Found in Translation

Rochester brings a new focus to clinical and translational science, an approach that promises to bring practical health benefits to patients.

By Kathleen McGarvey

HEN ARTHUR MOSS ’62M (RES), A PROFESSOR OF MEDICINE AT ROCHESTER, ARRIVED AT MASSACHUSETTS GENERAL HOSPITAL AS AN INTERN IN THE LATE 1950S, HE FOUND A TEACHER AND MENTOR WHO GAVE HIM A MODEL FOR HIS OWN LIFE AS A CARDIOLOGIST. PAUL DUDLEY WHITE, THE CHIEF OF CARDIOLOGY AT MASSACHUSETTS GENERAL AND CARDIOLOGIST TO FORMER PRESIDENT DWIGHT EISENHOWER, FOUNDED THE AMERICAN HEART ASSOCIATION. HE ESTABLISHED MASSACHUSETTS GENERAL’S CARDIAC UNIT AND THROUGH HIS CLINICAL RESEARCH, HE IMPROVED THE CARE OF PATIENTS WITH HEART DISEASE.

Today, Moss credits White—who was Moss’s teaching attending physician through his six-week internship—with showing him how a physician could both care for individual patients and discover new ways of treating disease. “I wanted to see patients in a clinical setting, and advance the science of cardiology,” Moss says of his aspirations for a career that, five decades on, has contributed to saving the lives of countless people.

Moss has done that by collaborating with other cardiologists, geneticists, epidemiologists, biostatisticians, and a host of others; he has involved thousands of patients who have volunteered to take part in his teams’ research—all in a quest to better understand heart disease and to develop more effective therapies for cardiac patients.

The world’s foremost expert on long QT syndrome—a condition that puts patients at risk for sudden cardiac arrest—Moss was one of the researchers who discovered the genes responsible for the disorder. For more than 20 years, he has led a team of cardiologists in reducing potentially fatal cardiac arrhythmias through advances in drug treatment, such as beta blockers, and through devices like implantable cardioverter defibrillators.

One concern unifies his years of research. “All of our studies have related, in one way or another, to the question,
‘How can we improve treatment for patients with heart disease?’ Moss says.

The importance of harnessing science for practical solutions to health problems may seem obvious, but in recent decades some policymakers have argued that the nation’s biomedical focus has drifted away from research that’s directly applicable to patients and human disease. Congress and the National Institutes of Health (NIH) are seeking to change that, and Rochester is helping to lead the way. This spring, Rochester will dedicate the new Clinical and Translational Science Building (see page 28). Built with the help of a $50 million grant from the state of New York, it’s one of the first facilities in the country constructed specifically to serve as the academic home for clinical and translational science at an academic health center.

It’s also the physical manifestation of a renewed emphasis on clinical research at Rochester. In 2006, the School of Medicine and Dentistry was one of 12 top academic health centers to receive a Clinical and Translational Science Award from the NIH. The $40 million dollar grant, the largest NIH award in Rochester’s history, is helping the University and its partner institutions to bring together the people, technologies, and infrastructure needed to speed the pace at which advances in biomedical research make tangible improvements in people’s lives.

Together, institutions receiving the awards—there are currently about 55—form a national consortium on clinical and translational science. “The development of this consortium represents the first systematic change in our approach to clinical research in 50 years,” Elias Zerhouni, then director of the NIH, said when announcing the first awards in 2006. “Working together, these sites will serve as discovery engines that will improve medical care by applying new scientific advances to real world practice. We expect to see new approaches reach underserved populations, local community organizations, and health care providers to ensure that medical advances are reaching people who need them.”

Since World War II, the United States has given priority to
and Translational Science Building is an integral "translational scientist," Berk says. "Our new Clinical researchers and researchers in specific areas such as clinical research at Rochester. It will bring together all discoveries to everyday patient care."

"This isn't about basic versus clinical research," says Thomas Pearson, the senior associate dean for clinical research at the School of Medicine and Dentistry and principal investigator of the NIH grant. "The point is, the basic science program is a great pitcher; it'd be awfully nice to have an equally great catcher. You need both sides to play baseball."

According to Bradford Berk '81M (MD/PhD), CEO of the Medical Center and senior vice president for health sciences, Rochester has a strong tradition of both basic and clinical science.

"This medical school is steeped in the legacy of founding dean George Whipple, himself an iconic translational scientist," Berk says. "Our new Clinical and Translational Science Building is an integral element of the Medical Center's strategic plan. It will serve as a conduit for rapidly bringing basic science discoveries to everyday patient care."

The new building—a four-story, 200,000-square-foot structure—provides an integrated academic home for the work of clinical research, and to train new generations of clinical and translational researchers.

"The inception of this lab as a core facility and the support we've received from the University really exemplifies the fact that this is what the University wants to see increased focus on—providing infrastructure for outstanding clinical science," Mustian says.

HE PLAN FOR A DEDICATED BUILDING DESIGNED SPECIFICALLY TO SUPPORT CLINICAL RESEARCH

Rochester's established history also helped. In addition to Whipple, the medical school's founding dean who earned a Nobel Prize in 1934 for his research leading to the use of raw liver as a treatment for pernicious anemia, more recent researchers have contributed such pioneering advances as the use of lung surfactant to help premature infants survive and the development of the Hib vaccine, which has nearly wiped out childhood meningitis. Rochester scientists also contributed to the discovery of a method to prevent many instances of cervical cancer, the HPV vaccine.

A wide-reaching biomedical research consortium—the Upstate New York Translational Research Network—expands the Medical Center's clinical research to encompass a region of about 6 million people. The demographically diverse area includes several understudied groups, such as rural communities, a substantial Native American population, and Rochester's large deaf and hard of hearing community.

Mark Taubman, dean of the School of Medicine and Dentistry, says enhancing clinical and translational science is fundamental to delivering on the Medical Center's promise.

"As an academic medical center, our number one goal is to make discoveries that will improve the health of our population—our region first, but also the world."

One way that making a priority of translational science will benefit people's health is by creating the in-

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Ad find,” Thornton says, “with no attachment to one theory ever al-
desire to find a treatment that can really improve the lives of our
lar methods or schools of thought but only to a final result.
members to work nimbly and prudently, committed not to particu-
ple with the disease.”
volving the reversal of features of the disease. “If we can translate
They’ve achieved good effects in genetically engineered mice, in-
Thornton and his team so far have results they are heartened by.
so have hundreds of patients, to the en-
dystrophy all happening simultaneously.
clinical research on people with myotonic
developments of potential treatments, and
targeted treatments of diseases that were incurable.”
people were hoping would work, in the sense that we’d take our
toms. That’s the stage we’re up to now. We have things we think are
of disease, to create animal models that recapitulate the disease
says, “to understand how an abnormal gene causes the symptoms

The research “started with, and has always been driven by, the
desire to find a treatment that can really improve the lives of our
patients using the fastest, cheapest, most effective path we could
find,” Thornton says, “with no attachment to one theory ever al-
lowed, always trying to keep ourselves attached to whatever could
get us where we wanted to go in the shortest period of time.”
Such practicality is central to clinical and translational research,
says Taubman, and it’s another way in which the enterprise can
benefit health care. “There are a lot of things out there on the pre-
vention, diagnostic, and treatments sides that we don’t know how
good they are,” he says. “There’s a whole area of research—it’s
called comparative effectiveness research—that’s trying to under-
stand, Are current treatments and diagnostic tools the best? What
increases quality and decreases cost?”
They’re questions that occupy Nana Bennett, a professor of med-
icine and director of the Center for Community Health. Focused on
prevention, the center aims to make Rochester a healthier place.
“We’re really focused on what I call the end stage of translation,”
says Bennett. “Academic research centers have an obligation to be
responsive to public health needs of their communities, and that
hasn’t been traditionally the case. We need to nurture that.”

HE WORLD HEALTH ORGANIZATION RANKS LIFE EXPECTANCY IN THE
United States—70 years—at 24th in the world. Less than 2 percent of
the country’s health care spending goes toward prevention, and sci-
cient advances are slow to make their way into people’s daily lives—
not just new drugs, but ways chronic disease can be managed, and
new insights into how people can take control of their own health.
Clinical trials can determine whether a given device or drug or
behavior is effective, Bennett says, but there are more questions to
be answered. How can new information best be disseminated to
the medical community? How well do measures work when they
move beyond the comparatively small groups participating in a
clinical trial and into the general population? What are the most
effective ways to educate the public?
If discoveries produced by basic science are going to improve the
nation’s health, she says, researchers have to work with the com-

the medical community? The Healthy Living Research Center that Bennett oversees
is an effort to do just that. She calls it a “unique marriage of clinical
behavior change services and behavior research.”
Bennett cites a 2007 study in the New England Journal of Medi-
cine showing that 40 percent of instances of premature death in the United States
can be attributed to behavior; social cir-
cumstances are at the root of another 15
percent. “If you want to improve health, you
need to go after these things.”
The Center for Community Health—which has run focus groups to learn more about demograph-
ic groups’ feelings about clinical research and participating in it—works with community organizations, individual community
members, and medical practices to improve community health and
to gather data that feeds further research.
“It’s the ultimate test of something’s implementability” to see
what happens when it reaches patients in their doctors’ offices,
says Pearson.
The path from the bench to the bedside and back again is one
shaped by rousing ambitions and gritty practicalities. They’re in-
extricable, Moss suggests.
“What we’ve tried to transmit to our cardiology fellows is that
with their specialized knowledge, they have a responsibility for ap-
plying that knowledge to patients—but also a responsibility to ad-

COMMUNITY TIES: Nana Bennett, the
director of the Center for Community Health
and a professor of medicine, says health
care providers and communities must work
together in solving health problems.

ADAM FENSTER
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Under One Roof

Rochester researchers in the new Clinical and Translational Science Building aim to accelerate the clinical applications of biomedical research.

The new 200,000-square-foot Clinical and Translational Science Building brings together scientists, physicians, nurses, researchers, and other staff who were formerly scattered across the University. Scheduled for dedication in April, the new building will be home to the Clinical and Translational Science Institute, which in 2006 received one of the nation’s first NIH grants designed to help accelerate the application of the discoveries of medical science. The new facility shares an atrium with the adjacent School of Nursing, symbolizing the close connection between clinical research and the School of Medicine and Dentistry and the School of Nursing.

—KATHLEEN MCGARVEY

First Floor

- **Bioinformatics Program**
  Assists with the design and management of databases used in clinical and translational research and the education of professionals in their use.

- **CTSI Program Offices**
  Operates programs and provides services to support and train clinical and translational investigators.

- **Office for Human Research Protection/Research Subjects Review Board**
  Responsible for ensuring that the rights and welfare of participants in medical research are adequately protected.

- **Clinical Research Suite**
  Provides dedicated space for health researchers to conduct safe, controlled, outpatient studies of children and adults.

GREEN DESIGN: The new facility is designed as the University’s first building to be certified according to the Leadership in Energy and Environmental Design (LEED) guidelines.
Center for Human Experimental Therapeutics Conducts hypothesis-driven initial investigations of new therapies for human diseases.

Muscle Study Group Carries out controlled clinical trials and other research for muscle and neuromuscular diseases.

Emergency Medicine Studies emergency care issues, with a primary emphasis on traumatic brain injury, geriatric emergency care, and prehospital medicine.

Seychelles Child Development Study Studies the risks and benefits of fish consumption on childhood development.

Cancer Survival Aims to enhance quality of life for cancer survivors through efforts to improve treatments and minimize lasting effects of radiation therapy, chemotherapy, and surgery.

Cancer Control Leads hundreds of researchers in 22 affiliated sites nationwide in developing ways to minimize or eliminate side effects of cancer treatment.

Pediatrics The Division of General Pediatrics conducts health services research with a focus on vulnerable children.

Community and Preventive Medicine Promotes and supports public health through research and outreach.

Heart Research Follow-Up Program Organizes and conducts cardiovascular research studies to improve diagnosis and management of patients with heart disease.

Biostatistics Conducts collaborative and methodologic research and provides education and assistance in study design and analysis and computational biology.

New Neighbor The CTSB is on Rochester’s Medical Center campus.