SUNY Downstate College of Medicine

Curriculum Renewal

Document 2

Principles, Structure and Organization of The Curriculum

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Executive Summary

Introduction

Over twelve years ago, SUNY Downstate College of Medicine began teaching basic science through interdisciplinary organ system courses, and clinical skills through a dedicated course now called Essentials of Clinical Medicine. Two years ago, Dean Ian Taylor asked that the school once again examine its curriculum in light of ongoing changes in medical education with a view to ensuring that Downstate meets the educational needs of future physicians. During these past two years over 160 faculty, students and staff, led by the Curriculum Renewal Steering Committee, worked to develop a proposal for a new curriculum for the medical school class that enters in August of 2012. The proposal for the new curriculum is presented here.

Proposal For The New Curriculum

Major Principles and Organization of the New Curriculum

This curriculum, designed to prepare our graduates to enter any field of medicine, rests on the guiding principles of Integration, Collaboration, and Relevance. The understanding and application of biomedical science is integrated with the development of professional and clinical skills beginning at the start of the curriculum and building throughout all four years. This will include learning of the knowledge, attitudes, and skills contained within the College of Medicine's six Domains of Competence. These Domains of Competence, modeled on the six ACGME competencies are:

- Patient Care
- Medical Knowledge
- Interpersonal and Communication Skills
- Medical Professionalism
- Social and Community Context of Health Care
- Life-Long Learning and Problem Solving

Each of the six competencies will be taught and evaluated in every Unit, Clerkship and advanced clinical course and, where possible, taught in an integrated fashion so that students understand how the individual competencies are linked and related to being an excellent physician. Faculty and individual students will be able to track how well a student is progressing so that early support and remediation can take place. Active learning methods such as interactive lectures, team-based learning, and small group learning will support our students' ability to become motivated, life-long learners.

The first component, or 18 months of the curriculum, is entitled "Foundations of Medicine." During this component, students do the groundwork for their development as physicians ready and able to practice medicine now and in the future. Part way through Foundations of Medicine, and again at the end of Foundations of Medicine, there are gateways where each student's progress in all Domains of Competence will be assessed. At the second gateway, a determination will be made as to whether or not the student can progress to the next phase of the curriculum – Core Clinical Medicine.

In Core Clinical Medicine, each of the six competencies will continue to be taught and evaluated. There will be specific core knowledge and skills taught and evaluated in each of the Clerkships so the development of a student's skill level can be tracked over time and across different Clerkships. Aside from this core material, discipline-specific knowledge and skills for particular Clerkships or groups of Clerkships will be identified, taught, and assessed. This is to ensure that we graduate physicians with the central competencies needed to enter any field of medicine. Students will continue to build their understanding of biomedical science during Core Clinical Medicine, in part through specifically identified activities and also by using methods to bring biomedical science into the daily life of patient care. After Core Clinical Medicine, students will once again arrive at a gateway which determines whether or not a student can progress to the final phase of the curriculum, Advanced Clinical Medicine.

During the Advanced Clinical Medicine phase, students will deepen their level of proficiency and have the opportunity to prepare themselves for selecting and applying for a residency, as well as prepare for the transition into residency. Students will take several required rotations — a Sub-internship in Internal Medicine or Pediatrics; rotations in Critical Care, Diagnostic Imaging, Emergency Medicine, Geriatrics and Palliative Medicine; Transition to Residency. Students will be required to take four weeks of Integrated Biomedical Science Selectives that are designed to provide a capstone immersion experience in biomedical science. Each of the required rotations in the Advanced Clinical Medicine phase will also be expected to integrate relevant biomedical science. The fourth and final gateway will take place midway through Advanced Clinical Medicine so that we can ensure that our graduates are ready to enter and succeed in residency training, and to provide time for remediation for students who may require it.

The new curriculum will also feature three curricular threads — Nutrition, Geriatrics, and Patient Safety. Threads are important subjects that transcend specific Domains of Competence or individual Units, Clerkships and rotations. They are taught in a coherent, developmental fashion over the four years and overseen by specific faculty members called Thread Masters.

Organizational Design to support the New Curriculum

A newly configured Office of Education will support the curriculum by using a matrix design which features the Associate Dean for Foundations of Medicine and the Associate Dean for Clinical Medicine who have authority to manage these components of the curriculum and who report to the Senior Associate Dean for Academic Affairs. This "vertical" structure is supplemented by the inclusion of three Competency Directors and a Thread Master for each of the three initial threads in the curriculum. These Directors and Thread Masters are responsible for ensuring that the competencies and threads are taught and evaluated over the entire four years. These are the "horizontal" parts of the matrix structure. Other important roles in the new Office of Education include the Assistant Dean for Educational Development (which includes Faculty Development) and Directors of Assessment, Instructional Technology, and Academic Development. To support quality assurance and continual improvement, student and curricular performance data will be collected and made available to those with responsibility for education and also be reviewed by those with a stake in the educational process, including faculty governance. Appropriate checks and balances are needed to ensure accountability and to encourage excellence.

Curriculum Overview

Curricular Framework

Principles

The principles of Integration, Collaboration, and Relevance emerged early in the process as the organizing themes for curriculum renewal. They are the touchstones that guide the process and invite ongoing and creative interpretation. Those steering the curriculum, and, indeed, faculty, staff and students as a whole, will continue to develop new understandings of how these principles can be best expressed and adopted here at Downstate. Another key principle is that of competency-based education, which guides much of the structure and management of the new curriculum. The following section presents our vision of how integration, collaboration and relevance guide curriculum development.

Integration

Medicine has changed greatly over the last fifty years as traditional discipline-based science has evolved to embrace inter-disciplinary understanding of the human body and disease. New fields such as Epigenetics have emerged and many schools teach fundamental biomedical science in an integrated fashion by using an organ system or principles approach, rather than in isolated course-based disciplines. Downstate recognized this shift over twelve years ago, when we began to teach the 'pre-clinical years' using an organ system-based curriculum. We are now consolidating and building on this approach by teaching normal functioning of the human body as we teach about illness and disease in the same curricular unit.

Students will learn anatomy, physiology, and cell biology of an organ system in the same unit as they are learning about pathophysiology, pathology and histopathology of various disease states. At the same time, students will be learning about the presentation and physical findings of relevant illnesses and the diagnostic and treatment strategies used to care for patients. Skills relating to patient care such as interviewing, physical diagnosis, and clinical reasoning will be integrated into the units, as well as opportunities to understand the patient experience of being ill and being in the health care system. This integrated experience allows the students to more immediately relate relevant biomedical science to its application in medicine and patient care. Our students will understand the relevance of biomedical science early in the curriculum and they will continually revisit relevant biomedical science during the Core Clinical Medicine and Advanced Clinical Medicine years. This allows for a deeper understanding and appreciation of biomedical science and the ability to use that understanding in caring for patients. By becoming comfortable with the process of relating underlying biomedical science to patient care, our students will be able to better integrate new understanding, approaches, and treatments as they arise during their lifetime.

Because an introduction to clinical material and to patients will begin early and be integrated with biomedical science, we will have the opportunity to introduce skills of clinical medicine from the start of medical school. Clinical skills, which develop over time and in the context of application to patients, will begin building from day one as students make early connections between anatomy and physical exam, pathophysiology and symptoms, and information gathering, processing and clinical

reasoning. Students will begin their Core Clinical Medicine year ready to gather information through medical history and physical exam in a sound, patient-centered manner with an understanding of the link between symptoms, findings, and disease. During Core Clinical Medicine, students will build on this base of understanding and spend the final portion of the curriculum, Advanced Clinical Medicine, refining those skills and preparing for the transition to residency.

Collaboration

The development and teaching of an integrated curriculum will require collaboration between College of Medicine faculty from different disciplines. In fact, interaction and collaboration will likely pay dividends not only by enriching our curriculum and our faculty's overall understanding of medicine, but also by encouraging new directions in research and scholarship. Collaborative efforts should extend beyond the College of Medicine as our faculty work with colleagues in other Downstate schools, colleges, and affiliates to enrich our students' learning and to pursue inter-disciplinary education. Collaboration with students, in their role as developing professionals and learners, will help faculty become better educators and signal to students their transition and responsibility to becoming life-long learners.

Relevance

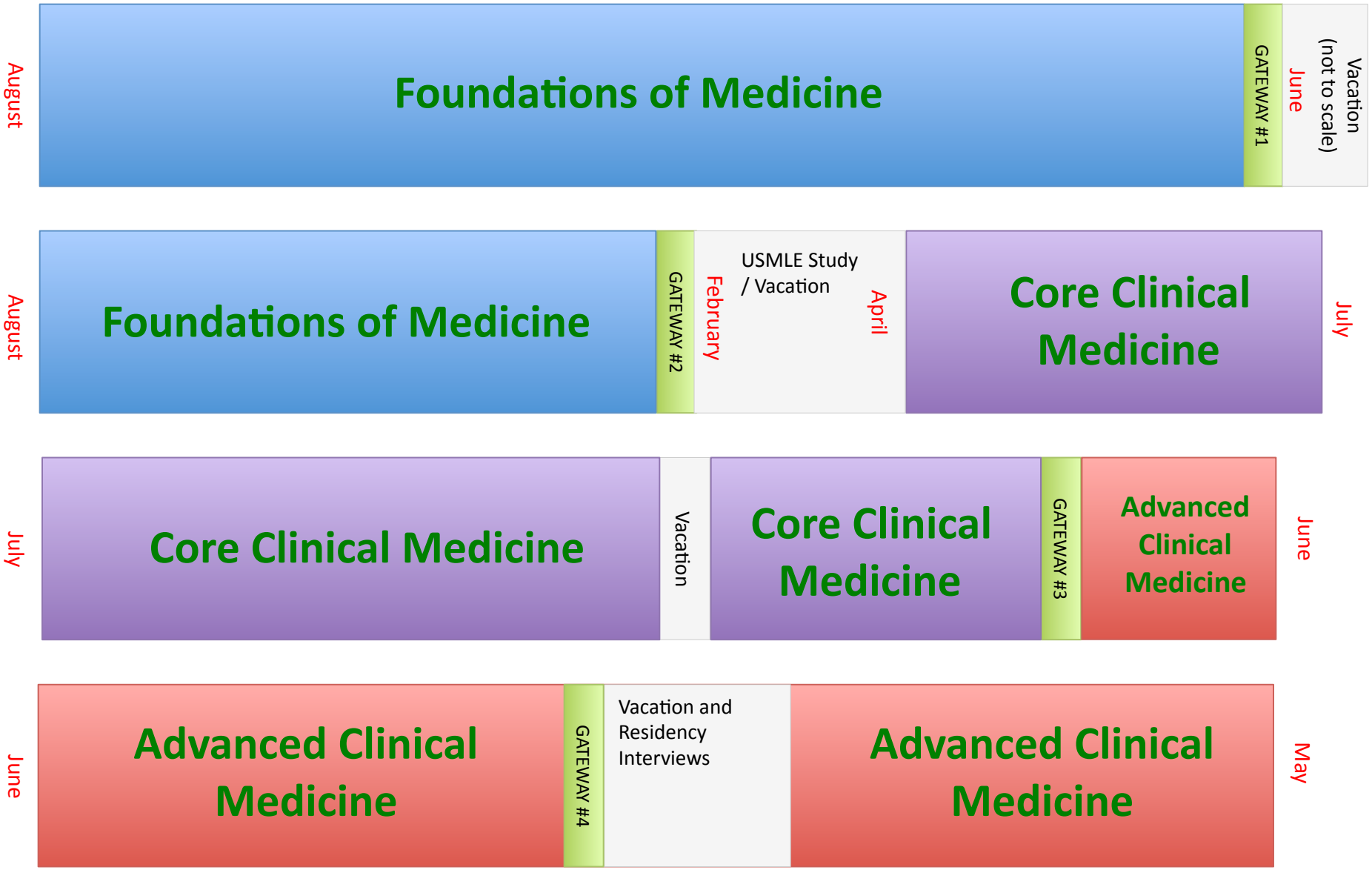
The curriculum should be examined for relevance on an ongoing basis. Medical science continually evolves, so the College of Medicine must continually identify and integrate relevant new material and educational methods. This means not only teaching new scientific knowledge and principles, but also assuring that we are training physicians with the skill sets they need to practice effectively in a changing health care environment. This includes the ability to work in teams and to understand the health care system, to practice in a patient-centered manner, and to be a life-long learner who can evaluate and integrate new knowledge and skills throughout his or her professional life. An emphasis on relevance will also promote ongoing review and discussion among the faculty regarding what material is required for the education of a generalist graduate with the most current and relevant training. It is essential for faculty to challenge themselves in this way for the continued development and delivery of the curriculum.

Overall Structure and Terminology

The new curriculum is divided into three major components, illustrated in Figure 1 (page 8) — Foundations of Medicine, Core Clinical Medicine, and Advanced Clinical Medicine. There are periods for vacation, USMLE Step 1 and Step 2, and residency interviews within or between the three major components of the curriculum, and the Nutrition, Geriatrics, and Patient Safety threads are taught across the four years. There are also four gateways, which will determine whether students have mastered the necessary competencies to progress to the next stage of the curriculum. A new committee structure is proposed for review and promotion of students at these gateways (the Academic Progress Committee, see #10 under *Organizational Design – Role Descriptions,* page 39).

The new curriculum has some important changes to the overall timeline, including start and end dates. For the incoming class, school will start at the beginning of August, about 2 weeks earlier than the start of the current curriculum. Foundations of Medicine (analogous to the current MS1 and MS2 years) will end in early February of the second year, and Core Clinical Medicine, containing Transition to Clerkship and the Clerkships proper, will begin in April.

Fig. 1 Overall structure of the new curriculum



In formulating an integrated curriculum in which competencies and threads are pursued across the four years of medical school, the Steering Committee strove to provide a nomenclature that both encompasses and promotes the visions of integration, collaboration, and relevance. In particular, it was important to promote a curriculum that gets away from the already extinct concepts of "the Basic Science Years" and "the Clinical Years" because the boundaries between basic science and clinical medicine are increasingly blurred, and the two areas should be regarded as aspects of the same whole. At the same time, the new curriculum will have components that correspond temporally to the components of the current curriculum, although the start and end dates and timelines within the various components will change significantly. Thus, the MS1 and MS2 years will become the Foundations of Medicine. The current MS3 year will become the time period devoted to Core Clinical Medicine; and the MS4 year, which will have a much improved structure and rigor, will be the period of Advanced Clinical Medicine.

In addition, there is new terminology to describe the components within Foundations of Medicine. Rather than the many Blocks and Courses that we have in the current curriculum (there are nineteen Blocks plus two ECM courses), there will be six Units in Foundations of Medicine, and these Units will encompass all of the material, skills, and competencies taught in the Foundations of Medicine years. In Core Clinical Medicine, although the structure of the Clerkships will change, Clerkships are still referred to by that name. The Advanced Clinical Medicine period will include Electives, similar to current electives but with more clearly defined structures and goals and, importantly, with evaluation and review; Integrated Biomedical Science Selectives; Required Rotations; and a required Sub-Internship in Medicine or Pediatrics, similar to the current Sub-Internship.

The term 'Basic Science' is also something of an anachronism with regard to medical education, and it evokes the 'Basic Science Boot Camp' picture of curricula of the past. In the new curriculum, we will talk extensively about Biomedical Science, taught across all four years of the curriculum and encompassing the traditional disciplines of basic science as well as knowledge and investigation at the interface with clinical science, clinical practice and translational research and medicine. Terminology is summarized in Table 1 below.

Table 1: Nomenclature in the current curriculum and the new curriculum

Designation in current curriculum	EQUIVALENT OR REVISED DESIGNATION IN NEW CURRICULUM
The Basic Science Years (MS1 and MS2)	Foundations of Medicine
Clerkship Year (MS3; or MS3 into MS4)	Core Clinical Medicine
Fourth Year (MS4)	Advanced Clinical Medicine
Blocks and Courses in MS1 and MS2	Units
Basic Science	Biomedical Science
Clerkships	Clerkships
Sub-Internship (Sub-I)	Sub-Internship (Sub-I)
Electives (MS3 and 4)	Electives, Selectives, Required Rotations

Competencies, Learning Objectives and Benchmarks

The LCME, the accreditation body for medical schools in the United States and Canada, requires that all medical schools state the objectives of their medical educational program in "*outcome-based terms that allow assessment of student progress in developing the competencies that the profession and the public expect of a physician*." Graduate medical education, or residency training programs, and the medical board organizations for specialty certification have adopted six competencies that are applied across the spectrum of medical education and certification. Many hospitals, including our own, use this competency framework to grant clinical privileges to physicians, and the USMLE uses these six competencies as the framework for certification for the licensing of physicians. We will use these basic six Domains of Competence for our curriculum but with modifications to two of them for undergraduate education. Please note that in Document 1 (*A Proposal for Curriculum Renewal*, August 2009), we listed 'Scholarship' as a seventh competency. Although it is not explicitly identified as one of the six competencies, Scholarship is included in our curricular goals and its content is distributed into each of the six Domains of Competence in recognition of its importance.

Table 2 lists the ACGME competency domains, with our domains for the undergraduate curriculum for side-by-side comparison. Each competency domain refers to the skills we deem necessary to graduate "generalist" physicians ready to enter any field of medicine. Table 3 defines the broad goals of each Domain of Competence.

Table 2: The Domains of Competence

ACGME Competency Name	Downstate COM Domains of Competence
Patient Care	**Patient Care**
Medical Knowledge	**Medical Knowledge**
Interpersonal and Communication Skills	**Interpersonal and Communication Skills**
Professionalism	**Medical Professionalism**
Systems Based Practice	**Social and Community Context of Health Care**
Practice-based Learning and Improvement	**Life-Long Learning and Problem Solving**

Table 3: Definition and Goals of Domains of Competence

Downstate COM Domains of Competence	Definition and Goals of Domains
Patient Care	Graduates must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health.
Medical Knowledge	Graduates must demonstrate knowledge about established and evolving biomedical, clinical, and cognate (e.g. epidemiological and social-behavioral) sciences and the application of this knowledge to patient care.

Downstate COM Domains of Competence	Definition and Goals of Domains
Interpersonal and Communication Skills	Graduates must be able to demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, their patient's families, and professional associates.
Medical Professionalism	Graduates must demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population. Graduates must also assess personal values and priorities in order to maintain an appropriate balance of personal and professional commitments.
Social and Community Context of Health Care	Graduates must demonstrate an awareness of the relationship between themselves and the patient, community, and healthcare system as well as recognize the impact on optimizing patient care.
Life-Long Learning and Problem Solving	Graduates must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices.

Competency Hierarchy

Under each Domain of Competence, there are several levels of detail:

- **Curricular Goals:** Curricular goals are summary statements within each competency domain that represent the knowledge, skills and attitudes required of students at the end of the 4 year curriculum.
- **Unit, Clerkship and Rotation Goals:** Unit, Clerkship, and rotation goals are the measurable knowledge, skills and observable behaviors that each student should be able to demonstrate as a result of successfully completing the curricular component.
- **Learning Objectives:** Learning Objectives are what a student is required to know or do at the end of a learning activity. These are stated in terms of observable behaviors.
- **Content:** Content is the term used for facts, pieces of a skill set, or other small pieces of data which are related to or contained within Learning Objectives.

Competency Development

Moving to a curriculum that uses competency standards as a basis for education and assessment is a major shift in the educational approach at Downstate. In building the curriculum, we will define the expected observable and measurable behaviors we deem important for the graduating student and then work backwards over the four years of the curriculum to identify where we will teach and assess these competencies.

We have defined four gateways in the new curriculum at which each student will be evaluated to assure they are ready to progress to the next component of the curriculum (see Figure 1, page 8). At each of these four gateways, each student's progress toward attaining the expected level of

competence in all six domains will be assessed and evaluated using benchmarks. A student who has not reached the required level of competence for that gateway will not be able to go on to the next phase of the curriculum. Once the student demonstrates that they have the expected level of knowledge or skill, the student will be able to proceed to the next phase of the curriculum.

An example of benchmarks for the Medical History Taking component of the Patient Care Competency is shown in Table 4, below.

Table 4: Example benchmarks for Medical History Taking

Curricular Goal	Gateway #1: Middle of Foundations of Medicine	Gateway #2: End of Foundations of Medicine	Gateway #3: End of Core Clinical Medicine	Gateway #4: Advanced Clinical Medicine
Gather complete and focused histories in an organized fashion, appropriate to the clinical situation and patient language ability.	**Benchmark**: Can develop an accurate chronologic history of the patient's illness.	**Benchmark**: Able to elicit complete medical history and have an understanding of how to organize and analyze data.	**Benchmark**: Able to elicit accurate, complete and focused medical history in patients of all ages appropriate to clinical setting. Elicit clinically relevant information during the medical interview.	**Benchmark**: Able to take an accurate and focused medical history with complex, difficult patients, account for cultural diversity and recognize critically ill or unstable patients.

Because faculty members will be clear about the levels of knowledge, skills and attitudes required of students in each component of the curriculum, they can use these benchmarks to work backwards to define what should be taught in the preceding part of the curriculum. For example, if at our second gateway, we decide that students must be able to use proper technique to perform a physical exam and have an understanding of how to organize and analyze data, the faculty must develop educational opportunities for students so that they can learn and demonstrate these skills.

Although it may seem challenging to define and assess the knowledge, attitudes and skills related to these six Domains of Competence, there is a growing body of scholarship that addresses just that challenge. Medical schools and residency programs alike are stepping up to the challenge of assuring that the physicians we graduate are capable and ready to practice in the 21st century. The other challenge that we face is developing a system by which we can closely follow our students' progress. This would allow us to identify students early who need additional support to continue their medical education and develop into good physicians.

Methods and Student Assessment

We have examined the learning methods used in the Downstate curriculum in light of our major goals of integration, collaboration, and relevance; rising external expectations for the cognitive level of student performance (on the USMLE exams, for example); and outcomes research on new methods already in use at other institutions. The overall themes that have emerged include the following:

- An intent to raise the level of cognitive tasks performed in classroom work, by shifting some factual learning to pre-class preparation and using more active, problem-oriented strategies in class.
- Consolidation of older methods with similar intent (e.g., mini-cases) into newer methods supported by outcome data (e.g., Team-Based Learning).
- Selection of methods that facilitate integration of disciplines, including integration of the teaching of medical knowledge and clinical skills.
- Shifting toward dependence early in the curriculum on learning strategies that will remain appropriate during later clinical training and throughout life ('adult learning', described below).
- Appropriate selection of learning methods to best support assessments of learning and Learning Objectives.

Adult Learning

Adult learning (see Table 5 below) refers to an educational approach that assumes the following:

- Students come to the educational setting with an intrinsic motivation to learn based on a direct need to apply new knowledge in their profession; that the educational program must connect with this motivation by providing relevant knowledge in a way that its occupational applicability is evident.
- Incoming students have substantial and variable prior knowledge based on education, occupational experience, or other life experience. The educational process must take advantage of this for optimal results, and the students' experience must be valued and respected by providing autonomous, student-centered learning experiences.
- Knowledge meant for application is best learned in the context of the application for which it is intended in order to promote application of that knowledge later in practice; active learning is favored over passive learning experiences.

Table 5: Comparison of childhood and adult learning

Comparison	Childhood learning	Adult learning
The need to know	Learners are less concerned with the reason they need to know information.	Learners need to know why they are learning.
Self-concept	Dependent on the teacher.	Responsible for own learning.
Role of experience	Learners have fewer experiences from which to draw.	Wide differences among learners enriches experience, but also introduces long-held biases.

Comparison	Childhood learning	Adult learning
Readiness to learn	Learners may be less ready to learn.	Learners understand the need for new knowledge and skills to address real-life situations.
Orientation to learning	Student- or content-centered.	Life- task-, or problem-centered.
Motivation	External: grades, instructor, peer or parent approval	Internal: self-esteem, job satisfaction, quality of life.

The use of methods based on adult learning principles is encouraged at multiple points in the current LCME accreditation standards and is mandated in at least one accreditation standard (ED-5A). It is encouraged in all recent reforms and calls to reform of medical education such as the 2010 Carnegie Foundation Report on Educating Physicians. In part, this is because the principles:

- have proven efficacy in promoting learning which are at least equivalent to older methods
- validate foundational learning grounded in medical context which emphasizes its applicability later in training and practice
- promote integration of learning in multiple Domains of Competence, and of knowledge and skills
- promote an approach to learning early in training that remains useful during advanced training and for lifelong learning

Another commonly used term, *active learning* is related to adult learning. Active learning refers to learning strategies in which students learn while applying new knowledge to problem solving. Active learning rises to the level of adult learning when the problems are realistically situated in the occupation the students are preparing for and to the extent that students have autonomy in the learning process. Thus, all adult learning is active; active learning may or may not be adult learning.

A nomenclature related to active learning is *student-centered learning*. Student-centered learning occurs when students are confronted with relevant problems that they must analyze to decide for themselves what they need to learn to reach a solution, and then gather the needed knowledge from appropriate sources to solve the problem. Student-centered learning is clearly adult learning of a high order as long as the problems are relevant, and inclusion of student-centered learning in the curriculum is explicitly required. The most familiar example of student-centered learning is problem-based learning (PBL). A few American medical schools, and a higher proportion of Canadian ones, have adopted PBL as the anchor mode in their curricula, which ensures that those curricula will depend on adult learning principles. However, a more common approach is to use a mixture of modes that emphasize adult learning principles to a greater or lesser extent for different purposes; that is the approach described here.

Methods Principles

Teaching methods have been selected for emphasis in the new curriculum based on:

- the principles of student-centered, adult, and active learning
- continuity and consistent expectations of student performance across the curriculum
- inclusion robust formative assessments

- suitability to subject matter
- realistic expectations of availability of physical resources and faculty teaching effort

It is important to distinguish between *methods*, exemplified by lecturing or PBL; *tools*, including online resources, virtual microscope slides, actual biological materials, and patient simulations of various sorts; and *venues*, such as lecture halls, conference rooms, and laboratories. Tools and venues do not define methods. Tools are available to various methods, and various tools and methods can be used in the same venue.

Several key methods include:

- **Interactive lecturing**, which could employ several strategies, including individual audience response or clicker quizzes, breakout discussion groups, and on-the-spot short writing assignments. A desirable strategy for interactive lecturing would demand and reward prior out-of-class preparation. Even with these enhancements lectures remain very strongly instructor-driven, and will be used only when most appropriate.
- **Team-Based Learning (TBL)**, an instructor-driven active learning mode in which many small teams of students solve problems autonomously in a large-group setting, after which the teams compare solutions under instructor guidance. TBL is gaining a lot of traction nationally and abroad, has a considerable research literature validating its use in both basic biomedical and clinical sciences, and places less demand on faculty time in class than student-centered learning such as PBL. It can be employed in laboratories as well as full-class groupings, and can logically replace some lectures and many or all small-group discussions that use methods that are non-validated or poorly defined, including Patient-Oriented Problem Solving (POPS) and mini-cases.
- **Small-group facilitated case discussions.** These are related to PBL in methodology, and could replace the case discussions in the current curriculum in Case-Based Learning (CBL) and ECM small-groups. These discussions are viewed as the apex of integration of medical knowledge learning with other Domains of Competence in the new curriculum, and would be facilitated by teams of clinical and biomedical science faculty members with a reasonable degree of longitudinal contact with the same group of students during the year. In addition to serving as a learning mode, these small groups with longitudinal faculty contact may be ideal for observational assessments of behavioral competencies such as professionalism.
- **On-line interactive courseware**, such as DxR Clinician cases, can be used for both learning and formative assessment.

Tools include standardized patients, simulated patients and task trainers, patient videos, and virtual microscope slides. Each of these could be used in a variety of situations. For instance, a standardized patient might be used in a stand-alone physical diagnosis session or as the “patient presentation” in a facilitated case. The minimal demands of virtual microscopy compared to regular microscopy free us from having to do microscopy in laboratories or in laboratory-sized classes. Dedicated facilities for both standardized and simulated patients are in the planning stage for the new academic building.

Venues include lecture halls, a dedicated TBL space, conference rooms for facilitated cases, and laboratories. An optimal TBL space increases effectiveness and acceptance by students, and

decreases faculty workload. Such a venue is in the planning stage for the new academic building. The demand for physical laboratories may decrease as simulations such as virtual microscopy supplant the use of actual biological materials. Where laboratory-based exercises remain, we need to reconsider the teaching methods used there according to the same principles that apply in all other venues. Laboratory exercises generally lend themselves to active learning and interaction.

Table 6 provides guidance on how we can move from current teaching methods to new ones in Foundations of Medicine. This is not meant to imply that a Learning Objective currently approached with an Old Method has to be transferred to a New Method on the same line; rather, it gives a rough idea about equivalence of applicability. A similar set of approaches will apply during Core Clinical Medicine and Advanced Clinical Medicine.

Table 6: Comparison of old and new teaching methods

Old Method	New Method	Notes
Lecture	Interactive Lecture	Supports adult learning methods
	Team-Based Learning (TBL)	Information transfer in prep. phase
	Online Module	High volume information transfer
Laboratory	In-lab session	Biological materials; interactive method, e.g., TBL
	Online interactive simulation	e.g., virtual microscopy
	Integration into non-lab session	e.g., virtual microscopy
POPS	TBL	Validated method, more uniform outcome
	Interactive online case	
Mini-case	TBL	Standardized, validated method, more uniform outcome, lower faculty effort
	Interactive online case	
CBL and ECM small group case	Jointly facilitated small group case	Greater integration, team coverage, more continuity, better training
Physical diagnosis lab	Physical diagnosis lab	Use interactive methods
Physical diagnosis lecture	Interactive lecture	As above
	Online module	
Doctor's office visit	Patient care continuum	(dependent on current objective)
Radiology lecture or interactive demo.	Radiology interactive demo.	Better approach to active learning

Student Assessment and Evaluation Principles

Students will be assessed in all Domains of Competence in the Foundations of Medicine Units, in Clerkships, and in required rotations. These assessments will contribute to grading and to internal decisions about promotion, remediation and graduation and have the potential to provide rich detail for the narrative portion of the Medical Student Performance Evaluation (MSPE or "Dean's letter"), which can deliver a competitive advantage to our graduates in the residency selection process.

To date, considerations for student assessment have only been developed for Foundations of Medicine, and the principles for assessment include:

- A dedicated week at the end of each Unit that includes time for review and cumulative assessments of all Domains of Competence.
- Some domains (e.g., Medical Professionalism) might not contain explicitly testable knowledge or skills, and might rely entirely on observation of behavior by preceptors during the Unit.
- Use of the most appropriate assessments, including but not limited to multiple-choice questions on medical knowledge. Assessments also could include essays, oral questions, multi-station skill and knowledge tests (OSCEs), and laboratory practical exercises, and could employ tools such as standardized patients and physical or computer simulations.
- Frequent formative assessments, which preview the cumulative assessments by familiarizing students with assessment modes and degree of difficulty.
- In both formative and summative assessments, assessment of different Domains of Competence will be integrated when possible. For example, a patient scenario on a multiple choice exam could lead to a question stem dealing with medical knowledge and another question stem dealing with a physical diagnosis skill.
- Summative assessments should include items that test knowledge and skills learned in previous Units.
- Formative and summative assessments should reflect the developmental nature of learning. Items should become progressively more complex from Unit to Unit, reflecting incorporation of core knowledge and skills from prior Units.
- Assessment results for each Unit will be reviewed on an ongoing basis to permit timely interventions that might prevent either failure of a Unit or of a Domain of Competence at the next gateway.

Grading and Student Progress

Grades in all required curricular elements such as Units and Clerkships will involve assessment of all Domains of Competence, and a passing grade will certify that the student has satisfactorily met the minimum competency standard in each of the six domains. The grading scale for Foundations of Medicine will be Pass, Conditional, or Fail. Based on a cumulative record of excellence across all competencies, a student can be awarded Honors or a notation of Completion with Distinction for Foundations of Medicine. This will be noted on the transcript and in the MSPE. The grading scale for Core Clinical Medicine and Advanced Clinical Medicine will be Honors, High Pass, Pass, Conditional, Fail. How the assessment of the individual competency domains will be used to arrive at these grades is to be determined. In any event, grading will be uniform across similar curricular elements such as Units or Clerkships.

The mechanics of advancement, remediation, and repetition during Core Clinical Medicine and Advanced Clinical Medicine are to be determined. Nonetheless, the general principles of continuous monitoring, gateway decisions, and rights of appeal continue to apply in these components of the curriculum as they do during Foundations of Medicine.

Student progress will be considered at four discrete gateways by the Academic Progress Committee. This committee will have discretion to determine whether a student can continue in the curriculum,

needs to undergo remediation outside the standard curriculum, needs to repeat a portion of the curriculum, or should be dismissed. Students will have the right to appeal decisions of the Academic Progress Committee to the Student Appeals Committee — see the section on *Organizational Design*, pages 37–41, for more detail on these committees.

In addition to assessments in Units, Clerkships, and other rotations, discrete gateway assessments might be included in promotions decisions – for example, a clinical skills assessment like the one currently done at the end of Year 3. The nature, timing, design, standards, and methods of remediating these assessments are still to be determined.

Remediation

Each of the six Domains of Competence will be evaluated throughout the curriculum, and all students will be followed to ensure they are attaining the knowledge, attitudes and skills needed at any point in the curriculum. Students who are not progressing will be required to work with the Office of Education and with Academic Development to improve their performance, and will not be able to progress beyond a gateway until they have met the competency requirements. Students may remediate in the summer between the first and second year, before beginning Core Clinical Medicine, and during non-required rotation time in Advanced Clinical Medicine.

Faculty Development and Assessment

Within the Office of Education, faculty development and assessment will be a concern of the Deans who are managing the curriculum, the Assistant Dean for Educational Development, and the Director of Assessment. They will create and maintain the infrastructure for assessing and developing faculty members as educators, and will provide or import special expertise as needed. Other centers outside the College of Medicine will also serve as resources for faculty development—for example the Centerwide Faculty Development Committee, the Educational Computing and Technology office, the library, the Simulation Center.

Initial faculty development efforts will include:

- On-site workshops and web resources using in-house or invited experts for teaching and assessment methods.
- Appropriate coordination with the Centerwide Faculty Development Committee.
- Support for selected educational leaders to attend external workshops and educational meetings.
- Training sessions within Units or Clerkships focused on the development needs of the faculty in those portions of the curriculum.
- Consultative and tutorial development of individual faculty members as needed or requested.

Longer-term initiatives, either within the College of Medicine or as part of centerwide programs, could include:

- Establishment of a curricular program or track for developing students as medical educators. Educational expertise is a valuable credential in many residency programs, and student-instructors can make a contribution to the educational program of junior students.

- Organization of an internal training program for advanced educators in which they receive training and mentoring and complete a project.
- Establishment of a community of master educators which could serve as a means of recognition for educational excellence and as a center for support of educational scholarship.

Assessment of faculty educational efforts has not been designed in detail, but there is a commitment to move to a model of evaluation that uses peer review and other types of evaluation in addition to student ratings. To do this, it may be necessary for Unit and Clerkship Directors or associated faculty to directly observe and evaluate the faculty members teaching under them.

Curricular Assessment

It is critical that the school have baseline and ongoing evaluations of the curriculum as we move forward, and that those assessments help inform a continuing quality improvement process. We will be developing an assessment and evaluation strategy that is likely to use existing external benchmarks, such as standardized test scores of students and graduates, supervisor ratings of PGY-1 graduates, AAMC graduation questionnaires, match results, and feedback from LCME accreditation reviews. We will refine and continue to use student assessments of the curriculum, and develop new internal measures to assess the curriculum and its components.

Curriculum Structure and Maps

The curriculum is illustrated schematically in Figure 2 (page 21), and for the entering class of 2012, which will graduate in 2016, the curricular elements are mapped to a calendar shown in Figure 3 (pages 22-23). Although not explicitly illustrated on Figure 2, there will be several longitudinal components that run through the four years of the curriculum. These include the six Domains of Competence, which, of course, provide the foundation and framework for the entire curriculum. Other longitudinal components include the three threads — Geriatrics, Nutrition, and Patient Safety.

Foundations of Medicine – Structure and Timelines

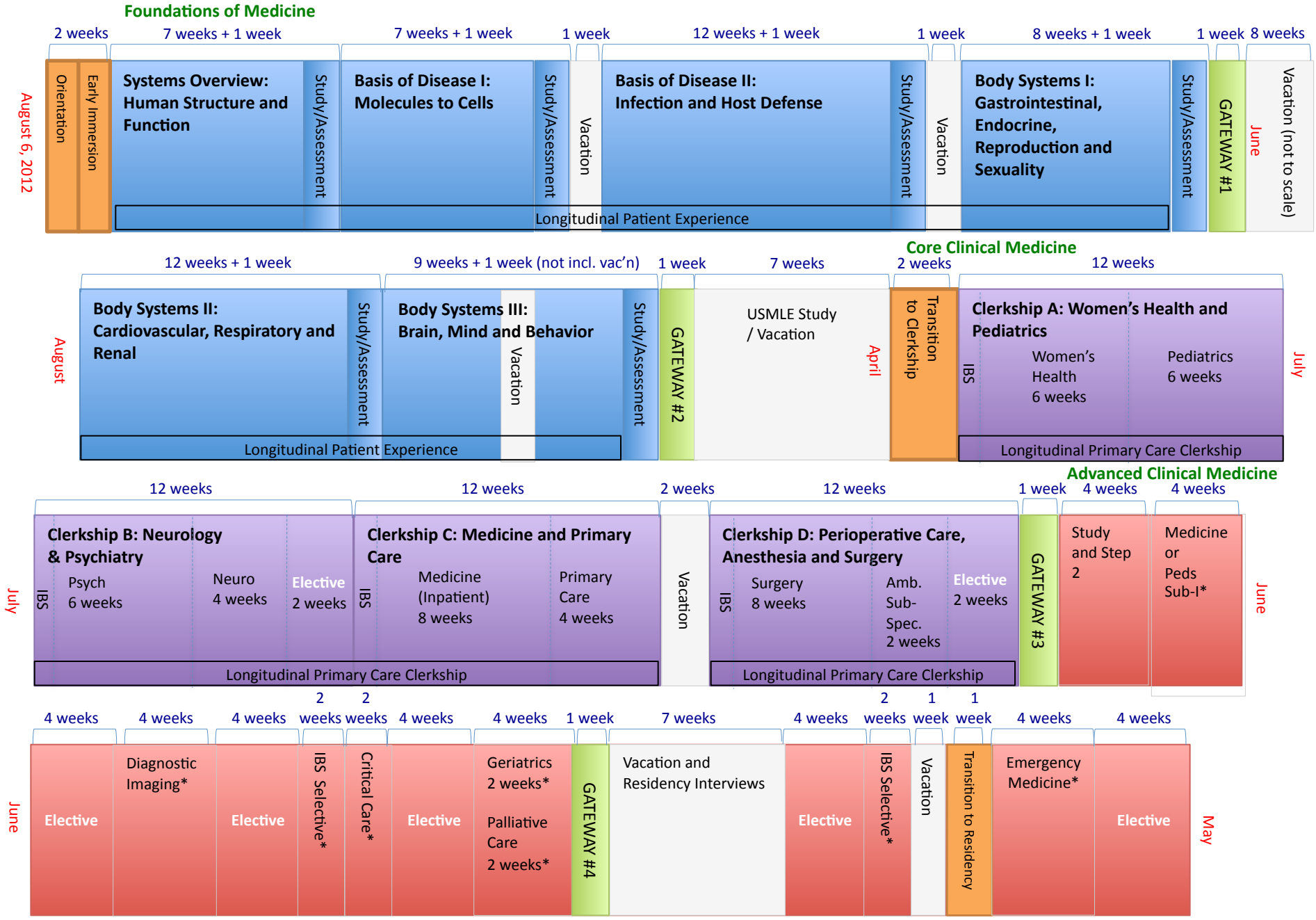
Foundations of Medicine is an extension of the structures proposed in Document-1 (*A Proposal For Curriculum Renewal*, August 2009). The final structure also draws on the themes, proposals, and discussion from the Curriculum Renewal Retreat held on May 13 and 14, 2010. Material from that retreat is collated in the Online Supplementary Material: http://www.downstate.edu/curriculum-renewal.

Foundations of Medicine begins in early August and runs for 18 months (Figures 2 and 3). It includes vacation time in winter, spring, and summer with a 9 week vacation between 'Year 1' and 'Year2', including a flex week that overlaps with Orientation week for the next incoming class. Foundations of Medicine is followed by a 7 week period for vacation, study, and USMLE Step-1 (Figures 2 and 3).

Foundations of Medicine begins with Orientation and Early Immersion, each one week in duration, although the activities in Orientation and Early Immersion may overlap and be distributed across the two week period rather than being rigidly separated into each of the one-week slots. Orientation will include many of the elements of the current Orientation for the incoming class – a discussion of who's who at Downstate, the overall structure of the curriculum, practicalities of living in New York and working toward the MD degree in a professional school, where to go for help, resources, ID cards, orientation to the layout of the school and adjacent hospitals, orientation to off-site activities, student life, volunteer opportunities, research opportunities, and so forth. Early Immersion is intended to provide an in-depth introduction to the six competencies that underlie the curriculum, and an introduction to the practice and culture of medicine as well as our community. It will contain various learning modes including large- and small-group exercises and early patient contact or community outreach activities.

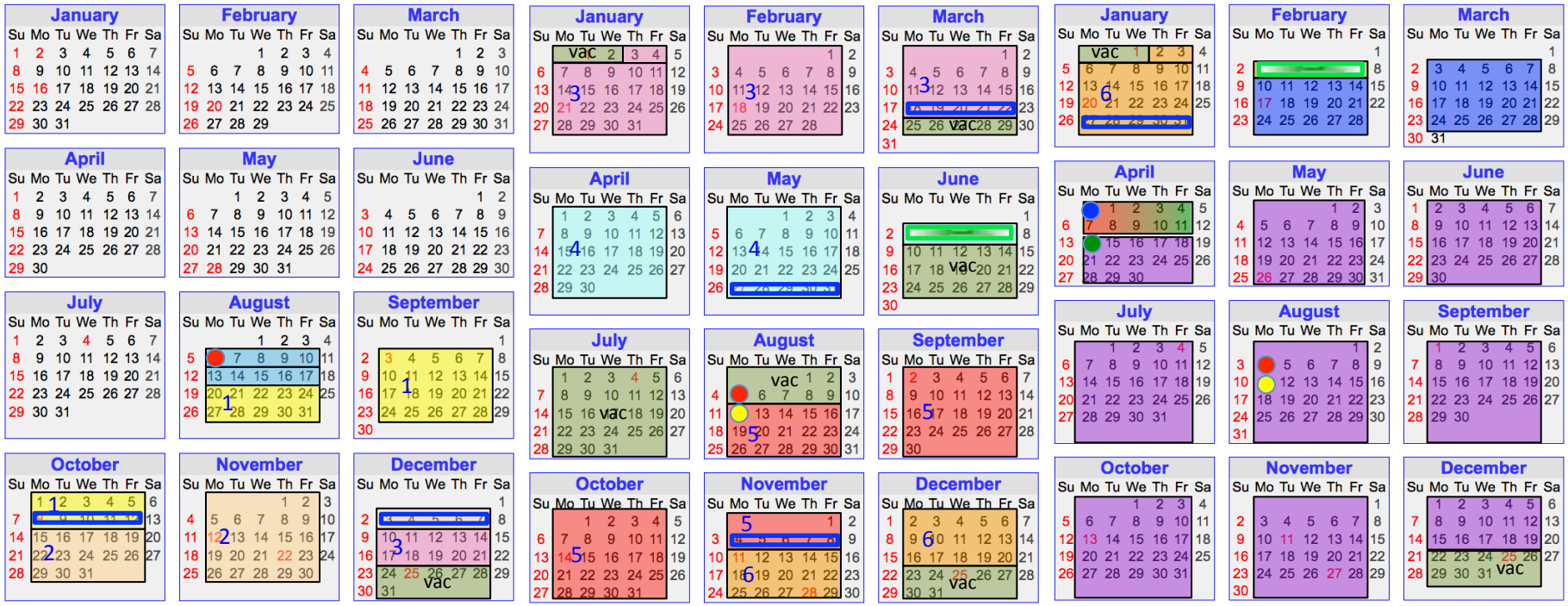
Foundations of Medicine contains six Units, with durations of 7 to 12.5 weeks, each followed by a one week period of study and assessment. In addition to the one week study and assessment period, Units 4 and 6 are also followed by a gateway assessment period of one week.

Fig. 2 Structure of Foundations of Medicine, and example structures of Core Clinical Medicine and Advanced Clinical Medicine



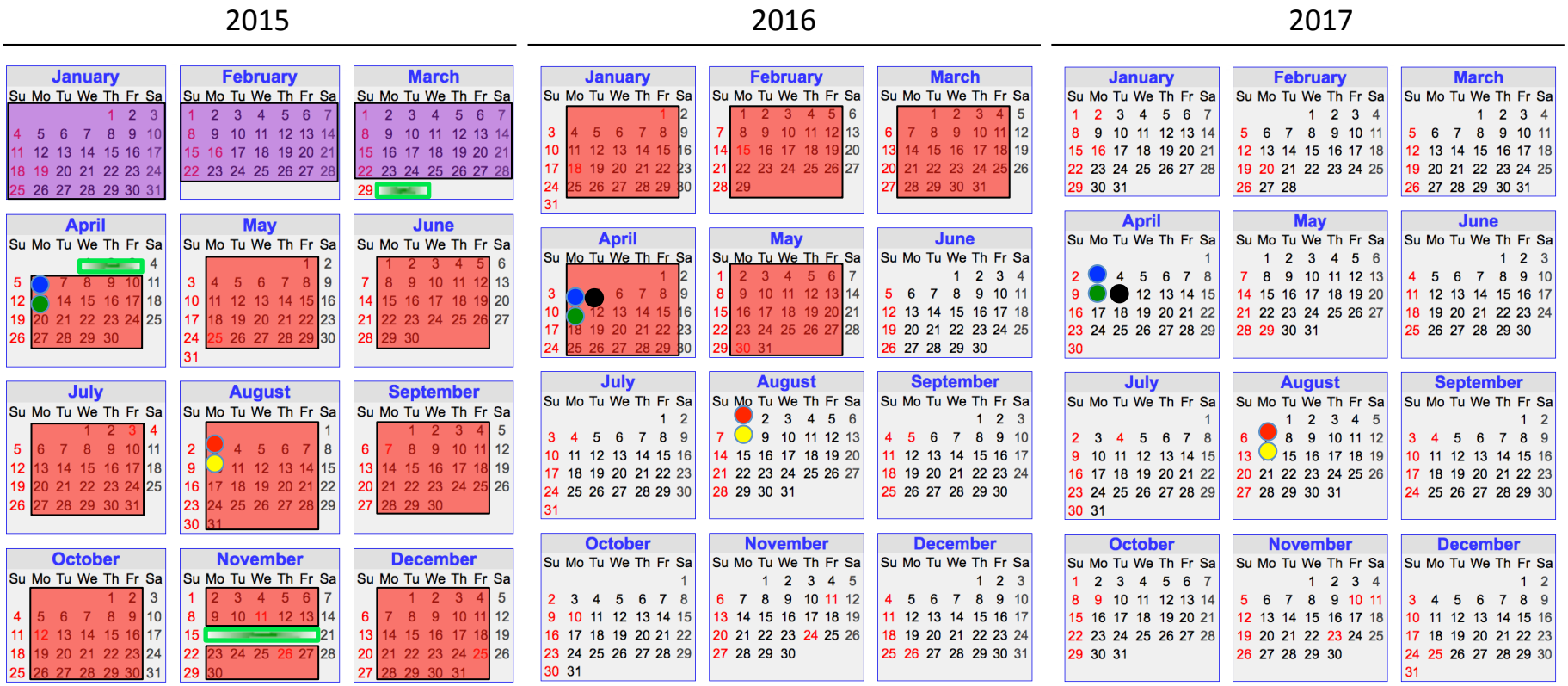
IBS = Integrated Biomedical Science / * Required elements in Advanced Clinical Medicine Years/ Threads are included in all four years (Geriatrics, Patient Safety, Nutrition)

Fig. 3a Curriculum for the entering class of 2012 mapped to the calendar for 2012–2016; Start dates for the main curricular elements for subsequent classes are also shown. *Continued on the next page…*



Curriculum on Calendar PAGE 1/2

Fig. 3b Curriculum for the entering class of 2012 mapped to the calendar for 2012–2016; Start dates for the main curricular elements for subsequent classes are also shown (colored circles).



Core Clinical Medicine

Gateway

Advanced Clinical Medicine (includes vacation time and residency interview time)

Start Foundations of Medicine Year 1; next class

Start Foundations of Medicine Year 2; next class

Start Core Clinical Medicine (transition to clerkship); next class

Start Clerkships; next class

Start Advanced Clinical Medicine; next class

The Units and their durations are listed in Table 7, and are illustrated schematically in Figures 2 & 3.

Table 7: The six Units within Foundations of Medicine

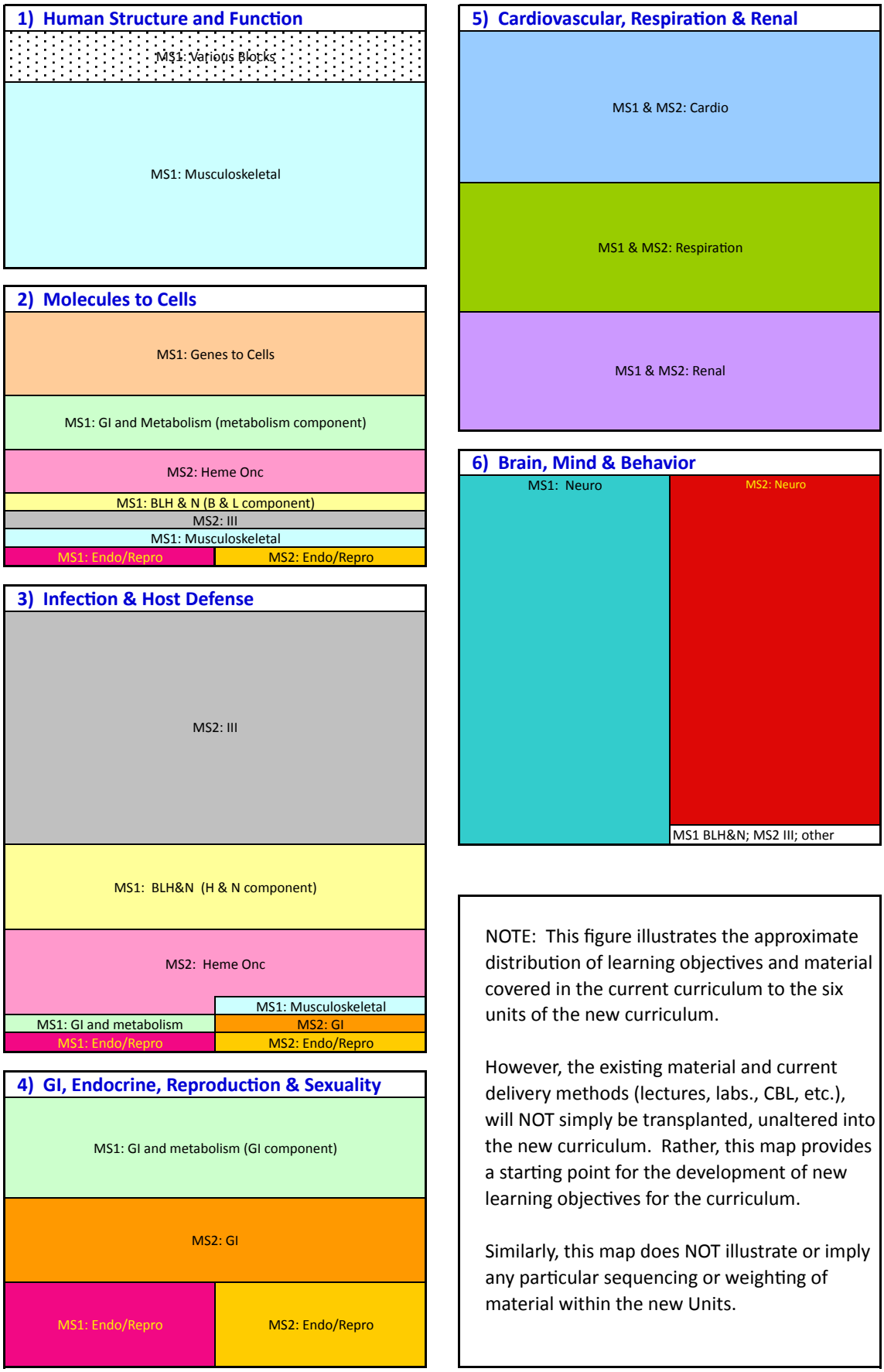
UNIT	Proposed Duration
1 Systems Overview: Human Structure and Function	7 weeks + 1 week for study and Unit assessment
2 Basis of Disease I: Molecules to Cells	7 weeks + 1 week for study and Unit assessment
3 Basis of Disease II: Infection and Host Defense	12.5 weeks + 1 week for study and Unit assessment
4 Body Systems I: Gastrointestinal, Endocrine, Reproduction and Sexuality	8 weeks + 2 weeks for study, Unit assessment and gateway assessment
5 Body Systems II: Cardiovascular, Respiratory and Renal	12 weeks + 1 week for study and Unit assessment
6 Body Systems III: Brain, Mind and Behavior	9.5 weeks + 2 weeks for study, Unit assessment and gateway assessment

Each Unit will address Learning Objectives and skills related to all six Domains of Competence – Patient Care, Medical Knowledge, Interpersonal and Communication Skills, Medical Professionalism, Social and Community Context of Health Care, Life-Long Learning and Problem Solving.

With regard to Medical Knowledge, a starting point for creating the appropriate Learning Objectives for each Unit will be the current USMLE requirements together with material taught in the current MS1 and MS2 blocks. In terms of the distribution of material relative to the current curriculum, we have listed and reviewed all available Learning Objectives from the current MS1 and MS2 blocks and have distributed them to their cognate Units in the new curriculum. This provides a starting point for creating new, uniform Learning Objectives. The distribution of material is summarized in Figure 4 (page 25). In this figure, blocks from the current curriculum have been color coded, and the approximate distribution of material to the new Units is shown by the distribution of those color-coded blocks. For example, most of the material currently covered in the MS1 Musculoskeletal Block will be covered in Unit 1 (Human Structure and Function), but some material will also be covered in Unit 2 (Molecules to Cells) and Unit 3 (Infection and Host Defense). Note that the existing material and current delivery methods (lectures, labs, CBL, etc.), will NOT simply be transplanted, unaltered, into the new curriculum. Similarly, Figure 4 does NOT illustrate or imply any particular sequencing or weighting of material within the Units.

Fig. 4 Mapping Learning Objectives based on content from the current curriculum.

Material from the current MS1 and MS2 blocks has been color-coded and mapped to the new Units



NOTE: This figure illustrates the approximate distribution of learning objectives and material covered in the current curriculum to the six units of the new curriculum.

However, the existing material and current delivery methods (lectures, labs., CBL, etc.), will NOT simply be transplanted, unaltered into the new curriculum. Rather, this map provides a starting point for the development of new learning objectives for the curriculum.

Similarly, this map does NOT illustrate or imply any particular sequencing or weighting of material within the new Units.

With regard to the other five Domains of Competence – Patient Care, Interpersonal and Communication Skills, Medical Professionalism, Social and Community Context of Health Care, Life-Long Learning and Problem Solving – a initial list of Curricular Goals under each competency domain has been identified along with benchmarks for three of the gateways including the gateway at the end Foundations of Medicine. That list is available in the Online Supplementary Material: http://www.downstate.edu/curriculum-renewal.

Figure 5 (pages 27–28) shows preliminary mapping of some material in the Patient Care, Medical Professionalism, and Interpersonal and Communication Skills Competency Domains to the six Units in Foundations of Medicine, and illustrates how these competencies build over time. In these figures, Patient Care has been sub-divided into four sub-categories – Medical History, Procedures, Clinical Testing and Physical Exam. Many of these areas sub-divide further. For example, Medical History can be broken down into Basics, Cultural Issues, Advanced Basics and so on.

By the end of Unit 1, students will have been exposed to some aspect of all these competencies, and the development of their knowledge and skills will continue throughout Foundations of Medicine. In many cases, the content will link and integrate logically with Medical Knowledge being taught in the same unit. For example, in Figure 5a, the throat culture (Patient Care – Procedures) would be logically introduced in Unit 3, Infection and Host Defense. Later material will build on earlier Units and will be continually reinforced in subsequent units, so that students achieve the level of competency required to reach the benchmark in the gateway at the end of Foundations of Medicine. The final placement of teaching and assessment will develop as the Units are built and reviewed in the first half of 2011.

Unit structures — Content and Integration of Competencies

The following themes will guide the structures of each of the six Units:

- Breadth and Depth All Units will include the six competencies and three threads in the appropriate proportions and sequence. Content will be matched with USMLE content lists and be taught in sufficient depth to ensure passage of Step 1 and 2 exams.
- Content will NOT represent one faculty member's research interests which do not also meet other criteria for inclusion in the curriculum.
- Content will NOT contain more detail than is appropriate for the students' stage of education.
- Coherence Content will be coherent, sensibly held together and flow within Units. Preferably, there will be a "story" that shows how the material relates within the Unit and links to previous and subsequent Units. Those competencies that are developmental must also be coherent longitudinally (e.g. students learn basic communication skills before they learn to talk to sick patients). Knowledge should also develop and build coherently (e.g., students should master the principles of Pharmacology before exploring pharmacologic approaches to the treatment of organ-system specific disease).

Fig. 5a Mapping Patient Care and other competencies (*contd. next page…*)

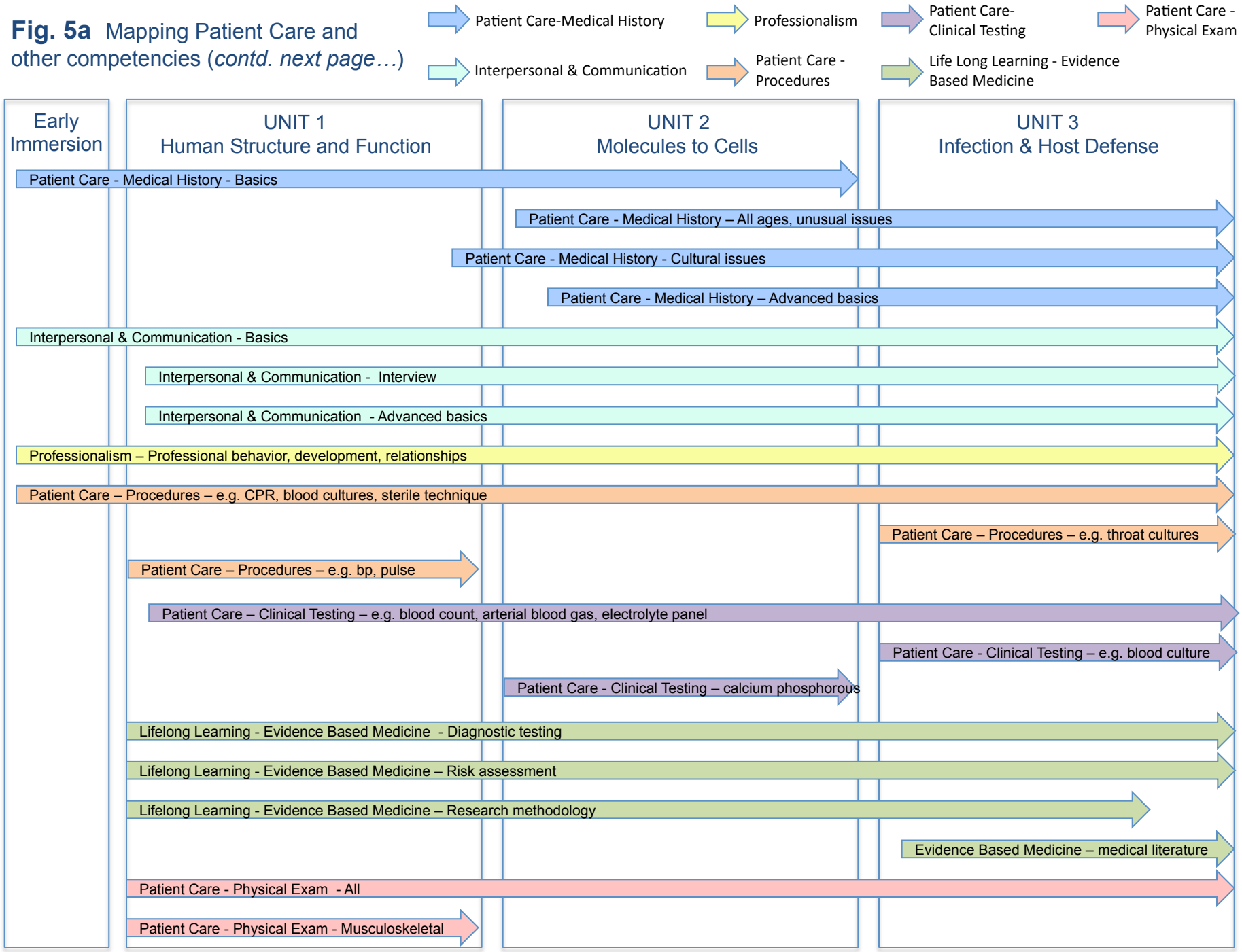
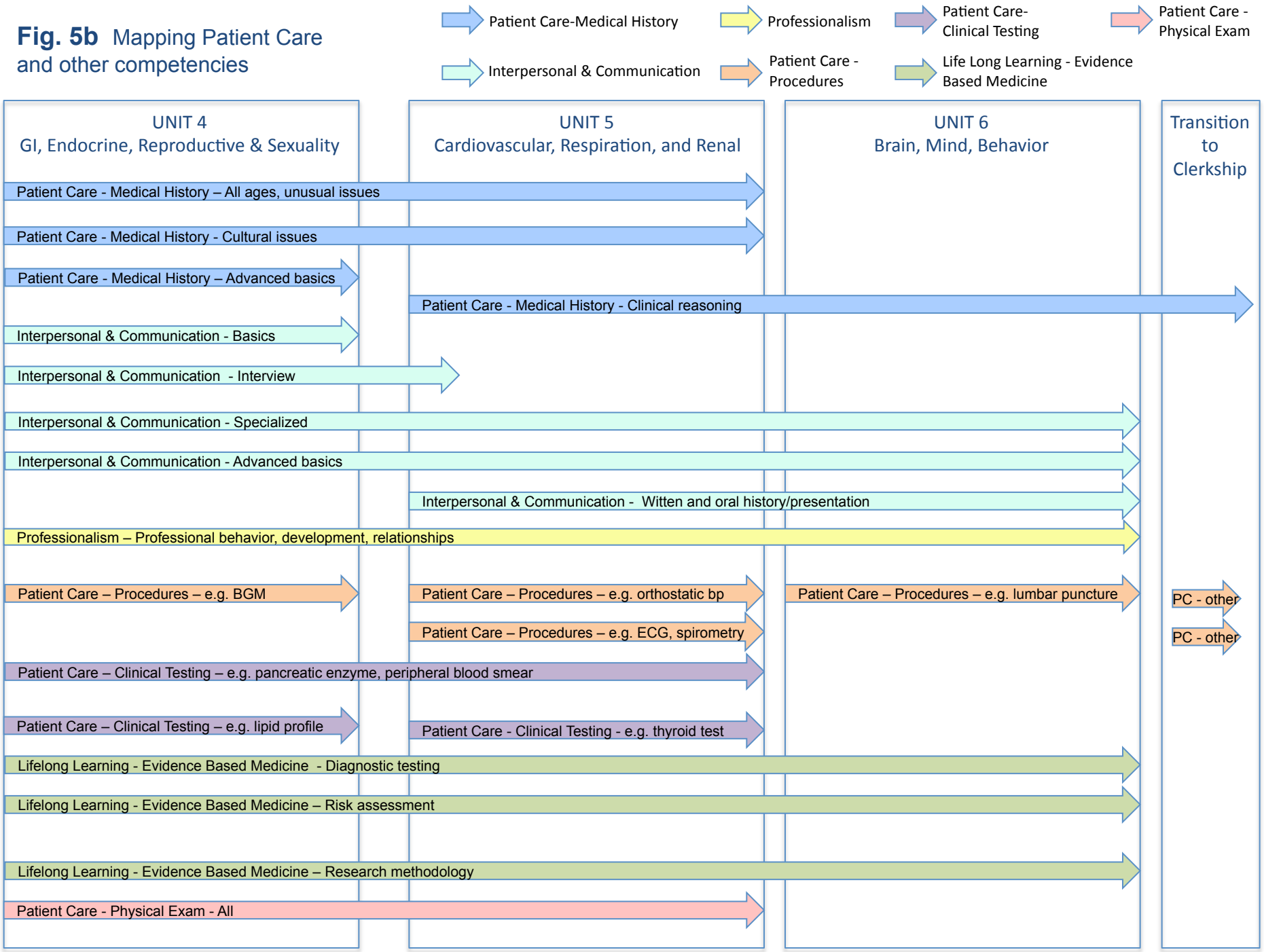


Fig. 5b Mapping Patient Care and other competencies



- Clinical Application/Relevance Wherever possible, biomedical science should have clinical application visible to students so they understand "why" they are learning it. In some cases, relevance to health and wellness may also be appropriate in addition to, or instead of, relevance to clinical medicine.
- New, Emerging Science Significant developments in biomedical science will be included to illustrate how medicine is always changing and emphasize the lifelong, adult learning aspect of medical knowledge.
- Building and Repeating/Reinforcing Content will build on and repeat or reinforce earlier content, and foundational material will be introduced before more complex material. Where appropriate, material will be repeated and reinforced, with reference to its previous appearance in the curriculum.
- Integration As one of the key principles underlying curriculum renewal, integration will guide much of the Unit structure. At the same time, it is important to stress that integration will not be done purely for the sake of integration itself. The level and frequency of integration may not be uniform across or within Units, and integration will be done where it makes sense.
- Integration of 'normal' and 'abnormal' The new curriculum combines the teaching of 'normal' and 'abnormal' or 'pathology' in each Unit. The goal of this strategy is to more closely connect students' understanding of normal body functions and pathology/abnormal function, and to eliminate unnecessary redundancy. Although it is clear that the balance and sequence of normal and abnormal may differ from Unit to Unit, we will strive to achieve the follow principles of integration:
    - Avoid having all normal followed by all abnormal within a Unit.
    - Start the Unit by emphasizing fundamentals, foreshadow wherever possible the clinical relevance to pathology, and then lead into sections with more detailed discussions of fundamentals, pathology and clinical application.
    - Wherever possible, teach fundamentals and pathology together.
    - Units should seek to integrate medical knowledge and clinical competencies, and material such as Anatomy and Physical Exam should be correlated wherever possible.

Core Clinical Medicine – Structure and Timelines

Core Clinical Medicine begins in early April, after USMLE Step 1 (Figures 2 and 3), and is a major transition point in the students' clinical training. It marks the first time that the students are assigned on a daily basis to a clinical team and expected to participate fully in the clinical care of patients. While they will still have purely educational responsibilities and will spend considerable time in seminars, small group sessions or lectures, their time will be predominantly spent in a work environment that involves learning by taking care of patients. The proposed structure and timeline sets the direction for Core Clinical Medicine. Compared with the current curriculum, the major changes in Core Clinical Medicine will include: the development of Learning Objectives for each of the Domains of Competence that will be taught in Clerkships; common assessments of core knowledge and skills so that student achievement can be followed over the year; explicit teaching of biomedical science in the Clerkships. The details of these changes will be determined by working with the major

stakeholders such as clinical departments and Clerkship directors, our Affiliate partners, biomedical science faculty, and the new Office of Education.

Core Clinical Medicine begins with a two-week Transition to Clerkship, which will contain some of the elements currently found in Transition to Clerkship, but with an expanded emphasis on clinical reasoning and skills. Thus, Transition to Clerkship will deal with the practicalities of life on the wards; with advanced clinical skills and procedures such as IV line placement and NG tube placement, SOAP notes, and so forth; and will likely contain complex case presentations and simulation exercises emphasizing patient presentation, chief complaint, and clinical reasoning.

As shown in Figure 2 (page 21), the major focus of Core Clinical Medicine is the Clerkships, but there are also four weeks of elective time and two weeks of vacation. The inclusion of elective time will provide opportunities for early exposure to various sub-specialties to help with career planning and eventual residency applications. The elective time within Clerkship blocks B and D can also be used as study time for students who may have to take USMLE later because they needed to remediate aspects of Foundations of Medicine, or need remediation time for material within Core Clinical Medicine itself. The third gateway comes at the end of Core Clinical Medicine, with the goal of ensuring that students have mastered all necessary competencies to progress to the next stage of the curriculum.

The Clerkships are arranged within four blocks, each of 12 weeks duration and each containing one or two Clerkships. Some blocks also contain a 2-week elective period. The 12-week structure will facilitate efficient scheduling across Clerkships and across sites. Each block will repeat four times a year as students transition through the various Clerkships. The Clerkship blocks and their contents/durations are as follows:

- **Clerkship A: Women's Health and Pediatrics (12 weeks total)**
    - Women's Health (6 weeks)
    - Pediatrics (6 weeks)

- **Clerkship B: Neurology and Psychiatry, and Elective (12 weeks total)**
    - Psychiatry (6 weeks)
    - Neurology (4 weeks)
    - Open Elective (2 weeks)

- **Clerkship C: Medicine and Primary Care (12 weeks total)**
    - Internal Medicine (8 weeks)
    - Primary Care (4 weeks)

- **Clerkship D: Perioperative Care, Anesthesia and Surgery, and Elective (12 weeks total)**
    - Perioperative Care, Anesthesia and Surgery, including both inpatient and outpatient experiences throughout (8 weeks)
    - Ambulatory Sub-specialties (2 weeks)
    - Open Elective (2 weeks)

In the example shown in Figure 2, a student would progress from block A to block B, then to block C and finally block D. However, this is just one possible configuration, and a student may start with block C then proceed to block A, and so on. Similarly, within block A, some students will take Pediatrics before Women's Health, and vice versa. The Perioperative Care, Anesthesia and Surgery block will be focused on general surgery and perioperative care that includes the teaching currently provided in our separate two-week Anesthesia Clerkship. The Clerkship will also include exposure to surgical subspecialties with a significant ambulatory component with the dual purpose of career exposure as well as learning core knowledge and skills required of a student prepared to enter any field of medicine. The elective time can be taken in a non-surgical field.

Each Clerkship block will contain structured teaching of Biomedical Science (IBS on Figure 2). One possibility would be to begin with a structured period of several days to a week that integrates patient care with Biomedical Science using topics and themes that are relevant to the two Clerkships within the block. Biomedical Science will also be integrated, as far as possible, into everyday exercises within the Clerkships – for example in patient presentations and patient write-ups and as a component of team-based learning exercises. In addition, the new curriculum strives to encourage and implement joint teaching across Clerkships, when this is feasible and appropriate. Indeed the arrangement of Clerkships within blocks is designed to explicitly encourage joint teaching of knowledge and skill sets relevant to different Clerkships, to encourage collaboration between faculty, and to encourage the development of a common core knowledge base and avoid duplication of what is taught in different Clerkships. For example, we envision joint teaching and core skill sets that relate to Women's Health and Pediatrics (Clerkship block A); Psychiatry and Neurology (Clerkship block B); Medicine and Primary Care (Clerkship block C). Another requirement for all Clerkships is that they contain a robust ambulatory care component.

A key theme in all Clerkships will be an increased focus on Learning Objectives within all six of the Domains of Competence and robust assessment of these competencies. As noted above, all Clerkships will share the teaching and evaluation of some core knowledge and skills that will allow for tracking of students across the Core Clinical Medicine year and thus help the faculty to identify students who are struggling and provide the opportunity for timely support and remediation. Aside from common competency-based Learning Objectives, Clerkship-specific Learning Objectives and assessments will also be organized within the six Domains of Competence.

In addition to the Clerkships housed within each of the four blocks, it is expected that we will develop a longitudinal Primary Care Clerkship which takes place in adult, pediatric or family medicine primary care settings. This longitudinal Clerkship will run through most or all of Core Clinical Medicine (illustrated in Figure 2 as the component running longitudinally across the bottom of all four blocks), and it exists *in addition* to the Primary Care Clerkship housed within Clerkship block C. The goal of the longitudinal component is to ensure that students have repeated and longitudinal exposure to the same patients in a primary care setting. The format of the longitudinal Primary Care Clerkship has not yet been finalized, but it could involve, for example, students spending one afternoon per week in the same primary care practice for much of the Core Clinical Medicine year. The final structure will depend on appropriate integration with the other Clerkships and on available resources.

Advanced Clinical Medicine – Structure and Timelines

Advanced Clinical Medicine begins in early April, after Core Clinical Medicine, and runs through May of the following year (Figures 2 and 3). One of the goals of curriculum renewal was to provide a more structured and rigorous experience for the senior year. The faculty and Steering Committee have thus proposed several new initiatives for the Advanced Clinical Medicine year in addition to a revised structure for Electives and other current activities. The details of this portion of the curriculum will be determined by working with major stakeholders such as our clinical departments, Affiliate partners, Biomedical Science faculty, and the new Office of Education. The major activities in Advanced Clinical Medicine are as follows:

- **Sub-Internship in Medicine or Pediatrics (4 weeks)**
- **Required Rotations:**
    - Diagnostic Imaging (4 weeks)
    - Critical Care (2 weeks)
    - Geriatrics (2 weeks)
    - Palliative Care (2 weeks)
    - Emergency Medicine (4 weeks)
- **Electives (20 weeks required)**
- **Integrated Biomedical Science Selectives (4 weeks total)**
- **Transition to Residency (1 week)**
- **Study time and USMLE Step 2 exam (up to 4 weeks)**
- **Residency Interviews (up to 8 weeks)**
- **Vacation (up to 4 weeks)**

An example Advanced Clinical Medicine year is shown in Figure 2 (page 21), beginning with study/USMLE Step 2, followed by the Sub-Internship, an Elective, the Diagnostic Imaging Required Rotation, a second Elective, an Integrated Biomedical Science Selective, the Critical Care Required Rotation, and so on. Obviously, the sequence of the various components, as well as the choice of Elective and Selective topics will be different for different students.

Sub-Internship and Required Rotations

The structure and goals of the Sub-Internship will be similar to that in the current curriculum, and students will be able to pursue a Sub-Internship in Medicine or Pediatrics. Similar to the Clerkships, the Required Rotations will include Learning Objectives based on the six Domains of Competence and will be assessed and reviewed similar to the Clerkships. These rotations are in areas that are not adequately covered in the Clerkships during the Core Clinical Medicine year, but provide important knowledge and skills for all generalist physicians and students preparing for residency – Diagnostic Imaging, Critical Care, Geriatrics, and so forth. The content of these proposed rotations will be further defined over the next year.

Selectives and Electives

Integrated Biomedical Science Selectives (IBS on Figure 2) are required rotations that provide the opportunity for students to have an in-depth exposure to biomedical science during Advanced Clinical Medicine. Each student will be required to take a total of four weeks of these selectives. The design specifications for the selectives will be developed as a partnership between our biomedical and clinical faculty.

Students will be able to choose from a menu of Electives offered by various clinical departments at Downstate. These will be similar in structure to current electives, but all electives will be assessed and reviewed, and renewed on a regular basis. In the new curriculum, elective proposals will be reviewed by the Office of Education, with subsequent assessment and review by the same office. Each department will be asked to develop a list of elective rotations that are considered to be specifically useful in preparation for residency in that field and students will be encouraged, possibly required, to choose one to three elective rotations from the list pertinent to the specialty they will be entering.

Vacation, USMLE Step 2, and residency interviews

In addition to the specific activities listed above, there will be a total of 16 weeks available for vacation, USMLE study time and residency interviews (see Figure 2, page 21).

Gateway

The fourth and final gateway comes in Advanced Clinical Medicine. As with prior gateways, this is a period of review, assessment, and evaluation to ensure that students have met all the requisite competency requirements and have an opportunity to remediate before graduation. Students will need to satisfy all requirements of this gateway in order to continue on to graduation.

Nutrition, Geriatrics, and Patient Safety Threads

Threads are longitudinal components that appear repeatedly throughout the curriculum, are of widespread and growing importance in health care and medicine, and are best taught longitudinally across the fours years. Threads ensure that related material is covered adequately throughout the curriculum, is integrated with the six competencies and with the other material in Units, Clerkships, required rotations, and elsewhere, and that students are repeatedly exposed to the theme of each thread and can appreciate its relevance. Initially, there will be three threads – Geriatrics, Nutrition, and Patient Safety.

Items Under Consideration

The items below were discussed and reviewed by various working groups during the Curriculum Renewal process. These items are considered important but have not yet been fully developed. More time and study is needed to determine the design of these elements and their implementation timeline, which may not be synchronous with rollout of the new curriculum.

Career

The Steering Committee charged a working group in the winter of 2010 to assess our current career advisement program and to make recommendations for the new curriculum. The working group found that although the current system for career advisement includes activities such as AAMC resources, Alumni Association mentor program, individual departmental programs and advisors, brief clinical electives, and clubs and campus organizations, there is no coordinated effort for students and that not all students take advantage of the offerings. The Steering Committee proposes that the new Office of Education work with the Office of Student Affairs to develop a cohesive and robust career advisement program. This program should also consider coordinating advisement for students interested in doing research as these two activities are related to each other. The Career Report is available in the Online Supplementary Material: http://www.downstate.edu/curriculum-renewal.

Tracks

Tracks are areas of concentration that can be specifically designed over 4 years and are extensions of required coursework that build expertise and provide opportunity to explore topics in depth. During the May 2010 Integrative Retreat, the issue of tracks for the new curriculum was explored. The group felt that tracks were important for the following reasons:

- Tracks provide an opportunity for students to focus on and further explore a topic of interest, and are an efficient structure for students who may be making individual efforts.
- Tracks highlights activities that may help students become more competitive for residency.
- Tracks would facilitate concurrent Masters Degree in Public Health.
- Tracks allow for early faculty/student interaction, and feedback provides enrichment and more mentoring possibilities.
- The inclusion of tracks responds to a proven interest – approximately 70 students sign up for the Clinical Neurosciences Pathway, including students with minimal interest in Neuroscience.

The retreat's working group recommended that all tracks require a written product such as a publication, presentation, new curriculum module, report on a service or performance improvement project. There might also be a Track Presentation Day (similar to the Research Day sponsored by the Graduate School) in order to highlight student work. Students would have the option to select a track by the end of the first year of medical school. Consideration would need to be made of the need for protected time in the curriculum and faculty and administrative resources to support the efforts.

Examples of tracks might include:

- Community Health: Urban Health or Health Care Disparities—local or international
- Global Health

- Humanities and Medicine: Medical Ethics, History of Medicine, Art and Medicine
- Medical Informatics
- Neuroscience
- Primary Care
- Research Track: Clinical, Basic Science or Translational Research
- Teaching
- Wellness

The Steering Committee supports the idea of Tracks and recommends, once the major features of the new curriculum are in place, that Tracks be further developed as a feature of the new curriculum.

Learning Communities

Learning communities, sometimes called houses or colleges, are an organizational scheme that divides the student body into smaller groups that contain students from all four years, and pairs each of these groups with a faculty cadre. Learning communities can be used for social activities, mentoring and advisement, and for curriculum delivery. Because one of the goals of the new curriculum is to create meaningful relationships between students and faculty, the Steering Committee asked a working group to explore learning communities during the May 2010 Integrative Retreat.

Because of the size of our College of Medicine, our 775 students could be divided into eight houses of about one hundred students per group and twenty-five students per class. If the houses were used for small group instruction, the twenty-five students would need to be subdivided into two smaller groups. Each house would have four or five faculty members.

The Steering Committee feels that learning communities could provide an important support and curriculum delivery structure for the new curriculum. Because the concept requires further development, we recommend that it be explored during the design phase of the new curriculum. It may be that some aspects of a learning community could be implemented at the onset of the new curriculum and other features added later.

Honor Code and Honor Council

The Assessment and Evaluation Committee report, submitted to the Steering Committee in the summer of 2010, recommends the institution of an Honor Code that promotes professional and ethical behavior by students. The following is adapted from the report:

Students would pledge to uphold the code and report violations of integrity by others. The report posits that if the school is serious about promoting the development of professionalism in our students, we should shift the responsibility for ensuring ethical behavior from faculty to students. Exams from the National Board of Medical Examiners require proctoring as a condition of use, but adoption of an honor code for in-house examinations would send a positive message to students that would be worth the risks. The Steering Committee feels that the institution of an Honor Code is an important contribution to the promotion of professional behavior expected of our students and reflected in the elevation of Medical Professionalism to one of our required six competencies. This Honor Code should be developed in conjunction with the Office of Education, Student Affairs, faculty, and students and be integrated into our curriculum as soon as possible given its importance. In

addition to institution of an honor code, the Steering Committee recommends the formation of a committee made up of students from all four years who will be charged to assist the faculty and administration by hearing perceived violations of the honor code and recommending an appropriate course of action. This Honor Council would attend to allegations of cheating, plagiarism, fabrication, breaches of confidentiality and other reports of unprofessional behavior.

The Professionalism Committee report recommended one step further by addressing professionalism, not just for students, but throughout the SUNY Downstate Medical Center. To promote and strengthen the culture of medical professionalism, the committee recommended the formation of a multidisciplinary professionalism council for SUNY Downstate Medical Center. The goal of this council is to educate and to facilitate professional behavior throughout University Hospital and all Downstate schools and colleges. The committee also recommended implementing a more comprehensive system of identifying, reporting, addressing and tracking unprofessional behavior at Downstate. If a multidisciplinary professionalism committee is implemented, one of the sub-committees could be a student-run Honor Council charged with the duties described above.

Scholarly Project

The Scholarship Competency Workgroup recommended a required scholarly project that would take the equivalent of six to eight weeks of full time effort by students. Benefits may include helping students be more competitive for residency, introducing students to the production of scholarly work early in their career and thereby maintaining interest, and providing an opportunity for students to understand the skills and processes that underlie the production of scholarly output. A scholarly project would require the development of a well-structured faculty oversight system with mentorship and faculty development. Given the anticipated demands on the faculty and resources of the College of Medicine in the initial rollout of the new curriculum, the Steering Committee feels that a required scholarly project should not be a priority, but should be revisited later in the process.

Organizational Design

Principles

The Office of Education is designed to support the principles of Integration, Collaboration and Relevance and is at the core of a system of institutional responsibility for the medical educational program. Additionally, it is important that the College of Medicine commit itself to becoming an organization that collects and uses information to continually evaluate its performance and to make changes that result in a better education for our students. It should recognize excellence in education and educational scholarship as well as provide support for the development of faculty members as teachers.

The Office of Education pursues these goals by clearly defining the accountability and authority for each role in the office as well as supporting a "matrix structure" that involves sharing of information across the curriculum and within the office. For example, the Associate Dean for Foundations of Medicine is responsible for ensuring that the first eighteen months of the curriculum is complete and cohesive, but he or she ensures these goals by working closely with the Associate Dean for Clinical Medicine, the Competency Directors, the Thread Masters, and other members of the Office of Education. In this way, those who are responsible for any given portion of the curriculum work directly with others who have a view of the entire curriculum thereby supporting an integrated four-year structure. This ensures a balance between authority and collaboration that keeps excellent student education at the fore. To support continuous improvement, student and curricular performance data must be collected and reviewed by those with responsibility for education and by those with a stake in the educational process, including faculty governance. Appropriate checks and balances are needed to ensure accountability and to encourage excellence.

Outreach and Collaboration

There are many stakeholders outside the Office of Education who have important roles in undergraduate medical education. In addition to faculty governance and the Curriculum and Educational Policy Committee (CEPC), these include our departmental chairs, the offices of Graduate Medical Education, Student Affairs, Student Life, the Sophie Davis School of Biomedical Education, Educational Computing and Technology, the Library, and those involved in the delivery of clinical services, including our affiliates. Students and student governance are key stakeholders. The faculty and leadership of the College of Health Related Professions, the College of Nursing, the Graduate School and the School of Public Health remain important partners, as does our Alumni Association. The Office of Education will continually seek to work with those outside the office in order to strengthen the institution's ability to provide the best educational environment possible for our students, and to improve and support the overall mission of the institution.

Role Descriptions

The following are narrative descriptions of the major roles in the Office of Education and related roles for curriculum delivery. Numbers refer to the organizational design chart shown in Figure 6, page 41.

1. Senior Associate Dean for Academic Affairs
   The person in this role, who reports to the Dean, broadly oversees all four years of medical educational, and is responsible for structure, content, delivery and outcomes of the four-year curriculum. He or she maintains curricular strategy, policies and standards, ensures completeness, cohesion and coordination across all four years, including personnel, content, methods, assessment, resources and outcomes. He or she manages directly or indirectly all faculty and staff involved in the delivery of medical education, leads and manages the Office of Education, recommends appointments for all positions, obtains resources to deliver the curriculum, builds relationships with other colleges, and other parts of the institution and affiliates.

2. Director of Administration
   The person in this role, who reports to the Senior Associate Dean for Academic Affairs, assures smooth functioning of the Office of Education, coordinates work and projects that fall outside of the domain of other Office of Education deans, Directors, and masters. He or she can assist as needed with overall problem solving within and outside of the Office of Education.

3. Associate Dean for Foundations of Medicine
   The person in this role oversees directly the Foundations of Medicine years of the curriculum; ensures all competencies and threads are taught and assessed effectively; identifies faculty for positions; collaborates with the Competency Directors, the Director of Assessment and the Assistant Dean for Educational Development to deliver a coherent curriculum; ensures coherence with Clinical years; identifies sufficient resources for Foundations of Medicine curriculum; leads, manages and supports Units and Unit Directors.

4. Associate Dean for Clinical Medicine
   The person in this role oversees directly the Core Clinical Medicine Year and Advanced Clinical Medicine years; ensures all competencies and threads are taught and assessed effectively; identifies faculty for positions; collaborates with the Competency Directors, the Director of Assessment and the Assistant Dean for Educational Development to deliver a coherent curriculum; ensures coherence with Foundations years; identifies sufficient resources for Clinical curriculum; leads, manages and supports Clerkships and required rotations, electives, selectives and their respective directors. He or she also manages relationships with Affiliates.

5. Competency Directors (3): Medical Knowledge; Life-long learning & Problem Solving and Social and Community Context of Health Care; Patient Care, Medical Professionalism, and Interpersonal and Communication Skills
   These colleagues lead a team that ensures relevance, completeness and appropriate continuity of content and assessments across 4 years; sources and mobilizes content experts to design the curriculum in conjunction with Unit, Clerkship and course Directors; maintains benchmarks and certifies that students have satisfactorily met benchmarks for progression. They will work with

the Deans and Thread Masters in the Office of Education, Unit and Clerkship Directors as well as consult with the Director of Assessment and the Assistant Dean for Educational Development. They may have a key role in determining the development of competency-specific remediation activities for students.

6. Thread Masters (3): Patient Safety, Nutrition, and Geriatrics
   These individuals, who report to the Senior Associate Dean for Academic Affairs, will source and mobilize content experts to design the curriculum in conjunction with Unit, Clerkship and rotation Directors. They will ensure continuity and appropriateness of content and assessments across 4 years.

7. Assistant Dean for Educational Development
   The person in this role, who reports to the Senior Associate Dean for Academic Affairs, will develop short-term and long-term strategy and goals, policies and standards for education in the curriculum. He or she will act as a subject matter expert and resource for deans and Directors, and work with Competency Directors and thread masters, Unit, Clerkship and rotation Directors in designing educational activities. This individual will set guidelines for methods use, review the curriculum for quality and quantity of methods and have the authority to approve specific method use. He or she will work with the Assessment Director to assess faculty skills in instructional methods and technology and recommend faculty development strategies for closing gaps in faculty skill levels. He or she will identify needed resources for faculty development and deliver appropriate faculty development support (e.g. conferences, training). The person in this role will work with Educational Computing Technology to coordinate use of technology in education. He or she will also work with the other colleges and schools to develop center-wide educational resources and collaborative teaching efforts.

8. Director of Assessment
   This individual, who reports to the Senior Associate Dean for Academic Affairs, develops and enforces minimum standards for all assessments for each course; analyzes assessment data; coordinates all reporting functions (e.g., bring reports to the Office of Education), collects and distributes Shelf Exam data; designs and administers benchmark evaluations; helps to administer of all assessments to ensure validity and reliability; procure proctors, rooms. He or she provides data to the Unit and Clerkship Directors as needed according to policy and provides specialized technical expertise on assessments to Office of Education and faculty.

9. Director of Academic Development
   This individual will work with the Office of Education and faculty to coordinate and provide academic support to individual students as well as serve as a resource to the Office regarding remediation.

10. Academic Progress Committee
    This Committee replaces the current Grades Committee and some functions of the current Student Promotions Committee. The committee structure, membership and policies will be fashioned to support the new curriculum as well as adhere to regulatory and accreditation standards. It will be housed within the Office of Education.

11. Student Appeals Committee

    This Committee replaces some functions of the current Student Promotions Committee. The committee structure, membership and policies will be fashioned to support the new curriculum as well as adhere to regulatory and accreditation standards. It will be housed within the Office of Student Affairs. The policies and procedures of this committee, and of the Academic Progress Committee, will be designed to assure students are treated fairly and in compliance with all regulatory and accreditation standards.

12. Unit Directors

    Unit Directors, who report to the Associate Dean for Foundations of Medicine, are broadly responsible for unit faculty, content and delivery. They are specifically responsible for the day-to-day management of the unit by being the "face of the unit" to students. This means being responsible for responding to student issues and concerns regarding faculty, content or logistics. Unit Directors will participate in Unit Director meetings and contribute to setting expectations for student learning in all six Domains of Competence within Units. He or she may delegate aspects of unit management to Associate Unit Directors, but may not delegate responsibility for outcomes. Each Unit should have both biomedical scientists and clinicians in leadership positions.

13. Clerkship Directors

    Clerkship Directors, who report to the Associate Dean for Clinical Medicine, are broadly responsible for their Clerkship's faculty, content and delivery. They must ensure Clerkships meet accreditation standards including such requirements as equivalence of student experience between Clerkship sites. He or she is specifically responsible for the day-to-day management of the Clerkship by being the "face of the Clerkship" to students. This means being responsible for responding to student issues and concerns regarding faculty, content or logistics. Clerkship Directors will participate in Clerkship Director meetings and contribute to setting expectations for student learning in all six Domains of Competence across and within Clerkships. He or she may delegate aspects of Unit management to Associate Clerkship Directors, but may not delegate responsibility for outcomes. Clerkship Directors will be expected to work closely with faculty from the biomedical sciences to integrate biomedical science into the Clerkships.

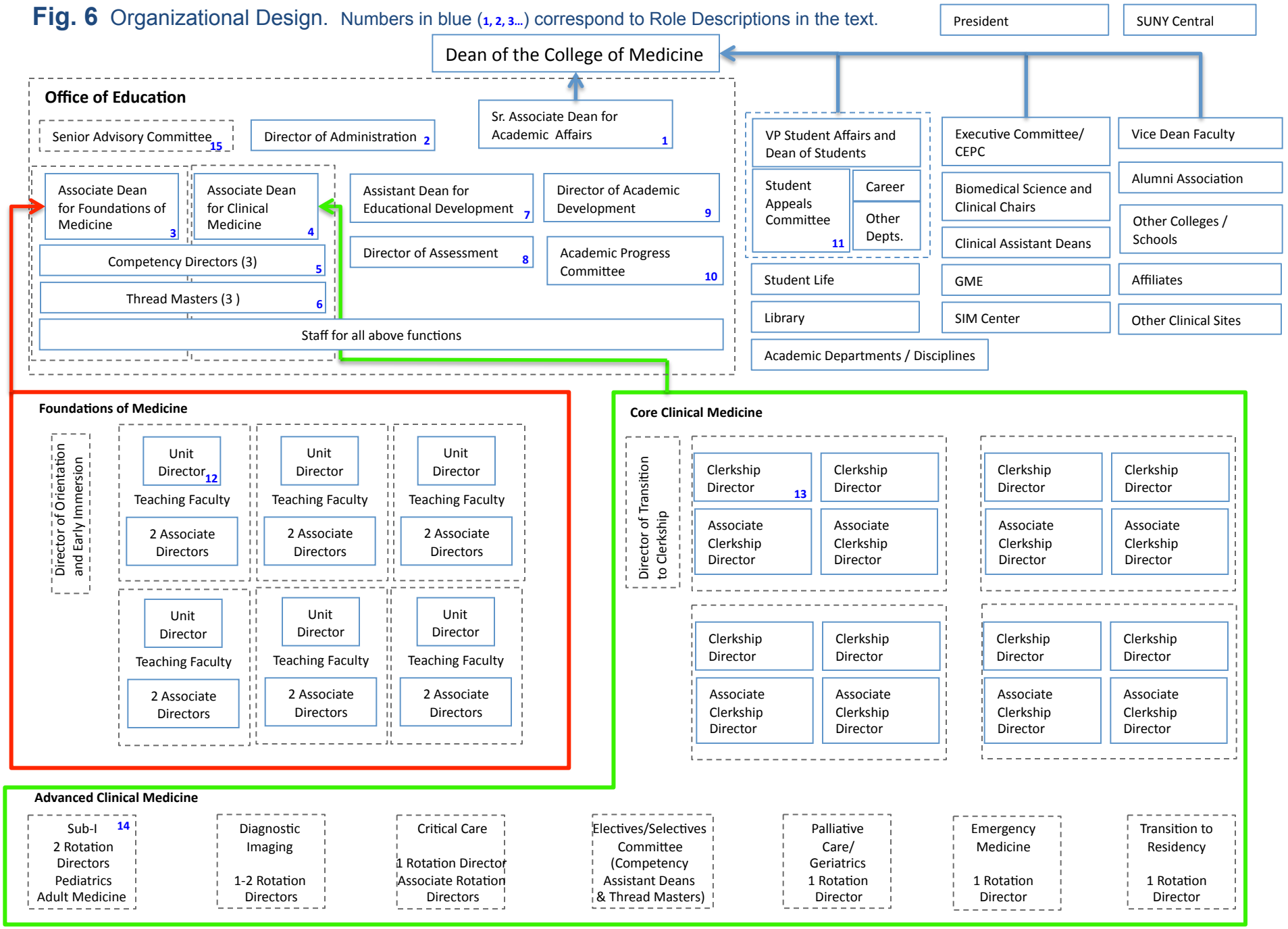
14. Advanced Clinical Medicine Rotation Directors

    These individuals, who report to the Associate Dean for Clinical Medicine, will direct the required rotations in the Advanced Clinical years. These Directors will be expected to work closely with faculty from the biomedical sciences to integrate biomedical science into the rotations and selectives.

15. Senior Advisory Committee

    This is a broadly representative advisory body that looks at the curriculum monthly; and gives recommendations to the Senior Associate Dean for Academic Affairs on major policy and curricular design issues.

Fig. 6 Organizational Design. Numbers in blue (1, 2, 3…) correspond to Role Descriptions in the text.



Implementation Plan

Implementing the curriculum outlined in this document will be a multi-year, multi-phase process with many streams of work occurring simultaneously. Two major phases are planned — Phase I will take place between January 2011 – June 2011 and Phase II will take place between July 2011 – August 2012 when the first class for the new curriculum arrives. Please refer to Figure 7, page 45, for a visual representation of these phases and the various streams of work.

Phase I (January – June 2011)

Program Management

This involves comprehensive implementation planning, tracking of progress against deadlines, and ensuring that the new curriculum is ready for the entering class of 2012. As a first deliverable, the Office of Education will publish the Unit Design Team Handbook which will outline the design principles for Foundations of Medicine Units. This stream of work is also responsible for budgeting, resources and the logistics associated with two curricula that will be overlapping for three years starting in 2012.

Office of Education and Committee Development

The Office of Education has a different purpose, scope and structure than in the past. This office needs to be fully staffed, and then developed and supported so that it can effectively lead and manage the complexities of the new curriculum and usher in the changes in process, policy, culture and structure needed to achieve its goals.

Several new committees will also be formed: the Academic Progress Committee, the Student Appeals Committee, and the Senior Advisory Committee (see Figure 6, page 41). Each of these committees needs to be appointed, charged and developed with goals, processes and policies that are aligned with the new curriculum, and then each needs time to develop and be fully functioning for the incoming class of 2012.

Foundations / Unit Design

Now that the structure and goals have been defined for the four years, the specific learning activities need to be developed so that faculty can be assigned and all materials can be developed. Unit Directors will be appointed, will receive training and will work together in a concentrated period between February 2011 and June 2011 to construct the hour-by-hour schedule that incorporates all competencies and threads and adheres to the design principles set out in the Unit Design Teams Handbook. In June of 2011, Unit Design Teams will complete the design for the Foundations of Medicine and will submit them to the Steering Committee for final review and approval.

Core and Advanced Clinical Medicine Design

During both phases, work to further define the structures and design of the Core and Advanced Clinical Medicine years will also take place. For Core Clinical Medicine, this will include finalizing the Clerkship blocks and their structure, determining the core clinical competencies that are taught in

every Clerkship and unique Clerkship-specific competencies, working on how to incorporate threads, and deciding how to best integrate biomedical science. For Advanced Clinical Medicine, the structures and competencies for all required rotations, electives and biomedical selectives need to be designed. Across both Core Clinical Medicine and Advanced Clinical Medicine, assessments will be redesigned to track all competencies and threads. The Associate Dean for Clinical Medicine will convene and lead teams to design these years, working closely with Clerkship Directors, biomedical science faculty and other teaching faculty. During this work, Downstate's relationships and agreements with our Affiliates will be looked at carefully to optimize our ability to effectively deliver the curriculum.

Infrastructure Development and Communication

Several parts of Downstate's infrastructure need to be enhanced and aligned in order to optimally support the new curriculum: the assessment infrastructure needs to more fully support all four years in a way that supports competency development; the IT infrastructure needs to support new teaching methods and adult learning; the faculty development program needs to focus on specific teaching skills and needs to develop the infrastructure to track and support all teaching faculty; the Office of Education needs to track all students through all four years and ensure adequate support for students in difficulty or in need of remediation; and the career infrastructure needs to be more highly centralized so that students can more easily access information on careers when they need it to make informed career decisions.

Additionally, all stakeholders need to be well informed about the process and the spectrum of changes that will be implemented. A communication plan will track communications and ensure that everyone is prepared for changes. There are several strategic relationships that need ongoing maintenance. Activities in this stream of work will include developing a productive working relationship with the CEPC, ensuring there is effective collaboration with the GME program, and developing a strategy to ensure we have the best possible partnership with all of our Affiliates. We will also work closely with the School of Public health regarding the MD/MPH program and the School of Graduate Studies regarding our MD/PhD students to ensure the success of these programs.

Phase II (July 2011 – August 2012)

In June 2011, Unit Design teams will present the Foundations of Medicine hour-by-hour Unit plans to the Steering Committee for final approval. These will represent the entirety of the first 18 months of the new curriculum. Once these have been approved, Downstate will have a year to put all the logistics in place for the incoming class of 2012. This will involve many of the same streams of work outlined above, including Program Management, Infrastructure Development, Communications, and Office of Education/Committee Development. New streams of work will also begin.

Infrastructure Development: Organizational Alignment

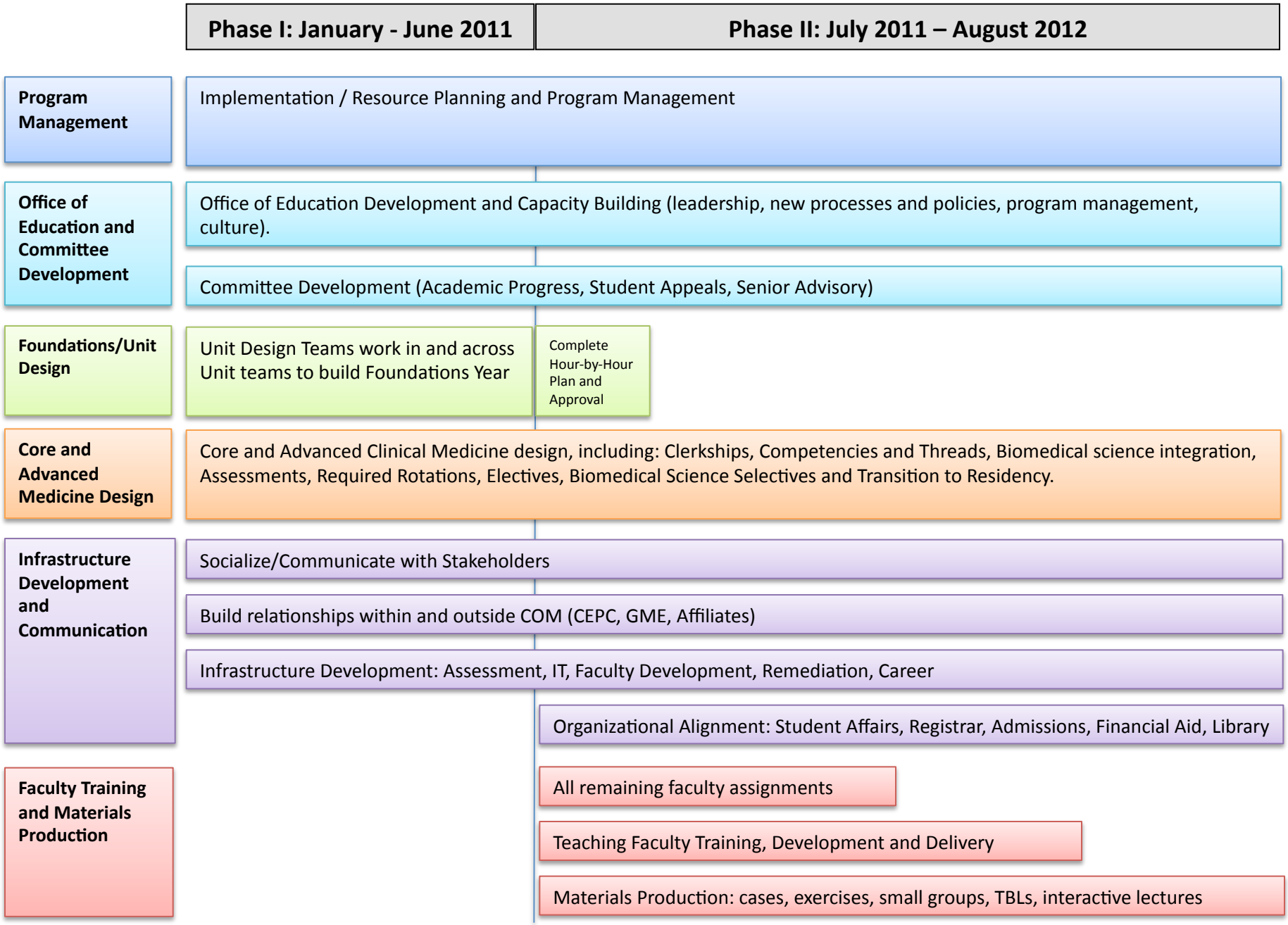
Many of the offices, programs and policies will need to be aligned in order to deliver the new curriculum. For example, admissions interviewers will need full briefing on the new curriculum, new unit names will need to be entered into Prime, and also into the Banner Student Information System so students can be registered for classes, financial aid packages may need updating to include any new requirements, the Library may need new technology loaded onto computers, and so forth. All

relevant supporting functions in the college and administration will have joint meetings with the Office of Education to determine the impacts of the new curriculum, and plans will be developed and executed during this twelve month phase.

Faculty Training and Materials Production

Once the hour-by-hour plan is complete, it will be possible to begin the assignments of all teaching faculty to all activities in all Units, and the design and production of materials can begin for interactive lectures, TBL exercises, small group cases, and other activities. Since many of the exercises will integrate topics like medical knowledge and clinical skills and will require coverage of normal and abnormal together, specific faculty development will be required – see *Faculty Development and Assessment*, page 18. The Office of Education will also develop guidelines, templates and support for materials development, so that the curriculum has a uniform and coherent look and feel.

Fig. 7 Overview of the implementation timeline



Appendices & Supplementary Material

Appendix 1 – Glossary

Term	Definition
AAMC	The American Association of Medical Colleges. See: https://www.aamc.org
ACGME	The Accreditation Council for Graduate Medical Education (ACGME) is responsible for the accreditation of post-MD medical training programs within the United States. See: http://www.acgme.org/acWebsite/home/home.asp
Active learning	Active learning refers to strategies in which students learn while applying new knowledge to problem solving.
Adult learning	Adult learning refers to an educational approach that assumes that students come to the educational setting with an intrinsic motivation to learn based on a direct need to apply new knowledge in their occupation or profession, and that the educational program must connect with this motivation by providing relevant knowledge in a way that its occupational applicability is evident.
Advanced Clinical Medicine	Culminating phase, comprised of required advanced clinical rotations, biomedical selectives and clinical electives. Students will have the opportunity to prepare themselves for selecting and applying for a residency, deepen their level of competency as physicians, and prepare for the transition into residency.
Ambulatory Care	Health services provided on an out-patient basis. Can be in any clinical discipline. (i.e. Surgical ambulatory care)
Benchmark	A benchmark is a level of achieved competence that can be assessed. At each gateway, for each competency domain there will be benchmarks used to evaluate progress.
Biomedical science	Biologic science in the context of medicine. Replaces term “basic science” to emphasize the relevance and integration with clinical medicine and with clinical and translational research.
Competency	The state of being qualified with a range of skill, knowledge or ability.
Core Clinical Medicine	Twelve month period of required Core Clerkships. Includes four twelve-week blocks.
Domains of Competence	The six Domains of Competence, modeled on the six ACGME competencies are: Patient Care, Medical Knowledge, Interpersonal and Communication Skills, Medical Professionalism, Social and Community Context of Health Care, Life-Long Learning and Problem Solving
Electives	Courses that are not required of all students but can be taken to satisfy credit requirements for graduation. There is a 20-week elective requirement for graduation.

Term	Definition
Formative Assessment	Assessment for learning – feedback from learner's performance provides guidance to enhance learning. Usually not graded.
Foundations of Medicine	The first phase (18 months) of the curriculum. During this phase, students will develop the "foundations" needed to begin their development as physicians.
Gateway	Gateways are a period of time in the curriculum when each student's progress in each competency will be assessed and a determination made as to whether or not he or she can progress to the next phase of the curriculum
LCME	The Liaison Committee on Medical Education (LCME) is the nationally recognized accrediting authority for medical education programs leading to the M.D. degree in U.S. and Canadian medical schools. See: http://www.lcme.org/
Learning Objective	Learning Objectives are what a student is required to know or do at the end of a learning activity. These are stated in terms of observable and measureable behaviors.
Primary Care	Widest scope of health care, usually first point of consultation of patients, generalist physicians – internists, pediatricians, family doctors.
Required Rotations	These clinical requirements are primarily offered in the Advanced Clinical Medicine phase. They are in disciplines generally not covered extensively in the Core Clinical Medicine year, but provide important knowledge and skills for all generalist physicians and students preparing for residency
Integrated Biomedical Science Selectives	Integrated Biomedical Science Selectives are short, 2-4 week required courses in the Advanced Clinical Medicine phase. Students must chose from a defined list of options.
Standard	Summary statements representing the knowledge, skills and attitudes required at the end of the four-year curriculum for each of the domains.
Summative Assessment	Assessment of learning – summarizes development of learner at a particular point in time. Used for formal grading of student.
Threads	Threads are topic areas that appear repeatedly throughout the curriculum, are of widespread and growing importance in health care and medicine, and are best taught longitudinally across the curriculum rather than being tucked away in a particular Unit or Clerkship.
Unit	A course in the Foundations of Medicine
USMLE	The United States Medical Licensing Exam. The exam currently comprises Steps 1, 2, and 3. Steps 1 and 2 are taken during the undergraduate years at Downstate. See: http://www.usmle.org

Appendix 2 – Curriculum Committees and Members

CURRICULUM COMMITTEES AND MEMBERS

1. Assessment and Evaluation

Barbara Lawrence, PhD, Committee, *Chair*
Richard Sadovsky, MD, Steering Committee, *Liaison*
Janelle Gordon, *Staff*

1a) Assessment and Evaluation of Student Learning

Shirley Eisner, PhD, *Subcommittee Chair*
Mary Ann Banerji, MD
Tom Brouette, MD
Susan Duberstein, MD
Steven Fox, PhD
Brett Huston, MS4
Seth Langley, PhD
Alix Leader-Cramer, MS4
Elisabeth Lessenich, MS3
Elvedin Lukovic, MS1
Caitlin McGinty, MS4
Scott Miller, MD
John Quale, MD
Grace Park, MD
Paul Pipia, MD
David Stern, MS4

1b) Assessment and Evaluation of the Curriculum

Riccardo Bianchi, PhD, *Subcommittee Chair*
Rebecca Citrin, MS4
Stephen Goldfinger, MD
Julia Hermos, MS4
Allen Norin, PhD
Bram Trauner, PhD

1c) Assessment and Evaluation of Faculty Teaching

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Andrew Edelstein, MS2
Laura Dattner, MD
Shereen Mahmood, MS1
Sammy McFarlane, MD
Julie Rushbrook, PhD
Michael Smerina, MS2

2. Career

Christopher I. Doty, MD, *Chair*
Jeanne Macrae, MD, *Liaison*
Frank Lucente, MD
Caitlin McGinty, MS4
Dimitri Papanagnou, MD
Robert Schulze, MD
Anne Shonbrun
Lorraine Terracina, PhD
Maureen Thompson, *Staff*

3. Clerkship Competencies

Mert Erogul MD, *Chair*
Margaret Golden, MD
Bram Trauner, MD
James Reilly, MD
Lisa Merlin, MD
Thomas Brouette, MD
Franscene Oulds, MD
Michael Rose, MS4
Punam Thakkar, MS4

4. Competency Domains

Charlene An, MD, *Chair*
Frank Lucente, MD
Nagaraj Gabbur, MD

5. Clerkship Structure and Prototype

Mike Augenbraun, MD, *Chair*
Lisa Dresner, MD
Tom Brouette, MD
Brian Anziska, MD
Giorgio Roccaro, MS
Stephen Thorp, MS

6. Fourth Year

Jeanne Macrae, MD, *Chair*
Brian Anziska, MD
Phyllis Supino, PhD
Marcia Gerber, MD
Riccardo Bianchi, PhD

Continued…

7. Geriatrics

Eve S. Faber, MD, *Chair*
Judith Ahronheim, MD
Jennifer Breznay, MD
Carl Cohen, MD
Paul Harris, MD
Steve Kaner, MD
Gary Rothberger, MS4

8. Health Care in the Context of Community and Society

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Simon Shamass, MS1
Miriam Vincent, MD, PhD
Roxanne Deshong, *Staff*

9. Interpersonal and Communication Skills

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Leslie Marino, MS4
Thomas McIntyre, MD
Kimberly Peters, MS2
James Reilly, MD
Ramotse Saunders, MD
Kara-Ann Bynoe-Griffith, *Staff*

10. Medical Knowledge and Clinical Skills

10a) Internal Data

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Sheldon Landesman, MD
Lisa Merlin, MD
Katherine Perkins, PhD
Richard Rubenstein, PhD
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Daria Ferro, MS2
Georgina Ferzli, MS1
Elizabeth Floyd, MS2
Nitin Goyal, MS1
Camilla Guitarte, MS1
Jennifer Guttman, MS1
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Hannah Odunaiya, MS2
Jake Rosenberg, MS2
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Ernest Chisena, MS2
Arkady Yaretskiy, MS2

10c) Database

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Andrea Bibbig, PhD
Greg Conyers
Tara Kelly, MS3
Denise Moses, MS1
Shunpei Okochi, MS2
Schnell Lafortune, *Staff*

10d) Medical Knowledge

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Riccardo Bianchi, PhD
Gary Briefel, MD
Tom Brouette, MD
Andrew Edelstein, MS3
Elizabeth Floyd, MS3
John Lewis, PhD
Jenny Libien, MD, PhD
Sam Márquez, PhD
Hillary Michelson, PhD
Scott Miller, MD
Man Oh, MD
Steve Ostrow, MD
Robin Ovitsh, MD
Katherine Perkins, PhD
Richard Rubenstein, PhD
Louis Salciccioli, MD
Bob Wong, PhD

11. Methods Workgroup

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Eugene Dinkevich, MD
Nagaraj Gabbur, MD
Brian Gillet, MD
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John Kubie, PhD
John Lewis, PhD
Andrea Markinson, MLS, DPM
Sam Marquez, PhD
Anna Salajegheh, MS4
Steven Weiss, MD
Janet McKenzie, *Staff*

12. Methods Block Prototype

Fred Volkert, PhD, *Chair*
Barbara Lawrence, PhD
Lee Eisner, PhD
Robin Ovitsh, MD

Continued…

13. Organizational Design

Pam Sass MD, *Chair*
Richard Sadovsky, MD
Jeanne Macrae, MD
Mike Augenbraun, MD
Sophie Christoforou, MS
Fred Volkert, PhD
Keith Williams, PhD

14. Primary Care

Richard Sadovsky, MD, *Co-Chair*
Eugene Dinkevich, MD, *Co-Chair*
Paul Harris, MD
Louis Salciccioli, MD
Leslie McCrary-Etuk, MD
Christina Guillen, MD
Alice Herb, JD
Gloria Mtomboti, MD
Tom Bayer, MS
Damali Adu, MS

15. Preclerkship Clinical Skills

Sheldon Landesman, MD, *Co-Chair*
Robin Ovitsh, MD, *Co-Chair*
Andrew Adler, MD
Richard Sinert, MD
Jeffry Feola, MD
Laura Dattner, MD
Franscene Oulds, MD
Michael Giuliano, MD
Anjali Sharma, MD
Keith Williams, PhD
Francesca Decker, MS3
Michael Dattilo, MS4

16. Professionalism

Charlene An, MD, *Chair and Liaison*
John Anthony Pillai, MS1
Todd Carpenter, MS4
Anna Cheng, MS3
Julia Glanternik, MS3
Theophilus Lewis, MD
Mariana Markell, MD
Mohammed Nurhussein, MD
Franscene Oulds, MD
Kathleen Powderly, PhD,
Subrata Saha, PhD
Joyce Molinari, *Staff*

17. Reflective Practice

Arthur Grant, MD, *Chair*
Mert Erogul, MD, *Liaison*
Gary Briefel, MD
Judy Burke, MS1
Sona Chauhan, MS1
Sara Egan, MD
Marcia Gerber, MD
David Linshaw, MS1
Michael Myers, MD
Hillary Michelson, PhD
Julie Mitchie, MS3
Anita Rohra, MS4
Todd Sacktor, MD
Lorraine Terracina, PhD
Hazel Williams, *Staff*

18. Relevance

Sage Wiener, MD, *Chair*
Pamela Sass, MD, *Liaison*
Louis Salciccioli, MD
William Urban, MD
Constance Hill, MD
Harris Huberman, MD
Shelly Regev, MS2
Martin Oselkin, MS4

19. Scholarship

Daniel Rosenbaum, MD, *Chair*
Jenny Libien, MD, PhD, *Liaison*
Charles Abrams, MD
Marcello Distasio, MS4
John Kral, MD
Richard Sinert, MD
Mark Stewart, MD, PhD
Phyllis Supino, PhD
Mary Lombardo, *Staff*

20. Threads

Samuel Márquez, PhD, *Co-Chair*
Gary Briefel, MD, *Co-chair*
Thomas Brouette, MD
William Brunken, PhD
Richard Feinman, PhD
Franscene Oulds, MD
Lisa Merlin, MD
James Reilly, MD
Hamed Rezaishiraz, MD, PhD
Richard Sinert, MD

21. Timeline Subcommittee

Sophie Christoforou, MS, *Chair*
Charlene An, MD
Riccardo Bianchi, PhD
Stanley Friedman, MD, PhD
Daniel Horn, MS4
Sheldon Landesman, MD
Jeanne Macrae, MD
Lisa Merlin, MD
Hillary Michelson, PhD
Roseann Lingeza, *Staff*