



SOM 11-13

University of Massachusetts Medical School

The University of Massachusetts Medical School (UMMS) was founded by proclamation of the governor and an act of the legislature to meet the health care needs of the residents of the commonwealth. Its mission is to advance the health and well-being of the people of the commonwealth and the world through pioneering education, research and health care delivery with its partner, UMass Memorial Health Care. UMMS is one of five campuses that make up the University of Massachusetts. Other campuses are located in Amherst, Boston, Dartmouth and Lowell.

The UMMS Educational Community

As of January 1, 2011

Faculty (including voluntary)	3,046
Basic science full- and part-time faculty	308
Clinical full- and part-time faculty	2,559
Nursing faculty	179

School of Medicine

MD students	457
MD/PhD students	30
Alumni	3,290

Graduate School of Biomedical Sciences

PhD students	381
MD/PhD students	29
Biomedical Engineering students	2
Clinical and Population Health Research students	19
Master of Science in Clinical Investigation students	8
Alumni	638

Graduate School of Nursing

MS students	43
Graduate Entry Pathway students	88
PhD students	26
Doctor of Nursing Practice students	9
Alumni	861

A local, regional and statewide health resource, UMMS comprises the School of Medicine, opened in 1970; the Graduate School of Biomedical Sciences, opened in 1979; and the Graduate School of Nursing, opened in 1986. UMMS also offers dynamic graduate medical education and continuing medical education programs.

Beyond fulfilling its core missions of health sciences education and public service, UMMS is home to a thriving biomedical research enterprise. With major funding from the \$1 billion Massachusetts Life Sciences Bill signed into law in 2008, UMMS research programs are central to the Massachusetts Life Sciences Initiative. Federal and private research grants and contracts reached more than \$240 million in fiscal year 2010, making UMMS one of the fastest-growing research institutions in the country. In 2006, UMMS professor Craig C. Mello, PhD, and his colleague Andrew Fire, PhD, of Stanford University, were awarded the Nobel Prize in Medicine by the Nobel Assembly at Karolinska Institute for their discoveries related to RNA interference (RNAi). First published in the journal *Nature* in 1998, their research showed that a particular form of ribonucleic acid or RNA—the cellular material responsible for the transmission of genetic information—can silence targeted genes. This RNAi process offers astounding potential for understanding and manipulating the cellular

basis of human disease and for the development of new therapeutics for disease treatment and cure.

Educational Mission

Consistently ranked by *U.S. News & World Report* as one of the leading medical schools in the nation for primary care education, the School of Medicine has a foremost responsibility to provide our students with an accessible, comprehensive and personally rewarding medical education of the highest quality and one that optimally prepares them to excel as tomorrow's physicians—caring, competent, productive and fulfilled in their chosen career serving a diversity of patients, communities and the health sciences. The school is committed to training in the full range of medical disciplines, with an emphasis on practice in the primary care specialties, in the public sector and in underserved areas of Massachusetts.

Our educational program has benefited in recent years from major investments in state-of-the-art educational technology and medical simulation and will continue to benefit from additional enhancements to be housed in the Albert Sherman Center, a new research and education building on campus slated for completion in late 2012. The Sherman Center's state-of-

Where Our Students and Residents Learn

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| <ul style="list-style-type: none"> • UMass Memorial Health Care <ul style="list-style-type: none"> - UMass Memorial Medical Center (Hahnemann, Memorial and University campuses) - UMass Memorial-Clinton Hospital - UMass Memorial-HealthAlliance Hospitals (Fitchburg and Leominster campuses) - UMass Memorial-Marlborough Hospital - UMass Memorial-Wing Memorial Hospital and Medical Centers - Barre Family Health Center - Community Healthlink - Hahnemann Family Health Center - South County Pediatrics - Tri-River Family Health Center | <ul style="list-style-type: none"> • Heywood Hospital • Holyoke Medical Center • Harrington HealthCare at Hubbard • Lahey Clinic Hospitals • Providence Behavioral Health Hospital • Worcester State Hospital • Baystate Medical Center |
| <ul style="list-style-type: none"> • Berkshire Medical Center • St. Elizabeth's Medical Center • Milford Regional Medical Center • Saint Vincent Hospital • Day Kimball Hospital • Harrington Memorial Hospital | <ul style="list-style-type: none"> • Community Health Connections <ul style="list-style-type: none"> - Fitchburg Family Health Center - Greater Gardner Community Health Center - Leominster Community Health Center • Fallon Clinic • Family Health Center of Worcester • Edward M. Kennedy Community Health Center • Greater Lawrence Family Health Center • Southborough Medical Group • Riverbend Medical Group |

And at 200 volunteer practices and clinics across the commonwealth

the-art educational resources will include the Center for Experiential Learning and Simulation (CELS), a 24,000-square-foot comprehensive, full-service simulation center, as well as our 10,000-square-foot facility dedicated to supporting the five houses of our Learning Communities. After four years of planning, the School of Medicine has undergone a comprehensive process of reshaping the curriculum to align with our six competencies for medical education: physician as professional, scientist, communicator, clinical problem solver, patient and community advocate, and person. Our new Learner-centered Integrated Curriculum (LInC) is now in place, with the first year of our new curriculum inaugurated with the entering class of 2010. Our newly redesigned LInC education program features comprehensive integration of the clinical and basic sciences; enhanced flexibility in the clinical clerkships allowing dedicated time for elective experiences in year three; educational methods that offer hands-on,

team-based small group learning; technology enhanced educational methods that support independent, self-directed learning; personalized, continuity-based mentorship with dedicated faculty through the learning community model; and an opportunity for all students to engage in scholarship and scientific inquiry through a capstone project experience. To support our new curriculum, the school's educational facilities have been renovated and expanded to create the "ideal learning environment" that will best prepare today's students as tomorrow's physicians. Among these enhancements are our recently renovated anatomy labs with computer technology at each dissection table; our upgraded classrooms and amphitheatres with campus-wide wireless connectivity; our newly built integrated Teaching and Learning Center (iTLC) that serves as our cutting-edge "technology-infused" classroom for interactive small group learning, high resolution AV systems and computer-based testing; our on-campus "clinical skills

center" with dedicated space for students to practice and learn techniques in clinical skills and physical diagnosis from expert faculty mentors; and our five student group study rooms, each dedicated to one of our Learning Communities. Complementing these recent enhancements, our students continue to benefit from our nationally recognized standardized patient program that serves all four years of our curriculum; our UMMS Simulation Center that provides comprehensive simulation resources including high-fidelity manikins, task trainers and computer-based "virtual" simulation dedicated to UMMS learners; and, finally, our expanding network of community-based faculty across the commonwealth whose practices provide our students with an immersion experience in doctoring and the opportunity to develop their relationships with patients from the first days of medical school.

At UMMS, our curriculum is nationally recognized for the outstanding clinical training of our students, preparing them for diverse career choices beyond medical school, whether in primary care or the medical specialties. In parallel with this exceptional clinical preparation, our fast-paced growth, leadership and worldwide recognition in health sciences research offers extraordinary research opportunities for our students.

The educational mission of the School of Medicine is further enhanced by 46 accredited residency and fellowship programs; cooperative degree programs with area colleges and universities; diverse community-based education programs across Massachusetts; outstanding achievements in clinical and translational research in the health sciences; and the Commonwealth Medicine division, dedicated to serving the state's broad community of health care and service agencies. As the commonwealth's only public medical school, UMMS places an emphasis on partnerships with the community, creating opportunities for students to learn in and contribute to serving Massachusetts communities and the care of its vulnerable and underserved populations.

The School of Medicine's educational program has been enriched through national grant awards that promote quality, innovation and national distinction in medical education.

Over the past 10 years, these awards have included:

- **Integrated Geriatrics Education:** A Model Curriculum across the Medical Education Continuum, Donald W. Reynolds Foundation Aging and Quality of Life Program (2009-2012), addresses the special health care needs of the elderly through targeted, comprehensive curricula.
- **NIDA Centers of Excellence for Physician Information,** National Institute on Drug Abuse (2007-2011), providing targeted curriculum in prescription drug abuse education.
- **Marrow for Tomorrow,** Association of American Medical Colleges Caring for Community grant (2005-2007), a student-led initiative to increase the representation of underserved minority populations in the marrow donor pool through outreach and education.
- **American Medical Association's, Innovative Strategies for Transforming the Education of Physicians (ISTEP)** (2005-present), a national consortium of medical schools dedicated to furthering rigorous research in medical education.
- **Stemmler Medical Education Grant,** National Board of Medical Examiners (2003-2005), investigating the use of standardized patients in assessing medical students' behaviors and skills in the domain of professionalism.
- **Educational Development for Complementary and Alternative Medicine,** (2003-2007), integrating educational objectives and curricula in complementary and alternative medicine into the mainstream of the Medical School curriculum.
- **A Comprehensive Approach to Sexual Health in Undergraduate Medical School Curricula,** Pfizer, Inc. (2001-2003), promoting the development of curricular innovations in sexual health.
- **Enhancing Gerontology and Geriatric Medicine Education in Undergraduate Medical Education,** AAMC/John A. Hartford Foundation (2001-2003), dedicated to enhancing our students' preparedness and commitment to care for the needs of the elderly.
- **Macy Initiatives in Health Communication,** Josiah Macy, Jr.

Foundation (1998-2006), a multi-staged project designed to catapult communication skills into the mainstream of medical education.

- **Undergraduate Medical Education for the 21st Century Associate Partnership** (1998-2001), promoting teaching and understanding about our changing health care systems, medical care delivery models and health policies.

Educational Partners and Affiliates

UMass Memorial Health Care

UMass Memorial Health Care, Inc. is the clinical partner of the University of Massachusetts Worcester and the largest health care system in Central and Western Massachusetts. It is a not-for-profit, integrated system designed to provide all levels of health care from primary to quaternary. UMass Memorial Health Care delivers care through the UMass Memorial Medical Center and community hospitals (Clinton Hospital, HealthAlliance Hospital, Marlborough Hospital and Wing Memorial Hospital and Medical Centers) with health care services further enhanced and augmented by community primary care practices, ambulatory outpatient clinics, home health agencies, hospice programs, rehabilitation and mental health services.

As the region's tertiary referral center, UMass Memorial Medical Center offers a full complement of advanced technology and support services, providing the region with a broad range of specialists renowned for their expertise in clinical areas, including the Centers of Excellence—heart and vascular, cancer, musculoskeletal and diabetes—as well as emergency medicine, surgery, women's health and children's medical services.

UMass Memorial Medical Center is a 781-licensed-bed facility on three campuses: Hahnemann, Memorial and University. UMass Memorial Medical Center records 138,000 visits at its two emergency departments located on the University and Memorial Campuses. In 2010, for the third year in a row, the Medical Center ranked number one in Massachusetts and New England for surviving a heart attack. The Medical Center is also the region's transplantation center

and provides liver, kidney, pancreas and bone marrow transplantation.

On the University Campus, clinical services are focused on radiation therapy and cancer care, neurology, trauma and critical care, psychiatry, surgery and advanced cardiovascular care. The Heart and Vascular Hospital provides integrated, patient-centered heart and vascular care by utilizing the latest research and technology available in cardiovascular medicine and surgery.

The Weight Center provides medical and multidisciplinary support services in the specialty of bariatric medicine, including gastric bypass surgery, behavioral therapy and comprehensive follow-up care for weight management. The University Campus is also home to the Children's Medical Center, providing extensive services, including the internationally recognized newborn intensive care unit, orthopedics, gastroenterology, neurology, pulmonology, oncology and surgery, and the only pediatric intensive care unit in Central Massachusetts. The Children's Medical Center offers the Child Protection Program, providing evaluations of children for suspected abuse, neglect and maltreatment. The Children's Medical Center is accredited by the prestigious National Association of Children's Hospitals and Related Institutions, a designation that identifies it as a facility that delivers exceptional care to children.

Also located on the University Campus, the Duddie Massad Emergency and Trauma Center, 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 25,000 patient flights. The Duddie Massad Emergency and Trauma Center provides training and consultation to providers and appoints medical directors for area towns' emergency medical services. UMass Memorial also sponsors the Disaster Medical Assistance Team – Massachusetts (DMAT-MA2), a volunteer group of professional and paraprofessional medical personnel who augment local medical efforts and provide emergency medical care during a disaster or other adverse event.

The University Campus is the site of the

new Ambulatory Care Center (ACC), offering a unique complement of state-of-the-art patient care clinics and translational research programs in a seven-story, 258,000-square-foot building. The ACC opened in 2010 and provides convenient access to outpatient services for cancer, diabetes, heart and vascular, orthopedics and to diagnostic testing services.

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. The maternity center delivers more than 4,000 babies a year, more than any hospital in the region. It is the regional referral center for women with high-risk pregnancies, and it provides the region's only Level III Newborn Intensive Care Unit, a 49-bed unit providing the most advanced life-saving care for fragile infants. The Levine Ambulatory Care Center on the Memorial Campus is the site of the New England Hemophilia Center and provides cancer services, including radiation oncology, gynecological oncology and infusion treatments. It is also the hub for all of the Medical Center's presurgical evaluation services.

In addition, the Spine Center and the Arthritis and Joint Replacement Center, also located on the Memorial Campus, provide a full spectrum of multidisciplinary care for orthopedic patients, including arthroscopic and open surgery for injury and orthopedic disease. Cardiologists also see patients for routine visits and diagnostic testing.

The **Hahnemann Campus** is a patient-centered, full-service outpatient center focusing on dermatology, hand and upper extremity surgery and therapy, sports medicine, ophthalmology and cosmetic surgery. This state-of-the-art ambulatory surgery and specialty care practice center offers day surgeries in many specialties as well as laboratory, mammography and X-ray services and primary care services at the Hahnemann Family Health Center.

Clerkships are offered in family medicine, medicine, obstetrics & gynecology, pediatrics, psychiatry, surgery and neurology.

Major Teaching Hospital Affiliates

In addition to UMass Memorial Medical Center, UMMS has major educational affiliations with Saint Vincent Hospital in Worcester, Berkshire Medical Center in Pittsfield, and Milford Regional Medical Center.

Saint Vincent Hospital at the Worcester Medical Center is a 348-bed acute care hospital that offers a variety of specialty care centers, including laparoscopic surgery, cardiovascular medicine, cancer medicine, family-centered maternal and child health services, general and vascular surgery, neurosurgery, psychiatric services, orthopedics and advanced diagnostic services. An extensive array of outpatient services, including same-day surgery, radiation oncology and a pain clinic, are also available. Clerkships available to UMMS students include medicine, neurology, obstetrics & gynecology and surgery, and subinternship in medicine. Independent residency programs are offered in cardiology, internal medicine, podiatry, sleep medicine and radiology.

Berkshire Medical Center in Pittsfield is a 302-bed acute care community teaching hospital serving residents of Berkshire County as well as Eastern New York, Northern Connecticut and Southern Vermont. It offers a full range of medical services, including anesthesiology, cardiology, dentistry, emergency medicine, family medicine, internal medicine, neurology and neurosurgery, obstetrics and gynecology, ophthalmology, orthopedic surgery, otorhinolaryngology, pathology, pediatrics, psychiatry, radiation oncology, radiology, rehabilitation, substance abuse, cardiac rehabilitation, a sleep disorders program and others. Clerkships available to UMMS students are in medicine, obstetrics & gynecology, psychiatry and surgery. Fourth year subinternships are available in medicine, psychiatry and general surgery. An extensive list of fourth year electives includes cardiology, consultation psychiatry, emergency medicine, infectious disease, laboratory hematology and hematopathology, nephrology, occupational health, orthopedic surgery, pathology (anatomic and clinical), physical medicine and rehabilitation, primary care internal medicine, pulmonary

medicine and radiology (diagnostic and/or interventional). Independent residency programs are offered in internal medicine, psychiatry, surgery, osteopathic medicine and dentistry.

Milford Regional Medical Center is a nonprofit, acute care, full-service, 121-bed community and regional teaching hospital, serving a region comprising 20 towns. In addition to providing basic acute care services such as medical, surgical, family-centered obstetrics and pediatrics, Milford Regional provides a full range of clinical services, from adolescent health to women's services. Clerkships are available in medicine, obstetrics & gynecology and pediatrics.

UMMS Schools and Other Sites

Along with the School of Medicine, UMMS comprises the Graduate School of Biomedical Sciences (GSBS) and the Graduate School of Nursing (GSN). The GSBS has two divisions—Basic & Biomedical Sciences and Clinical & Translational Sciences—that offer 10 programs of study. Students are trained in their selected specialty area and receive a broad background in the basic medical sciences, in preparation for research with direct relevance to human disease. Graduates are equipped to collaborate with scientists and physicians involved in basic research and clinical observations and are prepared to initiate careers as educators in schools of the health professions or in the biotechnology industry.

The GSN offers master's, post-master's and doctoral degrees, providing high quality education to prepare registered professional and advanced practice nurses within nurse practitioner and nurse educator specialties for faculty, research and other nursing leadership positions. Subspecialty professional and clinical education is also offered in selected areas. The basis for study includes theoretical foundations of professional and advanced practice nursing, research process and design, societal forces that influence nursing, advanced pathophysiology, pharmacology, health assessment, clinical decision making, specialty content and clinical education.

The UMMS extended campus includes the Brudnick Neuropsychiatric Research Institute and labs and offices within the Massachusetts Biotechnology Research Park in Worcester; sites in Shrewsbury and Auburn; the Eunice Kennedy Shriver Center in Waltham; and the New England Newborn Screening Program and MassBiologics with facilities in Jamaica Plain and Mattapan.

Public Service Mission

The faculty, students and staff at UMass Medical School are committed to making an impact on the health and well-being of the people of the commonwealth and the world. Every day, in ways large and small, our institutional community is actively and passionately engaged in the communities we serve, undertaking numerous and varied

outreach initiatives with partners in the academic, business and philanthropic fields. Collaborations include a new partnership with Special Olympics of Massachusetts to advance its Healthy Athletes initiative; the long-running Worcester Pipeline Collaborative and Regional Science Resource Center, both award-winning programs recognized as national models for K-12 science, technology, engineering and mathematics education outreach; and student-run, faculty-supervised free clinics that provide care for underserved and economically disadvantaged patients.

By working with schools, community groups and social service organizations, UMass Medical School has extended its reach into places where we can make a difference. And by creating and sustaining relationships with the social and cultural

fabric of the region—and indeed, much of the world—we provide both real-world help and role models for the next generation of nurses, doctors, researchers and leaders.

The newly established Office of Global Health is the latest method to broaden the Medical School's reach. The office will coordinate and optimize current and future endeavors in global medicine to elevate it to a more visible, high-impact initiative; develop a network of international activities that can inspire UMMS medical, nursing and basic science students as on-site teachers and practitioners; and enhance training of health care providers internationally. The Office of Global Health will also work with the Office of Research to help coordinate specific clinical trials and epidemiological studies as these opportunities arise.

The **Commonwealth Medicine** Division of

Spotlight on education

“Students are in the clinic sooner, working in partnership with the basic sciences. They are focusing more on the ability to learn and less on the ability to memorize,” said Michele P. Pugnoire, MD, senior associate dean for educational affairs and professor of family medicine & community health. “Learning on their own and learning in groups is the way they will be learning throughout their professional lives.”

Learner-centered Integrated Curriculum

When first-year medical students arrived on campus in August 2010, they were the first class to be taught the practice of medicine in a new way. Under the new Learner-centered Integrated Curriculum (LInC), which involved years of study and thousands of hours of discussion and planning, they are experiencing a fundamental change in the way courses are constructed, with basic science and clinical practice woven throughout all four years. And they are expected to learn differently—both on their own and from faculty mentors and fellow students and using nontraditional methods to take advantage of advances in technology. They will be asked to master learning methods that will prepare them to be lifelong learners.

For more news about UMass Medical School, visit: www.umassmed.edu/news

UMMS works in partnership with numerous state and local agencies in Massachusetts and other states to increase the value and quality of publicly funded health expenditures and to improve access and delivery of care to at-risk and uninsured populations. Drawing on the depth and breadth of UMMS academic, research, management and clinical resources, Commonwealth Medicine assists health care providers in the public sector to optimize efficiency and effectiveness.

Several programs illustrate the scope of Commonwealth Medicine's work in health policy, research, health care service delivery and education. The annual Health Policy Academic Conference showcases scholarly academic research projects on health care in the public sector with presentations on diverse topics including the future of research-based policymaking, child mental health, health care in the criminal justice system and health information technology. And Commonwealth Medicine's Mini-Grants program makes seed money available to UMMS investigators for innovative projects that address public sector needs, further exemplifying the division's ongoing support of the UMMS research mission.

Commonwealth Medicine facilitates educational opportunities for UMMS students such as the partnership with the Graduate School of Biomedical Sciences to develop the PhD program in Clinical & Population Health Research, one of the first in the nation to promote graduate study that fosters the analytic skills and methods necessary to conduct both health services and clinical research. In addition, Commonwealth Medicine was instrumental in launching the Graduate Entry Pathway in the Graduate School of Nursing as a response to the growing need for professional nursing staff. This program includes cooperative training opportunities that encourage public service.

The division's programs initiate early intervention for special populations including young patients who face obstacles in obtaining necessary health care. One example is Foster Care Evaluation Services (FaCES), a partnership of Commonwealth

Medicine, the Department of Pediatrics and the Massachusetts departments of Social Services and Medical Assistance that coordinates medical care for area foster children. Another is the Community Case Management program, which coordinates needed services for children disabled by complex, chronic medical problems.

Commonwealth Medicine's expertise in health policy, innovative educational programs, service delivery and applied clinical research is focused on increasing public service and changing public policy; it is helping improve health outcomes for the people of the commonwealth served by public health and human services programs. Indicative of its success, several medical schools and agencies from other states have collaborated with Commonwealth Medicine in order to replicate its unique work.

Research Mission

The research mission of UMMS is to promulgate scientific inquiries that produce groundbreaking discoveries in the basic and clinical sciences. Currently supporting more than 300 investigators, the growing UMMS research enterprise has led to stimulating advances in the treatment of disease and injury, as UMMS scientists undertake research to discover the causes of and cures for the most devastating diseases of our time.

Accomplished faculty members include a Nobel Prize winner; a Lasker Award recipient; two members of the National Academy of Sciences; a member of the Royal Society; five Howard Hughes Medical Institute Investigators; Banting Medal awardees; Pew and Keck scholars; MERIT awardees; a Fellow of the American Association for the Advancement of Science; cancer research award recipients and many other winners of scientific accolades. Capitalizing on a collaborative environment, UMMS research expertise lies in both basic and clinical areas with concentrations in diabetes, molecular genetics, immunology, virology, HIV/AIDS, cancer, signal transduction, structural biology (with attention to innovative drug design),

bone cell biology, chemical biology, gene function and expression, neuroscience, imaging, and occupational and environmental health.

Research growth is reflected in increased funding levels. In the past 10 years extramural funding has more than doubled, from \$89 million in FY '98 to more than \$240 million in FY '10.

Today, UMMS is proud to be at the forefront of the commonwealth's life sciences initiative, having received funding in 2007 and 2008 to establish an Advanced Therapeutics Cluster (ATC) on campus. The ATC will bring together an interdisciplinary group of research faculty and physician-scientists in three interconnected research clusters—stem cell biology, RNA biology and gene therapy. RNA studies at UMMS are conducted by world leaders in the field; to direct gene therapy initiatives, UMMS recruited an internationally recognized researcher in 2008. And in the realm of stem cell biology, the institution launched the Stem Cell Bank and Stem Cell Registry, two separate but complementary infrastructure programs that are fundamental to the advancement of today's cutting-edge biomedical research.

The ATC will be housed in the Albert Sherman Center, a new research and education facility slated for completion in late 2012 that will add approximately 500,000 square feet to a campus that has grown exponentially over the past 10 years. The Albert Sherman Center, which will double the campus's research capacity, follows on the heels of the Aaron Lazare Medical Research Building, an innovatively designed research facility that added 360,000 square feet of laboratory space to UMMS when it opened in the fall of 2001.