Mount Sinai

MSSM

MOUNT SINAI SCHOOL OF MEDICINE

ACCELERATING SCIENCE | ADVANCING MEDICINE

MEDICAL EDUCATION | MOUNT SINAI SCHOOL OF MEDICINE

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VOL. II

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Message from the Dean

I am proud to introduce Mount Sinai's vision for the School of Medicine. The programs and advances you will read about here represent a bold departure from the traditional medical school model. They also reflect Mount Sinai's deep and long-standing commitment to translational medicine.

As a medical school embedded in a hospital, Mount Sinai has always integrated research and clinical medicine, and our long record of scientific firsts proves the wisdom of this approach. Today, with the addition of our research institutes and the exceptional scientists who have joined our distinguished faculty, Mount Sinai is accelerating the pace of discovery.

Mount Sinai graduates are known throughout the world for their scientific expertise, clinical skills, and professional leadership. They are also renowned for their ethics, selflessness, and commitment.

We believe strongly that values can be taught through discourse and discussion, through role modeling of our outstanding faculty, and through our honor code. We place the highest value on educating physician-scientists who will be agents of change in this age of uncertainty and doubt.

From their very first semester, Mount Sinai students have the opportunity to integrate their basic science education with the realities of observation, decision-making, and patient care. In every class and clinic they are encouraged to be both team players and independent thinkers, as well as to pursue their areas of interest far beyond what is required.

Students who are prepared to give more of themselves self-select to attend Mount Sinai, and we provide every opportunity for growth—whether it is through the student-run clinic in East Harlem or fieldwork around the world. Over 80 percent of Mount Sinai students are engaged in mentored research projects in the lab, the hospital, and the community.

This is an impressive record that is emblematic of the contributions our graduates will make to society throughout their careers. It is also a tribute to the achievements of David Muller, MD, Dean for Medical Education, and his team, who are continually working to provide our students with the opportunities they need to achieve greatness.

DENNIS S. CHARNEY, MD

Anne and Joel Ehrenkranz Dean of Mount Sinai School of Medicine and Executive Vice President for Academic Affairs of The Mount Sinai Medical Center

Message from the Dean for Medical Education

Soon after my appointment as Dean for Medical Education, I convened a group of Mount Sinai thought leaders to focus our vision for the future of medical education. We resolved to transform our curriculum with an essential question in mind: What does it mean to become a Mount Sinai doctor?

Our goal is to prepare physicians and scientists to enter society as informed advocates and activists ready to advance research and clinical care and capable of promoting change. All our efforts and reforms are focused on creating a more integrated, patient-centered learning experience in both basic science and clinical medicine.

Groundbreaking change is our legacy. Forty years ago, leaders of The Mount Sinai Medical Center had a bold new vision for medical education: a hospital-based medical school that existed without a major university affiliation.

Our seamless connection to the Hospital allows us to teach basic science education effectively within a clinical context. As a result, our students see and better understand an incredible range of disease in patients—not just in textbooks.

In its relatively short history, the School of Medicine has established itself as a leader in research and is ranked by the National Institutes of Health among the country's top 20 medical schools. We have also been recognized by both the Association of American Medical Colleges and the American Medical Association for service to patients in our neighborhood and advocacy for their medical care. No other medical school has consistently achieved such distinction in both the scientific and humanitarian spheres.

With our strengths in science and in community, our emphasis is on teaching clinicians to think like scientists, and scientists to think about the patients they are working to cure. With 14 translational science institutes, we are uniquely positioned to do this.

In the following pages you will learn about curriculum innovations that build on Mount Sinai's infrastructure and strengths. These include our focus on team building, both in the classroom and in clinical settings; many unique opportunities for students to be mentored by world-class researchers; our new competency-based approach to education, which is designed to integrate the learning of foundational

science and clinical medicine; and the redesign of courses and content to support translational science. Through team learning and our honor-based exam system, we also foster integrity and professionalism in all our future physicians and researchers.

To support our faculty and students, we are continuously developing extraordinary teaching space equipped with state-of-the-art technology. Over the past three years, we have invested $15 million in classrooms, labs and other facilities throughout campus—innovations that enable Mount Sinai to create a curriculum that can serve as a model for medical education reform.

We have a common goal to enrich the medical field with humanistic, scholarly physicians who are self-directed, lifelong learners. Nothing could be more important to the future of medicine.

DAVID MULLER, MD

Marietta and Charles C. Morchand Chair in Medical Education and Dean for Medical Education

Dennis S. Charney, MD (left), and David Muller, MD

David Muller, MD, Dean for Medical Education, walks with students across the Mount Sinai campus. The campus leads directly into East Harlem, one of the communities Mount Sinai serves.

Passion

An Education Rooted in Community

"Mount Sinai sits in the most unusual place in the country, between one of the most affluent and one of the most underserved communities in America, and the fault line runs right through our campus. It is our challenge to do something about the health care disparities that are all around us."

Kenneth L. Davis, MD, President and Chief Executive Officer of The Mount Sinai Medical Center

Becoming a Mount Sinai Doctor:
It Begins with a Walk in the Neighborhood

During orientation week in August, all students encounter a cultural divide on the East Harlem Walking Tour, a rite of passage for the past six years that the *New York Times* chronicled in an article titled "Future Doctors, Crossing Borders; Lessons in East Harlem's Culture, Diet and Health." Groups of 10 students spend a full day with faculty tour guides exploring the wealth of experience that is East Harlem.

"The goal is to get the students, many of whom come from affluent families or have no concrete idea what East Harlem is like, to become engaged in a conversation about the richness and reality of living in this community," says Ann-Gel S. Palermo, MPH, Associate Director of Operations for the Center for Multicultural and Community Affairs, who administers the tour. "The students will have a much more rewarding educational experience if they can become aware of the impact of community on individual health and illness and begin to understand the social determinants of health, especially for East Harlem residents."

The tour is offered through our Center for Multicultural and Community Affairs (CMCA), which has successfully expanded diversity among students and faculty. "Enhanced diversity has impacted our learning environment in tangible and intangible ways," says Gary C. Butts, MD, Director of the CMCA; Associate Dean for Diversity Programs, Policy and Community Affairs; and Associate Professor of Medical Education, Preventive Medicine, and Pediatrics. "It supports our community health curriculum and our students' cultural competence."

East Harlem has always epitomized the American melting pot. Over the years it has been a community of first settlement for Jews, Italians, Puerto Ricans and Dominicans, Central and South Americans, and African Americans.

Over 140 first-year students—accompanied by third- and fourth-year students, faculty, and East Harlem community partners—walk the neighborhood, eat local foods, and discuss the community's history and transformations. Among the tour's highlights is the Justo Botanica shop on East 104th Street, where, according to the *Times,* "everything from voodoo dolls to herbal remedies to healing candles are sold," demonstrating that alternative and culture-based healing practices can be strong—a critical insight for physicians to gain early.

"The diversity of our patients, communities, and clinical experiences not only shapes but indelibly imprints the kinds of doctors our students will become," says David Muller, MD, Marietta and Charles C. Morchand Chair in Medical Education and Dean for Medical Education. "Our patients' lives outside the hospital and clinic are not neatly tucked away. Patients typically do not have job security or adequate access to health care; many do not have family to advocate for them or the educational background and English-language skills needed to help them understand everything that's happening and all that they need to do."

"Illness, any illness, reveals how fragile their existence is and how much is at stake when they get sick," says Dr. Muller. "Caring for these most vulnerable patients is our students' highest priority. They owe their greatest debt to these patients, whose lives will mold them as physicians and define their role in society."

A Life-Changing Partnership: First-Year Students and Their Geriatric Patients

In September 2005, Rebecca Karp, a first-year medical student, walked into an Upper East Side apartment that would shape her career. As part of Mount Sinai's Seniors as Mentors (SAM) Program, Ms. Karp and another student began monitoring the care of a 92-year-old woman with dementia and heart disease.

The patient was unable to leave her home without assistance, and until she moved to a palliative care facility, she was cared for by her niece. During many visits over four years, Ms. Karp gained an understanding of complex geriatric care and of the logistics involved in

Mount Sinai rests on the fault line of two very diverse neighborhoods: East and Central Harlem (top) and the Upper East Side (below). Mount Sinai's ability to meet the needs of such different communities helped establish the institution as a leader in both patient care and medical education.

transitioning from home to a chronic care facility. Perhaps most of all, she developed a deep appreciation for the caregiver whose life revolved around the patient's.

Ms. Karp describes the experience as life-changing. "Before I began medical school, I had been an EMT (emergency medical technician) for a long time. I always thought I would become an emergency room doctor, but now I am going into internal medicine," Ms. Karp explains. "In getting to know this patient, I saw what longitudinal care was all about. It was wonderful to know the family and the community, and I was moved by the appreciation the patient and family felt for their primary care physician."

In 2008, the patient, with the help of her niece, made a special trip to Mount Sinai—to embrace Ms. Karp as she was inducted into the national Gold Humanism Honor Society. Selected by her peers for her compassion and dedication, Ms. Karp was among 19 Mount Sinai students to be inducted that year.

Over the past four years, SAM has matured into a program in which students function as junior members of a multidisciplinary medical team. It has also become our answer to a question that many medical educators have struggled with: how to integrate meaningful clinical care into the curriculum from the very start of medical school.

From Aquaintances to Advocates: Caring for the Chronically Ill

Out of SAM grew our Longitudinal Clinical Experience (LCE). In LCE, pairs of students begin caring for chronically ill patients within weeks of starting school, and they continue their close provider-patient relationships into the beginning of their third year.

Based on their own clinical interests, all of our students choose from a wide variety of physician-mentors—geriatricians, nephrologists, oncologists, internists, physiatrists, and transplant surgeons—and begin caring for patients from that mentor's practice. Over time, each student pair builds a small panel of patients, eventually caring for several chronically ill patients whom they will follow in the clinics, at home, and in the hospital. Each mentor works with three student pairs, keeping them abreast of every detail related to their patients. All six students and the faculty mentor meet regularly as a small practice to review increasingly sophisticated clinical assignments.

Blogs: Live Lessons in Real Time

MARCH 17, 2009 – 1:44 A.M.

"It's late and there is little to say. My patient Michael passed away last night from, as yet, unknown causes. I have not really managed to absorb the fact that Michael is gone. How can you? I am meeting his sister in the morning so perhaps it will be more apparent then? I can hear his voice as I spoke to him Friday afternoon."

SAM and LCE students, along with their faculty mentors, have access to patient-specific blogs that they can contribute to at any hour on any day. The blogs give students a dedicated space where they can describe visits with their SAM and LCE patients, discuss coursework, and reflect on their emotional experiences as junior physicians.

Through LCE, students learn to recognize the complexity of coordinating care for the chronically ill, and they witness the profound influence of a patient's home environment: safety hazards, personal habits that affect health, obstacles to physical activity, polypharmacy, and the importance of family. As part of a home visit, students catalogue each patient's medications to identify issues surrounding cost, compliance, and drug-drug interactions—and learn to appreciate the value of effective communication between physician and patient regarding medication management.

"From the start of medical school, our redesigned curriculum teaches the importance of teamwork—partnering with colleagues, patients, and families to improve the quality of care for all patients," explains Erica Friedman, MD, Associate Dean for Undergraduate Medical Education and Associate Professor of Medicine and of Medical Education.

Over time, students evolve from being acquaintances, to advocates, to active participants in their patients' care. "There are certain salient moments in your medical education, certain patients that you never forget, and for many students, LCE is that kind of experience," says Valerie Parkas, MD, LCE Course Director, who is also Associate Dean for Medical Admissions, and Associate Professor of Medicine (Infectious Diseases) and of Medical Education.

Titled **THE SPIRIT OF HARLEM,** *this mural is located at the heart of the neighborhood on the southeast corner of East 104th Street and Lexington Avenue.*
Photo: Gary H. Spielvogel

Blogs: Eye-Opening Experiences

"On first sight, you can't tell Mr. A apart from any other New Yorker you'd see in the street. His friendly demeanor and casual style hides the hardships he's been through in his life: drug and alcohol addiction, rehab, HIV, hepatitis, a liver transplant, and a host of other problems," writes one LCE blogger who met Mr. A as part of LCE in 2009. "He's also been through plenty of things you wouldn't find on a medical chart, such as losing touch with his family members, becoming estranged from his wife, and finding out that his loved ones are also HIV positive."

The blog post continues, "Despite all of this, Mr. A is now a happy man who, ironically, in many ways is an exemplary citizen. He wakes up early every day, regularly goes to church, exercises, and keeps all his appointments with his doctors. On a grander scale, our meetings with Mr. A have opened my eyes to the diversity of human experience. If it weren't for the LCE assignments, I would've never met someone like him, and probably wouldn't have believed that a man like him even existed. I feel like my mind has been opened beyond the bubble of experience that a typical 22-year-old student is in."

Visiting Doctors:
An Advanced Education in Patient Care, One Home Visit at a Time

What happens to patients who are too old and frail to visit their doctors? If they are Mount Sinai patients, their doctors—together with medical students—visit them at home.

Since 1995, our Visiting Doctors Program has brought high-quality medical care to the homes of people with complex and serious illnesses, including Parkinson's disease and Alzheimer's disease, stroke, emphysema, congestive heart failure, depression, cancer, and arthritis. It began with 23 patients and is now the largest physician home visiting program in the United States, serving more than 1,000 men and women throughout Manhattan—and serving as a model for similar programs around the country. In 2008, the program received the Society of General Internal Medicine's Clinical Practice Innovations Award.

Every Mount Sinai medical student and internal medicine resident participates in an intensive Visiting Doctors rotation. Home visits provide an opportunity for trainees to appreciate critically important, but typically invisible, aspects of a patient's life, such as family, poverty, and culture. The experience reinforces for our students the notion that as physicians, they must seek opportunities to exceed expectations in patient care. There are many underserved communities

of patients that fall through the cracks in the American health care system. Our students are trained to look for the greatest challenges and conquer them.

While Visiting Doctors was designed with two main goals—to provide expert care to homebound patients and to give future physicians a real-world perspective on medical care—many others benefit from this landmark program. In an article titled "House Calls: How Physicians Heal Themselves," the *New York Times* chronicled the story of a mother and daughter living in East Harlem. The mother suffered from Alzheimer's, had had several strokes, and was unable to leave home. Her daughter abandoned plans to go to college to care for her full time.

"The doctors cannot cure her disease, but they have treated her bedsores and prescribed medicine to ease her agitation and lower her blood pressure," the article explains. "[Visiting Doctors] also arranged for nursing aides, paid for by Medicaid." The additional help enabled the daughter to attend college, take a part-time job, and date.

"We aim to ensure the best quality of life for all patients for as long as possible in the setting that many patients prefer: their own home," says David Muller, MD, a co-founder of the Visiting Doctors Program and Dean for Medical Education. In 2009, Dr. Muller was one of only four physicians in the U.S. to receive the Pride in the Profession Award from the American Medical Association (AMA) Foundation.

"Everyone deserves not just adequate health care, but the very best health care has to offer," says Theresa A. Soriano, MD, MPH, Director of the Visiting Doctors Program and Assistant Professor of Medicine (General Internal Medicine). "We want to help our neighbors live long, healthy, and independent lives, and that is our goal when we show up at the door."

East Harlem Health Outreach Partnership:
A Neighborhood Clinic, a National Model

In the summer of 2000, a group of first- and second-year students came together to explore ways in which they could better serve Mount Sinai's neighbors in East Harlem. The need is great: the rates of HIV diagnoses and people living with HIV/AIDS are more than double those of New York City overall. Six out of 10 adults in East Harlem are overweight or obese, and diabetes is four times more prevalent there than it is in the Upper East Side, which also borders Mount Sinai.

Top: David C. Thomas, MD, Medical Director for the student-run East Harlem Health Outreach Partnership (EHHOP) (center) talks with students during a Saturday-morning clinic.
Bottom: Students discuss a case at EHHOP.

Many of East Harlem's residents use the emergency department for episodic care when they have symptoms of illness or when they confront medical crises; even more forego care altogether. Against this backdrop, the East Harlem Health Outreach Partnership (EHHOP) has grown to become one of the most successful student-run free clinics in the nation. Over 80 percent of our students volunteer their time to staff the clinic, which is open every Saturday in Mount Sinai's Internal Medicine Associates building.

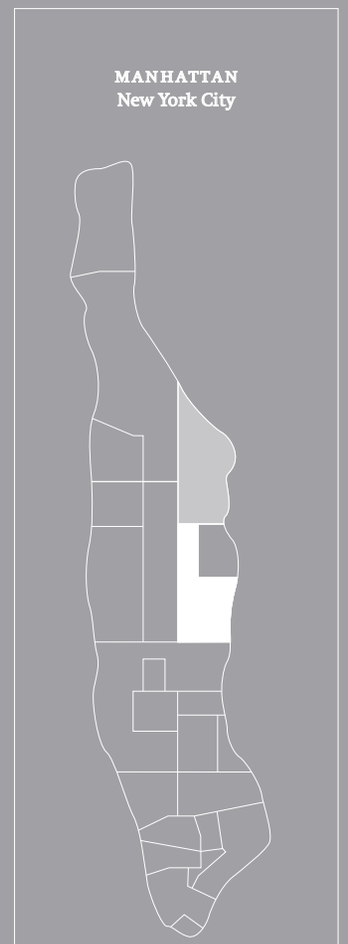
Together with supervising faculty, social workers, nutritionists, and community leaders, shifts of 15 students collaborate to address the complex health care needs of East Harlem's uninsured, providing health screenings, laboratory tests, social work counseling, and prescriptions.

Students are paired with patients and supervised jointly by Teaching Seniors and faculty. Teaching Seniors are a group of 14 highly accomplished senior medical students recruited because of their interest in honing their teaching skills in an active clinic setting. They train newer students in the medical management of patients, the socioeconomic barriers to effective management, and the ethical quandaries in caring for the medically underserved.

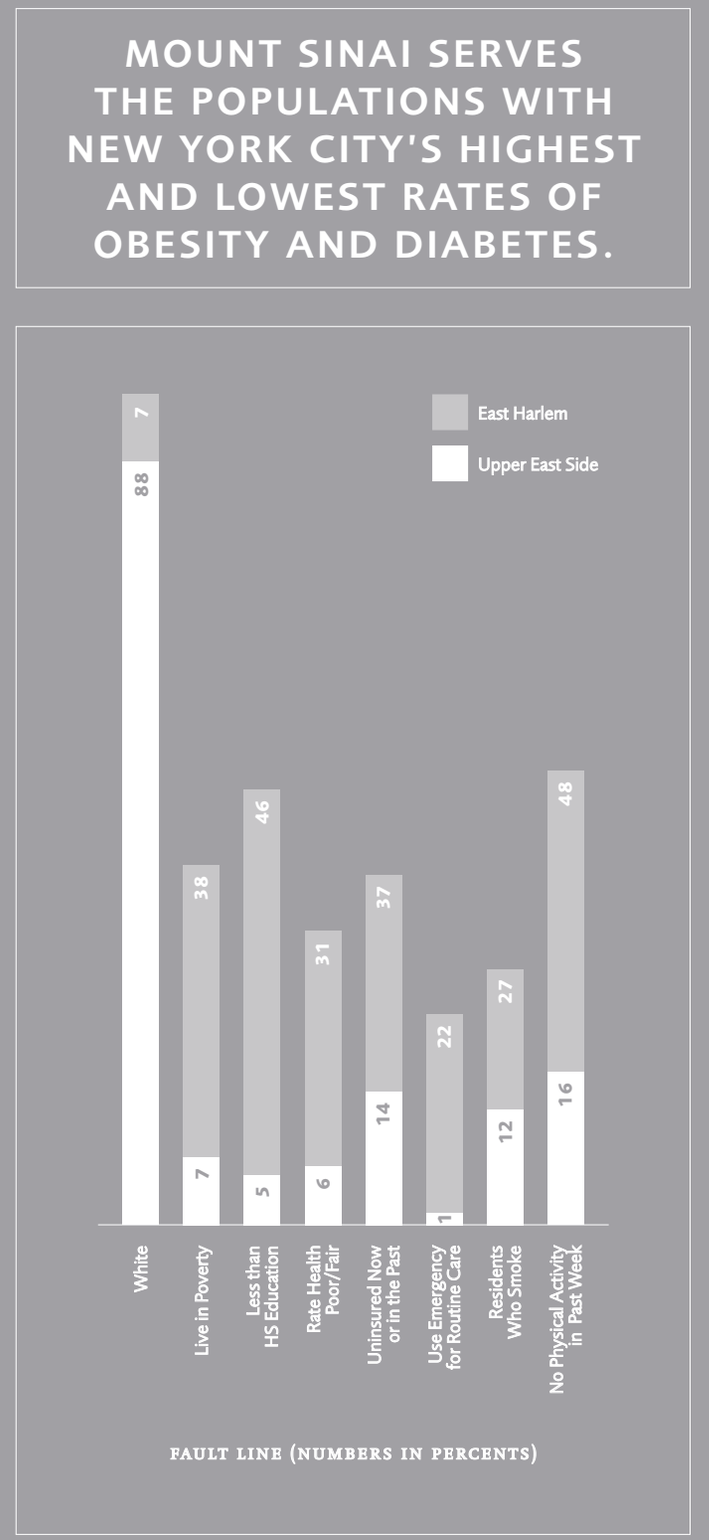
"In addition to providing much-needed medical care, EHHOP trains students to be lifelong advocates and leaders in health care for the poor and underserved," says Yasmin S. Meah, MD, Assistant Professor of Medical Education and Medicine, who with David C. Thomas, MD, Associate Professor of Medicine (General Internal Medicine) and Rehabilitation, is Faculty Leader of EHHOP. "It allows our students to deliver longitudinal care to chronically ill, uninsured patients, sparing them the devastating effects of neglected acute and chronic medical and psychiatric illness."

The benefits of EHHOP are evident. "There are no knee-jerk responses. When you're so conscious of the limitation of resources, that's where translational science or the science of medicine becomes very rigorous," says Dr. Meah, who, in 2007, received the Humanism in Medicine Award from the Association of American Medical Colleges (AAMC). "I think the misconception is that there is not scientific rigor because we don't have resources. I would argue that it's the opposite: because we're limited, we're much more conscious of what's evidence based, both in the literature and for our population."

The clinic compared its parameters of diabetes care with state and national standards, and beat them on multiple values. A forthcoming



MOUNT SINAI SERVES THE POPULATIONS WITH NEW YORK CITY'S HIGHEST AND LOWEST RATES OF OBESITY AND DIABETES.



publication documents how EHHOP patients were more likely to have consistent monitoring of hemoglobin A1c levels and to have undergone retinopathy screening compared with national and statewide Medicaid averages.

"Being free doesn't mean being substandard. We've actually proven that we've been providing better, more evidence-based care than a typical facility," says Dr. Meah.

In 2008, EHHOP also began paying for many specialist referrals, a step that has greatly improved patient access to advanced care. Payments are on a sliding fee scale, with most patients in the lowest tier. The referral network comprises the outpatient clinics in each department of The Mount Sinai Medical Center. The top five referrals were Radiology (44 percent), Ophthalmology (35 percent), Obstetrics-Gynecology (20 percent), Gastroenterology (19 percent), and Urology (8 percent).

"EHHOP trains students to be lifelong advocates and leaders in health care for the poor and underserved."

Reaching Beyond East Harlem

In 2006, EHHOP hosted the first national conference on student-run free clinics, with over 150 students from more than 25 schools participating. The clinic has twice received the AAMC's Caring for Communities grant, which provides four years of funding, and in 2007, the program was a Presidential Community Service Honor Roll Finalist. Nicholas Meo, a third-year medical student who was the 2008–09 student co-chair of EHHOP, received a Leadership Award from the AMA Foundation.

The Institute for Medical Education

"The rewards from investing in our faculty will come back to our students, our institution, and ultimately, our patients."

Any school is only as good as its educators. Recognizing this, in 2001 Mount Sinai launched the Institute for Medical Education (IME) and became one of the first U.S. medical schools to join the national movement to develop academies for educational excellence. The IME is now one of 14 institutes dedicated to advancing translational research and education at Mount Sinai.

"The rewards from investing in our faculty will come back to our students, our institution, and ultimately, our patients," says Lisa Coplit, MD, Director of the IME, and Assistant Professor of Medicine (General Internal Medicine) and Medical Education. "It is very much in the spirit of our focus on collegiality and collaboration as we work toward the common goal of training the best physicians and scientists." All faculty can participate, with more advanced IME membership levels reserved for teaching faculty who demonstrate excellence in education and continuously support and sustain the IME's work.

Programs include Medical Education Grand Rounds, a faculty development workshop series, and an interdisciplinary resident-as-teacher curriculum that has been adopted at other institutions. An annual Education Research Day continues to encourage the best of curriculum and research design, and yearly teaching awards honor the educators who make substantive impacts on our students.

IME also organizes the annual Educational Leadership Conference, a faculty development retreat for educational leaders of the Mount Sinai School of Medicine Educational Consortium, which includes other regional medical schools. Participants are medical and graduate school course directors, clinical clerkship directors, deans, and residency program directors. It is an ideal forum for faculty to address challenges, exchange ideas, and collaborate.

Student Leaders, National Networks

In addition to fostering relationships and learning opportunities for educators, Mount Sinai has served as a role model for collaboration and leadership among student organizations. In recent years, an increasing number of our students have taken regional and national leadership roles in organizations such as the American Medical Student Association (AMSA), Physicians for Social Responsibility (PSR), and the American Physician Scientists Association (APSA).

APSA is a national student organization dedicated to meeting the mentorship, networking, outreach, advocacy, and career development needs of future physician-scientists. Two years ago, David Braun, a third-year MD/PhD student who is now APSA President-elect, founded and chaired the New York Physician Scientists Symposium, which was held at Mount Sinai. In the first year, over 130 participants from 25 institutions attended, and the next year attendance nearly doubled to include 250 students from more than 45 institutions.

"By bringing people together so early in their medical careers, the symposia are making a seminal contribution to fulfilling the mission of APSA throughout the United States," says Lisa M. Satlin, MD, Associate Dean for Graduate Education in Translational Research, Professor of Pediatrics and Medicine (Nephrology), and Director of the Medical Scientist Training Program.

Collaboration is central to Mount Sinai's approach to education, whether it is training on a cadaver or a simulator. Here, students listen as an instructor discusses a simulation case.

Mentoring
A Model for Humanity

"The most sacred act in Anatomy is the laying on of hands. This is one of the single most important things that a physician can do. Indeed, the thing that distinguishes physicians from everybody else in the world is that they are empowered to touch another human being."

Jeffrey T. Laitman, PhD, Distinguished Professor of Medical Education and Director of Anatomy and Functional Morphology

The "First Patient" Teaches Essential Lessons

On the first day of Anatomy, students meet and touch the people whom Dr. Laitman calls "their first patients," the cadavers they are entrusted to treat as respectfully and thoughtfully as they will their living patients.

The laying on of hands has been a rite of passage during the 32 years that Dr. Laitman has taught Anatomy at Mount Sinai, but the course itself has evolved more rapidly than any other. "It takes a village to teach Anatomy," Dr. Laitman explains. More than 70 people from 16 departments are involved in team teaching this first-year course.

World-renowned physicians and scientists bring cutting-edge medical technology to class. Students first view a liver through a laparoscope—rather than as a whole organ, within or removed from a body—and they see a heart via ultrasound, because these are the ways physicians first examine these organs in clinical practice. In surface anatomy, Yasuharu Okuda, MD, Assistant Clinical Professor of Emergency Medicine and Medical Education, demonstrates the importance of anatomic surface structures in relation to their underlying organs by performing emergency procedures, such as placing chest tubes and ultrasound-guided central lines, on cadavers.

A Computed Tomography Library Records Every Dissection: A First for Any Medical School

In 2008, Mount Sinai became the first medical school to create a reconstructed-CT (computed tomography) library of every cadaver used in

the course, a tremendous undertaking that no other institution has replicated. “Dissections are, by nature, destructive, but this library enables students to go back and review images that would otherwise be impossible to view, such as the minor cranial foramina or a view of air spaces in the lungs and the sinuses,” explains Dr. Laitman.

At most medical schools, competence in anatomy is assessed by multiple-choice and practical exams that require students to identify parts of the body that are marked by pins. Mount Sinai has a novel approach to assessment, evaluating students’ competencies through team table conferences. Students work in teams learning and teaching each other anatomy, and faculty periodically ask student teams to demonstrate their knowledge, build on each other’s input, and receive a single grade for their group performance.

“Physicians must learn to work together as a team,” says Dr. Laitman. “When students complete our course, they know what they need to know, but they have also learned even more valuable lessons about the potency of science and the importance of teamwork.”

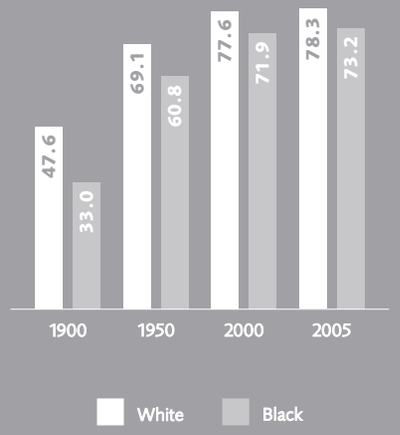
In many Mount Sinai courses, students provide and receive feedback on their own and their peers’ performance in teams throughout the year. Implementing this 360-degree feedback from the very start of medical school trains students to function seamlessly on the many clinical teams they will join during their clerkships.

Living Anatomy

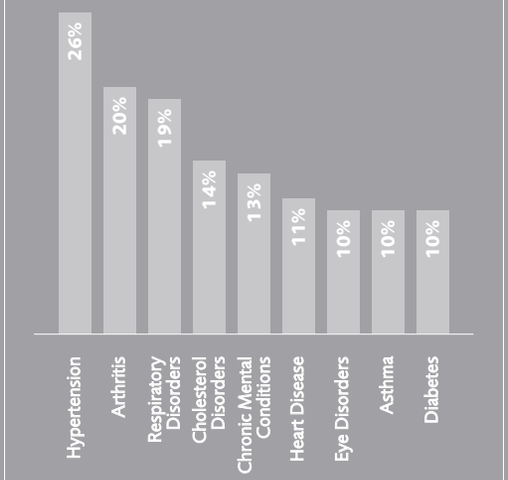
In 2004, two first-year students, Stephanie Pieczenik Marango and Carrie McCulloch, took their yoga and Pilates expertise to a new level. As certified instructors in these arts, they felt that the teaching of the musculoskeletal system could be reinforced through yoga and Pilates–giving students the benefit of relaxation while learning the functional anatomy. Their approach was a huge success, and it evolved into Mount Sinai’s award-winning Living Anatomy Project, which has received considerable press coverage, won national awards, and earned grants from national societies to be presented at meetings. Now, the project has developed into the forthcoming book *Gray’s Anatomy for Fitness Professionals,* authored by Drs. Pieczenik Marango, McCulloch, and Laitman, along with Matt McCulloch, Dr. McCulloch’s husband and a noted Pilates educator.

Top: Joy Reidenberg, PhD, Associate Professor of Medical Education (left), conducts comparative anatomy research that has been covered by National Geographic and the Discovery Channel.
Bottom: Max Levitan, PhD, Professor of Anatomy and Functional Morphology and of Genetics and Genomic Sciences (center) mentors students in an anatomy lab.
Photos: Alice Attie

PALLIATIVE CARE IS NOT DEPENDENT ON PROGNOSIS. THE ULTIMATE GOAL: TO IMPROVE QUALITY OF LIFE.



LIFE EXPECTANCY AT BIRTH
(BOTH SEXES)

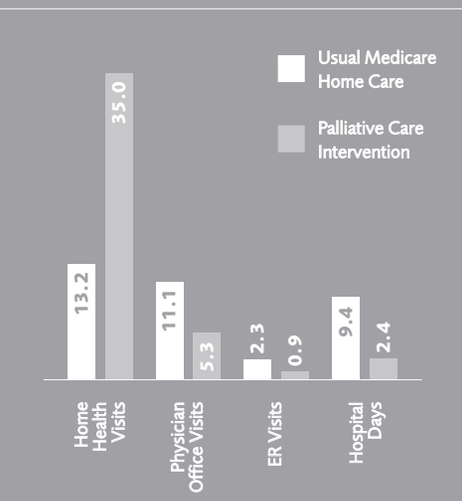


133 MIILION PEOPLE,
ALMOST HALF THE U.S. POPULATION,
LIVE WITH A CHRONIC CONDITION

PALLIATIVE CARE
REDUCES HOSPITAL COSTS

$1,506
per Admission

$5,248
per ICU Admission



PALLIATIVE HOME CARE REDUCES THE
NEED FOR HIGHER-COST MEDICAL CARE

The Palliative Care Rotation:
A Case for Comfort

In 2006, Mount Sinai School of Medicine became the first in the nation to require a clinical palliative care rotation for all third-year students. This important rotation prepares them to meet the needs of an aging population living with serious illness and struggling with a fragmented, confusing health care system.

"Palliative care applies to anyone facing the debilitating effects of a serious illness, regardless of prognosis," says Diane E. Meier, MD, the Catherine Gaisman Professor of Medical Ethics, Director of the Hertzberg Palliative Care Institute in the Brookdale Department of Geriatrics and Adult Development, and Director of the Center to Advance Palliative Care. "An artificial dichotomy exists in our health care system: cure versus comfort. In fact, most people living with advanced illness require both life-prolonging and palliative treatments at the same time."

Students complete the palliative care bedside rotation as part of a 12-week Integrated Internal Medicine-Geriatrics Clerkship—a departure from classroom-based instruction offered at other medical schools.

Established in 1982, Mount Sinai's Brookdale Department of Geriatrics and Adult Development was the first Department of Geriatrics at a U.S. medical school. "We saw where the nation was heading in terms of aging and illness and recognized that geriatrics needed formal study and practice," says Dr. Meier, a pioneer in the field who was named a MacArthur Fellow in 2008. Known as "genius grants," these fellowships are given to only 25 individuals per year who exemplify extraordinary leadership and creativity. She also received the 2009 Clinical Excellence Award at the fourth annual Castle Connolly Medical Ltd. National Physician of the Year Awards.

"Our program and similar programs nationwide can trace their roots and success to the strategies established by the Brookdale Department of Geriatrics and Adult Development," says Dr. Meier.

Research conducted by R. Sean Morrison, MD, Vice Chair for Research in the Department of Geriatrics and Adult Development and the Hermann Merkin Professor of Palliative Care, has shown that hospitals can save nearly $300 per day per patient in direct costs by providing better care to seriously ill patients.

"Despite enormous expenditures, patients still get uncoordinated care and endure poorly managed pain," says Dr. Morrison, who is also Director of the National Palliative Care Research Center.

Competency-Based Education

"We care a lot about training students who will be excellent clinicians, scientific thinkers, and at the same time, humanists," explains Peter Gliatto, MD, Assistant Professor of Medicine (General Internal Medicine) and Medical Education. Our competency-based educational approach, combined with many strong mentoring programs, supports this goal.

Some students enter medical school with a comprehensive science background, and others are more accomplished in the humanities. "We want all students to develop in all areas, and the best way to do that is to let them progress at their own pace," says Dr. Gliatto, co-chair of the competencies committee.

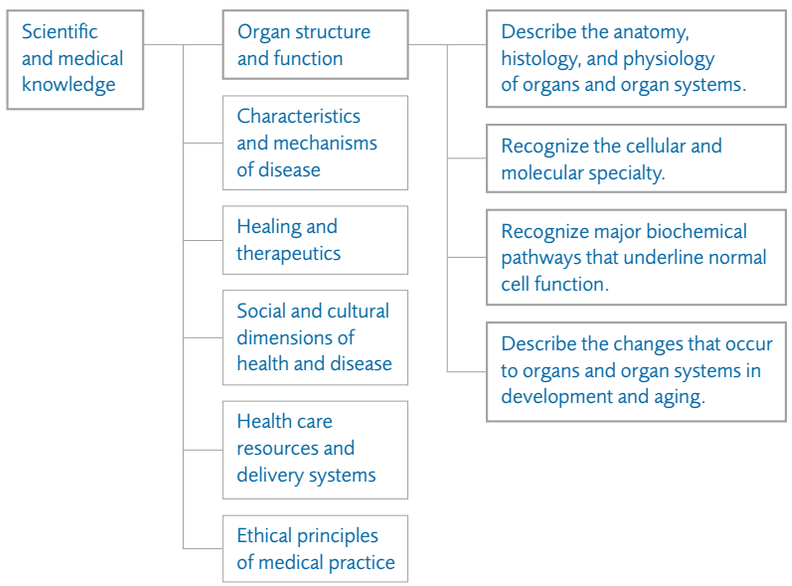
A dramatic departure from the traditional medical school model, competency-based education outlines the essential skills, knowledge, and attributes that define the Mount Sinai physician. Students will be required to demonstrate mastery in four competency areas, but in many instances they will be able to do so in different ways and at their own rates. Our areas are: Patient Care, Scientific and Medical Knowledge, Learning Scholarship and Collaboration, and Professionalism and Advocacy.

Our competency framework will help integrate the learning of foundational science and clinical medicine. It allows advanced students to create personalized opportunities for advanced training and for scholarship.

We are also in the process of aligning our competencies and curriculum integration with the recently published AAMC-Howard Hughes Medical Institute report *Scientific Foundations for Future Physicians*. This groundbreaking work will finally allow medical schools and premedical programs to provide tomorrow's doctors with a more flexible and sensible preparation for a life of practice, research, and continuous learning.

Defining the Tiers

An example of one of our four competency areas, Scientific and Medical Knowledge, and the essential skills and behaviors associated with this area. For our complete competencies framework, please visit www.mssm.edu/CompetenciesFramework.



"We want all students to develop in all areas, and the best way to do that is to let them progress at their own pace."

Academic and Student Affairs: Maximizing Potential

This integrated approach to teaching is further supported by the work of our Academic and Student Affairs (ASA) team. ASA faculty are expert clinician-educators and clinician-scientists who are also accomplished in other fields: social justice, art history, photography, and more.

Among them are Dr. Meah, who oversees EHHOP (see page 14) and cultivates interests in contemporary and medieval art, art history, and 20th-century design. Ana T. Blohm, MD, Assistant Professor of Medicine (General Internal Medicine), is also a photographer whose work has been exhibited at Harvard University's Art Forum and at New York University Medical Center's Smilow Gallery.

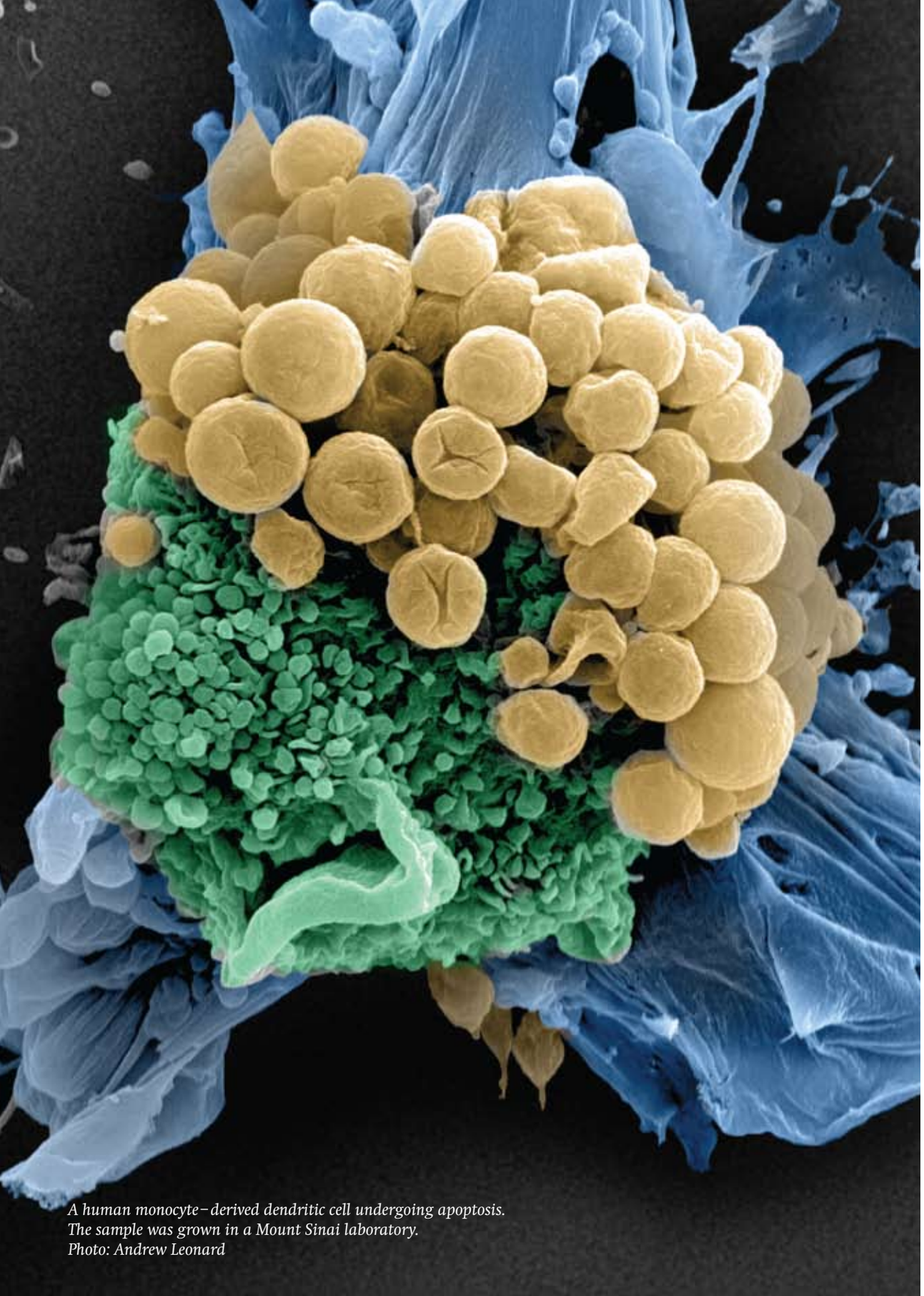
Craig L. Katz, MD, Assistant Clinical Professor of Psychiatry, co-founded Disaster Psychiatry Outreach, an organization that coordinates psychiatric care in the aftermath of disasters. He helped develop and direct a long-term mental health program at Mount Sinai for 9/11 responders, an effort that has evaluated thousands since 2002. Dr. Katz also founded and directs the Mount Sinai Fellowship in Global Mental Health as part of the Mount Sinai Global Health Center (see page 35).

Goutham Narla, MD, Assistant Professor of Medicine, Genetics and Genomic Sciences, is the Director of Physician Scientist Training for the Medicine Residency Program and was recently awarded a Howard Hughes Medical Institute grant to continue his work on the molecular mechanisms underlying cancer metastasis.

All ASA faculty work with students from matriculation to commencement to monitor academic progress, identify research mentors, provide career counseling, and nurture interests outside of medicine.

"ASA faculty exemplify outstanding achievement and work-life balance, and they help students attain both for themselves," says Suzanne Rose, MD, Associate Dean for Academic and Student Affairs and Chair of the Group on Educational Affairs for the AAMC. "We believe that students who are exposed to a collaborative and collegial environment, one that respects them and pays careful attention to their learning and well-being, are more likely to have a deeper reservoir of respect, altruism, and compassion for their patients."

Our Longitudinal Clinical Experience (see page 10), Visiting Doctors Program (see page 13), East Harlem Health Outreach Partnership (see page 14), and INSPIRE (see page 32) all have strong mentoring components that help students develop as physicians and scientists.



A human monocyte–derived dendritic cell undergoing apoptosis. The sample was grown in a Mount Sinai laboratory. Photo: Andrew Leonard

Vision

Innovation and Discovery

"Future physicians will routinely diagnose a patient's genetic risk and tailor treatments based on genotype for a broad range of conditions. These skills will rest on a strong foundation of translational science that begins immediately upon matriculation at Mount Sinai."

Dennis S. Charney, MD, Anne and Joel Ehrenkranz Dean of Mount Sinai School of Medicine

Molecules and Cells: The Science of Disease

"Advanced studies in genetics, pharmacology, toxicology, and the pathogenesis of disease all require a strong understanding of molecular and cellular structure and function," says Robert J. Desnick, MD, PhD, Dean for Genome-Based Research, and Professor and Chair of the Department of Genetics and Genomic Sciences.

The Molecules and Cells (M&C) course is designed to show how biochemistry, cell biology, molecular biology, and metabolism are applied to health and disease. The course lays the groundwork for appreciating the role of science in caring for patients and curing disease.

"Systems biology looks at molecules that come together to form whole cells or whole tissues," explains Ravi Iyengar, PhD, Director of the Experimental Therapeutics Institute, and Professor and Chair of Pharmacology and Systems Therapeutics. "Our students learn to look at whole patients in order to become more humanistic doctors. The processes are actually the same thing on different scales."

Mount Sinai students are taught and mentored by the same faculty whose research is helping to build the foundation for personalized medicine. "As we get a better handle on the biological bases of both disease and therapy, students—especially students who are going to be involved in specialty or tertiary care—will need to think of each patient as an individual," says Dr. Iyengar, who is also Director of the Systems Biology Center New York. "Ninety percent of that individual's attributes will be shared and similar to others, but 10 percent will be unique because of the patient's genomics and lifestyle. How

these differences and similarities come together to make an individual patient is where systems biology and personalized medicine come together. This way of thinking has to come from what you learn in medical school."

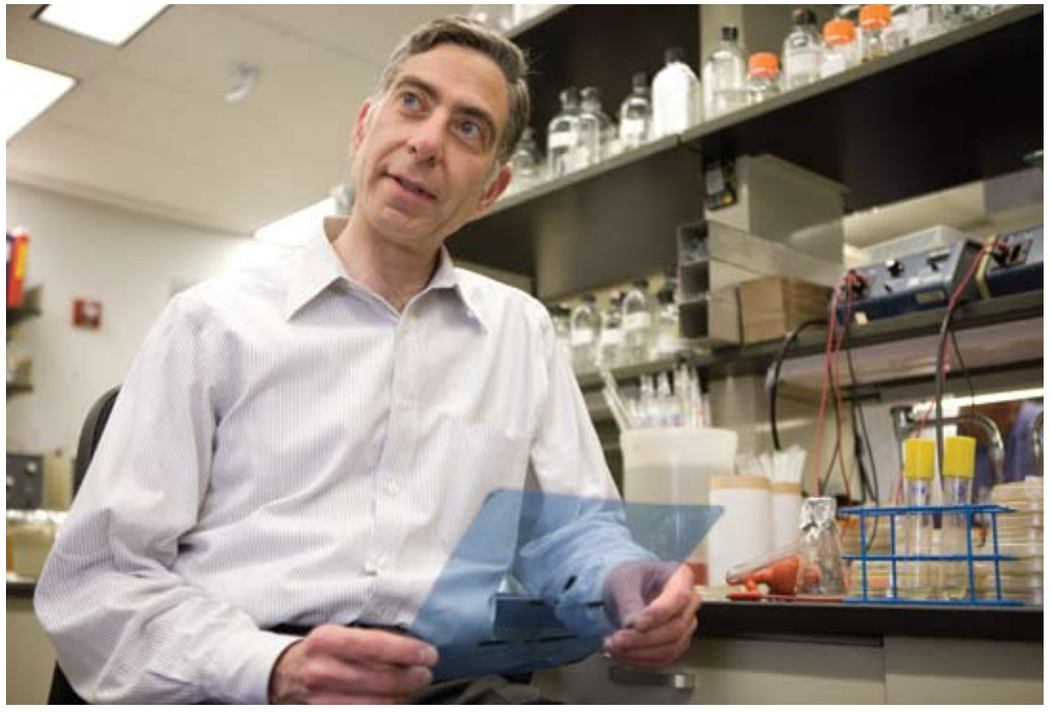
Every day, our researchers are working to unravel the complexities of many genetic, autoimmune, metabolic, developmental, and neurodegenerative disorders. Early exposure to emerging diagnostic tools and treatments puts the Mount Sinai student on the forefront of developing and delivering new standards of care.

"We are taking what we discover in the lab, from understanding who might be at risk of diabetic nephropathy to predicting which patients with hepatitis C will develop liver scarring, to better meet the needs of our patients," says Erwin P. Bottinger, MD, Director of the Charles R. Bronfman Institute for Personalized Medicine and the Dr. Arthur M. Fishberg Professor of Medicine (Nephrology) and of Pharmacology and Systems Therapeutics.

In addition to integrating various areas of basic science, M&C bridges the divide between science and clinical care. Each week, teams of students meet with faculty physicians–and often their patients–to discuss the clinical applications of scientific topics that are presented in the course. For example, when discussing the role of the chloride channel, students meet a patient with cystic fibrosis and discuss the mechanisms of the disease and potential research avenues for new treatments.

"We've found that early in medical education is the best time to begin the doctor-patient dialogue and connect it to the science students will be using as physicians and researchers," says David H. Bechhofer, PhD, Professor of Pharmacology and Systems Therapeutics and of Medical Education, who designed Molecules and Cells in 2000 and has overseen its transformation.

The early start also gives students the time needed to integrate vast amounts of information and experiential learning. "I've been practicing medicine since 1975, and the routine things that are happening now were things you could not even envision at that time," says Eric A. Rose, MD, the Edmond A. Guggenheim Professor and Chair of Health Evidence and Policy, and Professor of Cardiothoracic Surgery, Surgery, and Medicine (Cardiology). "In light of the explosive growth of knowledge in the field compared with what we experienced, and the caliber of today's students, there's no question they are going to provide a better level of medical care and do a better level of research than we're doing now."



Top: David H. Bechhofer, PhD, Professor of Pharmacology and Systems Therapeutics and of Medical Education, designed the Molecules and Cells course.
Bottom: World-renowned surgeon and scientist Eric A. Rose, MD, is the Edmond A. Guggenheim Professor and Chairman of Mount Sinai's Department of Health Evidence and Policy.

The Excitement of Original Science

When Alexandra Snyder was playing cello as a history major and music minor in college, she could never have imagined being the lead author on a paper titled "Murine models of Vpr-mediated pathogenesis" published in the journal *Current HIV Research* in March 2009. Now a fourth-year student, she has designed and executed studies to understand how HIV kills kidney cells.

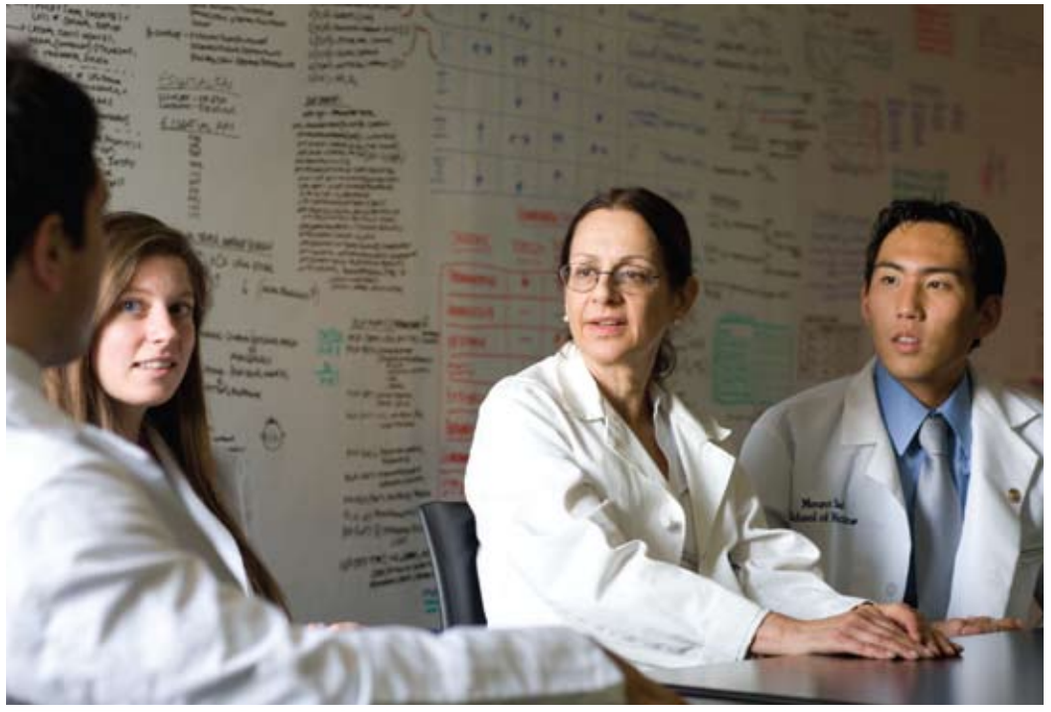
Ms. Snyder owes her research success to the wide variety of opportunities for scholarship at Mount Sinai. One-quarter of our students add a fifth year to medical school in order to complete a substantive research project. Many of these scholars take advantage of funding and mentorship through our Doris Duke Clinical Research Fellowship program—one of only 12 in the nation—and compete successfully for Fogarty, Howard Hughes, and other stipends. However, not all students can secure the time and resources for a dedicated research year. To give a greater number of students the opportunity to conduct strongly mentored independent research, Mount Sinai developed INSPIRE.

INSPIRE
Supporting Scholarship

INSPIRE—the Individual Scholarly Project and Independent Research Experience—is a new fourth-year program that provides students with several months of protected time to undertake meaningful scholarship without delaying training for a year. Ms. Snyder was able to take advantage of a scholarly year supported by the Howard Hughes Medical Institute, and INSPIRE.

"Independent research helps students develop new ideas, test hypotheses, and investigate diseases they see in their patients," says Karen Zier, PhD, Associate Dean for Medical Student Research and Professor of Medicine (Clinical Immunology) and Co-Director of INSPIRE. "Students often come to me with research interests that need to be shaped and mentored. One of the things I tell them is that when you are looking for a mentor at Mount Sinai, the answer here is always yes."

Since her first year of medical school, Ms. Snyder, who matriculated in our Humanities and Medicine program (see page 41), has worked in the lab of Paul E. Klotman, MD, Chair of the Samuel Bronfman Department of Medicine and Murray M. Rosenberg Professor of Medicine, and Michael J. Ross, MD, Assistant Professor of Medicine (Nephrology).



Top: Karen Zier, PhD (second from right), Associate Dean for Medical Student Research and Professor of Medicine (Clinical Immunology), helped create and now co-directs the Individual Scholarly Project and Independent Research Experience (INSPIRE).
Bottom: Applying benchside discoveries toward improving patient care.

Adolfo García-Sastre, PhD, whose laboratory investigates influenza, innate immunity, emerging viruses, and vaccines, examines a laboratory test for the titration of influenza virus.

Legacy
A Global Impact

"Infectious diseases live in a world without borders, posing local and global public health threats. How we and the international community respond to these threats is critical and supports the emerging dogma of one world, one health."

Adolfo García-Sastre, PhD, Co-Director of the Global Health and Emerging Pathogens Institute and Principal Investigator of the Center for Research on Influenza Pathogenesis at Mount Sinai

One World, One Health

"In just the past two decades, the world has faced numerous global epidemics: HIV, SARS, bioterrorism with anthrax, resurgent malaria, cholera, multi-drug resistant tuberculosis, and now zoonotic influenza strains," says Daniel S. Caplivski, MD, Assistant Professor of Medicine (Infectious Diseases). "Microbiology is regularly front-page news, and our students have a greater curiosity and interest than ever."

Physicians are the front line of defense against emerging infections, and ours are at the forefront of discoveries—from elucidating disease mechanisms to developing potential vaccines—around influenza, HIV, and more. These modern-day advances rest on a legacy of Mount Sinai physicians who have described many clinically complex conditions, including Crohn's disease, Churg-Strauss disease, and Brill's disease.

Medical Microbiology, a first-year course, complements this institution's core strength in this area. It integrates immunology, microbiology, and infectious disease, bridging the basic sciences and their clinical applications. Physician-scientists teach an approach to disease that requires understanding the role of the human immune response to infectious agents in preventing and causing disease.

"The virologist and the immunologist bring their expertise to bear on the molecular and host levels to understand pathogenesis of infectious diseases that are recognized by our clinicians," explains Mary E. Klotman, MD, Co-Director of the Global Health and Emerging Pathogens Institute (GHEPI) and Chief of the Division of Infectious Dis-

eases. “They study the pathogen and the host response to the pathogen to understand why outcomes may differ among individuals,” she says. Dr. Klotman teaches the basic biology and clinical implications of HIV to first-year students, and she teaches third- and fourth-year clinical clerks about the scientific basis for approaches to treatment.

Dr. Caplivski explains, “The hospital is really our greatest textbook, and we strive to bring our students to patients’ bedsides from the first year so that they see the application of the concepts we are teaching in microbiology. One of my favorite experiences is watching students’ faces when they make the conceptual connection between patients in the ICU and the pathogens we review in the clinical lab.” Dr. Caplivski co-directs Medical Microbiology with Roberto Posada, MD, Assistant Professor of Pediatrics (Infectious Diseases).

Students trained here are surrounded by researchers who have changed the landscape of science and medicine. Peter Palese, PhD, the Horace W. Goldsmith Professor and Chair of Microbiology; Dr. García-Sastre; and their colleagues reconstructed the devastating 1918 influenza virus, confirmed its virulence, and showed that it was sensitive to currently available antiviral agents such as Tamiflu.

Their work was named Paper of the Year in 2005 by *The Lancet,* and their reverse genetics technique paved the way for influenza vaccine development. Says Dr. Palese, “The goal is to train the next generation of physicians to be more proactive and less reactive to these emerging infections. We also recognize that when it comes to infectious agents, Nature will always be in control, so we cannot afford to fall behind.”

Mount Sinai provides students with the opportunity to work in communities like Elmhurst, Queens, the most ethnically diverse zip code in the nation. Our students rotate at Elmhurst Hospital Center, where over 150 languages are spoken and patients routinely arrive with infectious diseases and very advanced stages of chronic illness usually seen only in developing countries.

Global Exchanges

From Argentina to Uganda, East Harlem to India, Mount Sinai works to improve the health of underserved populations by training tomorrow’s leaders in global health.

Through the Global Health Center (GHC), students have collaborated with host-country partners to:

Top: Peter Palese, PhD, the Horace W. Goldsmith Professor and Chairman of Microbiology
Bottom: Mary E. Klotman, MD, Co-Director of the Global Health and Emerging Pathogens Institute and Chief of the Division of Infectious Diseases.

- Organize community education programs on HIV and malaria in rural Tanzania,
- Establish trauma surveillance systems in Honduras,
- Investigate rates and causes of anemia and newborn deaths in rural India, and
- Prevent lead poisoning in school children in Uganda.

Founded in 2005, the Center, part of GHEPI, formalized an already deep commitment to community health worldwide. GHC continues a legacy of working closely with domestic and international partners to provide educational exchanges, collaborative research, training, and public health projects. GHC emphasizes the importance of well-designed research, evidence-based practice, and interventions that empower communities to produce lasting, positive change.

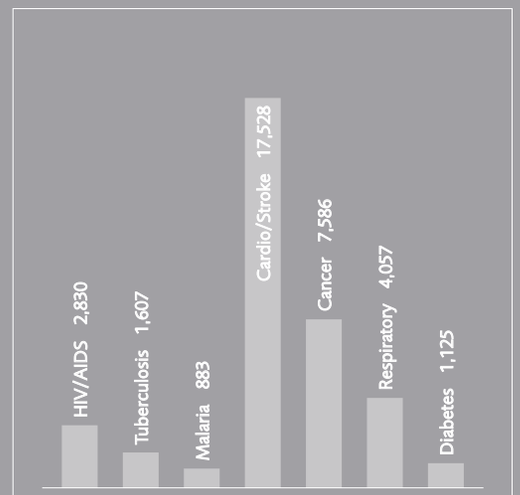
"At each site we aim to ensure that research is followed by action," says Natasha Anu Anandaraja, MD, GHC Co-Director and Assistant Professor of Medical Education and of Pediatrics. For example, in 2008, a student spent eight weeks in rural India talking to families about newborn death. "Surprisingly, she found that most infant deaths were caused by prematurity and low birth weight rather than by infection, as was previously suspected," Dr. Anandaraja explains. Based on these findings, two students are returning to the community to work with a local agency to train village health workers in skin-to-skin care between mothers and newborns, a practice that has been shown to reduce deaths due to low birth weight and prematurity.

In rural Tanzania, successive teams of Mount Sinai students have worked to lower malaria rates through community education and distribution of insecticide-treated bed nets (ITNs). The Tanzanian government recently decided to establish an ITN distribution program, and our students will collaborate with local health teams to evaluate program effectiveness by documenting malaria prevalence before and after ITNs are distributed.

GHC touches all medical students, bringing global health education into the core curriculum. For students committed to working with underserved communities, GHC offers global health electives, seminars, and workshops. The Center also coordinates a global health track with the Master of Public Health Program, and offers an interdisciplinary global health residency track in Pediatrics, Internal Medicine, Emergency Medicine, Obstetrics-Gynecology, and Psychiatry.

"Cardiovascular disease is the leading cause of death, and a major cause of permanent disability, worldwide."

Valentin Fuster, MD, PhD
Director, Mount Sinai Heart



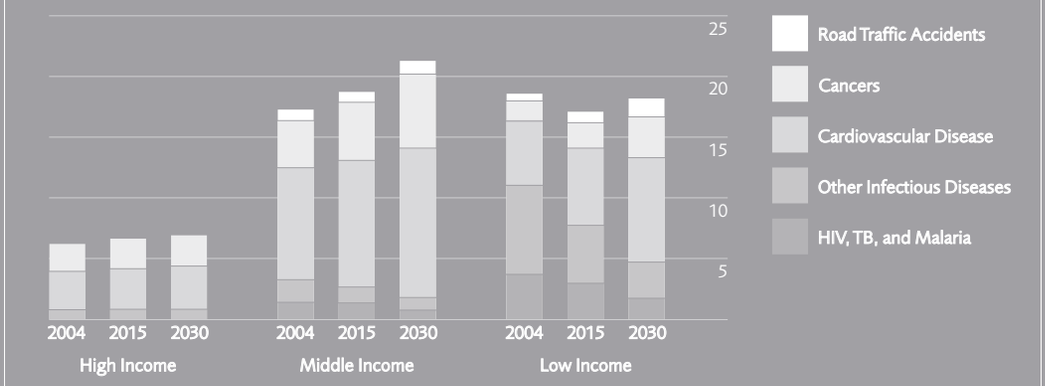
GLOBAL DEATHS, 2005 (NUMBERS X 1,000)

54%
GLOBAL STROKES, 2008

47%
GLOBAL HEART DISEASE, 2008

BURDEN OF HYPERTENSION

About half of this global burden is in people with hypertension.



PROJECTED DEATHS BY CAUSE FOR HIGH-, MIDDLE- AND LOW-INCOME COUNTRIES (DEATHS IN MILLIONS)
Data from World Health Organization's *World Health Statistics 2008*

"Mount Sinai has imbued values in me that have proven priceless in both patient care and global health work: mutual respect, cultural exchange, thoughtful compassion, and scholarly collaboration," says Jonathan Goldfinger, a fourth-year student who worked with Mount Sinai and local faculty to establish a trauma surveillance system at a public hospital in San Pedro Sula, Honduras.

Teaching the Next Generation

For Ramon Murphy, MD, MPH, seeing the source of the Nile was spectacular, for many reasons.

"I'm standing by one of the most historic rivers in the world, and in the neighboring capital city of Kampala, Uganda, is a deep pit of toxic waste," says Dr. Murphy, GHC co-founder and Clinical Professor of Pediatrics and Preventive Medicine. "This waste is draining lead and other hazardous materials into the local drinking water."

The toxic waste is why Dr. Murphy and Roy Brown, MD, MPH, Adjunct Professor of Pediatrics and Preventive Medicine, were invited by the Makerere University School of Medicine and Public Health in Kampala to visit—to provide long-term expertise on community, environmental, and public health, with a focus on lead monitoring.

"We don't want our people to just parachute in for two weeks and then leave," says Dr. Murphy. "These will be ongoing, long-term arrangements, using education, laboratory facilities, and electronic technology to track what's happening with the local water supply."

"What's happening in Kampala is an opportunity to teach the next generation of doctors what it means to be in the community health trenches," he adds.

In 2008, in collaboration with a Kampala community hospital, two Mount Sinai students conducted lead testing for children in the schools surrounding the waste site. They found that about 20 percent of children had elevated lead levels. In 2009, a second team of students will return to Kampala to continue testing and implement community- and school-based education programs to reduce childhood lead exposure.

Humanities and Medicine

It was on the Three Affiliated Tribes Reservation in North Dakota that Anna Goldman's career path crystallized before her. It was the summer of 2006 and Ms. Goldman was working with StoryCorps, a national oral history project that is capturing voices and life histories across the United States.

"I was recording an interview with a doctor who had grown up on the reservation and then returned after medical school to care for the community there," she explains. "It was then that I realized that I wanted to be an actor in the world rather than a documenter." To her, becoming a primary care physician is the most active way to engage in the community and the world.

Ms. Goldman had been considering this path since being accepted to our Humanities and Medicine (HuMed) Program as an undergraduate majoring in art history at Brown University. The only program of its kind in the nation, HuMed allows students who are humanities or social science majors to apply to our medical school in their sophomore year of college. If accepted they have the opportunity to pursue their majors without having to take organic chemistry, physics, calculus, and the MCAT.

"All of these experiences have given me perspective and direction about my future in medicine that I might not have had otherwise."

Most HuMed students also take up to two years off after college to complete service-learning projects, to immerse themselves in a foreign language and culture, or to pursue an advanced degree in their humanities field. Before going to medical school, Ms. Goldman traveled the nation working for StoryCorps, built on her undergraduate major by producing several animated films, and completed a year of coursework in health policy. "All of these experiences have given me perspective and direction about my future in medicine that I might not have had otherwise," she says.

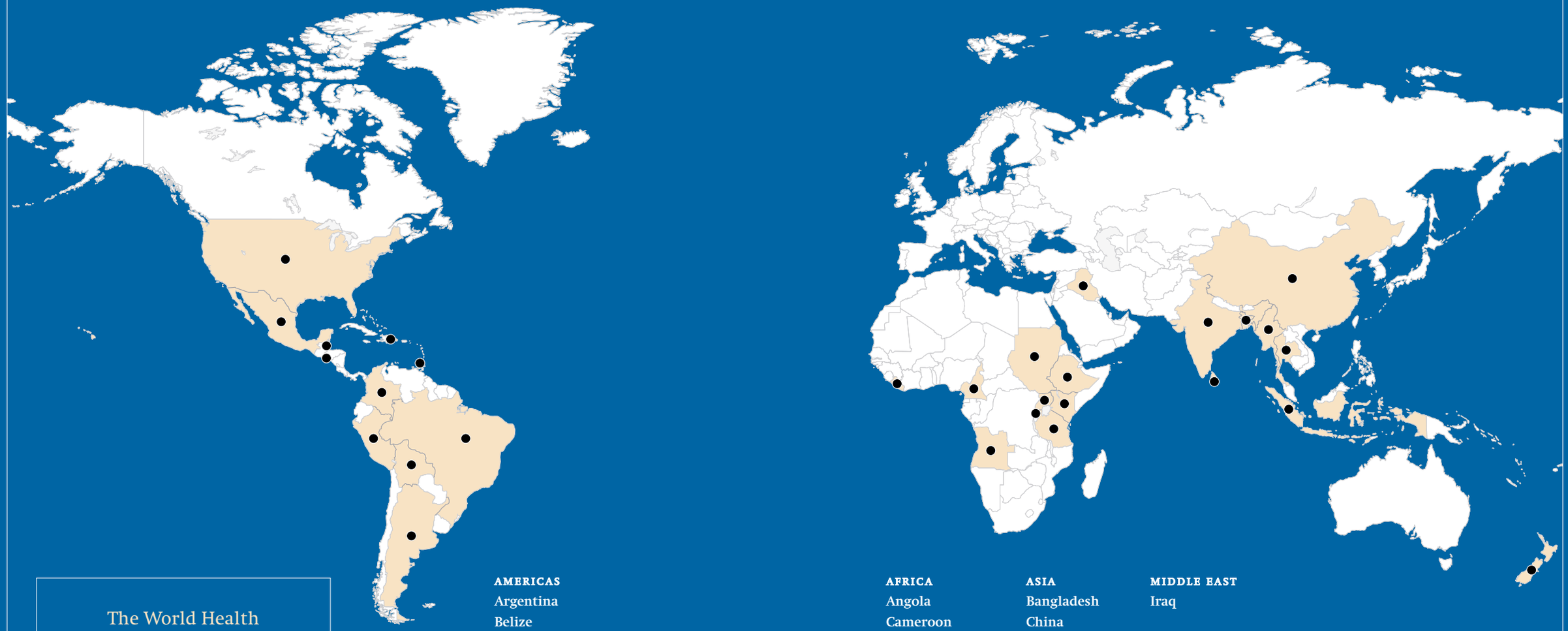
Ms. Goldman describes the challenges of taking medical courses without a formal science background. "A lot of it seemed like review, or at least familiar territory, for so many students, but for me it was all new—and fascinating," she says, explaining that videotaped lectures, faculty mentors, small-group discussions, and flexible online exams helped her succeed as a first-year student.

HuMed began in 1987 when our visionary dean, Nathan Kase, MD, recognized the importance of encouraging students with a broad liberal arts education to become physicians. Outcomes data have shown that HuMed students perform at least as well as their peers in clinical work, research, community service, and leadership activities. Due to increased interest in, and the success of, the program, the HuMed cohort has grown from only a handful of students in each incoming class in the 1980s to 25 percent of each admitted class today.

Among our many outstanding HuMed graduates are the acclaimed author Rivka Galchen, MD, MFA; Scott Gottlieb, MD, a former senior policy adviser to the Commissioner of the Food and Drug Administration and of the Centers for Medicare and Medicaid Services; and Peter Klatsky, MD, MPH, who as a medical student founded Medical Students Making Impacts (MSMI), a not-for-profit organization that helps health care providers—locally and in developing countries—write grants and fundraise for projects.

MOUNT SINAI GLOBAL

FROM LOCAL TO GLOBAL, MOUNT SINAI PREPARES ITS STUDENTS FOR THE WORLD BECAUSE THE WORLD IS OUR BACKYARD.



The World Health Organization estimates that better use of existing preventive measures could reduce the global burden of disease by as much as 70 percent.

AMERICAS
Argentina
Belize
Bolivia
Brazil
Colombia
Dominican Republic
El Salvador
Grenada
Mexico
Peru
United States

AFRICA
Angola
Cameroon
Ethiopia
Kenya
Liberia
Rwanda
Sudan
Tanzania
Uganda

ASIA
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Iraq

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