Learner-centered Integrated Curriculum (LInC) Portfolio

Foundations of Medicine (Years 1 and 2)
Core Clinical Experiences (Year 3)
Advanced Studies (Year 4)

Each curriculum year was presented to the Educational Policy Committee for review; each year was unanimously approved:

Foundations of Medicine 1	Monday, December, 2009
Foundations of Medicine 2	Monday, November, 2010
Core Clinical Experiences	Monday, February, 2011
Advanced Studies	Monday, February, 2012

Learner-centered Integrated Curriculum (LInC) Portfolio

This curriculum portfolio is designed to provide an overview of the Foundations of Medicine 1 and 2 (FOM1 and FOM2), Core Clinical Experiences (CCE) and Advanced Studies (AS) of the UMMS Learner-centered Integrated Curriculum (LInC). Our curriculum encompasses related courses, diverse pedagogical methods and coordinated relevant assessment. Specific examples from FOM1, FOM2, CCE and AS courses are referenced to highlight implementation of key principles throughout.

Background: Scientific and medical knowledge are expanding at an exponential pace. National organizations have called for changes to physician education in order to address new fields, changing practice and integration of this knowledge into clinical work. Medical schools across the country are heeding these calls and redesigning their curricula to address core competencies.

UMMS Competencies for Medical Education

Physician as:

Communicator
Advocate
Clinical Problem Solver
Scientist
Person
Professional

In 2003 UMMS began our curriculum redesign process by defining interrelated competencies for undergraduate medical education. After extensive self-study, review of external models and contemporary initiatives we defined a new curriculum footprint that was unanimously endorsed by the EPC in 2008. Over the subsequent months we have defined a new vision for the curriculum that builds on our strengths, addresses the needs of the Commonwealth and the US healthcare system and supports students to identify, solidify and pursue their passions.

The UMMS educational experience will inspire our future physicians to excel inpatient care, innovation, discovery, leadership and service.

This vision is represented within our curriculum by implementation of 7 key principles to support our students' achievement of our 6 competencies. Details of these principles are elaborated on the following pages.

New to LInC:

- Diverse approaches to learning (highlighting student preparation and responsibility)
- Flexibility of methods (to engage teachers and learners)
- Formative and summative student assessment with feedback (enhancing and supporting learning)
- Credit/No Credit in FOM1, FOM2 and the several components of the Advanced Studies curriculum (to build academic student community and support diverse students to achieve success and excellence), followed by our current differentiated grading in CCE, required AS sub-internship and electives to allow for students to distinguish their achievement. AS components that will be graded credit/no credit include the Emergency Clinical Problem Solver (ECPS), Advanced Biomedical and Translational Sciences (ABTS) and Capstone requirements.
- Robust course evaluation (to improve our processes of teaching)

- Coordinated thematic blocks of clinical experiences with purposeful integration of basic sciences, skill and content-based curricula
- Developmentally appropriate, longitudinal, integrated curriculum that spans the CCE focusing on threaded themes and building on the Learning Communities platform
- Career exploration electives in the CCE year
- Shared resources (developed and accessed over time to enhance teaching and learning)
- Neurology in the required third year CCE curriculum
- Early advancement to AS which allows senior electives to occur starting May of the students' 4th year (two months earlier than currently)
- An Emergency Clinical Problem Solver course that supports AS students integrate their cumulative basic and clinical science medical knowledge, teamwork based, problem solving and leadership to diagnose and treat the undifferentiated patient in common and unexpected urgent and emergent scenarios in varied settings and using simulation.
- Selection from a number of course topics that emphasize frontiers in biomedical sciences in a field of interest relevant to students' interest, preferences and career path offered through the AS Advanced Biomedical and Translational Sciences course.
- Enhanced focus on the principles of scholarship, research methods and scientific inquiry through the AS Capstone course that will allow all students the opportunity for a mentored scholarly project conducted throughout the four year curriculum on a topic of choice and under the guidance of a faculty member. Offered to interested students as a pilot in AY 12-13 and 13-14. This will become a graduation requirement for the class of 2016.

Principle #1: Interdisciplinary and Integrated Teaching and Learning

The LInC curriculum redesign enthusiastically embraces a philosophy of interdisciplinary and integrated teaching and learning in order to support our students' approach to patient care from their earliest courses. The integrated FOM1 and FOM2 curricula are designed to help students begin to gain confidence and competence in learning to solve a variety of scientific and medical problems. Foundational course materials will be taught and evaluated from multiple perspectives, giving students diverse opportunities to master the knowledge and skills they will use to identify and solve problems creatively and effectively. Courses designed and taught from multidisciplinary perspectives will model the kinds of creative partnerships we will ask our students to undertake as they learn to work in teams and take care of patients.

Medicine is by nature interdisciplinary.
Thoughtful patient care requires that physicians integrate knowledge in their own problem-solving and work across fields.

The CCE builds on this with maintenance of discipline-based experiences to inform students' career choices. Thoughtful coordination of those clerkships allows for shared curricula, teaching and modeling the interdisciplinary teamwork critical to patient care. Specific basic science integration led by basic science section leaders will link to the foundational curricula and build students' application of scientific principles and use of data in caring for patients. A longitudinal, thematic, interstitial curriculum that binds these pieces together will engage all students in learning together periodically throughout the CCE regardless of their clerkship or site location. The integration of the basic and clinical sciences, self-reflection, interprofessional teamwork and lifelong learning skills continue to grown through the Advanced Studies curriculum.

- Each FOM1 and FOM2 course is created and directed by faculty teams with complementary basic and clinical science expertise.
- FOM1 courses such as Building Working Cells and Tissues (BWCT) and Development, Structure and Function (DSF), and FOM2 courses such as Organ System Diseases (OSD) and The Brain: Nervous Systems and Behaviors (NSB) integrate related material from multiple basic and clinical perspectives.
- The Doctoring & Clinical Skills (DCS) course and the Integrated Case Exercise (ICE) curriculum provide ongoing opportunities to integrate developing clinical and basic science knowledge and skills over time, beginning in FOM1 and advancing in skills development throughout FOM2.
- A repository of shared BLS Vista (web-based) materials, including case materials, will be developed over time and become an important resource that will link courses together across the Foundations of Medicine continuum and into the CCE and AS years.
- Coordinated thematic sections of clinical clerkships allow for shared curricula, formative and summative assessments and student experiences across sites and disciplines.
- Specific basic science integration brings the foundations of medicine clearly into the focus of clinical care modeling the practice of physician as scientist and professional.
- Ongoing support of enthusiasm for lifelong learning through student-selected Advanced Biomedical and Translational Sciences coursework and the Capstone scholarly project requirement.

Principle #2: Sequencing and Prioritizing to Optimize Courses and Course Content

The Foundational LInC curriculum is based on a modified organ system approach, with a high degree of cooperation between FOM1 and FOM2 courses. The LInC FOM1 curriculum sequence begins with a study of molecules, genes, cells and tissues, then examines organs and organ systems and how they are regulated at both tissue and systemic levels (DSF). The second semester introduces a study of various diseases and agents that impact physiological function, and ends with our first FOM2 organ system disease (OSD) block – the cardiovascular system. Courses include an introduction to pharmacology, an introduction to cancer concepts, a study of infectious diseases and their causal agents and an examination of host defense systems and blood. These concepts are tied together through the learning communities' curriculum (DCS) and by a series of integrated case exercises (ICE) that both run throughout FOM1 and 2. Each builds in complexity as students master the concepts developed over two years. The FOM2 curriculum builds on FOM1 by integrating and advancing the concepts introduced by individual courses in Year 1. The OSD course continues through respiratory, renal, GI, reproductive, endocrine and musculoskeletal/skin blocks in parallel with the teaching of neurologic content in 'The Brain: Nervous System and Behavior.' The students are engaged in learning about populations and non-pathophysiologic causes of disease in the FOM2 course Determinants of Health, (DoH) and they become immersed in an interdisciplinary, community based service-learning experience through the DoH clerkship. The year culminates in a course titled 'Patients' which uses undifferentiated complaints to return to the basic sciences that underlie disease in a patient-centered, case-based model.

Core clinical experiences are organized into three coordinated thematic sections: Care of Adults (Medicine and Neurology), Care of Families (Family Medicine and Community Health, Pediatrics and Psychiatry) and Perioperative and Maternal Care (Surgery and Obstetrics/Gynecology. Each of these sections also has a basic science section leader who is responsible for working with the clerkship directors and FOM1 and FOM2 course co-leaders to integrate appropriate basic science instruction throughout the clinical clerkships. An 'interstitial curriculum' scheduled throughout the CCE will link threaded curricula in areas such as professionalism, patient-safety and quality improvement and interdisciplinary content areas such as domestic violence and geriatrics to students at set times in the year. Sessions and exercises will be geared towards student's developmental level, growing with them as they become more seasoned in their clinical studies. Practice-based exercises will occur between sessions as they return to their teams and patient care to reinforce principles and build their experience in applying principles to patient care supporting life-long learning. The AS curriculum will link back to the principles of the prior years, engaging students on a higher level with innovative science and further developing their skills in critical assessment. AS students will have the opportunity to communicate their learning in Advanced Biomedical and Translational Sciences, and through the Capstone scholarly project will pursue and share their work an area of their passion that will link them to the next phase of their career.

- Key course faculty cooperate in the planning and teaching of both FOM1 and FOM2 courses, and have specific links with the basic science section leaders for ongoing integration into the CCE and AS.
- Pharmacology leadership spans the entire curriculum to ensure well-sequenced curricula that build on previous learning and integrate appropriately.
- Population health concepts are introduced in the FOM1 Doctoring and Clinical Skills course, revisited and applied in more detail during the FOM2 Determinants of Health course and the Community Health Clerkship, and again in the threaded Interstitial Curriculum of the CCE.
- Foundations of Medicine courses and the CCE Interstitial Curriculum are sequenced to optimize the presentation and development of key concepts.
- Resources used in developing key concepts will be accessible to students and to faculty from other Foundations of Medicine courses and throughout the 4-year curriculum.

Curricul-omics

Deliberate and emerging interconnections between and within courses.

- Communication within and across courses and in CCE coordinated thematic sections and the new AS courses decreases unnecessary redundancy.
- A robust curriculum database supports appropriate tracking and monitoring of course objectives, content and competencies.
- Consistent course templates facilitate usability, support and access to content.
- Coordinated transitional curricula that link across years to develop a systematic and sequential approach to key educational points: transition to medical school, transition to the core clinical experiences and transition to internship.
- Advanced studies courses that support students' development and demonstration of independent and team-based self-directed learning.

Principle #3: Contemporary, Diverse Educational Methods

Recognizing that different students and different kinds of content may be best served by different educational methods, LInC courses utilize a variety of approaches. While the specific methods vary, the underlying goals of the learning methods are consistent across courses. They include expectations that students assume responsibility for their learning, prior to, during, and after course sessions. Class sessions, whether in large or small groups, actively engage students in learning by encouraging interaction and participation. Technology appropriately supports teaching and learning through course content delivery in the learning management system and online curriculum modules in FOM1, FOM2, CCE and AS.

- Starting with their first course, students are expected to complete specific advanced preparation for class sessions by seeking out and learning new material, and coming to class prepared to apply this information.
- Study and preparation time is protected to support students' developing independent learning skills.
- An average of 22.5 hours per week scheduled faculty contact time (including discussions, laboratories, lectures, clinical skills).
- Alternative educational methods will replace many sessions that serve almost exclusively for the one-way transmission of information that is readily available through other resources. (e. g. podcasts, web-based resources, professional society modules, books)
- Learning and teaching may include both individual and team efforts and cross class years, disciplines and professions.
- Students find, evaluate and utilize appropriate online resources for course preparation and to complete course assignments.
- Consolidation exercises such as quizzes, problem sets and formative assessments help students to solidify their knowledge and track their own learning.
- Technology-enhanced teaching and learning spaces such as the Learning Environment for Anatomical Science (prior anatomy lab), Integrated Teaching and Learning Center (ITLC) and remodeled amphitheaters are available for course meetings.
- Simulation Center, to be expanded with Albert Sherman building, utilized throughout all four years with special emphasis included in new Emergency Clinical Problem Solver AS course.

Shared Resources, More Hands On Learning

Interactive digital dissector, self learning exercises, scenarios, electronic images, physical diagnosis correlations, prosection library

Principle #4: Provide Flexibility for Learners and Teachers

Our students enter their medical study with a wide variety of prior experiences, interests and educational backgrounds. Our faculty are experienced researchers, clinicians and educators. Our curriculum offers flexibility in approaches to teaching and learning, choice of methods and pathways in order to capitalize on this diversity and help students prepare for success in their field of choice.

- Variety of pedagogical tools in FOM1, FOM2 , CCE and AS allow students to learn using familiar and comfortable methods -- traditional lecture, lecture enhanced with small groups or audience response, faculty-led small groups, peer-led small groups, faculty consultation with multiple groups, independent learning, problem or case-sets, online and independent learning.
- Course scheduling acknowledges student needs for dedicated time without faculty contact.
- CCE time dedicated to experiential learning follows Accreditation Council of Graduate Medical Education (ACGME) guidelines for interns to support and protect students' clinical and didactic education.
- Dedicated time to focus on curriculum studies, pathway programs, optional enrichment electives, and professional and volunteer activities.
- Early completion of Foundational Studies will allow students earlier clinical elective opportunities to help inform career choice.
- Retained rich elective opportunities and unscheduled time to support career exploration.

Commitment to Advanced Biomedical and Translational Sciences

Advanced Studies (Year 4) selectives promote continued development of advancement in foundational science knowledge in areas of relevance to students' chosen career.

Principle #5: Robust Student Assessment, Feedback and Course Evaluation

Student assessment that balances formative and summative methodology and tests student knowledge and skills at appropriate intervals from the point of teaching reinforces learning. Feedback supports student self-assessment and planning of study needs. Course evaluation employs a variety of methods to provide real-time feedback for faculty and course directors to allow effective and efficient course revision.

- LInC utilizes varied student assessment methods in order to test student knowledge of course content and demonstrate skills across disciplines.
- Student assessment includes both formative activities (providing feedback to promote student learning) and summative assessment (for determination of competence).
- Both course-specific and integrated assessments are incorporated to encourage students to apply knowledge and skills across the curriculum and demonstrate appropriate progress longitudinally.
- Course evaluations include periodic feedback on individual sessions and sections of a course as well as an end-of-course evaluation.
- Integrated clinical assessments that more closely model the competency of Physician as Clinical Problem Solver
- Opportunities for peer assessment in the Advanced Studies year that will help develop these skills necessary for practice and ongoing professional development.

Assessment is not "One Size Fits All"

Principle #6: Patient-Centeredness

Our curriculum has long been patient-centered with early clinical experiences and faculty who bring real patients into the classroom setting. In addition we utilize standardized patients throughout for student teaching and assessment. These experiences have continued, and have been enhanced to build even stronger connections between foundational sciences and patient care. The LInC uses actual patient cases or constructed scenarios to form a major focus of both the teaching and learning experience across all 4 years of medical school, which includes all courses/blocks in the Foundations of Medicine years (FOM1 and 2) as well as the core clinical and advanced studies experiences.

- Encourage and support integration across multiple disciplines in FOM1 and 2 and in the clinical years.
- Help students learn and retain more effectively the basic concepts and principles presented in each course as they observe how they are applied to real patients.
- Support active forms of teaching and learning.
- Help students develop and maintain problem-solving skills and the concept of "differential diagnosis" in preparation for later "live" patient encounters in FOM and throughout clinical and advanced studies experiences.
- Robust opportunities for simulated and standardized patient experiences to better prepare students for work with hospital and clinic patients when appropriate

'Cancer Concepts' and 'The Brain'

Framing key concepts and teaching using specific diseases.

AAMC-HHMI 2009

(Scientific Foundations for Future Physicians)

"It is important to 1) educate future physicians to be inquisitive; 2) help them build a strong scientific foundation for future medical practice; 3) equip them with the knowledge, skills and habits of mind to integrate new scientific discovery into their medical practice and throughout their professional lives and to share this knowledge with patients and with other healthcare professionals."

Principle #7: Mentoring

Mentoring is a key component of professional development. LInC enhances our current system through development of Learning Communities. Upon entry to medical school, students are randomly assigned to one of 5 learning community "houses" which enable them to interact academically and professionally with defined groups of faculty and students from all class years and departments. Each house has approximately 25 students from each class year, and all faculty will be assigned to a specific house with some assuming more concentrated responsibilities for teaching and mentorship. Opening in 2012, the Albert Sherman Center will have space designed to support planned activities that occur in the five learning community houses: competency based doctoring and clinical skills curriculum, student community and faculty and peer mentoring. Particularly exciting is this innovative approach to mentoring which includes both specific Foundations of Medicine curriculum and more general personal and professional faculty guidance. This dedicated space underscores the strong institutional commitment to this exciting change in our curriculum.

Student Mentors:

- Provide formal and informal peer to peer teaching
- Support personal and professional growth through interaction within and across classes.

Faculty Mentors:

- Serve as as a "faculty coach" shepherding each student through four years of medical school including key transitions, personal and professional development and career choice
- Monitor academic progress maintaining a learner-centered approach and providing specific learning guidance and proactive educational intervention
- Support students personal adjustments to undergraduate medical training
- Act as advocate for students linking them to specialty mentors, identifying opportunities to help students maximize their potential and serving as a student ally in times of difficulty.
- Teach students important doctoring and clinical skills including discrete mentoring curricula.
- Teach students in the CCE interstitial curriculum
- Provide guidance as students consider their AS Capstone Project, select their ABTS preferences , and prepare for residency

Our Learning Community Houses
Burncoat, Kelly, Tatnuck, Quinsigamond and Blackstone…

All Students * All Faculty

Outcome: Foundations of Medicine, Core Clinical Experiences and Advanced Studies Curriculum

The Foundations of Medicine FOM1 curriculum spans 36 weeks (excluding vacations). At its conclusion, students continue directly into FOM2, which provides a fully integrated basic and clinical science approach built around organs or systems. Because the first year of study concludes with the FOM2 cardiovascular block, students have the opportunity to immediately integrate, extend, and deepen knowledge and skills acquired in each of the FOM1 courses.

FOM1 is organized into 8 new, multidisciplinary courses, as shown on the graphic. Seven of the courses address principles of biomedical sciences including content from biochemistry, cell and molecular biology, histology, genetics, physiology, anatomy, pharmacology, pathology, immunology, hematology, microbiology and infectious disease. Each course constitutes a coherent, integrated block of material, and courses are scheduled in a coordinated and logical sequence. The eighth course is the year-long Doctoring & Clinical Skills 1 program, which has as a major goal the continuous application of integrated basic and clinical science. This program includes interviewing, physical examination, and problem-solving skills, opportunities for learning in patient care settings, and consideration of the social, cultural, ethical, environmental and economic aspects of medicine.

We believe that students' understanding of human health and disease - and passion for medicine - will be intensified by the FOM2 curriculum, and that they will be curious and excited to continue into Core Clinical Experiences and beyond.

FOM2 is organized into 5 courses as shown on the graphic. Two substantial courses, Organ System Diseases and The Brain: Nervous System and Behavior help students integrate knowledge related to pathophysiology, infectious diseases, malignancies, pharmacology and therapeutics within and across major organ systems. In parallel, the Determinants of Health (DoH) course provides the important psychosocial and environmental factors that impact health and illness. This course also hosts the 2-week interprofessional community-based immersion experience, the DoH clerkship. The year is capped by an innovative 'Patients' course that uses cases and undifferentiated systems to re-emphasize the basic science underpinnings of health and disease, and helps to prepare students for step 1 of the USMLE.

The Core Clinical Experiences span 48 weeks of curriculum organized into three 16-week coordinated thematic sections. These sections are Care of Adults (Medicine and Neurology), Care of Families (Family Medicine and Community Health, Pediatrics and Psychiatry) and Perioperative and Maternal Care (Surgery and Obstetrics & Gynecology). This model allows for both discipline-specific and interdisciplinary training, modeling the future of patient care. Basic science section leaders will work with clerkship directors to integrate specific basic science skills and content into the clinical experiences. A longitudinal, developmentally appropriate, integrated interstitial curriculum binds together the pieces of this model throughout the CCE with curriculum threads and continued presence of learning communities mentors as teachers. Students have the opportunity to craft a self-directed learning experience that links 4 discrete 1-week periods of time to meet their individualized needs over the span of the CCE year.

Advanced Studies begins in the spring of the third academic year, following completion of the Core Clinical Experiences. This curriculum balances required and elective time to support students' personal and professional development. The required elements include the Subinternship, an Advanced Biomedical and Translational Sciences selective, an Emergency Clinical Problem Solver course, the

Capstone course (as a pilot initially and a requirement starting with the class of 2016) and Transition to Internship experience. For the remainder of the Advanced Studies year, students undertake a planned program of study consisting of elective experiences and have unscheduled time for interviews, personal and professional development.

One of the key features of the four-year curriculum is integration both within and between courses. Integration is further strengthened in the foundational years by a two-year-long series of Integrated Case Exercises, and coordinated learning of Doctoring and Clinical skills in the eponymous course. The interstitial curriculum and basic science section leaders promote this integration in the CCE, and threads continue through AS in both the ABTS and ECPS course. A second key feature is the deliberate and consistent sequencing and reinforcement of basic principles with their clinical applications: making two-way connections between normal and abnormal, and asking the "why" of the connection. A third related feature is patient-centeredness through the consistent use of diverse cases, clinical scenarios, problems, simulation, formative and integrated summative OSCEs, development of clinical skills, and direct patient experiences.

Students average 22.5 hours of scheduled faculty contact time weekly in the foundational curricula with protected preparation and study time and follow current ACGME 'work hour' intern guidelines in their CCE. This supports interactive teaching methods that require student participation, and encourage the development of learning skills to support lifelong learning. All FOM courses will be graded on a Credit/No Credit scale to help create a collegial atmosphere of collaboration and support, and keep the emphasis on learning. Our current system of differentiated grading will continue in CCE, the required sub-internship and electives in AS to allow for students to distinguish their achievement. Team-based activities and assessments will emphasize the importance of interdisciplinary teamwork to the practice of medicine. In addition to the formal curricular elements outlined above, the new grouping of students from multiple classes into learning communities helps foster socialization in the profession and provide peer-to-peer mentoring.

We anticipate that the LInC will help students acquire basic science knowledge and problem-solving skills and apply these to clinical learning and patient care. Over the years, the curriculum should encourage LInC students to develop a rich appreciation of the interrelationships of basic science knowledge from different disciplines and the necessity of approaching clinical problems as a "whole."

"Based on the study's key findings, the team recommends four goals for medical education: standardization of learning outcomes and individualization of the learning process; integration of formal knowledge and clinical experience; development of habits of inquiry and innovation; and focus on professional identity formation"

Next Steps

Educating Physicians:
A Call for Reform of Medical School and Residency
{Molly Cooke, David M. Irby, Bridget C.}
Carnegie Foundation Study , June, 2010

Once approved by the Education Policy Committee, management of the Advanced Studies curriculum will be assumed by that group per established curriculum management processes. Until then, work continues under the direction of the Dean's LInC Steering Committee and the LInC Trustees. Approval of the AS curriculum will include establishment of an Advanced Studies EPC curriculum committee which will create the detailed curriculum calendar and further build and implement the Advanced Studies curriculum. LInC Trustees have mapped out milestones to aid smooth transition to that committee when it is formed, and will serve in an advisory capacity until the new AS curriculum committee is ready to commence work. In addition, the LInC Trustees will work collaboratively with the EPC to support development of a four-year longitudinal EPC sub-committee to continue to foster, manage and evaluate integrated, interdisciplinary, interprofessional education, longitudinal curricular themes and key curricular outcomes over time.

Upcoming meetings of interest include:

- Town Hall meeting for UMMS community-at-large to present LInC Advanced Studies, January 27, 2012
- EPC vote on Advanced Studies, February 6, 2012

LInC Foundations of Medicine 1 Launched

August, 2010

LInC Foundations of Medicine 2 Launched

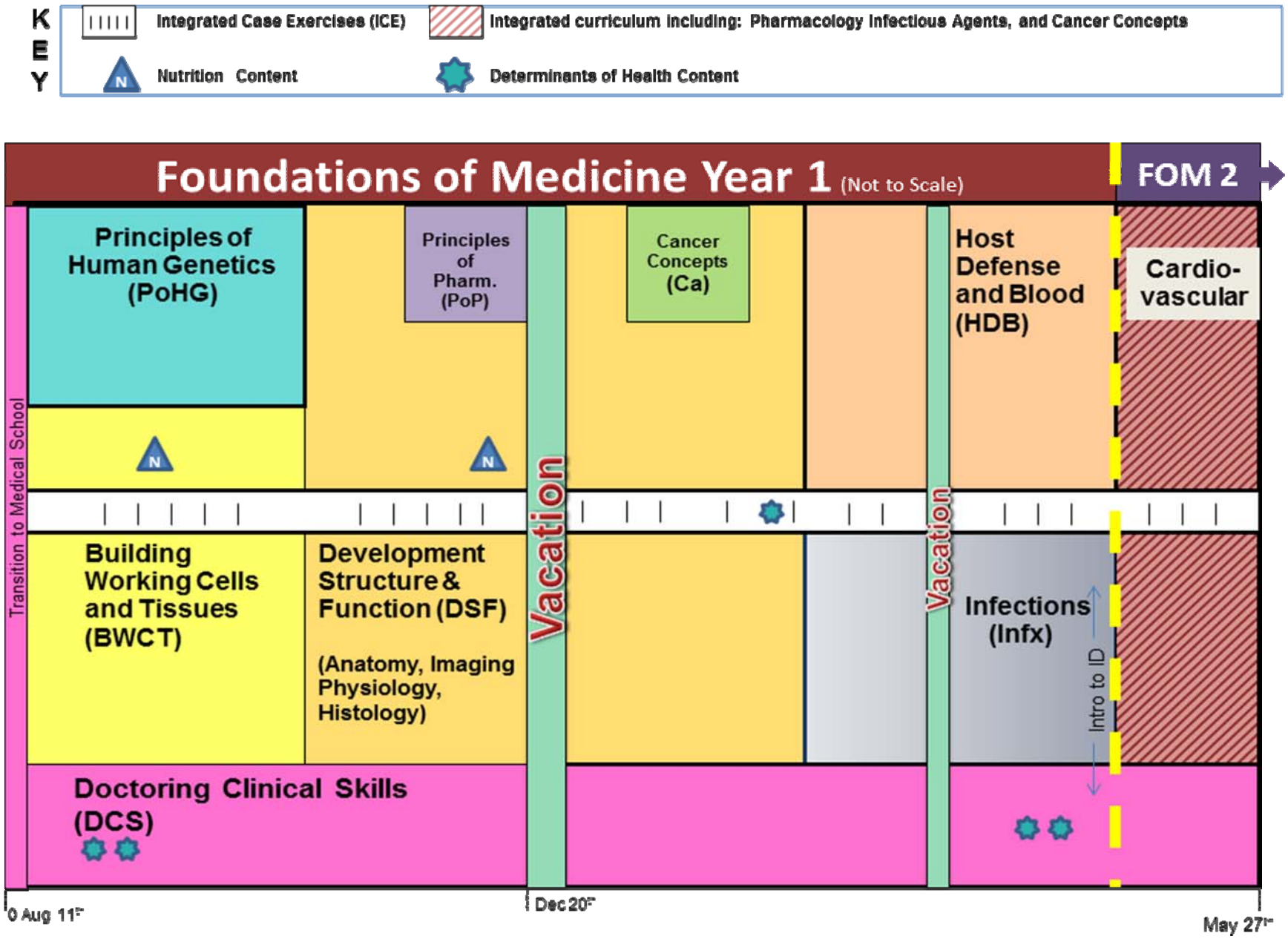
August, 2011

LInC Core Clinical Experiences Launch

May, 2012

LInC Advanced Studies Launch

May, 2013


KEY
Integrated Case Exercises (ICE)
Integrated curriculum including: Pharmacology Infectious Agents, and Cancer Concepts
N
Nutrition Content
Determinants of Health Content
Foundations of Medicine Year 1 (Not to Scale)
FOM 2
Transition to Medical School
Principles of Human Genetics (PoHG)
Principles of Pharm. (PoP)
Cancer Concepts (Ca)
Host Defense and Blood (HDB)
Cardio-vascular
Vacation
Vacation
Building Working Cells and Tissues (BWCT)
Development Structure & Function (DSF)
(Anatomy, Imaging Physiology, Histology)
Infections (Infx)
Intro to ID
Doctoring Clinical Skills (DCS)
0 Aug 11th
Dec 20th
May 27th

Foundations of Medicine Year 2

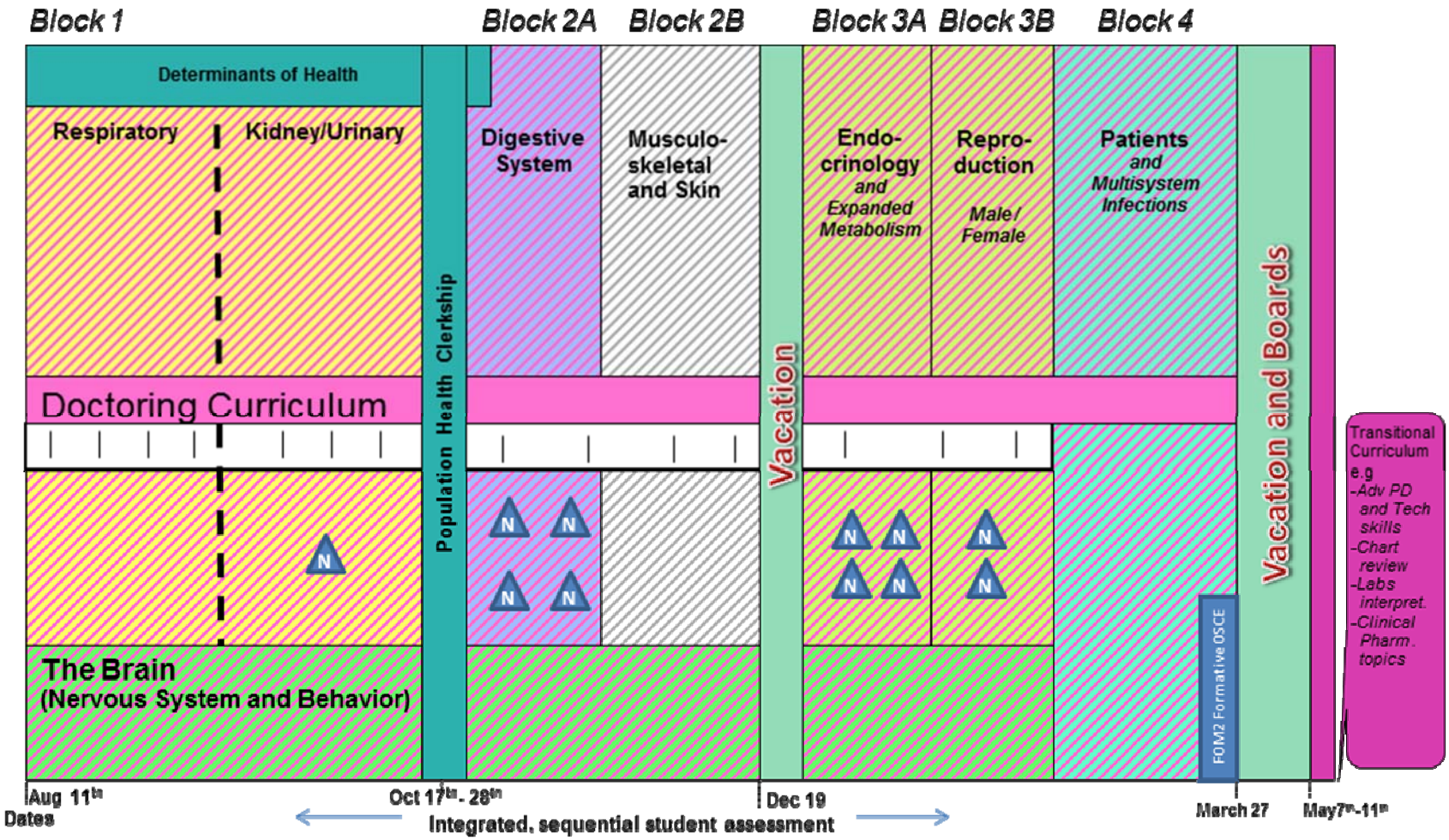
KEY

- Integrated Case Exercises (ICE)
- Integrated curriculum including: Pharmacology, Infectious Agents, and Cancer Concepts
- N — Nutrition Content

Some Common Features of Organ Blocks:

Interconnected, Multidisciplinary with Doctoring and Clinical Components

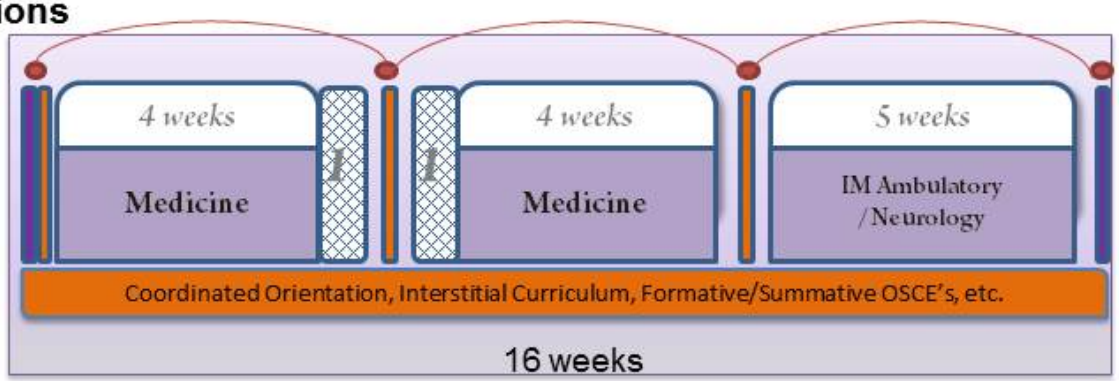
- Reviews of Year 1 Foundations content as appropriate
- Altered structure/ function in KEY disease states and their diagnosis (imaging/labs/H and P)
- Organ-specific infectious disease considerations
- Pharmacology/therapeutics for selected disease states; preview of management principles
- Genetics, Nutrition-related issues, Selected 'Frontiers of Medicine' etc.
- PD more advanced skills; Introduction to Differential Dx and Multi-system approaches



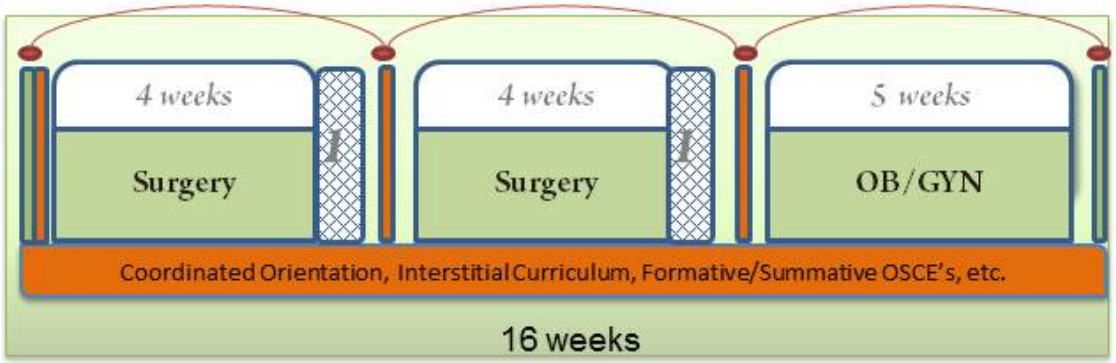
Core Clinical Experience Model

3 Coordinated Thematic Sections

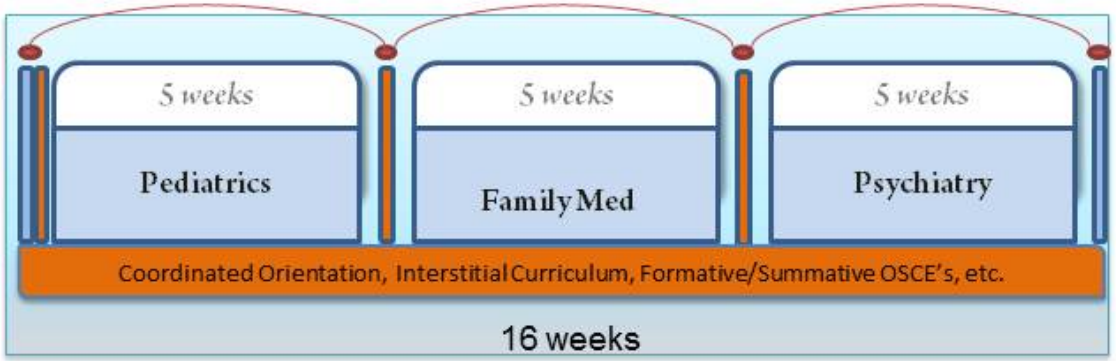
Care of the Adult:
shared objectives and basic science leadership



Perioperative and Maternal Care :
shared objectives and basic science leadership



Care of the Family:
shared objectives and basic science leadership



Legend

Three Coordinated Thematic Sections with Shared Objective, Basic Science Leadership and Coordinated Curricula:

***Care of Adults* (CoA)**

Medicine : 2 x 4 weeks Inpatient

2 x 1 week Elective – (at some points might be combined at clerkship discretion)

IM Ambulatory & Neurology : 5 week block – includes chronic care/rehabilitation.

Link to specific FOM components: e.g. Principles of Pharmacology, Organ System Diseases

***Perioperative and Maternal Care* (PMC)**

Surgery : 2 x 4 weeks

2 x 1 Week Elective – (at some points might be combined at clerkship discretion)

OB/GYN : 5 week block

Link to specific FOM components: e.g. Cancer Concepts, Development, Structure & Function, Principles of Human Genetics

***Care of Families* (CoF)**

Pediatrics : 5 week block

Family Med: 5 week block

Psychiatry: 5 week block

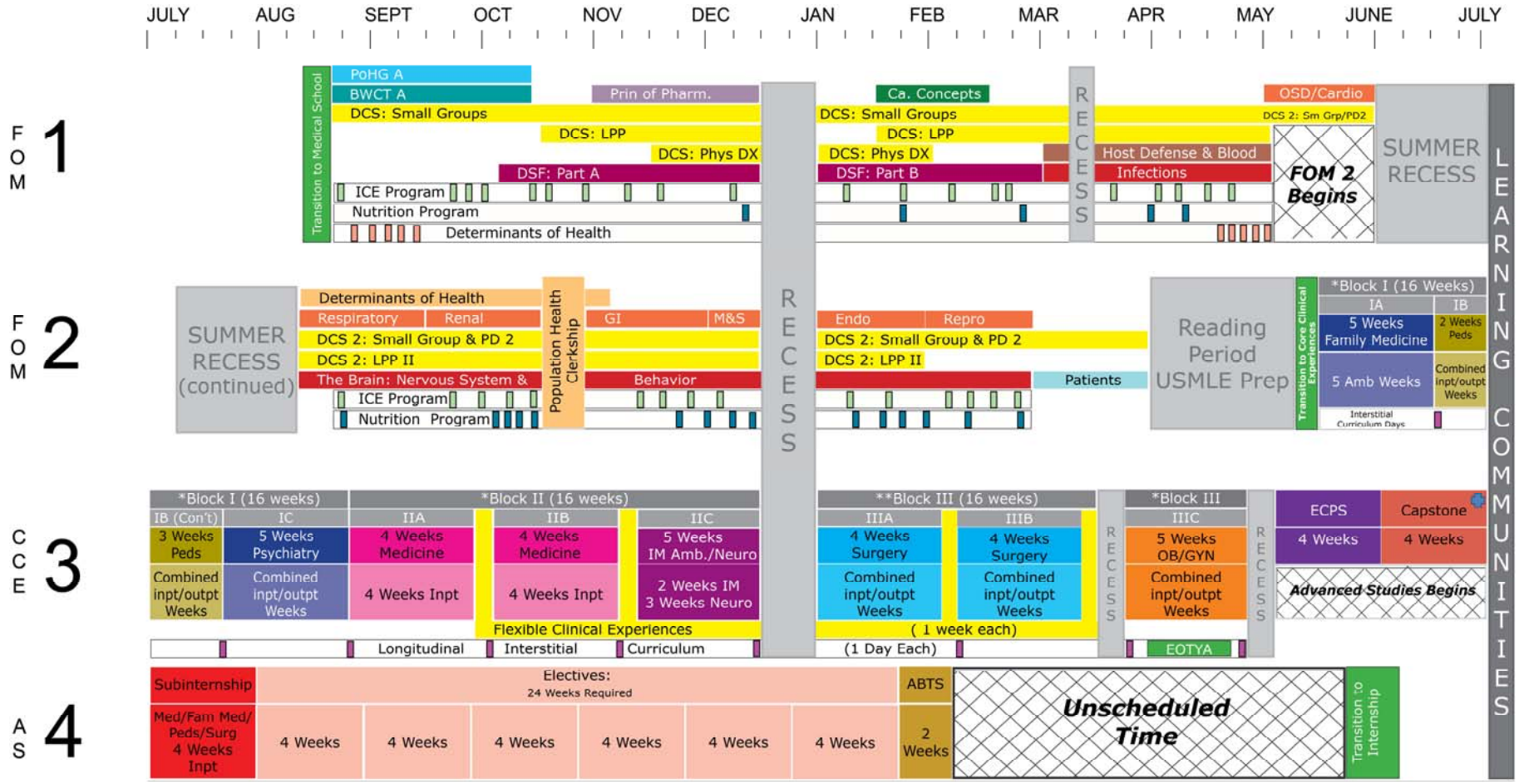
Link to FOM1 components: e.g.. Principles of Human Genetics, Determinants of Health

Interstitial curriculum: coordinated developmentally appropriate curriculum including communication, procedures, etc; coordinated orientations; Learning Community Curriculum; Interclerkship topics; journal club; Inter-professional education; Capstone topics, etc.

Clerkship-specific curriculum: integrated/shared and discipline-specific topics; intentional basic science integration, specific link to FOM courses

University of Massachusetts Medical School
UMASS

School of Medicine Curriculum at a Glance



Key

ABTS Advanced Biomedical and Translational Sciences
ACLS Advanced Cardiac Life Support Certification
AS Advanced Studies
BWCT Building Working Cells & Tissues
Cardio Cardiovascular
Ca. Cancer Concepts
DOH Determinants of Health
DSF Development Structure & Function
DCS Doctoring & Clinical Skills
Endo Endocrine
ECPS Emergency Clinical Problem Solver
EOTYA End of Third Year Assessment
FOM Foundations of Medicine
GI Gastrointestinal
HDB Host Defense & Blood
Inf Infections
ICE Integrated Case Exercises
LPP Longitudinal Preceptorship Program
M & S Musculoskeletal and Skin
Prin. of Pharm Prinicipals of Pharmacology
OSD Organ System Diseases
Repro Reproduction

***CCE blocks are each 16 weeks and include dedicated time for clerkships, assesments, and intersitial curriculum**

Required starting with Class of 2016

****Includes Surgical Subspecialties**

AY 2013-14
(2.6.12)

Principles of Human Genetics

Course Co-Leaders: Beverly Hay, MD and John Landers, MD

Foundations of Medicine I: Fall Semester, 29 hours {excluding student and course assessment time}

A Note from Course Leadership:

Recognizing the growing body of science related to genetics and its applications to healthcare, this course has been reconfigured to focus on the principles of genetics. Genetics content will then be threaded longitudinally into other components of the curriculum: Foundations of Medicine 1 courses, Foundations of Medicine 2 organ blocks and
Brain: Nervous System and Behavior and the clinical clerkships.

Course Overview:

The course will present a comprehensive and cohesive treatment of basic genetic concepts with clear clinical relevance, and will emphasize application and active learning. Concepts will be presented at various levels: chromosomal, molecular, Mendelian, multifactorial, population, genomic, all of which are relevant to clinical genetics/biomedicine and the patient/family. Human genetics is a critical and rapidly expanding area with linkages to many areas of medicine. The introductory content presented in this course will be reinforced and expanded by a planned integration of genetics topics within subsequent curriculum components of both the foundational years and clerkship experiences.

Scope of Content:

Includes basic cellular and molecular genetics and their clinical application in areas such as chromosomal abnormalities, genetic diseases, the human genome project, reproductive genetics, cancer genetics, genetics of aging, gene therapy, stem cells and cloning. Additionally the course will touch on some of the ethical, legal and social issues of genetic privacy and the 'genetic non-discrimination act. Current Hot Topics will be addressed, such as "personalized medicine" based on SNP variants that may impact an individual's responses to medications or therapies, and new discoveries and ideas about epigenetic inheritance.

Educational Methodologies:

The course will utilize large and small groups for presentation of key material, and will include patient-centered sessions in which patients and patient families are the primary "professors." Materials will be linked to clinical cases to reinforce concepts and application to patient care. Independent research requiring access and interpretation of the medical literature and use of online resources such as genetic databases will be introduced.

Student Assessment: Methods Planned:

Planned assessments for this course include in class and take-home exams and quizzes, problem sets and possibly a structured paper.

Building Working Cells and Tissues (BWCT)

Course Co-Leaders: Mary O'Brien, MD, and Bill Royer, PhD

Foundations of Medicine I: Fall Semester, 69 hours {excluding student and course assessment time}

A Note from Course Leadership:

Our committee firmly believes that our first two years of medical school "needs to establish a new culture". We need to initiate clinical thinking processes from the start, using a type of Oslerian model that promotes the application of scientific knowledge to solving medical problems. BWCT will make extensive use of cases to illustrate clinical aspects of the basic scientific concepts. We hope to have this teaching approach become the norm throughout all courses in the new curriculum, which will feature basic scientists collaborating with clinicians to illustrate topics. We hope that effective teaching in BWCT will lay the groundwork for the courses that follow, enabling these courses to spend more time on in-depth clinical illustrations of basic science principles.

Course Overview:

- We believe that students need a strong understanding of molecules and cells tin order to understand organ physiology and disease states
- BWCT addresses basic vocabulary, concepts, and methods of biochemistry, cell physiology, histology and metabolism, to promote an understanding of how cells work and how cells build tissues.
- Basic science concepts are reinforced through extensive use of clinical correlations

Scope of Content:

BWCT will introduce, and apply key principles of biochemistry, histology, physiology, carbohydrate metabolism, and cellular genetics to an understanding of how cells and tissues are built, and how they work.

Connections to Other Courses:

Substantial connections exist with the Genetics and Population Health course, as many metabolic diseases have a genetic origin. We would like to arrange the curriculum so that we can have joint case sessions where similar molecular and genetic concepts are being discussed. Moreover, our clinical discussions will provide important connections with the Doctoring/Clinical Experience course. Finally, BWCT will lay important groundwork for the Development, Structure and Function (DSF) course that immediately follows.

Educational Methodologies:

Clinical cases will be central to BWCT and used extensively to highlight basic scientific concepts. BWCT will use a teaching model similar to that utilized by business school/ law schools:

1. Students will prepare in advance for a specific topic using internet/ online lecture/notes.
2. Class time will be used for focused discussion on specific topics.
3. Clinical case presentations will be used to illustrate the topic. This can be done in large group or in smaller group settings, with clinician/basic science as co-leaders. We envision that our model can be the new "norm" for teaching methods throughout all courses.
4. Small group teaching will be co-facilitated by clinical and basic science faculty, depending on the faculty availability.

Student Assessment: Methods Planned:

- Problem- solving (formative): required responses to series of questions (preparatory quizzes) based on preparation work for specific topics.
- Emailed to course leaders prior to "class"
- Either solo or group response
- Course director/discussion leader will review some of the responses during "class discussion" and/or distribute review of responses to entire class via email
- Class participation: (formative): seminars/group discussions with faculty leaders
- Formal "interdisciplinary" exam: these exams to be interdisciplinary and possibly more like "board questions."

Development, Structure and Function

Course Co-Leaders: John Cooke, PhD Julie Jonassen, PhD and Daniel Schwartz, MD

Foundations of Medicine I: Fall and Spring Semesters, 216 hours {excluding student and course assessment time}

A Note from Course Leadership: Using a multifaceted approach, Development, Structure and Function (DSF) examines how the human body develops and how it works, by presenting a highly integrated view of anatomy, histology, physiology and development. This course emphasizes the importance of understanding both the regional and systemic aspects of human biology and medicine, using clinical cases and clinical imaging to integrate these heretofore isolated disciplines. A key feature of this course will be the development and implementation of a virtual library of shared resources (cases, images, course syllabi, etc) that link DSF to previous, concurrent and future courses.

Course Overview: DSF introduces first year medical students to the fundamental workings of the human body. This course integrates histological and gross anatomy, physiology, basic clinical imaging, development and clinical skills. Our diverse course directors and block leaders, comprising both basic scientists and clinical practitioners, will coordinate traditional teaching methods with innovative and unique computer based lessons, self-study, and hands-on, small group learning.

Scope of Content: DSF is organized into two highly inter-related blocks. "Regional DSF" (rDSF) integrates an intensive anatomic dissection experience with related microanatomy/histology, clinical imaging, and an introduction to major concepts of physiology. Regional dissections will cover limbs, thorax, abdomen/ pelvis, and head/neck. "Systemic DSF" (sDSF) presents detailed physiological function, enhanced by curriculum links to prosections, microscopic anatomy, clinical imaging and clinical presentations. Systems DSF will be organized into organ- and systems-based sections covering cardiovascular, respiratory, renal, GI, endocrine, and reproductive systems. Embryology and development will be presented throughout the course as a self-study online tutorial (http://www.embryology.ch/) and reinforced with weekly case presentations tied to current topics. Concepts of aging will be included in the development module. We emphasize that this is not a "two pass" model or "two course" model but rather a single course that weaves together the two overlapping major approaches to understanding human biology in medicine: regional and systemic. Key faculty will participate throughout the course, course materials will be well- integrated, and students will be able to "preview" and "review" course materials over the entire course.

Connections to Other Courses: Concepts introduced in Building Working Cells and Tissues (BWCT) will continue to be discussed and expanded. For example, basic biochemical processes such as intracellular signaling mechanisms, cell transport and ion channel physiology will provide a crucial background for many aspects of organ and systems physiology. Basic concepts of cell and tissue structure in BWCT will become the foundation for subsequent study of the organization of specific tissues and organ systems in DSF. Concurrent integration with the Doctoring Course will also be critical; for example, teaching a subset of the physical exam skills in the anatomy learning center with a coordinating dissection that emphasizes critical target structures, skeletal landmarks and surface anatomy. Resources such as Virtual Microscopy and an online lab manual could be shared with multiple courses, for example certain bone slides will be used for both bone histology (DSF) and bone marrow histology (host defense and blood). Faculty from the course expect to heavily participate in the ICE curriculum by sharing resources and assisting in developing cases. Because this course provides the foundation for FOM2 Organs, it is designed in consultation with key FOM2 faculty; FOM1 and FOM2 faculty jointly review course objectives and collectively organize the distribution of materials across FOM1 and FOM2. The repository of shared course resources will provide a convenient place for students to review earlier teaching materials independently and should help to eliminate unplanned redundancies.

Educational Methodologies: The course will use a combination of teaching methods, including intensive student dissection,, online lab modules using virtual microscopy, shorter formal lecture presentations (either given “live” or available online) done to introduce concepts or present cases, independent study with online learning modules, and faculty--and student-led clinical case study discussions and problem solving sessions.

Student Assessment: Assessment of students’ understanding of body and cell structures will be done in complementary ways, using formal assessments performed with specimens in the anatomy learning center or Integrated Teaching and Learning Center (practicals) combined with real-time, one-on-one assessment of competence by faculty in the anatomy learning center/ITLC settings. Self-assessment exercises will be used throughout the course, including web-based self-assessment modules (for embryology and development curricula). Student preparation for small group sessions will be evaluated by timely completion of assignments and by active student participation in small and large group sessions. Online or real-time summative quizzes will be used to provide timely feedback to students and faculty about current progress. Formal, summative examinations using a mixture of multiple choice and written questions will be used at selected intervals and will involve case-based material.

Principles of Pharmacology

Course Co-Leaders: Mark Dershwitz, MD, PhD and Charles Sagerstrom, PhD

Foundations of Medicine I: Winter Semester, 20 hours {excluding student and course assessment time}

A Note from Course Leadership:

The Principles of Pharmacology (PoP) course will lay the foundation for the teaching of pharmacology in the entire curriculum. Basic pharmacology principles and concepts will be introduced and placed in the context of other courses in the curriculum. The PoP course has been re-designed to emphasize how basic pharmacology principles impact treatment decisions – accomplished via close integration of clinical vignettes and case studies (to be co-taught by clinicians and basic scientists) with basic material.

Course Overview:

Students will learn to a) apply the scientific method and an understanding of the Principles of Pharmacology (pharmacokinetics, pharmacodynamics, drug metabolism, drug interactions, autonomic nervous system) to the practice of evidence-based medicine; b) apply an understanding of the Principles of Pharmacology in the making of treatment decisions and c) will have the tools to continue life-long learning and self-assessment with respect to the Principles of Pharmacology, including appropriate utilization of pharmaceuticals and prescribing practice.

Scope of Content:

Introduction and application of basic principles of pharmacology including the following topics:

- Drug Development & Regulation (1hr)
- Pharmacodynamics (3hr)
- Pharmacokinetics (2hr)
- Drug metabolism (2hr)
- Neuroeffector Systems (3 hr)
- Cholinergic Agents (2hr)
- Cholinesterase Inhibitors/Chemical Warfare (2hr)
- Adrenergic Agents (3hr)
- Clinical Vignette: Ocular & Critical Care (1 hr)
- Medication law (1hr)
- ICE cases (3hr) PK/PD, hypotension work-up, on-line resources

Connections to Other Courses:

PoP builds on information from Development Structure and Function (renal and cardiovascular physiology, autonomic nervous system anatomy) and Building Working Cells and Tissues (basic cell biology of neurons, neurotransmission).
PoP will make connections to Genetics and Population Health in the area of Pharmacogenetics.
While this template specifically addresses the FOM I PoP course for the first year, pharmacology and therapeutics will be intimately integrated throughout the FOM II organ blocks and specific content reflected in the clinical years. This will require close collaboration with those course directors and perhaps the development of a 'pharmacology teaching template'. Finally, we envision 4th year advanced therapeutics electives that would be available to students with specific needs to take a deeper dive into an area of interest.

Educational Methodologies:

Our goal is to encourage "internalization instead of memorization". We have attempted to shift learning from a lecture-based format to a format where lectures are combined with various exercises that apply concepts from the lectures. Some examples include: a) closer integration where a scientist and a clinician share one lecture session to closely integrate basic concepts with clinical applications; b) take-home exercises where students will work through a few scenarios to ensure that they grasp the implications of autonomic reflexes; c) two 'weekly cases' with one centered on warfarin to illustrate basic PD/PK/metabolism/pharmacogenetics concepts and another to familiarize students with various on-line/library Pharmacology resources. Also under consideration: on-line video recording showing how to work through take home problem sets/ exercises – to be posted after completion of take-home, possibly accompanied by on-line discussion thread to facilitate discussion of problems.

Student Assessment: Methods Planned:

Graded non-cumulative exams, graded "homework" assignments (PK/PD problem set or autonomic reflex exercise) and ungraded "homework" assignments (PK/PD problem set or autonomic reflex exercise) will be used. Also under consideration: Score the homework exercises to provide quantitative feedback to students, but do not include score when calculating course grade.

Cancer Concepts

Course Co-Leaders: James Liebmann, MD and Rick Pieters, MD

Foundations of Medicine I: Spring Semester, 20 hours
{excluding student and course assessment time}

A Note from Course Leadership:

This course will be entirely case based, so that the clinical relevance of each bit of information presented will be immediately apparent, but a very limited number of cases will be used to keep the focus on the basic science. The precept concept will require students to do reading before each session, and then be prepared to discuss. Recall of learned information is known to be better when it is learned in the same context in which it must be recalled. This structure is the way we wish we had been taught introduction to oncology.

Course Overview:

This course will cover the basic pathophysiology of malignancy, with each concept introduced by or tied back to one or more specific clinical cases. The course will utilize a combination of lectures and small group – either precepts, in which students discuss assigned reading with the assistance of a faculty preceptor, or virtual laboratories, in which students will use computer images of the pathology and the 3 dimensional anatomy of malignancy to understand the process at the cellular, tissue, organ and organism levels. In addition, introductions will be provided to the 3 clinical disciplines of oncology and to the epidemiology and societal implications of cancer.

Scope of Content:

This course will cover basic concepts including but not limited to carcinogenesis, tumor cell biology, angiogenesis, tissue invasion and metastasis. However, material will be presented in the context of clinical medicine. The curriculum will be based on five cancer cases. Basic principles of oncology highlighted by each case will be reviewed.

Connections to Other Courses:

The course will be built on the foundation of the Building Cells and Working Tissues course for the molecular and cellular basis of malignancy, Genetics and Population Health for genetic basis of cancer and epidemiologic approaches to malignancy, and the Structure and Function course (with which it will overlap in time) for the organ and organism effects of malignancy. Cancer Concepts will tie to the organ specific blocks which follow this course with the presentation of some of the cancers specific to each organ system within those blocks.

Educational Methodologies:

Lectures, Precepts, Case-Based Teaching; Precepts, 3-D Anatomy Lab, Virtual Lab.
The case-based teaching will include a case of pediatric cancer. The fact that most adult cancers are seen in older individuals will be emphasized. Review of cancer prevention and screening will include an overview of differences in care based on cultural and ethnic factors. Classes will be divided between lectures involving all students and small groups (precepts) with 10-25 students per group. It is our preference that precept groups be limited to 10-12 students.

Student Assessment: Methods Planned:

Preceptors will provide written evaluations of their students. Criteria to assess include attendance, participation in and preparation for precepts, and presentations at precepts. A two hour test using Medical Boards format will conclude the class and will be worth 50% of the grade. The Preceptor evaluation will cover the remaining 50% of the grade.

Doctoring/Clinical Skills

Course Co-Leaders: Mike Ennis, MD and Dave Hatem, MD

Foundations of Medicine I: Fall & Spring Semesters, 160 hours
{excluding student and course assessment time}

A Note from Course Leadership:

Students enter medical school to become doctors and engage in a career of lifelong learning and personal and professional development. Doctoring and Clinical Skills will provide a solid foundation for each of these goals through a mentored, skills-based curriculum with faculty mentors who have long-term relationships with students across their four years of medical school. The course structure includes small groups with vertical integration so that senior students share lessons learned with more junior students. In addition, mentors offer close observation and frequent feedback on clinical skills, application of scientific principles, and demonstration of humanistic values, will prepare our students to become skilled, innovative doctors and individuals who function effectively in teams.

Course Overview:

The course represents the primary curriculum delivered through the Learning Communities Program within Foundations of Medicine I. The curriculum begins with a 3 day transition to medical school with the goal of orienting the student to the structure of the medical school, learning resources, and the social and emotional needs of students in academically rigorous years. The Doctoring and Clinical Skills course will cover professional and personal topics important to the clinical skills of emerging doctors, including eliciting patient histories, performing physical exams, clinical decision making, and communication. Year 1 learning will occur in the context of mentored relationships with faculty in small groups and longitudinal clinical rotations with community providers. Many of the course topics will be revisited across the four years of medical school.

Scope of Content:

In the ***Transitions to Medical School*** component, students will receive an orientation to medical school and its community as well as receive certification in Basic Life Support. This will be followed by an introduction to the philosophy and structure of learning communities, strategies for learning in medical school, and an introduction to the concept of professionalism in medicine.
Primary content offered in the ***Doctoring and Clinical Skills course*** during Foundations of Medicine 1 include: the medical interview and communication in medicine, physical examination, clinical reasoning, professionalism, and medical ethics. More specific applications will include the student as professional, balancing personal and professional life, working in teams, physician (and student) as teacher, cultural diversity and patient care, oral presentations, determinants of health, and health care systems.

Connections to Other Courses:

There are multiple connections to other courses. Throughout the skills-based curriculum, the Doctoring and Clinical Skills course will reinforce and integrate scientific content taught in FOM1 courses with the skills needed to interact with, examine, diagnose, treat, and educate patients about their disease and its treatment. Integration with the concepts of Genetics and Population Health will emphasize the broad determinants of health beyond medical care including the role of genetics, behavior, and social environment.

Educational Methodologies:

Transitions curriculum will combine didactic lecture, role play, on-line modules, learning inventories, and discussion in small groups
Doctoring and Clinical Skills: Small groups incorporating patient encounters (real and standardized patients), peer to peer teaching and learning, problem solving, as well as physical examination sessions utilizing peer teaching, simulation technology, supplemental on-line learning, and selected didactic lectures.

Student Assessment: Methods Planned:

Transitions to Medical School Component:
Formative assessment will be the predominant focus during the transition programs in FOM I. Students will be asked to reflect upon experiences during each program and teachers/mentors will be encouraged to provide feedback and discussion points that will help educate the individual or group about all subjects presented.

Doctoring/Clinical Skills
Formative assessment of individual skills will occur with faculty evaluation and feedback. An End of Second Year Assessment will be introduced at the end of Foundations of Medicine 2 to assess competencies in the medical interview, physical examination, clinical reasoning, and oral and written communications with the aim of optimal preparation for the clinical years. Under consideration is the development and implementation of Learning Portfolios. Consideration will be given to balancing mentor teaching time with portfolio review time to allow the portfolio to serve as a formative assessment.

Host Defense and Blood

Course Co- Leaders: Leslie Berg, PhD and Robert Weinstein, MD

Foundations of Medicine I: Spring Semester, 62 hours
{excluding student and course assessment time}

A Note from Course Leadership:

This course will provide an integrated overview of blood and its disorders (hematology), immunology and inflammation. It will incorporate several new features including on-line learning modules, virtual microscopy exercises and student-led clinical case discussions and problem-solving sessions. Our specific focus is on building student knowledge of the interactions between the blood, immune and inflammatory systems and using this information in conjunction with clinical data to identify important hematological and immunological disorders.

Course Overview:

The course will be organized into two major sections: ***Blood*** and ***Host Defenses***. Each section will include a focus on the normal development, structure and function of the key components of these systems followed by a survey of the major disorders affecting them. The course will primarily address these competencies: *physician as scientist* and *physician as clinical problem solver.*

Scope of Content:

Blood:

- Bone marrow: normal and abnormal hematopoiesis
- Peripheral Blood
  - Red blood cells: normal structure and function, disorders, introduction to transfusion medicine
  - White blood cells: normal structure and function, disorders, progenitor cell transplantation
  - Platelets: primary hemostasis, platelet hematology, platelet transfusion
  - Plasma proteins and coagulation cascade: concepts, regulation, anticoagulation, coagulation disorders, plasma products and derivatives

Host Defenses:

- Inflammatory response: cells, soluble factors, vascular response, chronic inflammation
- Innate immune response: cells, soluble factors, immune receptors, response to infectious agents
- Adaptive immune response: antibody structure and function; B cells - development, activation and differentiation,malignancies; T cells - antigen presentation, T cell development and functions, T cells in disease -leprosy, autoimmune diseases, malignancy, tumor immunology; hypersensitivity reactions

Connections to Other Courses:

This course will be closely coordinated with the Infections course, which will occur simultaneously, and there will be critical links with content presented in other FOM1 courses, including Working Cells and Tissues, Genetics, Principles of Pharmacology, and Cancer Concepts. It is anticipated that clinical material presented in this course will have links with the Doctoring course and Integrated Clinical Exercises (ICE) program.

Educational Methodologies:

We plan to use the following new teaching methods: on-line learning modules and self-assessment quizzes, on-line virtual office hours and chat rooms, small group student-run clinical problem solving sessions, clinical cases requiring integration of hematology and immunology material, in class feedback on material and clinical problem solving using audience response system (clickers). Small groups will be facilitated by up to 20 faculty during small group case study discussion sessions.

Student Assessment: Methods Planned:

Formative: on-line self-assessment quizzes, use of audience response system during didactic lectures; no in-class time required
Evaluative: on-line graded quizzes following clinical case study discussions, in-class midterms and final exam; 4-6 hrs in class time required

Infections

Course Co- Leaders: Jennifer Daly, MD and Anthony Poteete, PhD

Foundations of Medicine I: Spring Semester, 59 hours {excluding student and course assessment time} Additional 16 hours of infections course content to be integrated into FOM II Organ Blocks

A Note from Course Leadership:

Infectious agents and infectious diseases affect our world and its inhabitants across generations (human and microbial), and interact with the human and non-human environment to cause disease. We have designed this new course based on LInC principles and meetings with individual faculty and students, building upon our experiences teaching students about microbiology, infections and antimicrobial pharmacology at various levels. We also reviewed past course evaluations. We are excited about continuing to refine our concept of evolving the course into integrated modules and creating new materials for individual and group learning related to Infections. We believe that the new design will excite students and their faculty teachers; encourage them to innovate; and challenge themselves as teachers and life-long learners.

Course Overview:

This course bridges the first and second year curriculum and gives the student understanding of viral, bacterial, fungal, protozoan and helminthic pathogens from both the organism and host point of view. It provides a foundation in basic microbial biology and pathogenesis using a framework of clinical disease and host defense in FOM I, followed by advanced concepts of pathophysiology, infectious disease syndromes, differential diagnosis and treatment (including pharmacology of antimicrobials) in FOM II.

Scope of Content:

The course deals with the laboratory aspects, structure, and pathogenic strategies of infectious agents that cause disease across populations from birth to death, including viral infections affecting pregnant women and their fetuses. We include in the course structure-function properties of microbes that relate to host response, clinical syndromes and antimicrobial therapy. We present infectious agents in the context of epidemiologic (population health) factors including the psychological and social implications of various infections and the need for providers to have the cultural competencies to help patients understand these illnesses. Once the students have the necessary background in the FOM II year, we correlate pathology with microbial properties and clinical signs and symptoms of disease including differential diagnosis and treatment.

Connections to Other Courses:

We need to collaborate with the Cells and Tissues course leaders on the teaching of the cell division cycle, which is a key target of intracellular pathogens. We need close coordination with the Host Defense and organ block teams on the timing of material dealing with the immune responses to bacterial, viral, fungal and parasitic infections. We need close collaboration with the FOM II block leaders to refine understanding of infectious agents after the students have an understanding of human pathology and disease, as our curriculum content needs to be spread through the organ blocks sections at the end of the first year (Cardiology/Heart) and throughout the second year organ blocks. We plan to connect with the ICE leaders and those preparing the doctoring curriculum to link topics in our course with the longitudinal curriculum. We need to link with the Clinical experiences teams for third and fourth year, so that they understand the foundations we taught, as well as the basic science and clinical topics we deferred, reserving them for advanced electives or clerkships.

Educational Methodologies:

We envision a course taught in modules (in the FOMI Infectious Agents block, perhaps each one week long) that have a mixture of standard lectures, interactive lectures with audience response, case and lecture sessions taught by basic scientist and clinical educator teams, and small group sessions. With the course directors' oversight, the faculty in each module will prepare an assignment to introduce any concepts not covered in the class time hours, and to provide review and formative assessment. For the small groups we will have instructors who are teaching in that module who will prepare the material and standardize the approach across the groups. We will use interactive sessions in certain class hours to provide "instant" self-assessment for students and allow faculty to gauge the students understanding of the material. We will use simulated labs and virtual microscopy when relevant to core curriculum.

Student Assessment: Methods Planned:

In addition to the formative methods listed above, we will use credit for written assignments and participation in small groups as part of the student assessment. We would like to develop some on line self tests for students with points given for completion of the exercise rather than correct answers. We plan to have tests and exams that will require 2 to 4 hours of curriculum time in year one (tests, review and answer session) and will be incorporated into block unit exams for additional time in the organ block curriculum.

Organ System Diseases

Course Co-Leaders: Sonia Chimienti MD, Mark Madison MD, Tom Smith, MD, and Vijay Vanguri, MD

Foundations of Medicine 2: Begins Spring Semester FOM 1 continues through Fall and Spring semesters FOM 2, 233 hours {excluding student and course assessment time}

A Note from Course Leadership:

An understanding of disease pathogenesis, pathology and pathophysiology is the bridge linking basic science to the clinical bedside. Combined with medical pharmacology, these disciplines provide the knowledge base necessary for effective and lasting learning in the third and fourth years of medical school. In keeping with LInC principles, the course Organ System Diseases (OSD) will build that knowledge base and then foster integration of the knowledge so that it can be applied in problem solving.

Course Overview:

OSD consists of 7 organ system blocks that begin at the end of the first year of medical school, follow in a sequence that may vary yearly, and end near the end of the second year of medical school. The blocks are Cardiovascular, Respiratory, Kidney/urinary, Digestive System, Musculoskeletal/Dermatology, Endocrine, and Reproduction.

Scope of Content:

The major disciplines covered are Human Pathology and Pathophyisology, along with Medical Pharmacology. Included under the categories of Pathology and Pathophysiology are Infectious Diseases, Oncology, and Nutrition. Key principles are that, first, no attempt will be made to cover all human diseases; instead, the course will focus on the most common diseases and those best illuminating basic principles. Second, the material will be covered at a depth appropriate for second year medical students. The course will not attempt to emphasize clinical management; however, the management of clinical cases frequently will be used to illustrate and underscore the importance of basic principles.

Connections to Other Courses:

Block coordinators will be expected to design their blocks with an emphasis on integration with other courses and other blocks in both the first and second years of medical school. Especially, blocks will be integrated with DSF in the first year and with the Doctoring Curriculum, The Brain, and ICE in the second year.

Educational Methodologies:

Block coordinators are encouraged to develop innovative methodologies. At a minimum, all are required to use no more than 60% of the allotted time for traditional lectures, all will use interactive large/small group sessions, all will provide electronic access to slides used in traditional lectures, and all will provide an electronic syllabus. Each block will create and maintain a catalog of covered and uncovered diseases/syndromes so that deficiencies and redundancies in the curriculum can be monitored for and corrected.

Student Assessment: Methods Planned:

Assessment methods will be uniform across all blocks and this will foster continuity of expectations throughout this long course. Each block will have a formative assessment based on existing question banks currently used for summative evaluations in the existing curriculum. In addition blocks may choose to incorporate other formative elements into the allotted curriculum time. A major innovation for the course will be the use of purchased NBME examination questions for the summative assessments for each block. These questions are designed to test the level of knowledge, integration of knowledge, a major LInC goal, and, in this regard, will lead to superior and more valid examinations. The goal is not to "teach for the boards" but to, instead, utilize these carefully crafted questions to fairly and accurately assess knowledge and integration. Finally, a case-based written exercise at the end of the course also will count for a portion of the students' final overall score and grade in the course.

Determinants of Health

Course Co-Leaders: Jeroan Allison, MD and Suzanne Cashman, ScD

Foundations of Medicine 2: Fall Semester, 70 hours

{excluding student and course assessment time}

A Note from Course Leadership: Much of medical study focuses on what is happening in the body to cause illness and/or disease. Through the Determinants of Health (DOH) course, students are challenged to think beyond the parameters of the human body and to consider the many ways in which the external environment affects and influences human beings' health. This includes factors related to the environment, social conditions, and behaviors. In FOM2, DOH will link instruction in the fundamentals of Biostatistics and Epidemiology with advocacy skills and practice through applying elements of population health in the community health clerkship. Given that individuals' living circumstances largely constitute the determinants of health, this course will ensure that students begin to identify and, as appropriate, learn methods for intervening and advocating related to any of the many factors affecting patients' health status. It will support the Physician as Advocate competency.

Course Overview The course will begin with instruction in Epidemiology and Biostatistics. Students will be challenged to think in terms of populations as they learn to understand the medical literature and apply findings in the literature to their own clinical decisions. They will accomplish this goal in part through working with data from community health clerkship populations as well as data from the health behavior survey administered to their own class. Immediately following the Epi/Biostatistics course segment, medical students will join Graduate School of Nursing students in interprofessional small groups assigned to one of approximately 25 community clerkship placements. Through this immersion clerkship experience, students will have mentored opportunities to apply their population health skills and begin honing skills in advocacy. In addition, they will begin to develop community engagement skills needed to ensure effective clinical and translational research. They will see how studies can be challenged by community conditions that must address issues related to Determinants of Health. These issues include but are not limited to literacy, culture, health beliefs, education level, and socioeconomic status.

Scope of Content: The FOM2 DOH course will build on elements of FOM1 through guiding students as they delve more deeply into issues related to health disparities, causes of illness and disease, the relationship between the health of an individual and the health of a population or community, and the role of physician as advocate. Students will learn basic population health skills and then have the opportunity to apply them in a wide range of communities. They will learn about applying principles of population health to a variety of populations and communities through presenting and discussing their clerkship experiences with other clerkship groups. In addition, the interprofessional nature of this course will provide opportunity for students to learn from, with, and about other health professions.

Connections to Other Courses: This course will connect primarily to the Doctoring and Clinical Skills course and the Integrated Case Exercises. Integration with DCS and ICE will ensure that students see that health is more than medical care: it is influenced and shaped as well by behavior and social forces, environment, and genetics. Through DCS and ICE, students will be challenged to make the connection between patients' clinical presentations and the wide array of factors that can cause illness and disease. In making these connections, students will begin to see where and how they may be advocates for their patients as well as for and with communities.

Educational Methodologies:

In the Epi/Biostatistics portion of DOH, the course will use a variety of educational methodologies including large group lectures, small group workshops, reflections on published literature, and live use of data to demonstrate key aspects of biostatistics. The community health clerkship will employ service-learning as its foundational pedagogy. Through the clerkship immersion experience, students will learn from and in a wide variety of communities as they apply principles of population health with their population of focus.

Student Assessment: Methods Planned:

We will use problem sets and a take home exam for the Epidemiology/Biostatistics segment of the course. For the applied community health clerkship immersion, assessment methods include: reflective journals or blogs, completion of a population health template and a poster that captures highlights of the clerkship activity.

The Brain: Nervous System and Behavior

Course Co-Leaders: Sue Gagliardi, PhD, Neeta Garg, MD, Mai-Lan Rogoff, MD and Tom Smith, MD

Foundations of Medicine 2: Fall and Spring Semesters, 143 hours
{excluding student and course assessment time}

A Note from Course Leadership:
We believe that physicians should see disorders of the nervous system and behavior as disorders of the whole person, taking into account genes, neurological substrate, behavior, and environment. They should consider the impact of these disorders on the person, the family, and society. We are designing our new course to promote this philosophy. It will emphasize content and clinical problem solving skills relevant to general medical practice now and in the foreseeable future. We also hope that it will excite and challenge both students and teachers to continue exploring this rapidly evolving field, and to incorporate what they learn into their ongoing work and practices.

Course Overview
The course will present foundational content in three concurrent tracks: neuroanatomy & systems neurophysiology, neuropathology & neurology, and psychiatry & behavioral science. Related content will be organized into sessions such as 'Approach to the patient with X' that include integrated pharmacology and infectious disease components. Cross-disciplinary approaches will consistently utilize 'anchor disorders' such as Stroke, Seizures, Dementia, Depression, Traumatic Brain (and SC) Injury, and Pain. Ways in which neurological and behavioral reactions to illness affect the doctor-patient relationship and practice of general medicine will be emphasized. The course will focus on analysis of information and clinical problem solving using both paper cases and multimedia content. It will be presented as a collaborative venture between teachers and learners. Students will be expected to share responsibility for their learning both as individuals and as members of teams.

Scope of Content:
- Normal structure and function of the nervous system
- Localization (where is the lesion)
- Pathophysiology of major nervous system disorders (what caused the lesion)
- Approach to the patient and differential diagnosis (how do common neurological and psychiatric disorders present clinically)
- Major psychiatric syndromes (e.g. psychoses, mood disorders)
- Normal and abnormal psychological development (e.g. child, sexuality, geriatrics)
- Introduction to management as it relates to pathophysiology and other etiologies

Connections to Other Courses:
The Brain builds on information from a number of FOM1 courses, mainly BWCT and DSF. It will make specific connections with components of the extensive FOM2 Organ System Diseases (OSD) course, particularly the Cardiovascular and Musculoskeletal/Dermatology blocks, and with Doctoring and Clinical Skills 2. Looking forward, course content will anticipate and complement the presentations of major clinical problems that students will encounter during their clinical clerkships.

Educational Methodologies:
The course will support different ways of learning, and utilize a variety of teaching formats and materials for individual and group study. Class time will include interactive large group lectures and discussions, smaller group conferences, clinical case presentations, and laboratories. Multimedia will be used extensively to enhance experiential learning. Students will be provided a smorgasbord of different learning materials including interactive atlases, video and audio resources, and cases.

Student Assessment: Methods Planned:
Assessment will be tied specifically to thee three key components of the curriculum – didactic content, experiential learning, and problem solving. Formative Evaluations will include both short quizzes related to individual prep sessions and longer formative evaluations on topics or cases reflecting larger "chunks" of curricular time. Summative evaluations will include both multiple choice and short answer formats. Questions will require analysis of cases and interpretation of clinical, imaging and laboratory data. In addition, take-home exercises will require discussion of cases, original papers or reviews in the current literature.

Doctoring/Clinical Skills

Course Co-Leaders: Mike Ennis, MD and Dave Hatem, MD

Foundations of Medicine II: Fall & Spring Semesters, 91 hours

{excluding student and course assessment time}

A Note from Course Leadership: Students enter medical school to become doctors and engage in a career of lifelong learning and personal and professional development. Doctoring and Clinical Skills will provide a solid foundation for each of these goals through a mentored, skills-based curriculum with faculty mentors who have long-term relationships with students across their four years of medical school. The course structure includes small groups with vertical integration so that senior students share lessons learned with more junior students. In addition, mentors offer close observation and frequent feedback on clinical skills, application of scientific principles, and demonstration of humanistic values, will prepare our students to become skilled, innovative doctors and individuals who function effectively in teams.

Course Overview: The course represents the primary curriculum delivered through the Learning Communities Program within Foundations of Medicine II. The curriculum begins by drawing specific attention to how the skills taught in second year will build on what was taught in first year. The goal of orienting the student to the structure of the second year, unique features requiring attention such as problem solving integrated with pathophysiology is learned in greater detail, and the social and emotional needs of students in academically rigorous preparation for the clinical years. The Doctoring and Clinical Skills course will cover topics important to the clinical skills of emerging doctors, including eliciting patient histories, performing physical exams, clinical decision making, and communication. Year 2 learning will occur in the context of mentored relationships with faculty in small groups and longitudinal clinical rotations with community providers. The second year course will conclude with a transition to clinical years. Many of the course topics will be revisited across the four years of medical school.

Scope of Content: The Doctoring and Clinical Skills II course will build on the philosophy and structure of learning communities, that learning of content should take place in a supportive environment that prepares learners fully for their next phase of training. The themes of professionalism and self-directed learning will be the foundation for what takes place. Primary content offered in the ***Doctoring and Clinical Skills course*** during Foundations of Medicine II include: advanced interviewing skills and communication in medicine, physical examination, clinical reasoning, professionalism, and medical ethics. More specific applications will include the student as professional, balancing personal and professional life, working in teams, physician (and student) as teacher, cultural diversity and patient care, oral presentations, determinants of health, and health care systems. All of these topics will be taught while significantly augmenting the teaching with regard to physical examination and its integration into the problem solving process. The course will culminate in the Transition to Clinical Years, an experience that will bridge the gap between the predominantly pre-clinical to the clinical years

Connections to Other Courses: There are multiple connections to other courses. Throughout the skills-based curriculum, the Doctoring and Clinical Skills course will reinforce and integrate scientific content taught in FOMII courses with the skills needed to interact with, examine, diagnose, treat, and educate patients about their disease and its treatment. Integration with Determinants of Health will emphasize the broad determinants of health beyond medical care including the role of genetics, behavior, and social environment. Robust integration with the Organ System Diseases, and Integrated Clinical Exercises and the Patients course will prepare students for their clinical rotations.

Educational Methodologies: ***Doctoring and Clinical Skills:*** Small groups incorporating patient encounters (real and standardized patients), peer to peer teaching and learning, problem solving, as well as physical examination sessions utilizing peer teaching, simulation technology, supplemental on-line learning, selected didactic lectures, and multiple encounters with patients in outpatient and inpatient settings will take place in the course. ***Transitions curriculum*** to prepare for the clinical years will combine didactic lecture, role play, on-line modules, learning inventories, and discussion in small groups

Student Assessment: Methods Planned: ***Doctoring/Clinical Skills:*** Formative assessment of individual skills interviewing, oral presentation, physical examination and write-up skills will occur with faculty evaluation and feedback. An End of Second Year Assessment will be introduced at the end of Foundations of Medicine 2 to assess competencies in the medical interview, physical examination, clinical reasoning, and oral and written communications with the aim of optimal preparation for the clinical years. Under consideration is the development and implementation of Learning Portfolios. Consideration will be given to balancing mentor teaching time with portfolio review time to allow the portfolio to serve as a formative assessment.

Integrated Case Exercises

Course Co-Leaders: Mike Fahey, MD and Christina Hernon, MD

Foundations of Medicine I: 20 hours, Foundations of Medicine 2: 15 hours
{excluding student and course assessment time}

A Note from Program Leadership:
Studying medicine is an extremely challenging endeavor. The first two years of medical school strive to make incoming students competent in a variety of fields, including biochemistry, physiology, histology, anatomy, genetics, pharmacology, pathophysiology, and clinical doctoring skills. It is easy for the medical student to become lost in the deluge of information in which they are immersed, thereby losing sight of the overreaching goal of this education. The goal is to become an outstanding physician who can relate their expertise in multiple disciplines to the health and well-being of their patients. The Integrated Case Exercises (ICE) curriculum aims to link the student's core learning through Foundations of Medicine (FOM) 1 and 2 to clinical problems that real patients face every day. The ICE curriculum in the first year of medical training (ICE-1) will serve to cross-link material from the other FOM1 courses, and apply this material practically in a clinical case setting. The ICE curriculum in the second year of medical training (ICE-2) will be geared toward preparing the second year student for competency on the wards and clinics in their following two years of training.

Program Overview
There will be 20 ICE sessions over the course of FOM1. The cases will be temporally linked to material covered in the other FOM-1 courses. We will draw on material already learned, review material currently being taught in other courses, and foreshadow material and concepts that are yet to come in the broader FOM curriculum.
There will be approximately 15 ICE sessions over the course of FOM2. The cases will draw on material covered in the relevant FOM1 and FOM2 courses. Whenever possible, the cases will be temporally linked to material being taught as part of FOM2. The flavor of ICE-2 will be distinctly practical, however. We anticipate instruction in several technical skills (interpreting an electrocardiogram, for example), as well as focused instruction on high-yield practical medical knowledge (the differential diagnosis and workup of acute abdominal pain, for example).

Scope of Content:
The topics covered will be intentionally very broad. The goal is to treat a variety of subjects that display the interconnections of the basic medical sciences and the humanistic side of practicing medicine. The topics covered in ICE-1 are determined by the ICE co-leadership in conjunction with other FOM1 course leaders. The topics covered in ICE-2 will be guided to a large extent by feedback from the senior medical students who have recently been through their ward and clinic experiences. The goal is to address material that is perceived as particularly high-yield and useful to the medical student entering their clinical years of training.

Connections to Other Courses:
As the primary goal of ICE is to tie together concepts from all corners of FOM, the connections to other FOM courses will be extensive and palpable. We will make clear references to concepts covered in other courses to reinforce these connections.

Educational Methodologies:
The backbone of each ICE session is a clinical case or problem. The case or problem is approached in a particular manner depending on the particular ICE session. While ICE-1 sessions would fall under a set number of templates, we anticipate the ICE-2 sessions being somewhat more free-form. In both ICE-1 and ICE-2, we will draw on the knowledge of experts in relevant fields of medicine whenever possible. The model for ICE-2 also lends itself to collaboration with current third and fourth year medical students who are interested in educating their peers, perhaps in small group sessions.

Student Assessment: Methods Planned:
Student performance assessment in ICE will include questions concerning ICE-related content / concepts that will be integrated into course examinations, in addition to participation in an end-of-year ICE exercise.

Patients

Course Co-Leaders: Michele Conroy, MD and Howard Sachs, MD

Foundations of Medicine 2: Spring Semester, 33 hours

{excluding student and course assessment time}

A Note from Course Leadership: Scheduled as the final teaching block of the foundational studies years, students arrive at the Patients course having completed their training in FOM 1, FOM 2, ICE and DCS. Thus, the course is situated at the crossroads of their foundational educational experience and the opportunity to apply this knowledge to clinical scenarios involving complex patients with multisystem disease states. The Patients course represents a culmination of the integrated curriculum and serves as a stepping stone from which the students will confidently move ahead, through a month long journey looking "backward" at their FOM. The course will reinforce that Foundations is truly the basis for successful clinical problem solving while generating enthusiasm and piquing curiosity toward their clinical training.

Course Overview The Patients course will be taught over a 4 week time frame at the end of second year, prior to students' transitions to more in depth clinical work. This course will take advantage of this placement and re-emphasize FOM1 basic science foundational knowledge into clinical cases. Clinical scenarios will be intentionally broad, with a focus on un-differentiated presentations such as weight loss, shortness of breath, joint pain, rashes, and failure to thrive. These cases will incorporate the aspects of the 10 basic science principles per the USMLE. An additional focus on multi-system disease will provide an opportunity to practically discuss systems that are not easily categorized into the 7 organ systems taught in OSD. Incorporation of USMLE preparation will be a key component of case discussions.

Scope of Content: The course will cover clinical scenarios involving all the components of the organ system blocks as well as the nervous system. In distinction from the blocks, patients will be presented with multisystem disease involvement necessitating integration of knowledge from several disciplines simultaneously. In addition, the scenarios will reflect the dynamic process integral to clinical problem solving. Our case-based presentations will include the "natural history" of patients, not just their diseases. That is, we will incorporate the sequential development and/or presence of multiple disease processes in individual patients and reflect how these multiple diseases effect and impact one another. In so doing, we will doggedly reflect back and integrate key components of FOM 1 and 2 avoiding undue focus on diagnostic testing and therapeutics except where appropriate to case development.

Connections to Other Courses: Situated at brink of full immersion into the clinical world, Patients represents a nexus of all prior course work. Intentionally, both novel and previously reviewed cases will be discussed. The course will make conspicuous references to prior material, particularly from FOM1 and the ICE curriculum. Various media applications will be employed to successfully consider basic science application to clinical disease. Our materials will integrate lessons learned from the Doctors and Clinical Skills curriculum and expand into areas not specifically covered in Infections.

Educational Methodologies: The foundation of this course will be clinical case scenarios drawn from the practices of the course co-directors. Where possible and practical, patient involvement will be integrated into the teaching process. PowerPoint based presentations will likely form the basis of teaching with a significant presence of information technology (IT) support including radiographic imaging studies, photomicrographs of histopathologic specimens, clinical imagery, pathoanatomic correlations, etc. Our ability to integrate USMLE materials will offer us additional IT opportunities appropriate to content. The exercises by definition will be interactive. Student participation should include answering USMLE-type and multiple choice questions as well as active involvement in problem solving. No specific textbook is expected other than reference to materials taught during Foundations. It is anticipated that educators from the Foundation curriculum will be either directly involved with teaching or their previously taught curriculum materials will be available.

Student Assessment: Methods Planned: This is a credit/no credit course that will utilize various methods to assess student performance. It is anticipated that students will be working in small groups of "specialists" lead by a designated Primary Care Physician. Given the interposition with the USMLE, multiple choice questions will be regularly integrated into our clinical scenarios with the groups being accountable for accumulating correct responses throughout the course. Upon completion of the Patients curriculum, a final exam will be offered including review of previous material and problem solving around a new case presentation appropriate to the level of training. The endpoint will be the student's ability to demonstrate a sound pathophysiologic approach to clinical problem solving which may include an end of 2nd year formative OSCE.

Nutrition Program

Program Leader: Angela Beeler, MD

Foundations of Medicine 1 (5 hours); Foundations of Medicine 2 (11 hours)

{excluding student and program assessment time}

A Note from Program Leadership:

Nutrition is a pervasive topic that affects all aspects of health care. It is important that students understanding the relationship between patients' (and their own) choices related to food and activity, and the emotional and physical health outcomes of these choices. The Nutrition Program aims to provide students with broad based nutritional information that they will be able to apply in their interactions with patients.

Program Overview

The nutrition program consists of online learning, lectures and experiences that are integrated into other courses, yet maintained within a separate site in the online learning system. This allows students to identify the nutrition they are learning throughout their courses and access it in one site. It helps students recognize that nutrition is and should be thought of in all they do, and not just focused on in a single course or time.

Scope of Content:

The integrated nutrition content provides students with a progressive exposure to nutrition. During Foundations of Medicine 1 (FOM1) they learn about the basics of macronutrients and micronutrients, including vitamin deficiency. They also learn about the basics of hunger and digestions. During Foundations of Medicine 2 (FOM2) they will learn about how nutritional needs change as people experience different developmental or disease states. This will lay the foundation for nutrition content during the clinical years that will reinforce how to use this information with patient interactions.

Connections to Other Courses:

Integration with other courses is a key aspect of the Nutrition Program. We work with leaders of all other courses to make sure nutrition content that correlates with their curricular content is presented during that course. Nutrition content will be presented during Building Working Cells and Tissues, Doctoring and Clinical Skills, Development Structure and Function and Host Defense and Blood in FOM1; and during almost all blocks of Organ System Diseases as well as Determinants of Health in FOM2.

Educational Methodologies:

Nutrition will be taught utilizing a wide variety of methodologies. Information will be provided largely in online modules or large group lectures. There will also be 2-3 experiential learning projects where students will be asked to analyze their own behavior and choices as well as try out behavior change in their own life. This will allow students to gather a knowledge base and practice using it during the first 2 years of medical school.

Student Assessment: Methods Planned:

Assessment will be done in the course in which the nutrition content resides. There will not be a separate grade given for the Nutrition Program. Assessments will consist of multiple choice question quizzes and experiential projects with short analytic and reflective write ups. Other assessment methods will be used at the discretion of various course directors.

Core Clinical Experiences (CCE)
Care of Adults Section

Basic Science Section Leader: Sanjay Ram, MD
Medicine Clerkship Director: Mary Hawthorne, MD
Neurology Clerkship Director: Lan Qin, MD

Core Clinical Experiences Year 3: 15 weeks of clinical experience
With coordinated curricular elements, formative and summative assessments

A Note from Care of Adults Section Leadership:

Students will have the opportunity to learn about a broad spectrum of illnesses in the adult patient, including the traditional scope of Internal Medicine, as well as Neurology. Coordinating with Basic Sciences will also allow students to integrate what they learned in their Basic Sciences years into their clinical training. The Basic science component would offer the opportunity to integrate the molecular basis of disease with clinical symptoms and relate this knowledge and therapy of various pathophysiological states.

Section Overview

The Care of the Adult Core Clinical Experience will share an Orientation, and will share a formative and summative OSCE. Students will receive lectures in an on-line format on topics in both Medicine and Neurology throughout the 16 week experience. Lectures will emphasize areas of overlap between the two disciplines, and each will contain discussions of applied therapeutics. Lectures will be linked to cases for live discussion. Small groups of 5-8 students will be assigned to Longitudinal Preceptor Groups. Groups will have representation from Medicine, Neurology and from the Basic Sciences to work with students throughout the course of their 16 week experience. Students will return for "Intraclerkship "days 2-3 times during their medicine inpatient and ambulatory rotation for live thematic days dealing with Geriatrics/End of Life and with Primary Care, with contributions from Medicine, Neurology and Basic Sciences for each of these days.

Scope of Content:

A combined 2-day Orientation will be held at the beginning of the 16 week block, and will focus on Oral and Written Presentations in Medicine and Neurology, the complete Neurologic Exam, Procedures modules including Lumbar Puncture, administration of injections, drawing blood, and an introduction to Interpretation of EKG's and imaging studies like chest x-ray, CT/ MRI. Students will spend a total of 8 weeks on Inpatient Medicine, 4 weeks on the Wards at the University campus and 4 weeks at a community hospital. During that time, they will see patients with a variety of illnesses, including diseases of the Cardiopulmonary system, the Neurologic system, the Gastrointestinal system, the Musculoskeletal system, the Renal System and the Hematopoietic System. At the University campus, they will work on teams with Hospitalists, residents and interns. At the community hospitals, they may work with Hospitalists with or without residents and interns. They will learn an approach to the differential diagnosis and basics of management of common diseases. They will also learn about Life-threatening illnesses and Medical and Neurologic emergencies. Basic Science principles of Pharmacology and Applied therapeutics, Neuroanatomy and Physiology will be incorporated into the structured curriculum to help students understand the pathophysiology of disease and therapy.

During the Ambulatory/Neurology section of the CCE, students will spend 2 weeks in a Primary Care Internal Medicine office or clinic. They will work with ambulatory preceptors learning about both Prevention/Health Maintenance and about Chronic Disease Management in an outpatient setting. They will also spend 3 weeks in an inpatient or outpatient Neurology setting, refining their neurological examination skills and learning about neurologic emergencies and some common neurological illness. Topics to which they will be exposed will include stroke, headache, dementia, movement disorders, neuropathies, coma, brain or spinal cord trauma, neuropathies, and other problems. Some of the common neurological diseases, which are most likely seen initially by primary care physicians, like migraine headache, neck pain/ back pain, memorial loss, sleep disorders, tremors or neuropathy can also be introduced longitudinally within the 16 weeks. Lectures on HIV can combine Medical aspects of the disease, neurologic sequellae, and pharmacologic treatment. A lecture on Hypertension can be linked to a lecture on Stroke.

Some select students may opt to be in a Primary Care track, in which they go to an ambulatory office for a continuity experience ½ day per week throughout the 16-week experience (except for the three weeks in neurology).

Connections to Other Courses:

Close connections exist with FOM1 and 2 via engagement of the basic science section leader (BSSL), as well as through Interstitial Curriculum (IC) plans. Principles learned in BWCT and POP from FOM 1 will be emphasized in the curriculum. The Neurology section will be closely related to material learned in The Brain section of FOM 2.

Educational Methodologies:

Combined Orientation will teach Oral and Written Case Presentation skills, EKG interpretation, Neurologic exam; Imaging Basics for the CXR and the Brain – CT/MRI through interactive medium-group methods. Students will have hands-on practice with a lumbar puncture module, as well as other simulation and procedure modules and Mock Code.

Many weekly lectures will exist in on-line format with built-in quizzes and links to readings, video demonstrations, and other methods for engagement and providing students with formative feedback. In addition, students will use standardized cases (such as the SIMPLE cases from the Clerkship Directors in Internal Medicine) to help students put into practice what they just learned and provide self-assessment. Intraclerkships will afford the opportunity for lectures, case discussions, small group role play and interactive quizzes.

Students will complete Reflective writing assignments (likely in conjunction with the IC) and will also do written assessments of their own performance. A combined formative OSCE will allow the students to practice their history-taking, physical exam and patient communication skills and receive real-time feedback in a simulation setting. Longitudinal Preceptor group sessions will incorporate small group case discussions of live and simulated cases.

Student Assessment: Methods Planned:

We are excited about potential options for combined knowledge assessments using NBME customizable exams; other quizzes and written exercises as described above; coordinated formative and Summative OSCE. Longitudinal Preceptor sessions will allow preceptors to assess students' clinical and problem-solving skills and changes over time. Students will turn in complete written histories and physical exams to their longitudinal preceptors. At least some of the write-ups will be expected to contain references to the Medical Literature. Ward Teaching attendings, hospitalists, outpatient preceptors and residents/interns will evaluate students' clinical performance using standardized forms. Students may receive peer review from other students on OSCE performance or other aspects of the CCE.

Core Clinical Experiences (CCE)
Care of Families Section

Basic Science Section Leader: Carolina Ionete, MD, PhD
Psychiatry Clerkship Director: Deb Field, MD
Family Medicine and Community Health Clerkship Director: Mary Lindholm, MD
Pediatrics Clerkship Director: Erin McMaster, MD

Core Clinical Experiences Year 3: 15 weeks of clinical experience with coordinated curricular elements, formative and summative assessments

A Note from Care of Families Section Leadership:

Key elements of this coordinated thematic section include opportunities for longitudinal experiences throughout the disciplines such as applying primary care skills in psychiatry, triage and referral, professional communication, consultant role; longitudinal elective experiences throughout the life span including behavioral pediatrics and child psychiatry, substance abuse counseling or treatment of chronic pain and chronic conditions; and joint didactic opportunities including integration of genetics and molecular basis of diseases with clinical presentations of real patients, human development and aging as it clinically applies in all disciplines, and management of difficult patients/personality disordered patients in all disciplines and diversity and culturally informed care; addressing health disparities.

Section Overview:

Each 15-week coordinated thematic section includes clinical experiences within and across disciplines, a coordinated curriculum, exercises that integrate content across elemental disciplines, work with the basic science section leader (BSSL); coordinated formative OSCE; summative OSCE(s).

Clinical Experiences:

- 5 weeks of psychiatry will include inpatient, ambulatory, emergency department experiences; C/L selective
- 5 weeks of Pediatrics will include inpatient, outpatient, and emergency department experiences.
- 5 weeks of Family Medicine will include outpatient experience in office setting seeing the full spectrum of family medicine which includes well and sick child outpatient care, and care of the mentally ill (both their primary care needs and treating their mental health needs when psychiatric consultation is not possible or needed).

Core Curriculum:

- Core curriculum in each discipline with explicit links to other disciplines. For example, the psychiatry core may include case-based exercises in maternal depression, iatrogenic delirium in elder, adolescent substance use. The family medicine core may include domestic violence, management of metabolic syndrome in psychiatric patient, nutrition and exercise counseling across the life span, treatment of depression and anxiety in primary care. The pediatric core may include treatment of children with ADHD by pediatricians, reporting of child abuse and neglect, impact of maternal depression on child development, adolescent risk assessment.
- Topics with high degree of overlap (i.e. hypothesis driven interviewing and physical exam, evidence-based medicine, management of chronic conditions, talking to parents, relationship violence, medical jurisprudence, pharmacology, culturally-informed care, etc), content will be distributed logically across the 3 disciplines.
- Shared didactic opportunities might include:, ethical dilemmas, complex cases and panel discussions, topics like preventive care, human development, use of imaging, laboratory interpretation, frontiers of medicine/ “hot topic” basic science-translational research updates
- Integrated on line learning modules, study guides and question banks, website heavily linked to resources.

Integrated Exercises and Projects:

- Integrated patient log (perhaps organized around chronic conditions and skills applied across lifespan)
- Integrated written reflections or writing assignments
- Maybe an integrated home visit to address issues relating to illness – impact on children, family, etc. to incorporate elements from all 3 clerkships; also living with physical and mental disabilities and use of adaptive equipment and community services.

- Maybe integrated community tours or interdisciplinary exercises. An example might be "Healthy living for the family" to include a trip to the grocery store (real or virtual) with a dietician to look for healthy foods and discuss how to help our patients make good nutritional decisions that are they culturally sensitive and financially realistic. Another example might be working with pharmacist to find safe OTC meds for pediatric and adult patients on prescription meds. Another might be going to a social or vocational rehabilitation program to interview patients and staff.

Assessments:

- Each discipline likely to have discipline - specific written exam and OSCE though leaders recognize that it will be desirable to have some integrated exam questions on every exam at the level of "all doctors need to know".
- Integrated formative quizzes, with an opportunity for student choice re: combined disciplines and on line cases/quizzes with target number to complete
- Integrated stations in a formative OSCE (DV, depression/suicide, medical clearance, substance abuse, teen risk behavior) placed in terminal Interstitial days.

Scope of Content:

All blocks will address common principles of professional behavior, basic competencies and promotion of lifelong learning as well as application and expansion of basic science knowledge as it informs patient care. Overlapping content will be emphasized whenever possible. Some discipline-specific content includes: Psychiatry -- Common psychiatric conditions, Epidemiology/Determinants of health, Substance abuse and dependence, Motivational interviewing, Psychiatric interview and Psychiatric differential diagnosis, Psychiatric emergencies, involuntary care, capacity; Pediatrics -- the triadic interview, talking with children at an appropriate developmental level, Common patterns of growth, development and behaviors, Common illnesses of childhood, differential diagnosis and basic management plans; Family Medicine -- Common Family Medicine conditions including: hypertension, lower back pain, gynecologic care, well baby care, asthma, post partum depression, sports medicine exam, Health maintenance and family planning, Nicotine Dependence and Motivational Interviewing, treating teenagers and patient confidentiality.

Connections to Other Courses:

This coordinated thematic section will explicitly link with FOM 1 & 2 including topics such as Neuroanatomy and neurophysiology, Epidemiology, Pharmacology, Genetics, Patient centered medical home, Physical exam skills and Professionalism. We will further link to other Core Clinical experience courses such as Neurology: dementia, delirium, seizure disorder, movement disorder, headache, traumatic brain injury; Surgery and Medicine: primary care of acute and chronic diseases (i.e. vascular disease risk factors, diabetes), substance withdrawal, delirium, overdose and self injury management; OB: sexual trauma, postpartum disorders, meds and pregnancy/lactation, meds and menstrual cycle/PCOS. We will link closely with the Interstitial Curriculum (IC) in areas such as screening for domestic violence, Physician wellness, Interpretation of medical literature, Team collaboration, Ethics and professionalism.

Educational Methodologies:

Students will learn in a variety of methods including but not limited to direct care of patients in the inpatient and outpatient settings under supervision of physicians, working on multidisciplinary teams, interactive case-based sessions that include standardized patient interviews, audience response technology, video, role-play and ample opportunities to ask questions. We will encourage self directed learning, use internally and externally development on-line case modules, simulation, facilitated reflection.

Student Assessment: Methods Planned:

While OSCEs will be primarily to assess discipline-specific skills, they will be modified to reinforce skills across disciplines. Students will receive ongoing feedback, formative and summative evaluations by supervising physicians, residents, other team members. Students can self-evaluate using quizzes and CLIPP cases. Opportunities exist for sections of written exam to overlap as detailed above and other exercises will be coordinated across disciplines to maximize integrative learning.

Core Clinical Experiences (CCE)
Perioperative and Maternal Care Section

Basic Science Section Leader: Julie Jonassen, PhD
Surgery Clerkship Director: Mitch Cahan, MD
Obstetrics and Gynecology Clerkship Director: Dawn Tasillo, MD

Core Clinical Experiences Year 3: 15 weeks of clinical experience with coordinated curricular elements, formative and summative assessments

A Note from Perioperative and Maternal Care Section Leadership

Surgery and OB/GYN share some common themes and skills that will allow us to build a common curriculum that spans the individual experiences and disciplines of each field. We are excited to collaborate on teaching of topics, including the preoperative evaluation of a surgical patient, postoperative care management, operative and postoperative complications, basic surgical skills (including sterile technique) and evaluation of abdominal or pelvic pain (chronic and acute). In addition to content integration, orientation to this block and summative evaluation at the end of the block will include these areas of overlap.

Section Overview:

Each 15-week coordinated thematic section includes clinical experiences within and across disciplines, a coordinated curriculum, exercises that integrate content across elemental obstetrical, gynecologic and surgical disciplines, work with a basic science section leader (BSSL) to integrate relevant content throughout and the possibilities of coordinated formative OSCE and summative OSCEs.

Scope of Content:

Obstetrics and Gynecology clerkship will continue to teach toward the following goals: understand common and emergent issues in OB/GYN, understand and contemplate OB GYN as a career, provide sufficient knowledge in subject area to successfully complete national licensure examinations. Clerkship objectives are varied but include an understanding of antepartum and intraparatum care, routine prenatal care and management of common obstetric complications, the medical and surgical treatment of gynecologic conditions such as infertility, cancer, incontinence, and abnormal uterine bleeding, women's health throughout the reproductive cycle (puberty to menopause), the ethical and medical issues surrounding pregnancy termination and an understanding of gender identity, sexuality and alternative lifestyles. The Surgery Clerkship's goals include: Teaching students how to recognize, work-up, and diagnose common surgical diseases; mastery of basic science concepts pertaining to surgical disease and management of surgical patients; introduction to surgical procedures and techniques; human factors training to allow students to become more effective clinicians who can work effectively in multi-disciplinary teams.

Connections to Other Courses:

Anatomy, physiology, pharmacology and pathophysiology of the human body covered during FOM 1 and FOM 2 will be on display in patients seen in the inpatient, outpatient, and OR settings. We will work with our BSSL in order to most effectively link to this content and to current topics in the basic sciences of the OB/GYN and Surgical fields. In addition, small-group discussions on puberty and menopause that are moderated by a physiologist and reproductive endocrinologist as well as informal discussions on perioperative and postoperative care including fluid and electrolyte management and hemodynamic changes link back to FOM 1

and FOM2. Ongoing coordination with the Interstitial Curriculum leadership will ensure appropriate reinforcement of content from those sections building through the Perioperative and Maternal Care section.

Educational Methodologies:

This will be accomplished through a combination of hands-on clinical experience in the outpatient, inpatient, surgical and labor and delivery operating theatres. Mandatory on-line modules, didactic and small-group coursework, as well as grand rounds and lecture series specific to each clerkship site will also be major educational components. Students will be taught physical examination skills in the outpatient settings, as well as using pelvic models and standardized patients.

Student Assessment: Methods Planned:

Students are evaluated by their faculty and resident preceptors/site directors using common assessment forms across sites. They participate in small-group teaching sessions where they evaluate each other while proctored by a faculty member. Objective standardized exam questions from NBME are used as well as a clerkship specific OSCE where students receive feedback from standardized patients and the clerkship director. Elements of this OSCE can used to evaluate combined surgical and gynecologic skills, such as evaluation of abdominal pain/the acute abdomen.

Core Clinical Experiences (CCE)
Interstitial Curriculum (IC)

Co-Leaders: Julie Jonassen, PhD and Susan Starr, MEd

Core Clinical Experiences Year 3: Nine full days – additional coordination with clerkship curricula

A Note from Course Leadership:

The IC will provide:

- The forum where learning communities will gather during year three. As such, IC will provide a "home base" for sharing experiences and reflecting on special topics.
- More than a collection of discreet topics, it will connect experiences from diverse specialties.
- Curriculum strands that are best learned in familiar small groups that meet over time.
- A place to include faculty and students from other disciplines, e.g., nursing or pharmacy.

Course Overview:

- A 9-day, threaded curriculum that takes place in small groups partially capitalizing on the structure of learning communities, and coordinating with clerkship experiences when possible

Scope of Content:

Threads under consideration:

- Health policy and the practice of medicine
  - US healthcare system
  - Medical errors and patient safety
  - Quality improvement and Principles of Lean management
  - Medical legal issues
- Learning from multi-professional teams
  - Teamwork
  - "Patient centered medical homes"
  - Connection to basic science and research
  - leadership
- Journal club
  - Evaluating scientific information
  - Writing for the lay press
- Reflective practice
  - Professionalism
  - Ethics
- Serving our neediest families
  - Follow an LPP family for the year
  - Multicultural experiences
  - Health disparities
  - Mental health
  - Poverty and health
  - Domestic violence
  - The elderly
  - The disabled

- Mentorship
  - Career guidance
  - Coordinating with learning communities
  - Financial planning
  - Stress and self-care

Connections to Other Courses:

- Content will complement clerkship material, with some planned redundancy
- Feedback loop with clerkship directors
- Discussion format will capitalize on the structure of learning communities

Educational Methodologies:

Our working model for the nine IC days:

8am-noon:

- A focus on a particular topic (see above) not specifically addressed in the clerkships
- 2 hours of interactive large groups facilitated by experts
- 2 hours of (very) small groups of 4-5 students practicing a skill

1-2pm:

- 1 hours of journal club

2-3pm:

- 6-7 students grouped by learning community mentors
- 2 hours of reflection on clerkship experiences, perhaps with a focus on the topic of the day. As the year progresses, students will reflect on cumulative topic areas.
- After 5pm, perhaps the students will meet by houses?

Methods will include prep for the day, lecture, skill practice sessions, small group discussions with LC mentors, field trips, journals, applied knowledge; assignments on one day that can be due the next time

Student Assessment: Methods Planned:

- Attendance required
- Journals
- Reflections

Core Clinical Experiences (CCE)
Flexible Clinical Experience Course

Course Leader: Samir Malkani, MD

Core Clinical Experiences Year 3: Four one-week elective experiences

A Note from Course Leadership:

This course embodies the spirit of the new curriculum, by expanding the opportunity for individual exploration in a variety of clinical and translational science fields, early in the students' career. The program allows for self directed learning by allowing students to either choose from a diverse offering of pre-designed electives or to design their own clinical experience as long as it satisfies the designated learning objectives. Students are encouraged to choose diverse experiences to broaden their horizons. The advantages of early exposure to a medical specialty include the opportunity to foster mentorships, to nurture and develop interest in the specialty and to provide intrinsic motivation to pursue further learning in the chosen field(s). The multiple elective experiences required in this course allow the students to discover their passions and get a glimpse of areas related to medicine they may normally not be exposed to. These electives may also help to explore a career choice.

Course Overview:

This is a required student-driven multidisciplinary learning program, which complements the core clinical electives. The flexible clinical experiences are specifically designed to:

- allow for career exploration and/or development, and planning for senior study
- allow exposure to evolving and cutting-edge branches of medicine
- provide an opportunity to work with recognized experts in different fields of medicine and allied sciences
- provide exposure to novel concepts or systems of care not normally available within the core clinical experience
- allow for student designed innovative experiences within the guidelines for this elective

Scope of Content:

We want to provide great flexibility in the scope of these electives as long as they satisfy a broad set of guidelines. One of more of the following requirements needs to be met for the activity to qualify for the FCE program:

- The activity should help in career planning; i.e. the elective should provide a pathway to a possible career in that specialty. It may serve to provide initial exploration in that field, ongoing mentorship, or spur research
- Development of skills pertinent to the practice of medicine outside of the core clinical experiences e.g. Allied health professionals, Complementary and Alternate Medicine and Community health
- Service projects related to the medical field
- International experiences that satisfy one or more of the other requirements
- Research exploration/preparation related to healthcare or medical education
- Conference attendance if the student is presenting their work
- Physician as a patient and community advocate
- Teaching related to medicine and public health
- Humanities as it pertains to medicine

- Hospital administration/medical leadership
- Activities enhancing clinical skills
- Remediation of mandatory core clinical experiences
- There should be a minimum of three distinct experiences, and the experiences should be in at least two different departments within or outside the medical school

Connections to Other Courses:

There will be close collaboration with all Core Clinical Experiences year 3 leaders, particularly the clerkship directors regarding scheduling, FCE expectations and course offerings. Elective leader collaboration will also be important to ensure differentiation of experiences between FCEs and 4th year electives. Collaboration with learning community mentors to guide students early in their decision process in designing or choosing the FCE. For cases where the FCE is used for remediation, oversight will be provided by the faculty in charge of course that needs remediation.

Educational Methodologies:

Students will learn in a variety of methods depending on the elective experience they choose. These electives will emphasize one on one interaction between the student and teacher. The methods employed include working in the inpatient and outpatient settings under supervision of physicians, oral and written case presentations, and education in specialized testing procedures used in the specialty. Attendance of lectures and seminars specific to the elective is required. Non-clinical electives will involve practical hands-on learning under the supervision of the sponsoring expert, based on the objectives and competencies as outlined in the specific course description. Conference attendance will require the student to submit a copy of the paper or oral presentation along with a conference schedule and attendance at conference sessions to qualify for credit. Self directed learning is an integral aspect of this elective. For student directed electives, the sponsor will be required to identify the objectives of the electives with a brief description of how these will be met along with the competencies addressed by the elective. Other methods employed include journal keeping for international electives, community health and service electives, or project reports for research electives.

Student Assessment: Methods Planned

Credit/ No credit with optional narrative on Medical School Performance Evaluation (Deans Letter). Criteria for granting credit are attendance, effort and achievement of minimum standards of performance as determined by the sponsoring department. Summative evaluation will be provided to each student by the sponsoring faculty or person. Formative feedback by all members of the sponsoring team and the students is encouraged.

Emergency Clinical Problem Solver

Course Leader: Paul Zgurzynski, MD

Advanced Studies Year 4: Four week course completed by April , Graduating Year; Offered 4-5 Months Early Summer, Fall, Winter

A Note from Course Leadership:

Anyone, anywhere, anytime can have an unforeseen emergency. All physicians will be called on to provide urgent decision making and treatment in the office, hospital, and in your community. Sometimes the "emergency" will seem to be a simple problem within your scope of training and experience. Sometimes it will dynamically evolve into an unfamiliar, high stakes puzzle. Using principles of expert diagnostic reasoning, prioritizing information, and identifying critical actions allows you to solve the case. These skills include augmenting deductive reasoning with the ability to self-correct in real time. Our goal is to have the senior students integrate their cumulative medical knowledge, teamwork based problem solving and leadership skills, to diagnose and treat common and unexpected urgent and emergent scenarios in varied settings. The course curriculum will focus on high yield chief complaints, key procedures, high acuity simulation scenarios, and acute care clinical experiences. Upon completing this course the successful student will be ready to identify and treat an emergency undifferentiated patient systematically and effectively.

Course Overview:

During this course, fourth year students will integrate their accumulated knowledge in order to:

- Recognize/identify an emergency (across different clinical settings) and adapt to cases that fall outside of the typically taught sequence of history-taking, physical exam, generation of a differential diagnosis and plan.
- Evaluate the undifferentiated patient and generate a differential diagnosis (worst case scenario vs. most common)
- Perform patient management to include :
    - Determination of acuity and related decision making (including disposition)
    - Procedural skills (using simulation where appropriate to treat the unstable patient)
    - Leadership / effective communication (including advanced presentation skills: ability to adjust to your audience and setting, effectively communicate with consultants and admitting services.)

Secondary Objectives:

- Multidisciplinary teamwork. Collaboration in delivering curriculum with School of Nursing, respiratory therapy, and pharmacy colleagues. Opportunities exist for participation in didactics and within simulation scenarios.
- Professional behavior – conflict resolution skills; bad news; family interaction; collegiality; debriefing, and transfer of care (hand-offs).
- Integration of basic science material in didactics and simulation. Integration and review especially during discussion of resuscitation, early goal directed therapy, and basic critical care therapeutics.
- Identification of systems issues in health care.

Scope of Content:

A general approach to emergency care

- Introduction to expert diagnostic reasoning, illness scripts, and self assessment
- Core topics such as STEMI, sepsis, and overdose will be introduced by a general chief complaint with paired target cases
- Procedural syllabus and integrated simulation scenarios

Connections to Other Courses:

As a fourth year course covering multiple disciplines in acute care settings, students will inherently integrate knowledge from the first three years of medical school as they evaluate and manage the undifferentiated patient. Re-visiting basic course science materials on physiology, anatomy, and pharmacology from FOM-1 and FOM-2 will occur during discussion of almost all emergency topics including use of prior materials with faculty consent. A specific example might be using a slide about vasopressors from Principle of Pharmacology (PoP) while learning early goal directed therapy (EGDT) to treat sepsis. Similarly, the course will build on curriculum from every CCE course to involve adult, pediatric, surgical, medical, inpatient, and outpatient cases. Lastly, it will connect to the Interstitial Curriculum (IC) by building on teamwork, leadership skills, interprofessional care, diversity, avoiding medical error, and safety.

Educational Methodologies:

The course will be a combination of acute care clinical experiences, didactics (emphasis on small group work), simulation of clinical encounters and procedures. Due to practical issues in caring for patients with very acute emergencies some of the highest acuity clinical experience may be team based or observational. However, students will be required to take leadership roles in case discussions and during simulation scenarios. Specifically, we plan to utilize the following multiple modalities during the course: Case-based learning; Student presentation with peer and self-assessment; Script concordance cases; On-line modules; Low fidelity task trainers; High-fidelity simulation scenarios.

Student Assessment: Methods Planned:

Formative Assessment:

- Preceptor Feedback
- Faculty and Peer to Peer debriefing during simulation
- Script Concordance Testing during “Approach to..." lecture

Summative Assessment:

- Completion of Case and Procedure logs including simulation
- Participation during cumulative simulation scenarios final week

Final Assessment: Credit / No credit

Capstone Course

Course Co-Leader: Melissa Fischer , MD, MEd

Advanced Studies Year 4: Offered in both Winter and Spring Semesters, 4 weeks

A Note from Course Leadership:

The Capstone Course will provide students an independent, but guided, opportunity to apply and integrate knowledge and skills gained during the first two years of the medical school education to a scholarly project in an area of their own choosing. This project will address a clinical, basic science, public health, or social problem or question that develops their understanding of an area of their own passion related to medicine. The course leader will meet with students during the first two years of medical school to help identify an area of interest for the student. The leader will then help students to identify an appropriate advisor to provide expertise in the chosen area of study and guide the student's project to completion. Small groups, with similar interests, will be organized to discuss progress and provide a forum to generate ideas concerning their process and presentation. Scheduled oversight and periodic reporting will provide the advisor with information to make certain that project goals are being met. The project will culminate with the submission of an end report and public presentation or other form of communication of results. The Capstone Scholarly Project will add to the student's portfolio by documenting organizational, reasoning, analytical, and authorship skills that will help the students develop the next phase of their professional careers.

Course Overview:

The goal of the Capstone course is to encourage learners to define and complete scholarly work in an area of passion that will help them bridge the transition from medical school to physician in an area consistent with one of the six core medical education competencies. Upon completion, learners will know how to identify a professionally related learning need or interest of their own, write related learning objectives, develop a project to address these objectives, and to demonstrate mastery of the particular material. Ultimately, the learner will present the experience in a manner worthy of peer review such that others may also learn from their experience.

Scope of Content:

The Capstone course will highlight elements of FOM1 and FOM2 courses that include the principles of scholarship, research methods, scientific inquiry, and communication. Students will follow a timeline that provides benchmarks for project measures spanning the curriculum.

Connections to Other Courses:

Direct connections will be drawn through the Learning Communities/Doctoring and Clinical Skills programs, Determinants of Health course and Interstitial Curriculum. Any experiences prior to medical school, and all required or elective courses (including the population health clerkship), summer activities, clinical experiences (including flexible clinical experiences), pathways and community service experiences can be the conduit where a student's curiosity is sparked, a question of interest is raised and a scholarly project is created. For example, summer research between MS1-2 years or an international service trip both provide unique experiences that may be developed into the Capstone project. As can partnership with students in other healthcare disciplines, such as the nursing program, which has a required scholarly project. The "product" may benefit peers (e.g., poster or presentation) or patients (e.g., new bi-lingual patient education materials for use by immigrants from the country visited on service trip). Longitudinal Pathway programs and the

Flexible Clinical Experiences course provide a wealth of experiences where students may choose to explore subjects in greater depth to fulfill their Capstone requirement.

Educational Methodologies:

This course will focus on diverse methods that support lifelong learning and scholarship including a) self-directed learning, b) development of individualized educational plan, c) experiential learning, d) mentored learning, e) collaboration with experts and peers, f) feedback on written and oral presentation skills.

Student Assessment: Methods Planned:

Grading will be credit/no credit, and dependent on meeting project benchmarks as defined by the course leader and advisory group. Such benchmarks may include submission of a project outline by the end of the second year of study, with opportunities to revise as necessary, expected attendance at and participation in advisory or small group meetings to discuss progress and generate ideas concerning data gathering and presentation, submission of a progress report after the third year of study, submission of a project end report to include background, results, conclusions, and insight into future work in the chosen area, public presentation of findings in one of many formats such as journals, poster session, public showing, lecture, teaching presentation, performance, or other form of communication of the activity with criteria-based peer review.

Advanced Biomedical and Translational Sciences

Course Co-Leaders: Jane Freedman, MD and Eric Mick, ScD

Advanced Studies Year 4: Winter Semester, 2 weeks course offered multiple times

A Note from Course Leadership:

The Advanced Biomedical and Translational Sciences (ABTS) course will revisit and expand on the basic science instruction provided in the Foundation Studies coursework of Years 1-2. The goal of ABTS is to provide students with an opportunity to reinforce their understanding of the basic mechanisms of disease but with the insight of clinical experiences gained in Years 3-4 and an eye towards scientific frontiers of medicine. The freedom to self-select a specific disease area coupled with a dedicated block of time for focused self-directed study and communication of those findings to a small group of peers will not only lead to a greater understanding of that particular scientific area but will provide students with additional tools necessary for continued self-education throughout their careers.

Course Overview:

This is a two-week course in which Medical Students study the molecular, cellular, and genetic basis of disease, selecting a specific area of study from a menu of 10-12 topic areas such as genetics, cancer, auto-immune/inflammatory disease, cardiovascular disease, and in-born errors of metabolism. Students will participate in a structured didactic program including a small number of core lectures, interactive lectures, directed group projects and presentations (both faculty- and student-led). Other activities to strengthen core skills will include discussions/comparisons of selected papers designed to help them build their expertise in the thematic area. Students will also be responsible for examining a specific, limited problem or question of their choosing within the scope of the area in a "real world" manner. Each class will be limited to no more than 12 students. Teaching will be collaborative and individualized to the extent possible, drawing on faculty, student participants themselves, and advanced GSBS students.

Scope of Content:

Potential topics are under consideration including: Cancer, Diabetes, Neurodegenerative, Cardiovascular, Osteoarthritis, Auto-immune, In-born errors of metabolism, Mechanisms of drug resistance, Autism spectrum, Asthma, Age-related diseases, wound-healing. However, additional topics will be added based on responses to a student questionnaire.

Connections to Other Courses:

Study of each of these disease areas requires multidisciplinary approaches that encompass multiple FOM1 and FOM2 courses. Specific Sections will encompass topics from *Foundations of Medicine* (Years 1-2), *Human Genetics*, *BWCT*, and other fundamental courses including epidemiology-biostatistics and journal clubs using actual slides or materials from prior courses if possible with faculty consent. In addition, they require a synthesis of basic and translational science information and its application. Thus, ABTS isn't simply more foundations of medicine – it instead accelerates towards a new level of multidisciplinary integration.

Educational Methodologies:

The Section Director will be responsible for identifying the core topic-specific content, and approaches, keeping in mind program goals. The class will meet every day for 2 weeks. The Course will have 3 central components: (1) Core curriculum that will span all 10-12 different topic groups and will include basics for understanding keys to deriving primary knowledge for basic, clinical, and translational skills for the course and

in future practice. (2) Didactics (~2 hours each morning) will extend across the entire 2 weeks of the program allowing time for students to refresh their knowledge of the content area, to learn more advanced information, and integrate new information. "Didactics" will not be limited to unidirectional lectures, but will include interactions with students taking responsibility for the group's learning. This will include a specific format of journal/paper discussions and similar activities that will be consistent across the 10-12 Sections. (3) Afternoon time will be utilized for individual and group topic exploration and a 2-staged presentation that will include feedback from both the Section Director and participating students.

Student Assessment: Methods Planned:

This will be a credit/no credit course. Students will be assessed on their active participation in class discussions using a common rubric, and quality of specific relevant presentations of the student's own question/problem within the format of the course based on peer and faculty assessment.