><td rowspan="5">Longitudinal Clerkship</td><td rowspan="5"></td></tr>
<tr><td>1:00</td><td rowspan="2">GTS</td><td>GTS</td></tr>
<tr><td>2:00</td><td rowspan="2">Workshop and prep</td></tr>
<tr><td>3:00</td><td rowspan="2"></td></tr>
<tr><td>4:00</td></tr>
</table>

Course calendar overview

Dates are *probably* finalized for 2011-12, as shown below

Block	Section	Starts	Ends	Days	Notes
Year 1					
1	Immunology	3 Jan	25 Jan	16	Adds content
	Microbiology/ID	26 Jan	22 Feb	20	
	Immunology II				*Eliminated*
	Heme/Onc	29 Feb	23 Mar	18	
2					
	Neuro/ Special Senses	2 April	9 April	6	Total NSS = 34
	MBB	10 April	25 April	12	Exam to be given in-class
	Neuro/Special Senses	26 April	8 May	9	
	Neuro/Special Senses	15 May	8 June	19	Memorial Day is 28 May
Year 2					
3	Pulmonary	22 August	8 Sept	13	Labor Day is 5 Sept
	Nephrology	9 Sept	3 Oct	17	One less day
	Cardiovascular	10 Oct	4 Nov	20	One more day (exam)
4	GI/Liver	7 Nov	5 Dec	18	One less day; 11/23-25 off
	Endocrine	6 Dec	22 Dec	13	
	Reproduction	9 Jan	2 Feb	18	One less day
	Musculoskeletal/ integument/ Rheumatology	3 Feb	16 Feb	10	

Holidays and vacations 2011-12	
22 August, 2011	Classes begin
5 September, 2011	Labor Day
23 – 27 November, 2011	Thanksgiving break (Wed-Sun)
23 December, 2011 – 2 January, 2012	Winter break
16 January, 2012	MLK Day
24 March - 1 April, 2012	Spring break (Year 1)
28 May, 2012	Memorial Day
15 June, 2012	Classes end (Year 1)

GTS Year 1

2011-2012 Calendar

August 2011						
Su	M	Tu	W	Th	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

September 2011						
Su	M	Tu	W	Th	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

October 2011						
Su	M	Tu	W	Th	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

November 2011						
Su	M	Tu	W	Th	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

December 2011						
Su	M	Tu	W	Th	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

January 2012						
Su	M	Tu	W	Th	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

February 2012						
Su	M	Tu	W	Th	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29			

March 2012						
Su	M	Tu	W	Th	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

April 2012						
Su	M	Tu	W	Th	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

May 2012						
Su	M	Tu	W	Th	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

June 2012						
Su	M	Tu	W	Th	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

July 2012						
Su	M	Tu	W	Th	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

	Immunology		MBB
	ID/Micro		Neuro/special senses
	Heme/Onc		

GTS Year 2

2011-2012 Calendar

August 2011						
Su	M	Tu	W	Th	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

September 2011						
Su	M	Tu	W	Th	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

October 2011						
Su	M	Tu	W	Th	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

November 2011						
Su	M	Tu	W	Th	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

December 2011						
Su	M	Tu	W	Th	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

January 2012						
Su	M	Tu	W	Th	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

February 2012						
Su	M	Tu	W	Th	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29			

March 2012						
Su	M	Tu	W	Th	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

April 2012						
Su	M	Tu	W	Th	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

May 2012						
Su	M	Tu	W	Th	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

June 2012						
Su	M	Tu	W	Th	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

July 2012						
Su	M	Tu	W	Th	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

	Pulmonary		Endocrine
	Renal		Reproduction
	Cardiovascular		Musculoskeletal
	GI/Liver		

Workshop Schedule 2011-2012

Block	Section	Topic	Prep	Present
Year 1				
1	Immunology I	HIV Immunology	1/4	1/11
		Organ Transplantation	1/11	1/18
	Microbiology/ID	Osteomyelitis	1/18	1/25
		Tuberculosis	1/25	2/1
		STDs	2/1	2/8
		TBD	2/8	2/15
	Immunology II	Autoimmunity	2/15	2/29[1]
	Heme/Onc	Thrombosis	2/29	3/7
		Cancer screening	3/7	3/14
		Transfusions	3/14	3/21
		TBD (new section after spring break)		4/4
2	BMB	Chronic mental illness	4/4[2]	4/11
		Suicide	4/11	4/18
		Eating disorders	4/18	4/25
	Nervous system/Senses	Repetitive stress injury	4/25	5/2
		Global blindness	5/2	5/16[1]
		Cochlear implants	5/16	5/23
		Prion disease	5/23	5/30
		Neuro-rehabilitation	5/30	6/6
Year 2				
3	Pulmonary	Tobacco	8/24	8/31
		Lung cancer	8/31	9/7
		TBD (? pulm/renal syndromes)	9/7	9/14
	Nephrology	Chronic kidney disease	9/14	9/21
		Secondary hypertension	9/21	9/28
	Cardiovascular	Stress and depression and the heart	10/12	10/19
		Heart transplantation	10/19	10/26
		Technology evaluation	10/26	11/2
		Health disparities	11/2	11/9
4	GI/Liver	Helicobactor pylori	11/9	11/16
		Genetic testing for GI cancer	11/16	11/30
		Global GI infections	11/30	12/7
	Endocrine	**TBD**	12/7	12/14
		rHG use	12/14	12/21
	Reproduction	Contraception	1/11	1/18
		Preconception testing	1/18	1/25
		Reproductive mysteries	1/25	2/1
	Musculo/skin/ Rheum	Nephrogenic systemic fibrosis	2/1	2/8
		Low back pain	2/8	2/15

[1] – 2 weeks prep time [2] – Prep *precedes* start of section

Deadlines

In addition to course administration and teaching, all section leaders must deliver the following course materials:

One month prior to start of section –

All scheduled course events, lecture titles, times, and speakers sent to 1st or 2nd year administrator. They will load into Oasis.

Two weeks prior to start of section –

All materials to comprise handouts sent to 1st or 2nd year administrator. This is material to be duplicated (120 copies) and distributed to class. Typically, it should include lecture slide sets, which will be printed as 6 slides/page handouts. For longer sections (>3 weeks) it is acceptable to divide the handout material into more than one portion and only make the first portion available at this time. Material for each subsection should still be made available two weeks prior to starting that subsection.

One week prior to start of section –

All course materials to be loaded onto Blackboard sent to 1st or 2nd year administrator and introductory welcome announcement posted. While this will largely be done by the administrators, some familiarity with BB will be useful to post announcements, send group emails, or other tasks. See Blackboard Tips for details.

Two weeks prior to scheduled exam -

Complete, finalized exam sent as **Word document** to 1st or 2nd year administrator. Indicate correct answer of multiple choice questions and include high-quality images when appropriate.

Tips for Blackboard (BB) and Oasis

These are not all-inclusive, just a few things I learned from trial and error. Users' manuals and technical assistance are available within each program or through Harry Goldberg's office.

BB

BB is the course management software used throughout JHU. Once you are assigned user privileges as a course section leader, you can upload files of any type, add headers and explanatory messages, edit the appearance of pages, post announcements, and send emails to individuals or groups of students. The students use BB as a hub for course materials, as well as to complete exams and course evaluations.

The bulk of materials for your section will be up-loaded by the course administrator. You will need to get her the materials and instructions for where in the folder structure you want them posted. Uploading material is straightforward, but tedious when a large number of files need to be loaded. **Allow sufficient time for you or the administrator**. I found that, from my office in the 1830 building, page redraws were agonizingly slow. They were much faster using Firefox than with IE, and faster in the Armstrong building than across campus. I was never able to find a reason or fix for that, but consider either of those work-arounds if you have the same problem.

The file structure for all GTS sections must remain consistent. The course materials folder includes the following sub-folders:

Powerpoint Presentations
Lecture Notes
Video Links (OAC will put in Sensei and Lecture Portal links)
Small Group Materials
Workshop Materials (for Genes to Society Course Workshops)
Readings and References
Additional Resources

Do not add, delete, or rename the folders. Use your judgment as to where to post the materials specific to your section. Some longer sections create subfolders for each week of their section. You can assist the students by adding a list of file contents to the "Course Materials" top page of your section. With **Edit mode** on (upper right), select the down-arrow next to any of the folder names. This brings up a menu, from which you can select **Edit.** Then type whatever you want displayed below the folder name into the text box. Click **Submit** to save the changes. This saves them from having to open a folder to check its contents.

Content is generally uploaded as **Files** or **Items**. A file is a single file of any type. An item can be multiple files, each of which can be opened individually. Your choice, but be internally consistent. Please use a file naming convention that will make the file contents obvious to the students: date_time_speaker_title for lectures, for example. Content can be loaded at any time,

but kept invisible to the students until a time you specify using the **Adaptive Release** option. This is useful, for example, to delay the answers to problem sets until after the assigned small group.

Content written or posted as an **announcement** will appear on the students' first page after they log in. Their daily notification will include whether any announcements have been posted. However, students have the option of turning off automated notifications. If you want to be sure they read something, send an email using the **communications** tools. This can send emails to individuals, groups of students, or students and faculty. There are also listservs for each class (med13@jhmi.edu, for example). However, these are used for all sorts of communications and are frequently full. Use the communications tool in BB for course-related email.

Oasis

Oasis is the calendar software for managing the academic calendar. It can be accessed from BB via the calendar link, or directly at oasis.med.jhmi.edu. All posting to Oasis is done by Theo or Terri, based on the schedule you provide them. Be sure to indicate which events have required attendance (see *attendance policy*) so the students are aware. Oasis can be used to check whether topics have been covered in earlier sections of GTS, or to check room assignments. Other than that is more useful to the students than to the section leaders.

Students check Oasis to know where they are supposed to be when. Please try to avoid last minute changes (notify them by group email). Be sure your instructors know where to be and when.

Pedagogy

Orientation/Introduction

Written orientation materials should be loaded onto BB by one week before the section starts. This should include formal objectives for the section, based closely on the GTS course objectives in this handout. I recommend them as the basis for section objectives because they have been carefully vetted, are consistent with the guidelines of the LCME, and because the section objectives must be congruent with the course objectives. Thus, you will solve a lot of problems if you base your section objectives on the course objectives, even if you think you could write better ones.

Other useful orientation materials include an overview of the section, teaching methods, a reminder of attendance expectations, how grades will be determined, a faculty list with contact information, and any advice on how to get the most out of the section. A glossary of section-specific terms and abbreviations, a list of specific concepts that they will need to master, a description of any unique teaching methods are some other ideas that might be useful to include up front.

Please open the section with a brief orientation lecture that covers the same material on day 1. It is also essential to have an early lecture provide a **review and overview**. The review should include embryology, anatomy, radiology to provide a clinical context, and organ-appropriate parts of the history and physical (which they will have heard in Clinical Foundations). It should also provide an overview or outline of what the section will cover. Sections that have opened with a detailed, narrow focus lecture without painting the big picture have consistently gotten off on the wrong foot.

Lectures

Lectures remain the most efficient means of conveying large amounts of information which you want the students to quickly forget. The goal should be to have less than half the class time spent in lectures. Each lecture should last no longer than 60 minutes, and 30 minutes is preferred. Focus on essential principles and core facts. The lecture should distill out what is important for a **medical student**, not a subspecialist, to know. Clearly distinguish what is core information and what are examples or embellishment.

Copious material is available on-line or in print on effective lecturing, and workshops for faculty are provided several times each year by the professional development office. Please coach your faculty to improve their lecture skills and slide graphic design. The students are not shy about providing feedback which can be a useful starting place. Lectures are filmed and are made available on-line. Unfortunately, this means the only incentive to attend is to make the lecture lively and compelling. Students also ask that speakers use the mouse to point, rather than the laser pointer which is invisible on the recorded version.

If possible, try to get some good lecturers to commit to more than a single lecture. This raises the overall quality, and also provides more continuity and internal consistency to the message. Consider the typical college course: One speaker covers an entire textbook, even though their own research involves one paragraph. Our typical model is the exact opposite. Best practice probably lies somewhere in between. Use ringers for special topics, but aim to have the course taught by teachers.

Students have requested a disclosure slide be included with every lecture. An outline or objectives slide and a closing summary or key points slide are also imperative. Students need to know what the take-home points are. I suggest deleting the date from the title slide of all lectures prior to posting. This will make it easier to reuse lectures in subsequent years, without having to edit the dates.

Encourage lecturers to incorporate use of the audience response system (ARS) to enliven lectures, and the SmartBoard or PowerPoint animations to annotate slides. Some sections have begun each day with a brief review of the previous day's material using the ARS. This has been appreciated by the students. It is essential that lecturers have some familiarity with what the students have already been taught on a topic, including vocabulary. They generally won't know a term unless you tell them.

Students will be provided with printed handouts of the lecture slides, but they will be in B&W and will be small (6/page). Many students prefer to take notes on their laptops directly into the power point presentation. Therefore, please post the PP presentation of each lecture on BB in advance of the delivery.

Students are aware and highly appreciative when the section leaders are present for all lectures. I understand this is a big time commitment that may not always be feasible. However, it is the best, perhaps the only, way to understand how well material is covered, areas of redundancy or omissions. Students recognize and interpret this as a sign of commitment to running a high quality section.

Electronic lectures

Many sections have produced electronic lectures for some of the material. The advantages of this are that the students can view the lectures at their chosen pace, can easily review slides, lectures can easily include multimedia, feedback questions, and conditional logic. If budget allows, artwork and animations can be elaborate. Once a lecture is produced, it can be reused from year-to-year. Downsides of e-lectures are the loss of opportunity for audience give-and-take or clarification, and the *substantial* time required to produce a lecture with good production values. I strongly recommend working from a script. The little stutters and corrections which sound fine in a live lecture sound much worse when recorded for eternity. Adding animations, feedback questions, and scripting add significant time compared to delivering a canned talk live.

I suggest trying some e-lectures in each section, perhaps adding a few each year, but not attempting to replace all live lectures. Live review sessions (lecture hall or small group) should go over material covered in electronic format. Relatively static material is better suited to electronic lectures than rapidly changing material, to reap the benefits of a reusable module.

The Office of Academic Computing can help with studio recording of electronic lectures.

Clinical Correlations

Clinical correlations are teaching experiences that include real patients. They may be held in the lecture hall, simulation center or other small group setting. Sections have used CCs in various formats:

1. A physician interviews a single patient.
2. A panel of patients with different stages of a given disease take questions from the students.
3. Live patients illustrate specific physical findings.
4. Short presentations by a patient, clinician, basic scientist, pathologist, therapist, etc. on their perspective on the patient's disease, followed by Q &A.

These sessions are limited only by your creativity. However, be sure to leave time for the students to ask questions. In general, the sessions are highly rated and are memorable.

Workshops

Workshops are student-led presentations on a topic that the section leader chooses. Three groups of 2 students each are assigned to present in a total of 90 minutes (60 minutes preferred). All workshops are held Wednesday afternoon, followed by a preparatory meeting for the next week's groups. One to three faculty members should be assigned to guide preparation (one per group seems to work best). The 3 presentations should fit together in a common theme, as if they were parts of a single talk. The workshops are a good opportunity to cover horizontal strands, and the HS faculty members are happy to help as facilitators. Contact Eric Bass or Gail Geller.

The students can easily go overboard, or be overwhelmed when they do a PubMed search on a huge topic. Faculty facilitators should provide 1-2 good review papers for each group and assistance deciding what is important and relevant to medical students. They should meet in person or electronically several times prior to the presentation, and should review the final slides. Faculty facilitators and other interested faculty should attend the workshops to answer questions. Groups of students are asked to complete a feedback form on the speakers which is returned to them immediately after the workshop.

Small groups

Small groups seem to work better if they cover topics from preceding days, rather than lectures that have just been given. This gives students an opportunity to digest the lectures, recognize what they don't understand, attempt problem sets, do supplemental reading, or otherwise process the material. Small groups have been utilized in a wide variety of formats, including review of discussion questions, interactive case presentations, computer-based or patient simulations. I encourage experimentation with a variety of methods.

Generally, the success of a small group session has depended more on the qualities of the facilitator than the activity. Meet with facilitators ahead of time to set expectations, make sure everyone agrees on the answers to problem sets. Facilitators should understand that they must come prepared to lead the session, familiar with the materials and objectives for the day. They must know to *facilitate*, not lecture. If staffing allows, having the same facilitator for multiple meetings with the same group improves the group dynamic and avoids redundancy. Plan to mentor new facilitators, and perhaps have them co-lead a section with an experienced leader the first year.

The simple act of calling students by name (study up from the attendance sheet) goes a long way to improving group dynamics.

Case-based session

In Pulmonary, we use the last small group session to "work up' and "treat" a complex case that is developed piece by piece, much like a patient would play out over time. This exercise requires the students to use clinical reasoning and integrate material from the entire pulmonary section. It also introduces some of the decisions they will have to deal with during clerkships and beyond. I encourage other sections of GTS to add this format as an end-of-section exercise. As the course progresses, the cases can become increasingly complex and draw on earlier GTS sections. The case we wrote, a writer's manual and facilitator's manual are provided at the end of this handout (Appendix A).

Team-Based Learning

This is a structured small-group learning experience that can work for rooms full of students, as long as they can work in groups of 5-8. This has worked well in some sections (Hematology) and poorly in others. Essential features that make for an effective TBL session include not overloading the students with reading material beforehand; having the questions in the readiness assessment exam (RAT) fairly reflect what they have read; and having the applications be based on what they have learned rather than requiring significant new knowledge.

VM

Virtual microscopy sessions have worked best when they are closely coordinated with the lecture content, and follow, rather than precede a lecture on a topic. They work poorly when they introduce new material devoid of context and when the facilitator has no idea what has been taught in class. The most effective sessions have given the students a specific task when looking at slides (making a diagnosis in an unknown case; finding a specific feature on a slide). A brief review orienting students to what they will see is often well-received. However, in their comments, students are about evenly divided between those who want to set off on their own, with faculty merely there to answer questions, and those who want more of a didactic orientation. You can't win. Some sections have been successful when they include a clinician to provide context. However, it is important that they allow the pathologist to run the show and not become distracted with clinical material.

Review Sessions

Review sessions have generally been very helpful. Some sections have started each day with a brief review of yesterday's lectures. Others have held periodic reviews at transition points. Students appreciate having expired exam questions to help them study, and some guidance as to what trivia is the important trivia. The ARS is excellent to gauge student understanding and identify areas that need attention.

Other

We encourage trials of new teaching methods and hope that successes can be incorporated elsewhere in the course.

Course Evaluations

Students complete evaluations at the end of each section, and sometimes in the middle of longer sections. Students get **2** extra *percentage* points on the exam for completing the evaluation. I read these closely to determine where sections need improvement and what methods worked well. You should do the same. Jorie Colbert can provide the speaker or small group leader evaluations separated by speaker, together with mean values for all speakers. I recommend you send each speaker and small group leader their evaluations and comments. Please mentor poorly performing teachers, or find substitutes for those who are refractory to change.

Attendance Policy

Please do not give instructions to the students that differ from the official attendance policy:

Among the goals of the Scientific Foundations of Medicine and the Genes to Society courses are to develop a sense of professionalism, to promote collegiality, to engage students in teaching one another, and to give students experience working in teams where different backgrounds and expertise are represented. Meeting these goals requires each student to be actively engaged, therefore attendance is mandatory at all group learning and teamwork activities. Attendance is also mandatory at all activities that involve patients and/or guests.

Mandatory attendance:
- Small group sessions
- Clinical Correlations
- Events involving interaction with a patient
- Case discussions
- Labs
- Activities in the Simulation Center
- GTS Workshops

Failure to attend at least 80% of these events in a block will result in the student being reported to the course and block directors and the Associate Dean for Student Affairs. Unexcused attendance below 80% will affect the student's performance in the course and will be considered a breach of the standards of professionalism expected by the School. In blocks where at least five sessions of one type of event occur (e.g., Small Group Discussions), attendance at 80% of these sessions is required in additional to overall attendance at 80% of interactive and patient and guest events.

Excused absences may be granted in cases of illness, religious observance, family emergency, presentations at scientific conferences, or required legal activity (e.g., jury duty) through discussion (in advance whenever feasible) with the section director, course director, and/or Associate Dean for Student Affairs.

With assistance from Terri and Theo, I will track student attendance. Remediation will be required of student who miss too many sessions and receive a U for the block. I may be contacting you to discuss appropriate remediation expectations. **Please remind small group instructors to circulate the sign-in sheet and leave it in their room. Because of problems in the past, they should bring it to your attention (and you to mine) if they believe a student is signed in but is not physically present in small group.** I will deal with them.

Examinations

Each section of GTS will have a summative examination. These will be multiple choice, single correct answer, and will be administered electronically through BB. The goal should be 75-100 questions per exam. Examination questions can be reused, but please adjust the question based on the previous year's item analysis or any change in the teaching materials. Questions from prior years already exist in BB and do not have to be re-written. We need to know what question numbers they were, the beginning of the stem (to confirm we are grabbing the right one), and any edits you want made.

In addition to the reused questions, please **write 25 NEW exam questions** each year. Over several years, this will give us a pool of questions that will allow us to vary the exam, or give remediation exams that are different from the first one.

Writing good questions is difficult. Please see Jorie Colbert's tips (Appendix B). I will review the exams before posting to make sure the questions are unambiguous and not too susceptible to strategy. The section leader should write at many questions as feasible for his or her block, and should edit all questions carefully to assure that they address key material, align with lecture objectives, and are well written.. Keep in mind that these are medical student level questions, not questions for fellows taking subspecialty boards.

Avoid answer choices such as "all of the above", "none of the above," "both A and B," "A, C, but not B," etc. Just write straightforward one correct answer questions. A cluster of questions based on a patient scenario is good, but avoid clusters in which the answer to subsequent questions is contingent upon them knowing the answer to the first one. Include questions that require reasoning rather than simple recall. Include multimedia and images if appropriate.

Complete exams should be sent to the course administrator as a single Word file in which the correct answer is indicated. They need to be received at least **2 weeks in advance** of the test date to allow time for review, revisions, posting and beta-testing prior to administration.

Grading

The end-of-section exam should reflect the minimum level of medical knowledge that a student should possess. Passing the end-of-section exam is therefore required to pass a section. I encourage you to incorporate other forms of evaluation into your section: Quizzes, small group participation, TBL IRAT exams, etc. However, these should be used to provide formative feedback to students and to make sure they are grasping the concepts. These formative scores should not be used to convert a marginal failed test score to a pass.

Remediation
Standardized remediation plan for knowledge-based examinations in the Genes to Society Year 1 and Year 2 curriculum

Goals

- Provide a uniform approach and set of expectations for students who fail an exam in a section of the GTS course in years 1 or 2.
- Promote only those students who have demonstrated their competence.
- Assist students in obtaining that competence through the remediation process.

1. Passing score for first test administrations will be the lower of either 70% or 1.5 SD below the mean score.
2. Students who fail the first test administration or other requirements of the section will receive a U for the section until they successfully remediate. The U and remediation outcome will be reported to the registrar.
3. First remediation attempt will be no sooner than one week after the failed exam.
4. The latest that remediation can be completed is July 1 for first year students and June 1 for second year students.
5. Whenever possible, remediation testing should be postponed until after a vacation (spring break, etc.) to prevent students from falling behind in on-going work.
6. Students failing any end-of-section exam will speak with the section leader or course director to discuss potential reasons for the failure and establish a learning plan. The student's college advisor will be informed of the need to remediate.
7. First remediation requirement will be to retake a proctored exam
    a. Closed book format will require 70% to pass
    b. If banked exam questions are available, new questions should be substituted in the redo exam.
8. If the first remediation is failed, the student will meet with the course director. Learning plan must include scheduled peer tutoring sessions.
9. Second remediation requirement will be to either:
    a. Write one or more essays of up to 2 pages in length, on topic(s) assigned by the section leader. Topics should be based on the test questions that were missed and the associated lecture objectives, with the total page requirement $\leq$ 5. Essays will be graded P/F by the section leader, approved by the course director.
    b. Complete an oral examination administered by the section leader, to be based on the missed test questions and associated lecture objectives.
10. Students whose attendance record does not show $\geq$80% attendance at the total required sessions for a course block will meet with the course director. If they cannot justify or disprove their absences, they will receive a grade of U until they remediate, and a Professionalism Concern Card will be forwarded to the Dean of Student Affairs.
    a. Remediation plan will be an essay based on the content of the missed session(s), not to exceed 6 pages, and
    b. A reflective essay on why attendance is considered required for certain curricular events, not to exceed 1 page.

Teaching resources

JH SOM Faculty development in teaching resources:

http://www.hopkinsmedicine.org/fac_development/teaching/index.html#teaching_Skillstop

Links to teaching courses offered here and on-line videos and tutorials.

Harvard Derek Bok Center for Teaching and Learning:

http://bokcenter.harvard.edu/icb/icb.do

This is a rich source of tutorials, articles, and videos on teaching skills.

The NBME test writing guide:

http://www.nbme.org/publications/item-writing-manual.html

This is the gold-standard guide to writing the gold-standard exam.

Appendix A
Lung Pathophysiology
Small Group Case Discussion
Facilitator Manual

This material will be used during the last small group session of the Lung section. The information that follows describes a case through which you will lead the group to its conclusion. Pieces of the case are to be revealed bit-by-bit, guided by the class' response. They may stray into the weeds for a while; you should let them try to find their way out but not let them fall in any big gopher holes. They should be forced to be active participants; depending on the group that may require long periods of silence. Getting the "right" answer is important, but so too is the process.

Educational Goals:

- Encourage active student participation.
- Integrate facts and concepts learned across multiple lectures.
- Introduce clinical thinking and decision-making.
- Introduce concepts of medical uncertainty.
- Integrate multiple layers of medical knowledge (basic science, physiology, genetics, therapeutics, etc)

Logistics:

Divide the class into 3-4 groups. Let all the groups work out their response to each section, then have a representative from one group present their conclusions to the class. Give the class some time to agree or disagree and discuss the plan. I found that it takes about 10 minutes of discussion in small group, then another 5-10 minutes for the whole class to discuss a complex step. Listen to the murmuring to help time your interruptions without rushing them. Then move on to the next bolus of clinical information. When appropriate, call on one group or another to represent the radiologists, the ID consultants, the MICU team, etc. Ask open questions (What are you thinking? Why?) rather than closed (What would the spirogram look like?) whenever possible. Even if you disagree with a plan, consider letting it play itself out for a while rather than acting as the hand of God. ("Okay, now the patient has no palpable blood pressure. What next, Einstein?"). If some of the students have laptops, encourage them to use Google to find answers.

I used the differential diagnosis to provide structure to the discussion. That is, I had the group come up with a differential without telegraphing my approval or disapproval. I asked them to justify their additions or deletions from the list, or asked the class what they thought about each suggestion. As the case revealed itself, we added or subtracted. The case suggested the underlying diagnosis early on, but without cues from me they did not focus on it.

Encourage group participation by not answering the questions they will pepper you with until the whole class is ready to discuss it. (Some specific points may need simple clarification.) Redirect other questions to their group; they may get out their laptops to Google things. When asking for input, wait a good 6-8 seconds before calling on someone to answer. Try to get the quieter students involved, perhaps with follow-up questions or to offer their opinion on someone else's suggestion.

Use the blackboard to track the discussion. I write down a differential diagnosis that we re-order, add and subtract to. Other lists may be questions they want to ask or tests they want to order.

At this point, they have had very limited patient exposure including history and physical skills. I really don't know how much H&P vocabulary they will know. Don't get too side-tracked, and don't get them too worried about stuff they don't know yet, unless it was just taught in Pulmonary Pathophysiology.

I have provided below the outline of the case, but feel free meander around it and embellish features as time and interest allows.

The case is a patient with previously undiagnosed mild CF having an acute exacerbation. I hope you can lead them through the process of recognizing that this is an obstructive disease, considering CF in the differential, knowing what tests to order, deciding whether to admit the patient, actually choosing some admission orders, deciding whether to intubate the patient, etc. The exercise will require that they remember facts from multiple different lectures, combine them with the inevitable medical uncertainty, work as a team, and deal with the results of their decisions.

This is an experiment, so I will need your feedback on whether it works, how to make it better, or whether we should revert to the same set of questions and answers we have used since about 1974.

Information to be revealed to the students is in italics, followed by suggested teaching points:

The young woman before you could have been a classmate, except you've never seen a classmate looking so sick. Her frightened husband holds her grey hand. Rail-thin beneath her sweat-soaked hospital gown, she sits bolt upright on the ER stretcher barely aware of the new intern next to her . "I. Can't. Breathe." Her husband implores, "Doc, I've never seen her this bad before. Please, you've <u>got</u> to do something!" Your white coat, cool and crisp when you slipped into it a few hours ago, starts to dampen.

What is running through your mind?
What do you want to do immediately?
What would you like to ask her and her husband?

Points to bring out:

Give oxygen. Characteristics of the dyspnea, duration, severity, positional qualities, episodic or continuous nature, associated pain, cough, sputum, relevant past, social, or family history. Rather than just soliciting a list, ask the class to "think out loud" about what is on their differential and how the answers would expand, contract, or re-order the possibilities.

The next set of data can be revealed piece-by-piece, when they ask the right questions, or all together when they have exhausted their ideas. If there are important omissions, you might suggest "Would smoking history be important? Why? etc.

You give her some oxygen by nasal cannula and she looks a little more comfortable. You are able to piece together her story with help from her husband. She developed a "cold" about 4-5 days ago, but it "settled in their chest." She has been getting more short of breath for 2-3 days, with an increasing cough productive of green sputum. She has not slept in about two days. She felt feverish, but did not take her temperature. She has not had chest pain or rigors. Her child had a cold last week but is recovered.

She is not normally short of breath, but does not exercise and works at a desk job. She does feel winded if she climbs a flight of stairs quickly. She typically has a morning cough productive of tan sputum. She has episodes once or twice a year where it turns green, she feels more short of breath or wheezes. If it bothers her enough, she goes to an urgent care center for an antibiotic prescription, which is what she wants now. She also has an inhaler of some medication she does not remember that she uses when she has these episodes. It does not seem to be helping now.

She does not know of any other medical illnesses. She has never had pneumonia that she knows of as an adult, but she thinks her mother said she used to get walking pneumonias as a child. She is not on any medications except OCPs nor does she have any regular medical care.

She and her husband have one child. She smoked for a few years in college, but quit. She works at a computer desk job. Her father, a heavy smoker, has emphysema, but no one else in her family has lung disease.

What is on your differential diagnosis? Why?

Points to bring out:

Could this be a pneumonia?
Does it sound like there is some underlying lung disease?
Could Daddy's smoking have caused this?
What class of diseases might this be (obstructive, restrictive, etc.)?

What do you want to look for on physical and why?

She is a thin, diaphoretic white female in moderate respiratory distress, leaning forward on the stretcher and able to speak in only short sentences.

Vital signs are BP 135/85, Pulse 125, RR 32, Temperature 38.3, SpO_2 91% on 2L/m O_2

Neck: No adenopathy, breathing with accessory muscle use
Chest: Hyperresonant. Inspiration:expiration 1:5 with diffuse expiratory wheezes, crackles left base.
Heart: Tachycardic with distant tones. No Gallop. There is a I/VI systolic murmur at the base.
Abdomen: Scaphoid, with respiratory alternans.
Extremities: No edema or clubbing.
Neurologic: Alert and oriented. Exam is limited but there is no gross weakness or asymmetry. Patellar reflexes are 3+.

Points to bring out:

What is normal and what is not?
How does this narrow or expand the differential previously discussed?
Can you decide at this point if the patient needs to be admitted to the hospital?
What is pulsus paradoxus and what would it mean in this patient?
What tests do you want to order? Can they be done in a patient this ill (eg, full PFTs)? How will they help you here in the ER?
Is the saturation on 2 L/min normal? Can you calculate an A-a gradient?

Here are some test results:

Hct 37% WBC 14500

(show chest x-ray; have class interpret [subtle retrocardiac LLL infiltrate])

Peak flow 90 L/min

Arterial blood gas pH 7.32/$PaCO_2$ 50 mmHg/PaO_2 70 mmHg on 30% oxygen.

Points to bring out:

Interpret the x-ray, blood tests, peak flow.
How does this narrow or expand the differential previously discussed?
Can you now decide if the patient needs to be admitted?
What about a trial of treatment in the ER?
What drugs and mode of administration would you want to try?
Would you start antibiotics? Which ones?

The patient is given a dose of moxifloxacin (you may need to explain what that is)*, and nebulizer treatments with inhaled ipratropium once and albuterol 3 times (once per hour). She is also given 125 mg of methylprednisolone. After 3 hours, she feels and looks no better.*

Now what? Assuming the agree to admit her:
Do you want another ABG?
Consider non-invasive ventilation?
What admission orders do you want to write? (Discuss medications, but also other diagnostic testing, and diet and activity orders….they may not be aware that they actually have to decide each of these things)…and whether this patient needs more attention than provided on a regular medicine floor.

The patient is admitted to the intermediate care unit. Sputum and blood are sent for culture. Antibiotics are changed to ceftriaxone and azithromycin. Corticosteroids are continued, and bronchodilators are continued every 2 hours (for albuterol) and q 4 hours (ipratropium). She is too dyspneic to eat, so IV fluids are started at a maintenance rate. Repeat ABG soon after arrival is 7.30/52/74.

What next? (If they have not yet begun NIV, now is the time)
Are maintenance fluids sufficient? (discuss insensible losses)
Would you consider placing an arterial line?
ICU transfer?

By the next day, 12 hours after admission, she is more dyspneic with marked accessory muscle use. Speech is clipped. Single. Words. She has been awake yet another night. Temperature is 39^{0}, pulse 155, and BP 115/45. Respiratory rate varies between 35-45. An arterial line has been placed, and demonstrates 20 mmHg variations in systolic pressure across the respiratory cycle. Inspection of the chest and abdomen shows paradoxical breathing. Breath sounds are decreased, with softer wheezes but more crackles. To maintain her SpO_2>90%, FiO_2 has been marched up to 80%. The morning CXR shows a larger infiltrate.

What are the implications of the evolving signs and symptoms?
What next? (time to intubate)
Any medication changes?
What sort of decisions need to be made about ventilator settings?

She is intubated and ventilated with 100% oxygen. SpO_2 rises quickly to 99%. BP falls quickly to 60/palp.

What possibilities are you worried about? What do you want to do? (Discuss tube malposition, hyperinflation, auto-PEEP and hemodynamics, pneumothorax)

With adjustments and treatment, BP is restored. The rapidly-acting sedatives administered for intubation are wearing off. The patient appears distressed, with marked accessory muscle use, and seems to be fighting the efforts of the ventilator. BP now rises to 195/140. Oxygen saturation remains 99%

Now what? (discuss hyperinflation, auto-PEEP and respiratory effort)

With sufficient sedation, the patient finally appears comfortable. Oxygen is weaned to 40%, and arterial blood gases are 7.36/45/65. The blood cultures show no growth, but the sputum gram stain and culture shows many PMNs, few epithelial cells, and a heavy growth of Pseudomonas.

What organisms usually cause community-acquired pneumonia?
What diseases or situations might Pseudomonas suggest?
Would you change antibiotics? (they probably won't know this yet, so don't make them feel scared)
What additional questions would you want to know?
What tests might you now be interested in ordering?

Antibiotics are changed to an anti-pseudomonal penicillin and aminoglycoside. Over the next two weeks, the patient improves, is successfully weaned off of mechanical ventilation, and is getting ready for discharge home.

The patient's mother reports that her daughter had an intussusception reduced as an infant.
Sweat chloride testing shows a chloride level of 45 mequi/l
Genetic screen for CF mutations shows the patient is compound heterozygous D508/A544E.

What other medical and non-medical therapies might be appropriate for her?
What would you tell her about genetic screening for her child and siblings?
What could you tell her about her own prognosis?
What do you think her PFTs would look like when she recovers?
To whom should she go for follow-up care?

GTS Small Group Case-Based Exercise
Writer's Manual

Introduction

The case-based exercise is intended as a 1-2 hour small group exercise devoted to a single case. It will generally be used as the last small group meeting of each organ system; for some systems more than one session may be appropriate. The case will be revealed to the group piece by piece, much in the way a real patient would unfold.

The group should be divided into subgroups of 4-6 students. After each bolus of new information is introduced, the subgroups will be given a series of open-ended questions and will have some time to work among themselves. One subgroup will then be asked to present their ideas and there can some discussion. The next set of patient information will then be revealed, etc, until the case is worked to a conclusion.

Goals

The goals of case presentation and discussion in this format are to:

- Integrate facts and concepts from within the current organ system, from organ systems that preceded the current one, and from the levels of genes to society.
- Introduce clinical thinking, decision-making, and medical uncertainty to foster the transition from the fact-based learning of the pre-clinical years to the clinical reasoning that will dominate future years.
- Reinforce facts and concepts by encouraging active participation in a realistic situation.
- Reinforce the teamwork inherent in medical care.

Writing the case

The author should prepare both a *case* manual and an *instructors'* manual. The case will include all of the information that is to be revealed to the students, the sequence of revelation, and will be divided into appropriate sections. Each section will conclude with one or more discussion questions. At least one question in each section should be open-ended (*What diagnoses are you considering? What else would you like to know?*) while others may be more specific (*What cell type would dominate the inflammation? What would you expect the spirogram to look like?*)

Instructors' manual

The instructors' manual should include explicit instructions that would allow a small group leader who knows the field to walk into the classroom and run an effective group. This would include an explanation of the purpose of the exercise, instructions on how to divide up the group into subgroups, how to present the case and phrase questions, suggested time to be devoted to each section, and key discussion points for each section of the case. Where there are a range of possible answers, the most important or essential ones should be listed. For example, if every patient with a certain presentation needs a CBC, but some doctors might also want other tests, the instructors should be sure a CBC is mentioned before moving on to the next step. If one step of a case could open up discussions of multiple issues, the manual should indicate which ones need to be covered. For example, a case of a genetic disease could lead anywhere from genomics to eugenics. Some flexibility can be encouraged, but the instructor should know what the class is expected to learn. Where there is controversy or when some instructors may be more or less knowledgeable about a condition, the student's course handout, lecture notes, or text should be referenced as the final authority. If there is information that the students have not yet had in class but is crucial to the case, the instructors' manual should indicate that so their expectations are appropriate.

We also recommend that the manual include a reprint of a paper such as Gabarro JJ and Harlan A, A note on process observation, In: Leading the discussion process: Some basic operating issues 1976: 205-210. This is a practical guide to running a small group session that provides tips on how to encourage participation and make the session lively and memorable.

Case

A good case for this format includes:

1. Realism. The best cases are real cases, although most will require modification to fit the time and teaching points. An imaginary "typical" case can work, but a case that is obviously contrived will be dismissed.

2. Personality. Patients and doctors that have character and back stories are more engaging. The patient does not need to be Madam Bovary, but they should not just be generic WM or BF. One way to give the physician a personality is to make him/her be the student themselves. Another way is to have the characters speak in their own voice, with quotes.

3. A hook. Cases are stories. Good stories open strong: "*It was the best of times, it was the worst of times.*" "*Call me Ishmael*." Not: "*You are asked to see an elderly woman with no appetite*."

4. Relevance. The case should address the key objectives of your GTS session. It should not, for example, focus on diagnosis of a rare disease unless the process of making that diagnosis incorporates important key objectives.

5. Completeness. Provides enough information to get to the next step. Students should need to call upon what they have learned, apply concepts and facts, but should not have to guess at what they have not yet encountered in the GTS course. Students will have other exercises in GTS where they need to do outside research and report back to the group. This case exercise is not intended to be run in that fashion.

6. Red herrings. A juicy case provides some excess information. Some detail will improve the story, and some will just be distraction. However, every real patient provides too much information about some things, and too little about other things. Part of medical decision making is knowing what to discard and what to explore.

7. Variety. Include data in multiple formats. Taking time to show an x-ray or blood smear in class, as on the wards, is more engaging and educational than reading the results.

8. Integration. Cases should include facts and concepts not only from the current organ section, but also from preceding sections. Therefore, cases can get more complex as the year progresses, with more co-morbidities, social dysfunction, polypharmacy, etc. This may require some consultation from other section leaders to clarify the class knowledge level. With planning, characters can recur, such as a patient who develops complications from the therapy prescribed by an earlier set of specialists.

Cases may be set in a clinic or office, emergency room, hospital ward, the side of the highway, etc. They may end well or poorly. Both physician and patient/family characters can exhibit adaptive or maladaptive traits. If appropriate, the linear story can be interrupted by health system roadblocks, such as unavailability of a hospital bed, medical non-adherence, lack of insurance, or loss to follow-up. However, we do ask that there be some consistency to the cases among all the organ systems:

- Cases should be presented in the traditional order of history – physical – lab (although some patients sent for a consultation might bring an outside test with them).

- Physical exam data should begin with general appearance, include vital signs, and should mention at least the major elements of a standard physical. The physical would be an opportunity to include distracters in addition to the relevant positive and negative findings.

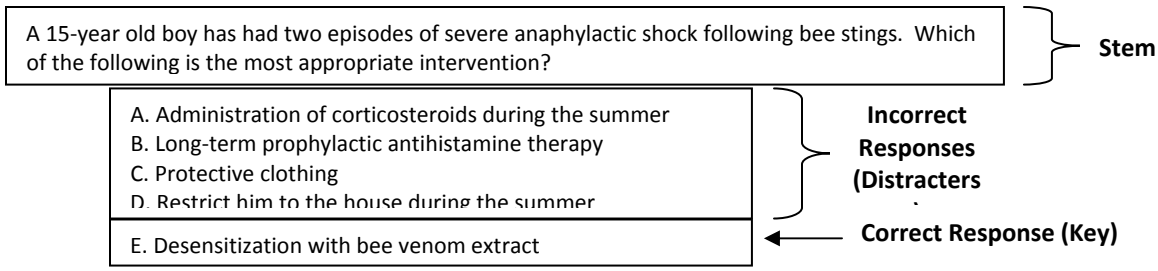
- Laboratory testing should be pragmatic, and distinguish what is needed to narrow a differential from what else might be abnormal in this disorder. The student should learn what should be ordered, not what could be ordered.

- Differential diagnosis should be discussed at several points, such as after the history, again after the physical, and after each layer of laboratory data. The questions should guide the students to make a complete list, choose the most likely diagnoses, and decide what information they need to distinguish between possibilities. Once they get that information, they should be prompted to revisit the list to see what gets added or eliminated.

Before unleashing the case on the class, I strongly suggest reviewing it with colleagues and pilot testing it with a few medical students to make sure there are no dead-ends.

Appendix B
Item Writing Tip Sheet
Based on the NBME's Item Writing Manual*

Anatomy of a multiple choice item



In General

- Each item should be aligned with a course or lecture objective
  - Exam performance will reflect how well students meet objectives
  - Will reduce students complaining about testing trivia
- Each item should only have one correct or best answer on which experts would agree
- Each item should assess one idea; otherwise consider breaking into two or more items
- Include items that require reasoning and analysis, not just recall
- Avoid groups of questions in which knowing the first is required to answer the others

Stem

-Students should be able to answer the question <u>before</u> reading the options (i.e. the options should not set the frame of reference)

- Use clear and unambiguous wording
- Avoid the following: is *associated with, is useful, is important, may, could be*, etc.
- Avoid negative wording (*<u>not</u>, <u>except</u>*), if unavoidable, CAPITALIZE the negative word(s)
- Avoid items that contain a frequency term (*usually, often*, *frequently* are interpreted variably)
- Longer stems with shorter options are preferred over shorter stems with long options
- If using a completion item, do not leave the blank at the beginning or in the middle of the stem
- Make sure the stem of one item does not cue the correct answer to another item

Distracters

-Distracters should not cue students to the correct response

- Must be plausible (if no one is choosing the distracter than it probably needs to be replaced)
- Should be similar to the correct answer in terms of:
  - Construction
  - Length
  - Grammar
- For numerical data, the options need to be consistent and ranges non-overlapping.
- Avoid 2 mutually exclusive responses; correct answer MUST be one of them
- Avoid *never* and *always*; response is always wrong and students never choose it
- Avoid excessive use of *none of the above* or *all of the above*. Students need only remember some of the information to answer all of the above (e.g. only need to know at least 2 options are correct) or to exclude none of the above (e.g. just need to know 1 option is true)

Case, S.M. & Swanson, D. B. (2001). *Constructing written test questions for the basic and clinical sciences: Third edition revised.* Philadelphia: National Board of Medical Examiners. **www.nbme.org/publications/item-writing-manual.html**