School of Medicine Curriculum

In its educational mission, UMMS pledges to provide students with a comprehensive and personally rewarding medical education of the highest quality, preparing our graduates to be caring, competent, productive and fulfilled physicians serving a diversity of patients, communities and the health sciences. The educational program at UMMS is designed to develop six foundational competencies required of all physicians: professional, scientist, communicator, clinical problem solver, patient and community advocate, and person. By focusing curriculum planning on these required core competencies, the UMMS educational program prepares students for their future medical careers regardless of specialty choice, while maintaining our founding commitment to prepare students for training in the primary care disciplines. The philosophy of our educational program values partnership between students and faculty in teaching and learning; respect and dignity in the physician-patient and student-learner relationship; and a learning milieu of collegiality, collaboration and diversity.

Years 1 and 2

The first two years of the educational program provide the essential foundations of the medical sciences, clinical skills and professional values that will serve students’ lifelong learning needs and career paths as physicians. The curriculum emphasizes current advances in the life sciences; applications and clinical correlations to patient care; integration of content across years and courses; opportunities for self-directed, independent study; teaching and learning in teams; and cross-disciplinary teaching models that engage clinicians, basic scientists and the broad spectrum of health professions trainees in nursing, the social sciences, public health and the allied health professions.

The first-year Human Anatomy course explores gross anatomy and embryology in a clinical context. Students study the normal structure of the human body using dissection and radiologic images. They use...

Competency Standards

- Physician as Professional
- Physician as Scientist
- Physician as Communicator
- Physician as Clinical Problem Solver
- Physician as Patient and Community Advocate
- Physician as Person

Our current curriculum emphasizes early patient care exposure from the first weeks of medical school; strong clinical skills development in communications, clinical problem solving and professionalism; student activism in community service and advocacy; and life-long learning skills. Educational methods promote active scholarship in which students learn with hands-on practice under the close observation of faculty. As a supplement to students’ learning in the clinical setting, our nationally recognized Standardized Patient Program and UMMS Simulation Center provide opportunities for ongoing practice, improvement and mastery of essential clinical skills. Our courses and clerkships are continuously being enhanced and renewed, to keep pace with the rapidly changing science of medicine, the evolving standards of professional medical practice, and state-of-the-art educational methods and technologies.
their understanding of structure-function relationships to begin interpreting the signs, symptoms and clinical management of selected human diseases and injuries. Basic science lectures by Human Anatomy faculty are supplemented by numerous clinical correlations by clinical faculty. The course offers students exceptional learning experiences including cadaver dissection done in small groups, an anatomy resource center, an introduction to surgery, and a variety of online, interactive resources. Supplemental activities draw on the Medical Humanities, including presentations on the history of human anatomy, discussions of death and dissection, and an annual student-led memorial service honoring UMMS anatomical gift donors.

The Histology/Cell Biology course provides a basic understanding of the structure and function of cells, tissues and organs at the microscopic level. Taught by a faculty team from basic and clinical science departments, the course includes lectures, clinical correlations, patient interviews, and laboratories. Presentation of organ systems is linked with the Physiology course, and the dynamic nature of structure-function relationships is emphasized. Students observe microscopic structure in the lab and consider how knowledge of normal structure and function can be applied to clinical problem solving. The course offers a rich image database and lab manuals online, providing Web-based self study modules to supplement classroom and lab-based educational activities.

Physiology is broadly defined as the study of functional mechanisms that underlie life. During the Physiology course, students learn the molecular and cellular underpinnings of human organ and whole body functions. Through lectures and small group problem-solving sessions, the normal functions and integrative nature of the human body are explored. This exploration introduces students to the clinical problem-solving model as they begin to acquire the skills of interpreting the signs, symptoms and processes characteristic of human health and disease.

Mind, Brain and Behavior I is the first course in a longitudinal, integrated neuroscience curriculum that spans all four years. Students learn about the relationship between the structure and function of the nervous system, and the various behaviors generated through this dynamic interaction. Emphasis is on knowledge and skills that are both current and clinically relevant. Topics include: major CNS motor and sensory systems; systems serving emotion, memory and intellect; principles underlying structure-function relationships at the cellular and system level; and functional/clinical consequences of damage or disconnection in these systems. Students apply their knowledge to clinical problems in which the primary task is to localize lesions. Material on stroke and its prevention is interwoven throughout the course. Extensive technology-based teaching materials including brain and spinal cord atlases provide a framework for student-driven, interactive learning, helping students integrate complex basic and clinical information about nervous system structure and function.

The first-year Biochemistry course incorporates the fundamental aspects of biochemistry through lectures, clinical correlations, medical vignettes, problem-solving sessions and problem-based cases. Students gain an understanding of chemical and cellular mechanisms underlying normal and disease processes. To achieve these goals, a large body of material is presented as a framework for understanding problems in human health, along with an emphasis on modes of problem solving used for investigation of the molecular basis of disease. An innovative disease-based model has been developed to teach the principles of metabolism. Using diabetes as a framework, this disease-based approach highlights clinical applications and the relevance of basic science principles to the cutting-edge advances in diabetes management.

The Physician, Patient and Society course (PPS) teaches the foundational patient care competencies during the pre-clinical years, preparing students for their clinical clerkships. The course emphasizes competencies in the medical interview; the physical examination; clinical problem solving (including integration of basic science material), personal and professional development; continuous teaching and learning; and the application of specific analytic and assessment principles from the fields of epidemiology, community health and medical ethics.

The longitudinal, multi-component course is the largest in the school, encompassing more than 450 hours of required curriculum time across Years 1 and 2, and utilizing approximately 300 faculty. The course has three main components: PPS small groups, in which students meet regularly with two faculty facilitators in order to acquire skills in the course competencies detailed above; and two practice laboratory components: the Longitudinal Preceptorship Program (LPP) and the Physical Diagnosis course (PD). Through the LPP, students are placed...
in the clinical setting beginning in the first weeks of medical school and have the opportunity to interact with patients under the supervision of an assigned faculty physician preceptor. Diverse preceptorship sites are available, including urban, rural, and underserved settings. Students attend LPP sessions an average of every other week during the first two years, first “shadowing” their assigned preceptor, then actively practicing clinical skills introduced in PPS small groups. In the Physical Diagnosis (PD) component, the principles of the normal and abnormal physical examination are taught and practiced, providing opportunities for early hands-on practice of physical exam skills with standardized patients and subsequently with patients at eight clinical sites.

Additional components include: the Community Health Clerkship (CHC) in Year 1, and the Epidemiology component in Year 2. The CHC places students in diverse sites across the commonwealth for a two-week immersion experience to enhance their understanding of the importance of the community context in health and health care, with a focus on underserved populations. Students focus on the problems and services that exist among diverse racial, ethnic and cultural groups, patients with HIV/AIDS, poor families, persons dealing with substance abuse, the elderly, the homeless, people with developmental disabilities, abused children, and incarcerated populations. The Epidemiology component in Year 2 provides a core set of epidemiologic and biostatistical concepts and skills required to critically evaluate research reports in the medical literature, including measures of disease occurrence and association; and design, bias and cause in epidemiologic studies. The goal of this component is to provide a skills base for the practice of Evidence-Based Medicine (EBM) and to develop students’ awareness of contemporary approaches and issues in clinical research in medicine. The PPS course utilizes standardized patients for teaching and assessment, including Objective Structured Clinical Examinations (OSCEs) conducted at critical points in the two-year curriculum.

Human Genetics underlies almost every aspect of human health, and recent advances in human genome sciences makes knowledge of this fast-paced field imperative for future clinicians. This course focuses strictly on human and clinically relevant genetics with emphasis on basic underlying scientific mechanisms and concepts. Evaluations examine knowledge base, as well as problem solving skills involving clinical, molecular and statistical data, and ability to seek out and analyze appropriate information. Topics covered include chromosomal, single gene, multifactorial and non-Mendelian inheritance, cancer genetics and human genomics. The course provides a framework for understanding this fast-growing and highly technical field, and an appreciation of how current

### Year 2
- Physician, Patient & Society II: Longitudinal Preceptorship Program II; Physical Diagnosis II; Epidemiology; Small Group Sessions
- Mind, Brain and Behavior II
- Biology of Disease with Multi-Systems: General Pathology; Immunology; Cardiovascular System; Hematology/Neoplasia; Renal; Respiratory; Endocrine; GI; Reproduction; Dermatology; Rheumatology
- Microbiology
- Medical Pharmacology
- Preparation for USMLE Step I

### Year 3
- Orientation to Year 3
- Clerkships: Family Medicine; OB/GYN; Medicine; Pediatrics; Psychiatry; Surgery
- Interclerkships (current offerings): Domestic Violence; Medical Error and Patient Safety; End of Life; Multiculturalism; Geriatrics; Disabilities; Pain Management; Oral Health; Health Care Policy and the Practice of Medicine
- End of Third Year Assessment

### Year 4
- Clerkship in Neurology; Subinternship in Family Medicine, Internal Medicine or Pediatrics
- Electives: a variety of electives sponsored by UMMS departments and the Office of Medical Education

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<td><strong>December</strong></td>
<td>- End of Fall Semester for first- and second-year students</td>
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<td><strong>January</strong></td>
<td>- Start of Spring Semester for first- and second-year students</td>
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<td><strong>February</strong></td>
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### UMMS Course of Study at a Glance

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#### Year One

The first-year *Nutrition* course emphasizes nutritional assessment and counseling through the lifespan as a key feature of medical care. The course is divided into two blocks, a core series of lectures and case discussions closely linked with the Biochemistry course in the fall semester; and a series of topics tied to organ system presentations in Physiology and Histology in the spring. Students learn core principles essential to nutrition and apply them by personal analyses of nutritional intake via a dietary assessment project and physical activity via a pedometer project. The course explores common issues such as obesity, and special nutritional needs during various physiologic and disease states.

The second-year *Biology of Disease* course is comprehensive and multidisciplinary, covering the pathology and pathophysiology of human diseases. Under the leadership of the departments of Medicine and Pathology, the course is comprehensively coordinated across clinical and basic science departments, using an integrated organ system approach to human disease. Students develop an in-depth understanding of disease by correlating underlying molecular and physiologic mechanisms with structural, functional and clinical manifestations. Beginning with an introduction to general disease mechanisms at the cellular and tissue levels, the course continues with an analysis of specific diseases as they affect various organ systems: general pathology, immunology, hematology/neoplasia, cardiology, respiratory, renal, gastrointestinal, endocrine, reproductive, dermatology, and musculoskeletal. The Multi-System component of the course offers interactive, computer-based problem-solving sessions based on clinical cases. Students interact directly with faculty to solve the clinical problems while integrating curriculum content across various organ systems.

The *Microbiology* course provides a base of knowledge concerning pathogenic microorganisms to allow students to understand and eventually treat human infectious disease. The course focuses on the most clinically significant pathogens, and develops a framework for thinking about and understanding pathogenic microbes that can be applied to any pathogen or infectious process. The course is presented in four blocks. The Bacteriology block, presented in Year 1, covers the basic biology of bacteria. A particular focus includes biochemical reactions which are the targets of antibacterial agents used in medicine, and the genetic mechanisms underlying the evolution of bacterial pathogenicity and resistance to antibiotics are also addressed. The remaining three blocks of this course—Virology, Pathogenic Organisms, and Infectious Disease—are presented in Year 2. Virology addresses the basic biology of viruses, with particular attention to biochemical reactions which are required for viral replication, and which are the targets of antiviral agents used in medicine. The pathogenesis of viral infection is covered; in this context, systematic exploration of pathogenic “strategies” is begun and extended via study of the major classes of human viruses. The block on Pathogenic Organisms focuses on the basic pathogenic strategies of the major bacterial, fungal, protozoan, and helminthic pathogens. The fourth and final block, Infectious Diseases, systematically explores the diagnosis, treatment, and prevention of the major classes of human infectious diseases. Topics developed in previous blocks—the biology of pathogens and their interactions with the human host—are extensively drawn upon to develop an integrated understanding of the scientific basis of clinical practice in infectious diseases.

The objective of the second-year course in *Pharmacology* is to help students learn pharmacological principles and become familiar with commonly used classes of drugs. Co-directed by the departments of Medicine, Biochemistry & Molecular Pharmacology and Anesthesiology, the course offers an integrated multidisciplinary model for pharmacology teaching that blends clinical and basic sciences, diverse clinical specialties and patient care correlations to provide the essential foundations of pharmacology and medical therapeutics. The course emphasizes general principles that can often be applied broadly to many therapeutic agents. An understanding of these principles, such as drug absorption, distribution, metabolism and excretion, and the mechanisms by which drugs produce their therapeutic effects, helps students treat the whole patient rather than a particular symptom. The Medical Pharmacology course Web site offers a comprehensive database of drug structures and other pharmacology...
resources to help students learn course material and self-assess progress. The course is divided into blocks covering General Principles of Pharmacology; Peripheral Neuroeffector System; Drugs to Treat Disorders of the Cardiovascular System, Central Nervous System and other major organ systems; Antimicrobial Agents; and Clinical Pharmacology. Clinical cases are utilized within each block to emphasize use of the drugs learned. Case-based, problem-solving sessions help students learn to search efficiently and evaluate critically sources of drug information, to prepare for lifelong learning about unfamiliar or new drugs.

**Mind, Brain and Behavior II** constitutes the second year of the integrated neuroscience curriculum and is co-directed by faculty in the departments of Neurology, Psychiatry and Pathology. The first half of this multidisciplinary course introduces students to the general mechanisms of disease affecting the nervous system from a functional and structural perspective, and then considers the pathophysiology and clinical aspects of specific neurological syndromes and structural disorders with emphasis on clinical-pathological correlation and principles of localization. Small group case discussions and computer-assisted interactive exercises are utilized to reinforce didactic material. The second half of the course surveys the major psychopathological syndromes and normal/abnormal aspects of development from birth through old age. Psychological problems that frequently arise in primary care medicine—grief, anxiety and reaction to illness—are also considered in depth. Small group learning is utilized extensively to reinforce didactic material.

The end of Year 2 culminates in Step I of the **U.S. Medical Licensing Exam (USMLE)**, which is required for licensure and for graduation from UMMS. The Year 2 curriculum at UMMS offers interested students the opportunity to participate in a comprehensive board review course for USMLE Step I through the Center for Academic Achievement.

**Years 3 and 4**

The clerkship years comprise the third and fourth years of study and constitute a critical transition in students’ educational experience, from the classroom to the clinical setting. During these clinical years, students fully enter the hospital wards, ambulatory clinics and physician offices and serve as members of the health care teams providing direct care to patients and their families. Under faculty guidance and supervision, clinical years students actively apply the principles of clinical medicine to patient care, acquire essential technical skills, and further develop personal and professional values that will enable them to serve as caring, competent and compassionate physicians.

Year 3 begins with a formal orientation to the clinical clerkships. The clerkship orientation program provides hands-on training and exposure to the essential information and introductory skills to prepare students for a successful transition to their clerkship rotations. Students then begin their third-year clerkship rotations in six required disciplines: medicine, surgery, family medicine, obstetrics & gynecology, pediatrics, and psychiatry.
The Internal Medicine clerkship is a 12-week experience with broad objectives comprised of eight weeks in the acute care, inpatient setting at one of five teaching sites, and four weeks in the ambulatory care setting in a community physician’s office, possibly including time with medical subspecialists. Through diverse experiences, students learn to diagnose and manage the major illnesses of adults of all ages as well as the principles and practice of health promotion and disease prevention. Essential skills in history-taking, clinical problem solving and physical examination are developed through hands-on practice and direct observation and feedback from faculty and standardized patients.

The clerkship curriculum emphasizes an appreciation of the impact of illness on the patient, physician and society; the importance of professionalism and professional development; rapid and effective access to information; ways to assure patient safety; and the use of evidence-driven approaches to the diagnosis, management and prevention of disease. Students explore ethical dilemmas and issues surrounding the end of life and experience continuity with patients and their families over time. An innovative curriculum based on the virtual “McQ” family is conducted at the Medical School, where students work in small groups to manage the health care needs of this simulated three-generation family. Core curricular objectives include prenatal care management, common childhood illness, adolescent issues, health maintenance and disease prevention across diverse age groups, and evidence-driven management of common diseases encountered in the ambulatory setting. Additionally, students participate in online curriculum programs, as well as hands-on curriculum in evidence-based medicine.

During the six-week Pediatrics clerkship, students participate in the care of infants, children and adolescents in the ambulatory, inpatient and nursery settings. Students become familiar with primary care and subspecialty pediatrics and the important role of the pediatrician in children’s physical and emotional development. They acquire basic knowledge of normal growth and development, as well as common pediatric acute and chronic illnesses. In the ambulatory component of the clerkship, students spend three weeks as a member of a health care team in a community-based office, supplemented with experiences in the pediatric emergency department, newborn nursery and patient home visits. During the inpatient component of the clerkship, students spend three weeks in an acute care hospital caring for hospitalized children. Students develop competency in the physical examination of infants, children and adolescents, acquire an understanding of the influence of family, community and society on a child’s health and develop strategies for heath promotion. Throughout the entire clerkship, third-year students actively participate in the health care of pediatric patients and their families, developing and refining their communication/interviewing skills and clinical problem-solving skills. All conferences are in a Case Method Teaching format, facilitating student/preceptor discussion, critical thinking and development of problem-solving skills. The pediatric clerkship curriculum is also supplemented by a computer-based learning program that allows students to participate in the care of interactive virtual patient cases designed to cover areas of the core curriculum.

The six-week Family Medicine clerkship gives students broad exposure to the principles and practice of family medicine. Students work one-on-one with an assigned community-based faculty preceptor, seeing and following patients in the office setting over the six weeks. This format provides students with a continuity of care experience, in which the health care needs of patients and their families are managed over time. An innovative curriculum based on the virtual “McQ” family is conducted at the Medical School, where students work in small groups to manage the health care needs of this simulated three-generation family. Core curricular objectives include prenatal care management, common childhood illness, adolescent issues, health maintenance and disease prevention across diverse age groups, and evidence-driven management of common diseases encountered in the ambulatory setting. Additionally, students participate in online curriculum programs, as well as hands-on curriculum in evidence-based medicine.

During the six-week Obstetrics & Gynecology clerkship, third-year students participate in women’s health care in inpatient and ambulatory settings located at large tertiary referral centers and smaller community hospitals. Formal didactic and clinical sessions are interwoven to help students develop interviewing, physical examination, and diagnostic and management planning skills. The clerkship curriculum focuses on a variety of areas related to women’s health across
**Electives Overview**

UMass Medical School emphasizes a strong, 24-week elective program in Year 4 to complement the required areas of study.

**Type A electives:** supervised students function as if they have primary responsibility for patient care in an acute hospital setting.

**Type B electives:** patient care/clinical electives in a range of specialties and subspecialties, featuring either direct patient contact as a major feature of the elective or direct exposure to clinical specialties not involving traditional patient care, e.g., pathology, radiology, radiation oncology. Students need not have primary responsibility for patients.

**Type C electives:** encompass all those experiences during which there is limited or no patient care component, e.g., Language Immersion (International Elective), Basic Sciences Revisited, Wilderness and Environmental Medicine, Research and Understanding Peer-reviewed Literature.

the life cycle, including family planning, prenatal care, normal and abnormal labor management, gynecologic surgery, cancer screening and treatment, menopausal issues, and assessment and management of pain, infection and bleeding. Additional content includes: explorations of legal and ethical issues related to women’s health care; topics in lesbian health; and a basic science-clinical correlation in reproductive endocrinology.

During the 12-week Surgery clerkship, students learn a broad base of fundamental skills and clinical knowledge pertaining to general surgery and the surgical specialties. The clerkship’s clinical experiences include a variety of venues, with rotations in the traditional surgical disciplines as well as the subspecialties. Clinical experiences are enriched by a core curriculum that includes lectures with case discussions, standardized patient cases and practice in basic surgical techniques. Students spend six weeks on general surgery services and six weeks on subspecialty services and clinics. In addition to seeing patients in the hospital, emergency rooms and clinics, students attend conferences and participate in small group discussions utilizing the case study method of teaching. Special sessions are offered on fundamental technical skills such as intravenous access, the management of the patient with small bowel obstruction, and relevant human factors issues (including surgical decision making, communicating empathy and caring, oral presentations and time management). All students participate in the Trauma Evaluation and Management program sponsored by the American College of Surgeons, as well as a day-long session dedicated to surgical imaging. A Web site provides links to multiple resources that enhance the student’s experience during the surgical clerkship.

Students undertaking the six-week Psychiatry clerkship develop the interviewing, reasoning and communications skills fundamental to psychiatric diagnosis and intervention. An integrative model emphasizes the biologic, psychodynamic, social and behavioral aspects of treatment. Students learn about diagnosis and treatment of common psychiatric disorders and develop an appreciation for the unique factors that influence presentation, treatment response and prognosis. Students also learn the role of the psychiatrist and other mental health disciplines in the care of persons with mental illness; how to work as part of a health care team; and when and how to refer patients for mental health services. All students are given opportunities to see patients in hospital-based and ambulatory settings. UMass Memorial has a state-of-the-art emergency mental health facility where students can observe the evaluations of adults and children in crisis.

The clerkship core curriculum includes case-based teaching sessions, videotapes, role play with standardized patients and new audience response technology. All students are given the opportunity to observe electroconvulsive therapy. A one-week enrichment selective is available where students can rotate on a unique psychiatric inpatient service for developmentally disabled adults.

Supplementing the six core clerkships, eight one-day interclerkships are scheduled between the clerkship block rotations throughout the third year. Launched in 1995, the innovative Interclerkship program addresses important contemporary issues and areas of need in our curriculum as identified by faculty and curriculum committees.

The diverse Interclerkship courses comprehensively address medical as well as societal dimensions of health care in a wide range of topic areas. Current Interclerkships include domestic violence, health care policy, geriatrics, disabilities, end-of-life care, multiculturalism, medical error/patient safety, oral health and pain management. Each Interclerkship is carefully planned by a team of faculty and multidisciplinary professionals to address educational objectives from basic and clinical sciences as well as psychosocial, legal, ethical and societal perspectives.

A broad range of educational formats is used to promote active learning and interdisciplinary teaching. A typical interclerkship is taught by as many as 40 medical school and community faculty, and includes plenary sessions, classroom teaching,
small group workshops, expert panels, films, and interactions with standardized and real patients. Each Interclerkship emphasizes specific advocacy issues and highlights local and national resources to enhance students’ abilities to advocate for their patients and communities. Students are required to attend all scheduled Interclerkships and receive a credit grade for each one on their transcripts.

Upon completion of the six Year 3 clerkships, all students must successfully complete the End of Third Year Assessment, which evaluates student performance in the essential clinical skills and competency areas covered in the core clerkships. The EOTYA is a comprehensive performance-based assessment consisting of multiple clinical cases using standardized patients as well as other methods such as computer-based and mannequin-based case simulations, X-ray interpretation and physical exam models.

In Year 4, the clinical curriculum includes two required four-week rotations: the Neurology Clerkship, and the Subinternship, with the remainder of curriculum time allocated to 24 weeks of electives. The Neurology clerkship provides students with a solid foundation in the neurological exam, the interpretation and significance of exam findings, and the major neurological disorders and syndromes. Educational experiences include inpatient as well as outpatient rotations and a core curriculum to supplement these clinical experiences.

The required fourth-year Subinternship is designed to allow students the experience of managing patient care on an acute care hospital service under direct supervision of residents and attending physicians. Required Subinternship rotations are offered in approved specialties that currently include Internal Medicine, Family Medicine and Pediatrics. Rotations have been standardized to ensure comparable experiences with different patient populations. The roles and responsibilities of subinterns mirror that of interns as closely as possible. Duties include patient admission; initial evaluation and subsequent coordination of care; daily ward rounds and discharge planning; communication with primary care providers, consultants, patients and family members; necessary procedures; and coordination of discharge. Subinterns attend team and resident educational meetings and participate in a case-based Subinternship-specific curriculum which focuses on higher level practice-based skills.

For the remainder of the fourth-year, students undertake a planned program of study consisting of 24 weeks of elective experiences. With the guidance of an assigned faculty advisor, students develop an individualized and balanced elective schedule that includes rotations appropriate to their field of interest, work in both basic science and clinical medicine and

“I have a passion to pass on not only education about disease, but why it happens and how to influence it through research.”

Gyongyi Szabo, MD, PhD
Professor of Medicine
Associate Director of the MD/PhD Program
Associate Dean for Clinical and Translational Research

Dr. Szabo established a new pathway program for UMass Medical School students on clinical and translational research. Such research lays the groundwork for clinical trials with patients that “bring discoveries from the bench to the clinic. This is a cornerstone for students to understand.” Szabo's research focuses on liver diseases, including those caused by alcohol consumption, hepatitis C infection and obesity, which Szabo fears has implications for a larger epidemic among Americans.
LInC, will feature seven major innovations.

1. Formal Transitional Studies Curricula will take place at three major transition points: the start of medical school; entry into the core clinical experiences; and preparation for internship.

2. Following the initial transition at the start of medical school, Foundational Studies curriculum will offer a fully integrated program of study in the foundations of medicine and the biomedical sciences with joint "co-teaching" by basic and clinical science faculty.

3. Core Clinical Experiences will follow, providing students with an expanded timeframe for required core clinical and elective experiences, increasing flexibility and choice in the clinical years.

4. Advanced clinical training and opportunities in the biomedical sciences will be featured in Senior Studies curriculum.

5. Longitudinal Themes will be integrated throughout the four-year curriculum, featuring: Applied Medical Therapeutics; Geriatrics, Ethics and Professionalism; Health Policy; Clinical and Translational Research; and Evidence-based Medicine.

6. Learning Communities will offer the opportunity for small groups of students in all four years to meet regularly with assigned faculty "master teachers" to advance personal and professional development; mentorship and career guidance; the development of clinical and critical thinking skills; and the chance to learn from each other as "peer teachers."

7. A Capstone Scholarly Project on a self-chosen subject will be required of all students, working under the guidance of a selected faculty mentor.

Competency-based Curriculum Redesign

In partnership with our diverse faculty, students, alumni and educational leaders, the Medical School is now engaged in a comprehensive redesign of our four-year curriculum that will begin phasing in with the entering class in the fall of 2010. Guided by the school’s competency-based framework established in 2002, these efforts will translate the six foundational competencies into an innovative state-of-the-art educational program. This learner-centered integrated curriculum, known as LInC, will feature seven major innovations.

- Formal Transitional Studies Curricula
- Foundational Studies Curriculum
- Core Clinical Experiences
- Senior Studies Curriculum
- Longitudinal Themes
- Learning Communities
- Capstone Scholarly Project

As an integral aspect of the LInC redesign effort, the School of Medicine will be undertaking a four-year initiative to dramatically enhance the training of medical students, residents and practicing physicians in geriatrics. Funded through a grant award from the Donald W. Reynolds Foundation, this initiative will provide extensive resources to support the implementation of a comprehensive geriatrics curriculum as a longitudinal theme across all four years of the school’s educational program.

To provide a state-of-the-art learning environment to support the curriculum redesign, UMMS is investing in a major transformation of our educational facilities and resources, including creation of an integrated teaching and learning center featuring interactive, technology-based and multimedia capabilities for small group and conference-style teaching and learning; provision of cutting-edge technology in teaching laboratories and lecture halls; expanded and enhanced facilities for experiential learning and simulation to support hands-on clinical training utilizing simulation technology and standardized patients; expanded on-site computer access for students and wireless connectivity throughout the UMMS campus; student-dedicated independent study spaces; and enhanced student life facilities.

Our faculty and technology experts have partnered to create a robust array of educational resources, including our online curriculum and video capture of course lectures; the Web-based curriculum calendar, providing both students and faculty with universal, up-to-date access to course schedules and educational events; technology-based classroom sessions that integrate online, interactive teaching into large group lectures; and a variety of computer-based independent learning modules that include high resolution image databases, interactive learning exercises, Web-based clinical simulations and computer-based testing. The transformation of educational facilities will be phased in over several years, culminating in the dedication of the Albert Sherman Center, a new research and education facility on the University campus slated for completion in 2012.
MD/PhD Program

For students planning a career in biomedical research, the MD/PhD Program represents an integrated pathway for training to become a physician-scientist. The program combines the curriculums of the School of Medicine and the Graduate School of Biomedical Sciences (GSBS) to provide a structured foundation of diverse topics with the flexibility necessary to meet the needs of the individual student. The expected outcome is the education of talented students for a career as physician-scientists prepared to make significant contributions to health care and to become the leaders in academic medicine.

Curriculum

The first two years of the program are based in the School of Medicine. During the summer prior to first year of medical school, students have the opportunity to select a laboratory rotation with one of our many graduate training faculty. Between first and second year of medical school, students experience fulltime lab rotations with the goal of identifying a thesis advisor. In addition to the traditional School of Medicine curriculum, students participate in literature tutorials with research faculty of the Graduate School of Biomedical Sciences during fall and spring semesters of years one and two.

After the first two years of medical school are completed, the student spends the next three or four years performing research and their thesis project. Students are expected to complete their qualifying exams within three to six months of starting research. Members of the Qualifying Committee will be chosen from members of that Graduate School most qualified to ensure oversight of the student’s academic development in the selected area of thesis research. The program encourages each PhD candidate to make consistent progress toward their PhD to keep the length of the entire MD/PhD program to seven or eight years.

The Thesis Research Advisory Committee, which in many cases is the same as the Qualifying Committee, convenes when the student has written their thesis for the defense. Students submit biannual research progress reports to their committee. The MD/PhD program integrates clinical education and preparation for return to medical school throughout the graduate years. During each term (fall, spring and summer) of the graduate school years, students participate in a self-selected clinical tutorial (minimum of ten hours per semester). Students can round on the ward services with a member of the clinical faculty, usually a physician-scientist, , attend an outpatient clinic, or participate in supervised freestanding clinics in the area.
Master of Public Health Program

A Master of Public Health (MPH) degree is offered at UMMS and granted through and accredited by the School of Public Health and Health Sciences at the University of Massachusetts in Amherst. The courses are taught in Worcester by faculty from both campuses.

The curriculum for the MPH Program is designed to enable health care professionals to earn this advanced degree while engaged in professional activities. Classes are scheduled in the early evening to accommodate working students. The courses cover a wide variety of subjects in the fields of epidemiology, biostatistics, health policy and administration, research methods, managed care, program planning, environmental health and data management.

The requirements for the degree include a total of 42 credits. This may include an optional MPH Project for 3 or 6 credits.

All MPH students are required to complete a three-credit practice experience as a degree requirement. However, a student can petition for a waiver for the practice requirement based on previous, documented experience. All students, including those who receive this waiver, must complete 42 credits. For more information on the practicum requirement, please see: http://www.umass.edu/phs/phd MPHPracticumStudentHandbook_000.html

A typical student can complete the MPH program in 2-4 years and can accelerate their completion by taking courses on the Amherst campus or through the Public Health Practice online program. Students who do not wish to pursue the degree may take courses in the program on a non-degree basis.

Master of Science in Clinical Investigation

The Master of Science in Clinical Investigation (MSCI) program emphasizes the development of strong clinical investigation skills based on a solid foundation in study design, conduct of observational studies and randomized trials, clinical epidemiology and biostatistics. Students will also acquire excellent writing and oral presentation skills through formal classroom work.

Trainees completing the MSCI Program will acquire the necessary skills to successfully design, conduct, and analyze the results of clinical investigations at the individual and population-wide level and design and analyze the results of studies that provide insights into the molecular pathophysiology of disease.

Trainees are grounded in the principles of clinical investigation with a flexible multidisciplinary focus providing a curriculum tailored to their needs and interests as young researchers aspiring to become successful independent clinical investigators.

The MSCI Program offers two concentration tracks: Population-based clinical research and bench-to-bedside translational research. These concentrations allow students to enhance their knowledge based on their current interests and career objectives. The participating faculty-representing the interdisciplinary nature of the MSCI Program-come from the disciplines of epidemiology, biostatistics, clinical research, biomedical informatics and molecular medicine.

Requirements

Candidates for the MSCI degree should have a medical or nursing degree or a PhD in the social, physical, or biological sciences. While no minimum grade point average is required for entry into the program, students applying for admission must have demonstrated superior academic performance and have prior research experience.

Eligibility

Residents and non-residents of Massachusetts are eligible for admission to the MD/PhD Program through the Graduate School of Biomedical Sciences and the School of Medicine.

Financial Support, Tuition and Fees

Tuition is waived and fees are set forth in the general schedule (page 43). Out-of-state MD/PhD students are subject to the GSBS non-resident annual Special Program Fee ($35,000) for the four years of medical school education. Massachusetts residents are subject to an annual Special Program Fee of $20,000. These Special Program Fees are deferred and forgiven in full with the successful completion of the PhD and MD degrees. Students are eligible for graduate student stipends ($28,000 for 2009-2010) and health and disability insurance throughout the program.

Application Procedures

Candidates for the MD/PhD Program begin the application process by submitting an application to the School of Medicine through the American Medical College Application Service (AMCAS). After receipt of the AMCAS application, candidates will be sent an online link to a supplementary UMass Medical School application. Only the MCAT is required for application. Additional information about the program is available by contacting phmd@umassmed.edu.