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 self-fulfilled physicians serving a diversity of patients, communities and the health sciences. Whether a student plans to practice primary care or pursue subspecialty training, the educational program at UMMS is designed to develop the foundational competencies required of all physicians. In 2002, UMMS formally established its commitment to this competency-based framework by approving a set of six foundational competency standards, to be achieved by all UMMS graduates. (See box.)

These competencies for medical education were developed through a comprehensive consensus-building process over two years with the active participation of our students, alumni, course and clerkship directors, and diverse faculty at UMMS and at community-based training sites across the Commonwealth. As a result of this process, these six competencies embody our educational philosophy and the distinctive and unique attributes of UMMS, our faculty and our students. By focusing our curriculum planning on these required core competencies, the UMMS educational program will continue to prepare 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.

These competencies are now being used to advance innovation and quality in our educational program, serving as the common framework that guides faculty in planning what we teach, how we teach, and the process and methods for evaluating student performance. As reflected in the competencies, 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. Our curriculum emphasizes early patient care exposure from day one 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-by-doing, with hands-on practice under the close observation of faculty. As a supplement to students’ learning in the clinical setting, standardized patients are used extensively in all four years, allowing ongoing practice, improvement and mastery of essential skills, such as history taking, physical examination, oral case presentation and clinical problem solving. Our nationally recognized standardized patient program provides a simulated clinical setting for both learning and assessment, complete with exam rooms, video feedback, and a diverse array of training models and computer-based cases.

**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 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 necessary for teaching and learning in the information age. Supporting these state-of-the-art advances, UMMS has invested in a major transformation of our educational facilities and resources, including an expansion of small group learning space, a major library renovation, technology upgrades in lecture halls and laboratories, expanded on-site computer access for students and wireless connectivity throughout the UMMS campus. Our faculty and technology experts have partnered to create a robust array of on-line educational resources, including our Web-based curriculum calendar, providing both students and faculty with universal and up-to-date access to course schedules and educational events; “technology classroom sessions” that integrate on-line, interactive teaching cases into large group lectures; and a variety of computer-based independent learning modules that include image databases, interactive learning exercises, Web-based clinical simulations and computer-based testing.

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 the health professions such as 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 their understanding of structure-function relationships to begin interpreting the signs, symptoms and course of selected human diseases and injuries. The resources of the UMMS human anatomy lab offer exceptional learning experiences in human anatomy dissection and an extensive inventory of prosected specimens and radiologic images.

The Histology/Cell Biology course provides a basic understanding of structural and spatial organization at the micro-anatomical level and how this relates to the function of cells, tissues and organ systems. Presentation of the organ systems is linked with the Physiology course, and the dynamic nature of
structure-function relationships is emphasized. Students observe micro-anatomical structure in the lab and consider how knowledge of normal structure and function can be applied to clinical problem solving. The course also offers a selection of on-line histologic images and 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. By means of 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 that are 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 about the various behaviors generated through this dynamic interaction. The emphasis is on knowledge and skills that are both current and clinically relevant, with topics covering the organization of 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 solve clinical problems in which the primary task is to localize the lesion. Material about stroke and its prevention is interwoven throughout the course.

The **Biochemistry** course incorporates the fundamental aspects of biochemistry through lectures, Web-based modules, clinical correlations, medical vignettes, problem-solving sessions and problem-based cases. Students gain expertise in understanding chemical and cellular mechanisms underlying normal and disease processes. In order to achieve these goals, a large body of material is presented as a framework for understanding problems in human health, while the modes of problem solving used for investigation of the molecular basis of disease are emphasized. 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 (Years 1 and 2) allows students to develop their clinical skills early on, from their first days in medical school. The course emphasizes the medical interview, and its three major functions—gathering data, establishing and maintaining patient relationships and educating the patient; the physical exam; clinical reasoning and problem solving; medical ethics; community medicine and public health; teaching and learning for development as a lifelong learner; and personal and professional growth. The course is integrated with the ongoing curriculum, so that students can apply basic science information to practice in clinical situations. This integrative aspect of the curriculum emphasizes that physicians must
call upon knowledge from diverse areas to solve clinical problems. The course is also longitudinal, allowing students to learn basic skills early so they can take on progressively more difficult tasks, such as performing a geriatric interview, obtaining a sexual history or delivering bad news. Two components of the course, the Longitudinal Preceptor Program (LPP) and Physical Diagnosis (PD), function as practice laboratories. Through the LPP, students are placed in the clinical setting from day one of medical school and have the opportunity to see and interact with patients under the supervision of their assigned LPP preceptor. A diverse array of preceptorship sites are available and include urban, rural, as well as underserved settings. Students attend LPP sessions an average of every other week during the first two years, first “shadowing” their assigned physician preceptor, then actively practicing the skills that have been taught in the PPS small groups. Similar to the continuity of learning model in the LPP, the PD course provides ongoing experience in physical diagnosis across the first two years, with early and hands-on practice of physical exam skills with standardized patients and later with patients in the clinical setting. The Year 1 and 2 PD courses include a lecture series, practice “skills” sessions, as well as on-line curriculum that allows students to review and reinforce the various techniques and skills involved in the physical exam. By Year 2, students are prepared to conduct full and complete physical exams on hospitalized patients under the direct supervision of an assigned PD preceptor.

The Human Genetics course exposes students to basic concepts on molecular, cytogenetic and clinical levels. Building on the basic biochemistry of nucleic acids, DNA replication and repair, transcription and protein synthesis, the course lays the foundation for understanding how mutations result in disease processes. Both classic Mendelian inheritance and newly described complex forms of inheritance are presented. Emphasis is placed on the molecular nature of specific genetic disorders, and students explore the impact of genetic disease on the family and society. The implications of current research, imperative for all physicians of the 21st century, are also explored. Throughout the course, clinical correlations and patient case presentations illustrate and reinforce the relevance of basic genetic principles to the care of patients.

One of four blocks constituting the Microbiology course, Bacteriology, is presented in Year 1; the remaining three—Virology, Pathogenic Organisms and Infectious Disease—are presented in Year 2. Bacteriology acquaints students with the basic biology of bacteria, with particular emphasis on cellular processes and structures that are determinants of pathogenicity; characteristics used for detection and identification; and targets of antimicrobial chemotherapy. Laboratory exercises introduce students to standard microbiological techniques and provide illustrations of key principles.

The Nutrition course emphasizes the importance of nutritional assessment and counseling throughout the lifespan as a key feature of medical care. The course is divided into two blocks, a core series of lectures and case discussions in the fall semester that are closely linked with the Biochemistry course, and a series of topics tied to organ system presentations (Physiology and Histology) in the spring. Students learn core principles that are essential to nutrition, and explore nutritional assessment and counseling, common issues such as obesity, and special nutritional needs at various stages of life.

The second-year Biology of Disease course covers the pathology and pathophysiology of human diseases. Under the leadership of the departments of Medicine and Pathology, the course is comprehensively coordinated across the clinical and basic departments, using an integrated organ system approach to human disease. Students thereby develop an in-depth understanding of disease by correlating underlying molecular and physiologic mechanisms with structural, functional and clinical manifestations. The course begins with an introduction to general disease mechanisms at the cellular and tissue levels and
continues with an analysis of specific diseases as they affect various organ systems. 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.

Microbiology explores pathogenic microorganisms, providing students knowledge necessary for mastering the diagnosis, treatment and prevention of infectious diseases. Students are first introduced to the basic biological processes of viruses and bacteria. Then, the strategies that microbial pathogens use to successfully infect humans and cause disease are described. Finally, students are introduced to the diagnosis, treatment and prevention of specific human infections. A comprehensive Web site provides supplementary resources for independent study and self-directed learning.

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. The course also 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 instead of a particular symptom. The Pharmacology course Web site offers a comprehensive database of drug structures and other Web-based pharmacology resources.

Building on Physician, Patient & Society I, the second year of the PPS course continues students’ introduction to clinical skills and begins the bridge to direct patient care in the third-year clerkships. Students refine their interviewing, physical examination and problem-solving skills, leading to the development of problem lists, assessments and management plans, and developing knowledge of epidemiology, health care delivery, ethics, decision analyses and multi-cultural issues. Communication skills are further developed through presentations with patients and close observation and constructive feedback from faculty, preparing students for self-directed learning in the clerkships.

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. The second half of the course considers normal and abnormal human behavior from birth to old age, explores the major psychopathological syndromes and provides an introduction to clinical psychiatry.

The Year 2 curriculum also offers interested students the opportunity to participate in a comprehensive board review course for Step 1 of the U.S. Medical Licensing Exam (USMLE), which students usually complete at the end of Year 2.

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 enter the hospital wards, ambulatory clinics and physician offices and serve as members of the health care teams that provide direct care to patients and their families. Under the guidance and
supervision of faculty, clinical years students actively apply the principles of clinical medicine to patient care, practice and acquire essential technical skills, and further develop the personal and professional values that will enable them to serve as caring, competent and compassionate physicians.

The Third Year begins with a formal program of orientation to the clinical clerkships. The clerkship orientation program provides comprehensive exposure to the essential information and introductory skills training that will prepare students for a successful transition to their clerkship rotations. Students then begin their third-year clerkship rotations in the six required disciplines of medicine, surgery, family medicine, obstetrics & gynecology, pediatrics and psychiatry.

The **Internal Medicine** clerkship is a 12-week experience with broad objectives. Students spend 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. Through these 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. Supplementing students’ learning in the clinical setting, essential skills in history-taking, clinical problem solving and physical examination are developed through hands-on practice and direct observation and feedback using standardized patients. The clerkship’s curriculum emphasizes an appreciation of the impact of illness on the patient, physician and society, and the use of evidence-driven approaches to the diagnosis, management and prevention of disease. Students also explore ethical dilemmas, issues in geriatric medicine and those surrounding end of life. Student performance is assessed through a variety of measures including clinical performance evaluations by faculty preceptors, performance on the Objective Structured Clinical Examination (OSCE) and on a written test, the National Board Internal Medicine shelf exam.

The six-week **Pediatrics** clerkship utilizes the pediatric interview and a clinical problem-solving orientation to encourage patient/student interaction, critical thinking and preceptor/student discussion. Students become familiar with the primary care and subspecialty aspects of the field and the important role the pediatrician plays in the physical and emotional development of children. In the ambulatory component of the clerkship, students spend three weeks as a member of a health care team in a community-based outpatient office, supplemented with experiences in urgent care, newborn nursery and patient home visits. For the inpatient component of the clerkship, students spend three weeks in an acute care hospital caring for hospitalized children. Throughout the entire six-week clerkship, students actively participate in the health care of pediatric patients and their families, developing and refining interviewing and clinical problem-solving skills.

The six-week **Family Medicine** clerkship gives students a 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 an online program on Ambulatory Medical Ethics and a hands-on curriculum in Evidence-based Medicine.

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

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. These clinical experiences are enriched by a core curriculum that includes basic science and clinical lectures, standardized patient cases and practice in basic surgical techniques. Students spend two months on inpatient surgical services and one month in subspecialty services and clinics. In addition to seeing patients in the hospital, emergency rooms and clinics, students attend conferences and participate in small group discussion utilizing the case study method of teaching.

Students undertaking the six-week Psychiatry clerkship develop the interviewing, reasoning and communications skills fundamental to psychiatric diagnosis and intervention. An integrative model is stressed, emphasizing 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 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.

Supplementing the six core clerkships, nine day-long “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, with current offerings including domestic violence, health care policy, geriatrics, disabilities, end-of-life care, multiculturalism, medical error/patient safety, and complementary and alternative medicine. Each interclerkship is carefully planned by a team of faculty and multidisciplinary professionals to address educational objectives from basic science and clinical sciences as well as psychosocial, legal, ethical and societal perspectives. A broad

“UMMS is a wonderful place to link basic science to medicine. Research and teaching are complementary.”
Jeanne B. Lawrence, PhD
Professor of Cell Biology

A National Institutes of Health-funded stem cell researcher investigating the links between genetics and cell biology, Dr. Lawrence directs the first-year Human Genetics course and supervises graduate students and postdoctoral fellows in her lab. “We’re pleased that we’re able to give students a medically relevant grounding in human genetics, something clinicians will need more and more in practice as discoveries lead to gene-based tests and therapies for common diseases.”
range of educational formats is used to promote active learning and interdisciplinary teaching. A typical interclerkship will be taught by as many as 40 medical school and community faculty, and include plenary sessions, classroom teaching, small group workshops, expert panels, films, and interactions with standardized and real patients.

Upon completion of the six Year 3 clerkships, all students must 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 so-called “EOTYA” is a comprehensive performance-based assessment consisting of multiple “clinical cases” using standardized patients as well as other methods such as computer-based case simulations, X-ray interpretation and physical exam models.

In Year 4, the required clinical curriculum includes two, four-week rotations in Neurology and in a subinternship, with the remainder of curriculum time allocated to 24 weeks of electives in areas of the student’s choice.

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 **Subinternship** allows students to experience first-hand the role of being an intern on an acute care hospital service under direct supervision of residents and attending physicians. Duties include admission and initial evaluation of the patient, subsequent coordination of care for that patient during hospital stay, daily ward rounds and discharge planning. Students are expected to take overnight calls with an assigned team and patient load is comparable to other interns on the team. Subinternship rotations are offered in approved specialties that currently include Medicine and Family Medicine.

For the remainder of the fourth year, students spend the majority of their time in 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 experiences in preparation for internship. Fourth-year elective opportunities are available in diverse areas of interest such as the medical and surgical subspecialties, community-based experiences at public health agencies and community health centers, rotations sponsored by other U.S. medical schools, experiences abroad through our International Health Medical Education Program and research in the clinical or basic sciences. As many as 20 percent of fourth-year students elect to participate in the Senior Scholars Program, which offers up to three months of supervised research experience under the sponsorship of a research mentor.

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**Educational Partners and Affiliates**

**UMASS MEMORIAL MEDICAL CENTER**

UMass Memorial Medical Center’s role in the education of medical students is to train the next generation of physicians for the Commonwealth and provide continuing education to primary care physicians and specialists in the region. As the advanced tertiary care referral center for Central and Western Massachusetts, UMass Memorial Medical Center is a 783-licensed bed facility on three campuses: University, Memorial and Hahnemann, described on the following pages. UMass Memorial Medical Center offers a full complement of sophisticated technology and support services, providing the region with specialists renowned for their work in areas such as cancer, cardiology, emergency medicine, women’s health and children’s medical services—including an internationally recognized newborn intensive care unit. UMass Memorial Medical Center is the region’s transplantation center and provides liver, kidney, pancreas, small bowel and bone marrow transplantation. It also operates a 26-bed mental health unit at Worcester State Hospital.
At the **University Campus**, which has 406 licensed acute-care beds, staff focus on radiation therapy and cancer care, neurology, trauma and critical care, psychiatry, surgery and advanced cardiovascular care. The new **Cardiac Catheterization Laboratory** employs the most technologically advanced electrophysiology and interventional cardiovascular equipment and procedures to evaluate the structure and function of the heart and detect and treat heart disease.

The campus also houses the new **Weight Center**, which provides medical and support services for the morbidly obese, including gastric bypass surgery and comprehensive follow-up care for weight management.

In addition, the University Campus is home to the **Children’s Medical Center**, a pediatric specialty center providing care in all principal fields, including orthopedics, psychiatry, neurology, pulmonology, oncology and surgery, with the only pediatric intensive care unit and pediatric AIDS treatment facility in Central Massachusetts. The Children’s Medical Center also conducts a Child Protection Program, providing evaluations of children for suspected abuse, neglect and maltreatment.

The University Campus, which houses the region’s only Level I trauma center, is the home base of **Life Flight**, New England’s first hospital-based air ambulance and the only emergency helicopter service in Central Massachusetts. Since its founding in 1982, Life Flight has become one of the busiest single-aircraft services in the country, with more than 20,000 patient flights. The University Campus Emergency Department, which records some 112,000 patient visits per year and is currently undergoing a dramatic $129 million renovation to be completed in 2006, provides training and consultation to providers and appoints medical directors for area town Emergency Medical Services. The department also conducts symposiums on subjects such as helicopter services, critical pediatrics and management of trauma cases.

The **Memorial Campus** is a leading provider of acute-care services in the greater Worcester area and offers a broad array of primary, secondary and tertiary care services. An acute care facility with 334 licensed beds, it is well known for its long history of outstanding patient care and excellence in teaching. It is the regional referral center for women with high-risk pregnancies, and houses the region’s only **Level III Newborn Intensive Care Unit**, a 43-bed unit providing the most innovative life-saving care for fragile infants.

The **Levine Cancer Center** at the Memorial Campus is a leading center for the care and treatment of cancer patients. It is also the site of the New England Hemophilia Center and the Comprehensive Breast Center, a unique multidisciplinary facility focused on the diagnosis and wrap-around treatment of women with breast cancer and other diseases of the breast.
In addition, the Memorial Campus houses the Spine Center and Arthritis and Joint Replacement Center and provides a full spectrum of multidisciplinary care for orthopedic patients, including arthroscopic and open surgery for injury and orthopedic disease.

The Hahnemann Campus is a patient-centered, full-service outpatient surgery center focusing on dermatology, hand and upper extremity surgery and therapy, ophthalmology and cosmetic surgery. This state-of-the-art ambulatory surgery and specialty care practice center contains eight day-surgery operating rooms; two ophthalmologic operating rooms; three surgical rooms for Moh's microsurgery, a specialized type of skin cancer surgery; six procedure rooms; 28 exam rooms; 25 physician offices; and admission, testing and discharge areas. The campus also contains laboratory and X-ray facilities, as well as the Hahnemann Family Health Center.

In addition to UMass Memorial Medical Center, UMMS has major educational affiliations with Saint Vincent Hospital at Worcester Medical Center, Berkshire Medical Center in Pittsfield, Milford Regional Medical Center and Caritas St. Elizabeth’s Medical Center in Boston.

Saint Vincent Hospital at the Worcester Medical Center is a 348-bed acute care general hospital containing a range of teaching, research and patient care services including internal medicine, neurology, surgery, cardiovascular medicine, critical care medicine, orthopedics, family-centered maternity care, oncology, geriatrics and behavioral medicine/psychiatric services. Clerkships available to UMMS students include Medicine, Surgery, OB/GYN and subinternships in Medicine and Neurology. A fellowship in Cardiology is offered and residency programs include Emergency Medicine, Surgery, OB/GYN, Neurology, Medicine and Diagnostic Radiology.

Berkshire Medical Center in Pittsfield is a 306-bed acute care community teaching hospital serving Berkshire County and adjacent New York, Vermont and Connecticut. It offers full services in medicine, surgery, pediatrics, OB/GYN, pathology and radiology and has an active emergency medicine department, trauma center and full range of coronary, intensive and respiratory care units. Clerkships available to UMMS students include Medicine, Surgery, OB/GYN, Psychiatry, Neurology and subinternship in Medicine. Residency programs are Medicine, Surgery and Pathology.

A full-service, 116-bed community and regional teaching hospital, Milford Regional Medical Center is a non-profit, acute care facility, serving a region comprising 20 towns. More than 250 physicians in numerous specialties admit to Milford Regional, with consulting physicians available in ambulatory care,
OB/GYN, oncology, physical medicine/rehabilitation and geriatrics, radiation oncology and radiation therapy. Clerkships available to UMMS students include Medicine, Pediatrics, OB/GYN, Neurology and subinternship in Medicine. Residency programs are Medicine, Family Medicine and Emergency Medicine.

**Caritas St. Elizabeth’s Medical Center** is a full-service, 400-bed facility that offers comprehensive inpatient and outpatient medical care as well as active research laboratories focused on cardiology, neurology, hematology/oncology and gastroenterology. Clerkships available to UMMS students include Medicine, Surgery, OB/GYN and subinternship in Medicine. Fellowships in Cardiology, Pulmonary/Critical Care and Hematology/Oncology are offered and residency programs include Anesthesia, Internal Medicine, Primary Care, Psychiatry and Surgery.

**Research Opportunities for Students**

Many opportunities for research experience complete the curriculum for medical students, in all four years of study.

**SENIOR SCHOLARS PROGRAM**

The Senior Scholars Program was established in 1991. Since that time, numerous fourth-year medical students have participated in this unique educational opportunity designed to:

- assist in career development;
- promote the critical interpretation of published literature;
- provide an opportunity for performing high quality clinical, epidemiologic or basic science research; and
- give students a firsthand view of scientific principles and their application in medicine.

Both clinical and basic science faculty from all UMMS departments have embraced the program, supporting students, designing projects and serving as mentors. As a result, the diversity of project opportunities is vast, ranging from molecular and cellular biology to international health initiatives and medical school advocacy.

The Senior Scholars Program has grown steadily over the years with a full 20 percent of the senior class participating. Beyond an opportunity to conduct high-level research under the guidance of a faculty member, students meet as a group four times during the year to openly discuss their work with other students and members of the Senior Scholars Committee. In addition, each student prepares a poster for Senior Scholars Day, a campuswide event that is attended by faculty, students and community supporters. Many students have also presented their work at regional, national and international meetings, won national education awards and published in respected journals.

**SUMMER RESEARCH FELLOWSHIP PROGRAM**

The Summer Research Fellowship Program matches students with individual research projects in their areas of interest. Students work on the projects for pay during an eight-week period in the summer, under the supervision of faculty advisors. The timing of the program is arranged to fit the schedules of students between their first and second years, but incoming first-year students are eligible to participate as well. In the summer of 2004, 24 students participated in the program, focusing on such topics as “cochlear implantation in the elderly” and “multidrug-resistant tuberculosis treatment quality improvement.” In a recent survey, 86 percent of student participants reported that the experience positively influenced their career or residency choices.

**Special Programs**

**ACADEMIC COMPUTING**

Academic Computing is a division of Information Services that provides support to faculty, students and staff in the areas of informatics, biostatistics, instructional design, Web development and training. Academic Computing also serves as the liaison to the other divisions of IS for the school community. These include enterprise network services, telecommunications, product support and technology, and business relations and consulting.

**GRANT-FUNDED INITIATIVES IN EDUCATION**

**Macy Initiative in Health Communication**

The Macy Initiative in Health Communication (1998-2002), was a national, collaborative three-school medical education project funded by the Josiah Macy, Jr. Foundation. The initiative, under the leadership of Chancellor and Dean Aaron Lazare, MD, provided UMMS with an opportunity to develop, implement and
evaluate innovative communication skills curricula for medical students. The initiative garnered international and national recognition for its innovative and systematic approach to communication skills education, with outcomes published in such prestigious medical journals as the *Journal of the American Medical Association* and *Academic Medicine*. Building on the success of this national initiative, UMass is now leading a regional dissemination program involving all of the allopathic medical schools in New England. Through the Macy Mentorship Program in Health Communication Education, also supported by the Josiah Macy, Jr. Foundation, UMMS is directing a 10-school collaboration with partner medical schools Brown, Boston University, Case Western Reserve, Dartmouth, Harvard, Tufts, University of Connecticut, University of Vermont and Yale.

**Educational Development in Complementary and Alternative Medicine**

UMass Medical School is one of six medical schools nationwide to be awarded a grant to participate in the Educational Development in Complementary and Alternative Medicine (EDCAM) project. The goal of this project is to educate medical students about the role of complementary and alternative medicine (CAM) in medical practice, preventive medicine and self-care. As a participating school, UMMS is piloting a comprehensive, integrated multi-disciplinary core curriculum in CAM spanning all four years of undergraduate medical education. The project is spearheaded by the American Medical Student Association, and supported through a grant from the National Institutes of Health National Center for Complementary and Alternative Medicine.

**Stemmler Medical Education Research Grant**

In recent years, professionalism education has emerged as a critical need in undergraduate medical education. UMass was one of five schools selected nationally for the prestigious Stemmler Medical Education Research Award in 2002-03. The UMMS Stemmler project aims to study the feasibility of using standardized patients to assess students’ professional behavior. The project builds on the strength of the UMMS Standardized Patient Program, the school’s expertise in medical education research and our institutional commitment to the values of professionalism in our curriculum. We anticipate that the outcomes from this study will have important implications for medical educators currently seeking to design and implement professionalism assessments using standardized patients. The study findings will also benefit the development of “professionalism stations” as part of clinical skills assessments. This is particularly relevant at this time since medical schools are preparing their students for the OSCE-based Clinical Skills Assessment of the USMLE Step II, which is now required for licensure.

**INTERNATIONAL MEDICAL EDUCATION**

This program adds a global dimension to medical education at UMMS by supporting international electives for our students as well as electives at UMMS for students from foreign medical schools as part of a formal exchange program. International Medical Education for UMMS students develops linguistic, cultural and clinical skills to enable them to better serve an expanding immigrant and refugee population in Massachusetts and the nation. In the past four years, over 200 students have been trained in medical facilities and language schools in over 50 countries, with many taking part in the four-year Pathway on Serving Multicultural and Underserved Populations, which inte-
grates domestic and international experiences with such popula-
tions throughout medical school. Evaluations have demonstrated
that students participating in the Pathway and international
electives develop higher levels of cultural and linguistic compe-
tence, enthusiasm and idealism than non-traveling students. The
success of International Medical Education has led to the forma-
tion of a UMMS Rotaract Club, an important partnership with
Rotary International that provides students access to its vast
global network and individual grants for service projects overseas.

MEYERS PRIMARY CARE INSTITUTE
The Meyers Primary Care Institute is a research and educational
partnership between UMMS and the Fallon Foundation, an affili-
ate of the Fallon Healthcare System. The Institute’s principal focus
is on issues relating to managed primary care, particularly its
interface with academic medicine. The institute promotes primary
care practice through the development and implementation of
innovative programs in research, education and clinical practice.

SPECIAL ELECTIVE PROGRAMS
Recognizing that medicine is a highly complex and diversified
field and that needs and interests of medical students are varied,
UMMS emphasizes strong elective programs to complement
required areas of study. The Office of Medical Education sponsors
two unique programs for medical students: Optional Enrichment
Electives and the month-long Fourth-year Mini-Selectives elective.
Optional Enrichment Electives include Adoption and Foster Care:
Biopsychosocial Considerations; American Sign Language; Basic
Skills for Working with Smokers; Care of the Seriously Ill; Child
Maltreatment; Creative Writing in Medical School; Maternal
Child Health; Medical Interviewing in Spanish; Teen Pregnancy;
Medical and Psychosocial Perspectives; Pathway on Serving Multi-
cultural and Underserved Populations; Rural Health Scholars; and
Wilderness Medicine and Recreational Emergencies. The mini-
selectives, an integrated and interactive sequence of offerings that
can be applied to students’ upcoming residencies, are: Emergency
Medicine; Teaching and Learning in Residency: Maximizing Your
Experience; Laboratory Medicine for the Clinician; and Urgent
Medical Problems: Preparation for Internship.

Academic Policies
and Procedures

ADVANCED STANDING
In consideration of the varied backgrounds of students and to
allow some flexibility in programming, there are many courses in
which students may apply for advanced standing. The decision to
grant advanced standing in a course is the responsibility of the
department teaching that course. In some courses, conferring
advanced standing constitutes certification that the student has
fulfilled all requirements for that course. Alternatively, the depart-
ment may require another experience within that discipline as
more appropriate than taking the prescribed course.

GRADING SYSTEM
The faculty believes that a system of periodic evaluation is essen-
tial to enable students to identify their strengths and deficiencies
and to permit instructors to evaluate student progress and their
own teaching efforts. It is the intent of the faculty that all students
successfully complete their course of study. Early on, through
frequent and personal contact with students, faculty members
identify any difficulty a student may be having in understanding
a topic.

At the end of each pre-clinical course, the course coordinator
submits a grade of Honors, Credit, No Credit or Incomplete; some
courses are given on a basis of Credit/No Credit. A low passing
grade of CR/M (“internal marginal”) is also retained, if appropri-
ate, for internal tracking purposes. In some cases a written
narrative may also be included. For clinical clerkships and elec-
tives, the ratings given are Outstanding, Above Expected
Performance, Expected Performance, Below Expected Performance
or Failure, and a written narrative is also included. The purpose of
the narrative is to aid students in evaluating individual ability
and performance, to aid the academic evaluation boards in mak-
ing recommendations concerning the student’s subsequent
education, including graduate medical (residency) training and to
aid in preparation of the Medical Student Performance Evaluation
(“MSPE” or “dean’s letter”).

The faculty members of each course determine specific meth-
ods of evaluation, which may, for example, include
examinations, case-based exercises, papers or observed structured clinical interactions. Examinations are conducted and graded consistent with the school’s philosophy of emphasizing learning through self-motivation rather than through competition. Post hoc curving is not allowed except in instances where it has been determined that the grades on a particular exercise are unreasonably low, in which case the evaluations can be upgraded. There is no public listing of letter grades or class rank. The grade of Incomplete indicates that completion of examinations or other course requirements has been postponed because of the student’s illness or other extenuating circumstances.

All records used by the faculty as a basis for recommendations for promotion or graduate medical training of a student are available to that student upon request.

Students are required to take Steps 1 and 2 (Clinical Knowledge “CK” and Clinical Skills Examination “CSE”) of the U.S. Medical Licensing Examination (USMLE) and to have their scores reported to UMMS. The CK components of USMLE are computerized examinations which students schedule at a time convenient to them usually following the second year (Step 1) and some time during the fourth year (Step 2). The CSE is a performance-based examination scheduled by the student some time after completing required third-year clerkships. Passing this examination is not a requirement for promotion or graduation, but is required for licensure.

Prior to graduation, students are required to become certified in Advanced Cardiac Life Support and to satisfactorily complete an end-of-third-year clinical performance assessment.

MONITORING STUDENT PROGRESS

The progress of first- and second-year students is monitored by the Basic Science Academic Evaluation Board, while the progress of third- and fourth-year students is measured by the Clinical Science Academic Evaluation Board. These boards meet regularly throughout the academic year.

In the event of a less-than-satisfactory grade in any course, the appropriate evaluation board determines the course of action the student must follow to qualify for promotion or graduation. The Associate Dean for Student Affairs notifies, in advance of each board meeting, any student for whom an “adverse action” is likely to be considered, so that the student can provide additional information and appear at the meeting in person if he or she chooses.

Promotion from the first year to the second year and from the second year to the third year of the medical curriculum, and progress during this period, is monitored by the Basic Science Academic Evaluation Board. It is expected that student performance in all first- and second-year courses will be at least at the satisfactory (CR) level. During this period, however, one rating of internal marginal (CR/M) will be allowed without remediation. Any student receiving more than one rating of CR/M or any rating of no credit (NCR) is reviewed by the Basic Science Academic Evaluation Board and actions are prescribed to ensure remediation. Such actions include, but are not limited to, re-taking of examinations, repetition of the course(s) or repetition of an entire year. Other possible outcomes include program extension and, in rare cases, dismissal.

The predominantly clinical curriculum of the third and fourth years is treated as a continuum by the Clinical Science Academic Evaluation Board. This board also assesses qualifications for graduation. Any rating of less than Expected Performance in required clerkships must be remediated. Remediation may take the form of repetition of an examination, repetition of part or all of the clerkship in question, or repetition of an entire year. Students will, however, be allowed one rating of Below Expected Performance in a clinical elective without remediation. Any rating of Failure or any Below Expected Performance rating beyond the one permitted must be remediated.

WITHDRAWALS, LEAVES OF ABSENCE AND READMISSION

Students may withdraw voluntarily from the School of Medicine at any time upon written request to the Associate Dean for Student Affairs. Readmission after voluntary withdrawal is not guaranteed. Reinstatement requires application in writing to the Admissions Committee at least two months prior to the date of requested readmission. If the readmission is approved by the Admissions Committee, the appropriate academic evaluation board will determine the level at which the student will be reinstated within the curriculum and the courses that will be required.

Students in good academic standing may request a leave of absence for a specified period of time not to exceed one year. In
such cases, the appropriate academic evaluation board determines whether such a leave of absence is to be granted and sets any conditions for readmission. Readmission after a leave of absence does not require action by the evaluation boards (unless specifically stated) or by the Admissions Committee. Students who fail to attend class regularly or fail to return from a leave of absence, in spite of notification by the Associate Dean for Student Affairs, will be considered to have withdrawn voluntarily from the School of Medicine, and cannot be reinstated without positive action of the Admissions Committee.

**GRADUATION**

Regularly matriculated medical students who have fulfilled all requirements of the University, as certified by action of the Clinical Science Academic Evaluation Board, will be recommended by the Dean of the Medical School to the president and trustees of the University of Massachusetts for the degree of Doctor of Medicine. Requirements include satisfactory completion of four years of study of not less than 32 weeks each year, satisfactory completion of a clinical skills performance assessment, successful completion of a course in Advanced Cardiac Life Support, and the recording of scores on Steps 1 and 2 of the U.S Medical Licensing Examination.

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**John E. Harris**

PhD/MD student

Harris, who expects to combine research and clinical practice, is completing the last two years of medical school after fulfilling PhD requirements studying T-cell transplantation tolerance in the UMMS laboratory of world-renowned diabetes researcher Aldo Rossini, MD. “The outstanding mentorship for students and the extent to which labs work together make UMMS a great scientific environment.”

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