

Medical Bulletin

The evolution of medical education

The Medical School
is adapting to meet
new needs in a
changing world

FALL 2005 What does it take to become a doctor today? □ Virtual reality and patient simulators bridge the gap between school and practice □ Demystifying the link between smoking and cancer



DEAR FRIENDS,

Fall is a time of fresh starts and new perspectives, and as I welcome the Medical School's newest students, I'm aware of how much they've changed—as individuals and as a class—since I pursued my own M.D.

In the Twin Cities, 165 students are joining us this year: 87 men and 78 women. About a third come from outside Minnesota. They range in age from 19 to 42, and a quarter of them are multicultural. In Duluth, nearly all of our 55 incoming students are Minnesota residents—mostly from small towns, in keeping with the rural mission of the Duluth campus. There are a few more men (29) than women (26). Five students are multicultural, including two American Indians.

As were generations before them, they are bright, curious, and determined. But as a class, they reflect many of the variations that are occurring at medical schools across the country: more women, more cultural diversity, more students pursuing medical school later in life, and a lot more debt. In addition,

these students are about to enter a health care system that's rapidly changing in terms of technology, infrastructure, and patient needs.

In this issue of the *Medical Bulletin*, you'll walk in the shoes of two current students and a first-year resident to see the profession from their point of view. You'll read about how the University is harnessing the power of simulation and virtual reality to provide new ways to learn and develop critical skills. And you'll learn about how our Medical School is leading the nation in providing a flexible education leading to an M.D.

These are just a few of the ways we're working to transform the medical school experience in response to the changing needs of our future doctors and the patients they'll serve. It's a necessary and rewarding journey—one that will ultimately lead us toward building a better health care system for everyone.

Deborah E. Powell, M.D.

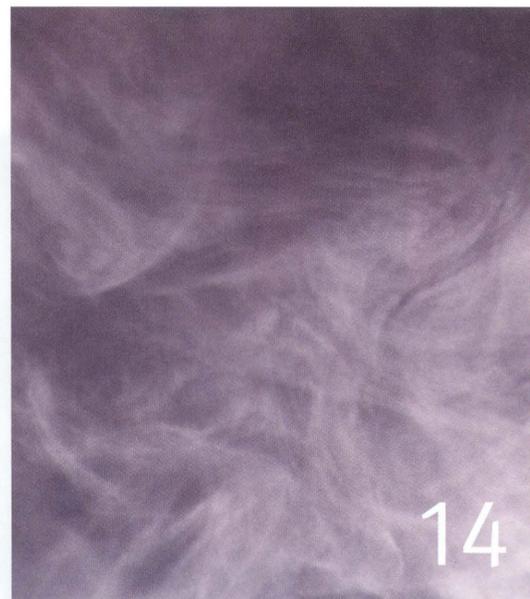
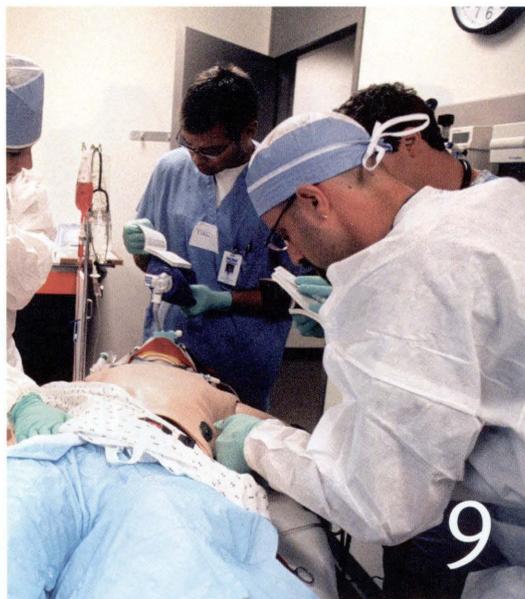
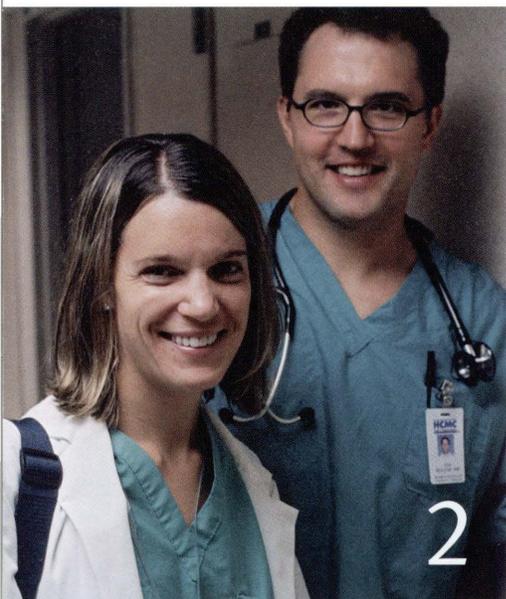
Dean, University of Minnesota Medical School
McKnight Presidential Leadership Chair

MINNESOTA MEDICAL FOUNDATION

at the University of Minnesota

The mission of the Minnesota Medical Foundation is to improve the quality of life for the people of Minnesota, the nation, and the world by supporting the advancement of health-related education, research, and service at the University of Minnesota.

FALL 2005 Contents



Features

2 WHAT DOES IT TAKE TO BECOME A DOCTOR?

Today's students and residents are grappling with a new and changing world. See how it looks through the eyes of two current students and a first-year resident.

9 CYBER MEDICINE

Virtual reality and patient simulators are bridging the gap between classroom instruction and real patient care.

14 SMOKING OUT A KILLER

In 1964, the U.S. surgeon general first declared that smoking causes cancer. But what exactly is the link? University researchers are close to some answers.

DEPARTMENTS

20 Medical School News

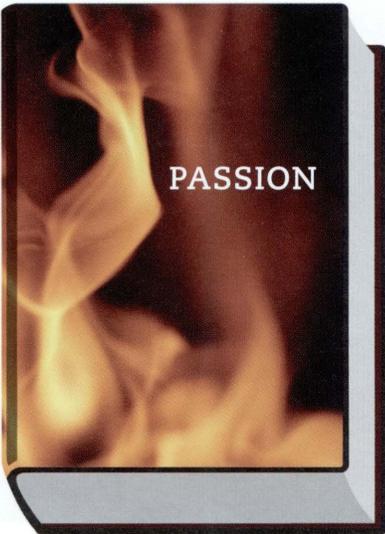
25 Alumni Connections

30 A Look Back:
Wangensteen
the Teacher

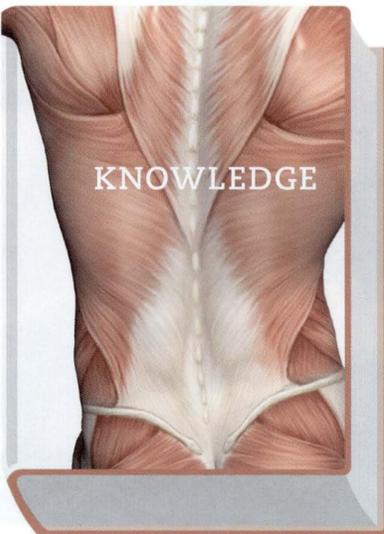
ON THE WEB

 Find Web-exclusive content in the online version of the *Medical Bulletin*. Go to: www.mmf.umn.edu/bulletin.

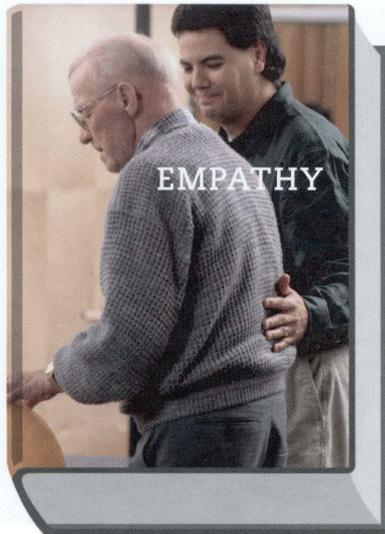
COVER IMAGES: THE ANATOMICAL ILLUSTRATION IS FROM A WOODCUT BY THE BELGIAN PHYSICIAN ANDREAS VESALIUS (1514 – 64); IMAGE COURTESY OF THE NATIONAL LIBRARY OF MEDICINE; X-RAY, CUSTOM MEDICAL STOCK PHOTO; TORSO, GETTY IMAGES; HAND, RICHARD ANDERSON.



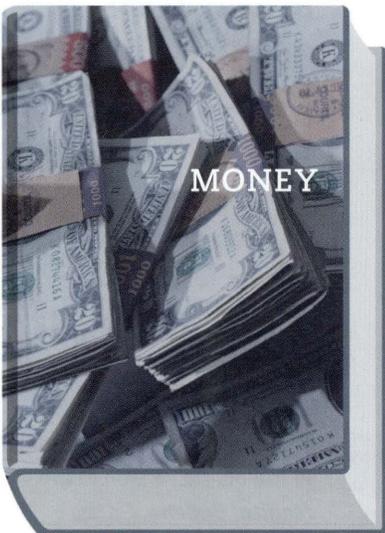
PASSION



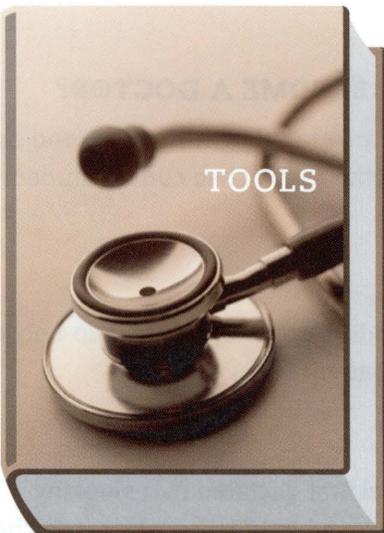
KNOWLEDGE



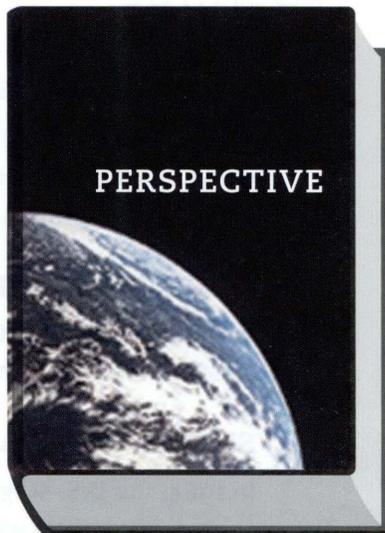
EMPATHY



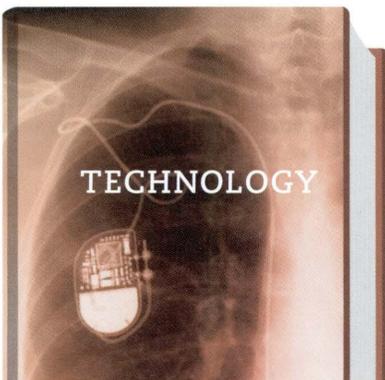
MONEY



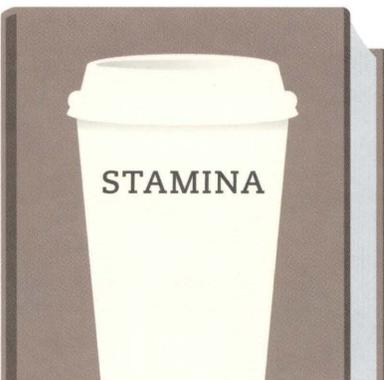
TOOLS



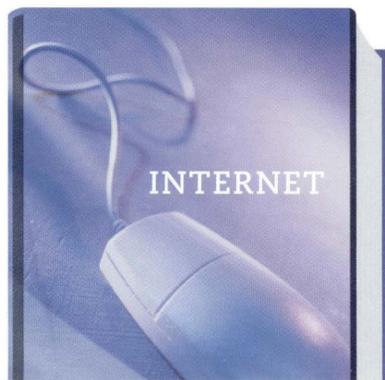
PERSPECTIVE



TECHNOLOGY



STAMINA



INTERNET

What does it take to become a doctor?

Today's students and residents grapple with a new and changing world

MEDICAL SCHOOL. Of all the words associated with education, those two probably evoke the most intense imagery. Tough to get into. Even tougher to get through. Classes with cadavers. Mind-bending mountains of memorization. All-nighters. And debt. Lots of debt.

Today's medical school experience has much in common with experiences of generations past, when these stereotypes were forged. Students still need to be intelligent, dedicated, and idealistic to get through the door. Once they're in, they work like sled dogs for four years and like sled dogs with M.D. degrees for three or more years after they graduate. But as technologies evolve, social norms change, and state education funds start to erode, important differences emerge.

Here's how medicine today looks through the eyes of three in the thick of it.

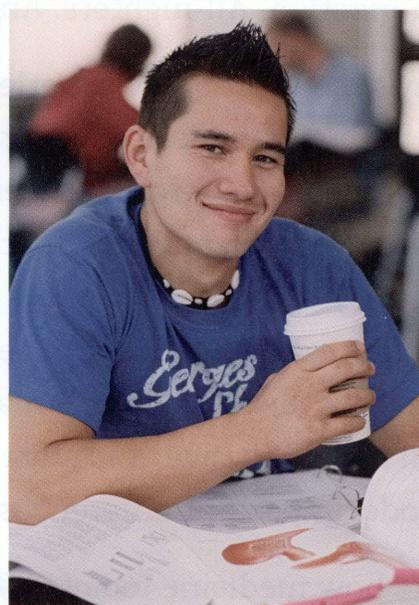
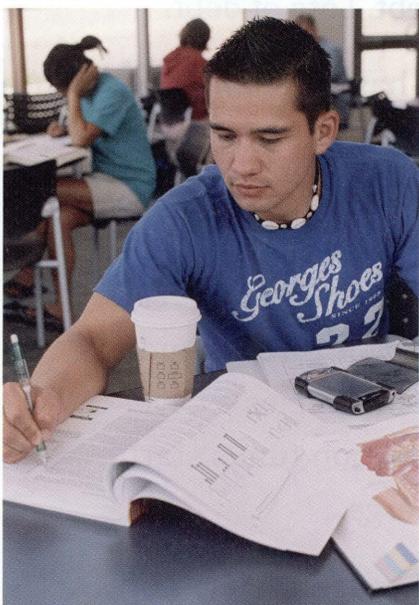
First year: From dream to reality

Chris Vu is on his way.

Four years ago, when Vu decided to switch his undergraduate studies from engineering to pre-med, medical school seemed an almost impossible dream. Now, with the first year behind him, it is a sometimes-seemingly-impossible reality instead, one flirting with the upper limits of how much the human mind—and 24 hours—can hold. Anatomy, microbiology, neuroscience, physiology, pathology, pharmacology... The list seems endless.

“You’re so bombarded with information that when all is said and done, you struggle to find out what you really know,” Vu says. “There are so many things. How much have I really learned so far? I really appreciate what physicians and faculty have told me—that in your third and fourth year, it all comes back.”

Double lattes helped Chris Vu survive the seemingly endless study sessions of his first year of medical school.



The highlight of the year for him, as it is for many first-year medical students, was the gross anatomy class. “It was probably one of the coolest experiences I’ve ever had in my life,” he says. “Everyone appreciated the opportunity to see how we’re all put together. It was really interesting to see up close how layered we are—all the skin, fat, and muscle—before you get to the really interesting stuff.”

Less exciting were the brain-busting basic-science classes that followed. “You’re learning receptors and neurotransmitters and genetics,” he says. “Yes, they’re interesting. Yes, they’re required. Yes, they’re important. But is this the thrill of medicine? You’re still stuck in a classroom in a chair for four hours a day, looking at a PowerPoint presentation.”

Or not. Like many of his classmates, Vu occasionally watched taped lectures at home over the Internet rather than trekking into campus to catch them live. “You can sit at the computer in boxers and eat breakfast,” he says. The technology also allowed him to watch the lectures at his own pace and on his own schedule as well as review them for exams. It also, he admits, left him more time for things like snowboarding and golf. “That’s definitely an awesome tool,” he says.

Vu enjoyed the Tuesday sessions he and his classmates spent with master tutors, off-campus physicians who gave students a taste of real-world medicine. “We learned in a small-group format, which helped us feel more comfortable asking questions and gave us an opportunity to think like physicians,” he says. Less “real-world” was the Physician and Patient (PAP) class, in which students practice patient

interviews with actors. He found it tough to take the class seriously—after all, the patient wasn't really sick, and he wasn't really a doctor. But he admits the class did provide some valuable practice for the day when he will finally sit down with a real patient. "It takes the edge off," he says.

One of the challenges for Vu has been accepting the trade-offs medical school requires. Friends from college have been settling down, getting married, taking well-paying jobs, buying new cars. Meanwhile, he's going deeper into debt than he cares to think about—by the time he's done, he figures he'll have \$150,000 in loans—all for the opportunity to work long hours at a starting job with pay comparable to what he got working as a landscaper.

"It's such a long process to get somewhere," he says. "I know I like medicine. I know I will enjoy it. I knew I would be intellectually stimulated by the education. It's more like, 'Am I going to be wasting a large chunk of my youth?' Doctors are respected; it's a good field. But it's 10 years out of your life."

For now, he's looking forward to his second year—and even more to years three and four, when he'll get to work with real patients in real clinical settings.

"I really want to learn, to put everything together, to think, to understand how it applies to everything else," he says. "I just want to get by these, the first and second years, and get to medicine."

Second year: A time of transition

Halfway through medical school, Sarah Nakib doesn't really have a lot of time to spend mulling over the experience. She just finished finals, but the rush of relief is tempered by the need to prepare for boards, the first of three national exams she and her classmates will take over the next four years to become licensed to practice medicine. At the same time she's studying for the make-or-break test of pretty much everything she's learned in the past two years, she's also working in a dermatology research laboratory to help cover some of the costs of medical school. What lies ahead, and in front of her, clearly has the upper hand.

Still, sitting in her lab, with a brightly colored M&M telephone behind her and a big bag of M&Ms in the break room refrigerator, she's happy to take a break from the flurry to reflect on the past nine months.

The second year of medical school, she says, was a time of transition for her and her classmates.

"First year, you still kind of feel like a biology student," she says. But with its focus on diseases and pathology, second year brings countless concepts not covered in undergraduate classes. "A lot of it is new to everybody at this point," she says.

Nakib particularly appreciated the time spent each week in clinics, "to remind us what our jobs are going to be," she says. "It's a different mode—you have to have your thinking cap on." Now, as she studies for board exams, she is surprised to discover that the things that really stick in her mind are concepts she encountered in clinics as well as the classroom.

MEDICAL SCHOOL OFFERS CHOICE AND FLEXIBILITY

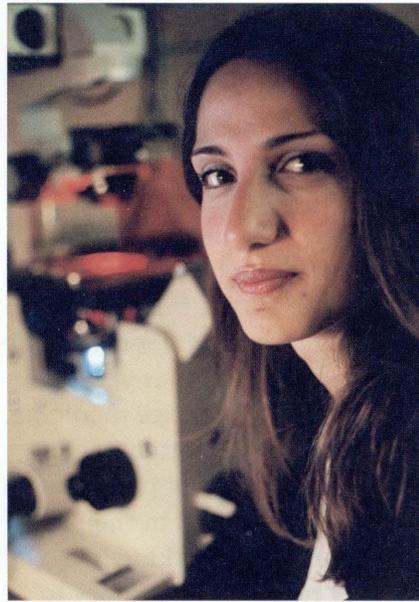
This fall, Medical School Dean Deborah Powell, M.D., announced a new program that will allow students the opportunity to create their own individualized medical educations. Starting this year, medical students at the University of Minnesota can earn their M.D. in anywhere from three and a half to six years. And they will not have to pay extra tuition to do this.

The University of Minnesota is the nation's first public medical school to offer this type of program.

"Choice and flexibility are very important in our changing society and world," says Powell. "By launching this program, the Medical School is pioneering a new era of learner-centered medical education, which can only help the next generation of physicians better serve their communities."

Under the program, students can proceed at their own pace without appearing before a committee or suffering a stigma for their decisions. This allows students to pursue opportunities that include taking additional electives, focusing on a particular discipline prior to residencies, taking time to explore several disciplines within medicine, and building a better understanding of health care policy and health care teams.

In addition, students may choose to do research, take an internship at one of Minnesota's medical device companies, work in an inner-city or rural clinic, or experience medicine in another country. Students will have the flexibility to create career pathways that make sense for them as individuals.



Sarah Nakib examines samples of mouse hair in the dermatology lab. Nakib spent many hours of her second year of medical school doing research.

OUCH

For many students these days, one of the scariest things about medical school is not the amount of time it takes or the grueling work it doles out, but the price tag.

Since 1984, tuition has doubled at U.S. medical schools and indebtedness of medical students has risen even faster, according to Medical School Dean Deborah Powell, M.D., who chaired a work group on the topic for the Association of American Medical Colleges (AAMC). Today, in-state tuition and fees for a four-year medical education at the University of Minnesota total \$93,578. Nationwide, according to the AAMC, the average debt for 2004 medical school graduates exceeds \$115,000—more than five times what it was two decades ago. The average debt carried by members of the University of Minnesota Class of 2004 is \$119,868.

At the same time, Powell says, physicians' incomes have remained relatively unchanged. "We are particularly concerned

that this will drive many people away from careers in medicine, particularly those of diverse ethnic and socioeconomic backgrounds," she says.

Second-year student Chris Vu says the numbers become surreal after awhile. "Thousands of dollars doesn't mean anything to me because I'm so much in debt. It's definitely a scary feeling."

Third-year student Sarah Nakib says that while money is definitely something to think about, her attitude at the outset was, "Medical school is so difficult to get into; let me just get in and I'll worry about it later."

"It's expensive. I'm in debt," says first-year resident Ted Ruzanic, M.D. "Is it worth it? Yes. Absolutely. There's no doubt in my mind it's worth it."



To learn more about current Medical School tuition, fees, and debt loads, go to: www.mmf.umn.edu/mb/debt.

You might imagine that the second-year curriculum—filled as it is with end-to-end classes in lab medicine, pathophysiology, pharmacology, and more—would rule out anything extra. But that's not the case for Nakib. Even with free time at a premium, she has found extracurricular activities a much-valued break from the books. She was a student organization representative for two years, and last year she helped establish a global health program that brings students and others from law, medicine, public policy, and other fields together to promote global health. She also performed in Harambe—a celebration of medicine, culture, and the arts that medical students put together for the community each spring—and contributed an act involving a whoopee cushion and hidden cameras for a Medical School talent show.

For now, Nakib's focus is on getting through the board exam, a grueling eight-hour, 350-question, multiple-choice test administered via computer in a setting so secure that students can't even carry a sweatshirt into the room. But dancing around the edges is delight at the thought of moving on.

"I'm really excited about my third and fourth years. It's all clinical," she says. For the next two years, she and her classmates will rotate through clerkships in clinics around the Twin Cities and beyond, testing the waters of the various medical specialties in two- to eight-week sessions spent learning from and assisting practicing physicians.

Nakib's first clerkship will be in orthopaedic surgery in Duluth. In addition to required rotations in internal medicine, neurology, obstetrics and

gynecology, pediatrics, primary care, psychiatry, surgery, and two subspecialties, she's hoping to go to Brown University in Rhode Island to learn about dermatological epidemiology, and to Tanzania to do a rotation with a physician there. That plan fits well with her interest in international health as well as with a growing trend for students to do at least one clerkship overseas.

"It's really encouraged your third and fourth years to have an international rotation," she says. "I think a lot of people do it."

In addition to this summer's boards and the last two years of medical school, Nakib has two more sets of board exams—one next year, and the last after she graduates—and perhaps four years of residency to look forward to.

"I have had moments where I think, 'Wow, this is a really big commitment.' But I always remember what a great opportunity this is and my desire to be part of this profession."

Residency: Finally a doctor

It wasn't the day he found out he had been accepted to medical school. Nor the formal white coat ceremony his first year, when he and his classmates recited the oath bonding them philosophically and ethically to the countless generations of physicians who have preceded them. Nor the start of clinical rotations as a third-year medical student, nor even the commencement celebration last May. The day Ted Ruzanic, M.D., knew he'd arrived was June 23, 2005—the day he first walked through the doors of Hennepin County Medical Center's emergency department as a medical resident.

"Medical school was a great experience. I had a solid foundation when I graduated. But the feeling of becoming a physician and helping people in this profession really began when I started my residency," Ruzanic says. "There's a big difference between medical school and residency. There are certain things that are included in a resident's life that are not included in a student's life."

For the time being, at least, those "certain things" do not include a lot of free time. Ruzanic spends the bulk of his waking hours at work, squeezing things like meals, exercise, family time, and recreation in around the edges of nine- to twelve-hour shifts that can start and end just about any time—sometimes day, sometimes evening, sometimes night—and can total up to 80 hours per week. If medical school seemed a clock-and-calendar crunch, it was nothing compared with this.

But he loves it. In emergency medicine, "You get to see every person in the population—men, women, kids, adults," he says. "I really like the pace and the atmosphere of the emergency department." To his own surprise, he particularly enjoys working the night shifts. The people who come to the emergency room in the wee hours, he says, are typically people who are in serious need of emergent or urgent care.

"I get a lot of satisfaction helping people in the middle of the night," he says. "Plus I like the night atmosphere."

Ruzanic began his medical education at the University of Minnesota Medical School-Duluth. Students accepted there attend classes on the UMD campus for years one and two, then join Twin Cities medical students for

DIVERSE AND DEDICATED: TODAY'S MEDICAL STUDENT

Some things don't change. Like their counterparts from generations gone by, today's medical students are idealistic, intelligent, dedicated, and determined.

But some things do. "The class is much more diverse than it used to be," says Kathleen Watson, M.D., the Medical School's senior associate dean for education. Half the members of last fall's entering class are female, compared with 42 percent in 1990. Nearly one-fourth are multicultural.

Goals have changed, too. There's still a strong emphasis on providing medical care to Minnesotans: A strong majority of matriculants are Minnesota residents, and many are expected to practice eventually in communities around the state. But overall, students today represent a broader range of career ambitions, from advocacy to science.

"They are much more interested in global medicine and public health medicine and in thinking about medicine as a career that can branch into other areas," Watson says. "They are much more sophisticated about the possibilities for career development."

Resources for pursuing education for careers that extend beyond practice have grown concurrently. Multi-degree opportunities now include the M.D./Ph.D. program as well as joint degree programs with business administration, health informatics, public health, and law.

their third and fourth years, during which they rotate among clerkships at various clinics, getting a taste for different kinds of medicine under the tutelage of established physicians.

"It's a fantastic place," Ruzanic says of his UMD experience. Along with taking the typically grueling medical student course load and discerning his future career, he also enjoyed the many outdoor activities the Duluth area offers. "Duluth was a great fit for me. I loved the campus and the town. Since it was my plan to pursue a career in family-practice medicine, it was perfect for me," he says.

Ruzanic decided to shift direction toward emergency medicine between his third and fourth years of medical school. Hennepin County Medical Center (HCMC) was his top choice for his three-year residency, the final formal stage of a medical education. He's extremely happy with the way it's turned out so far.

"You're in a learning mode, mentored by attending physicians," he says. "It doesn't feel like being thrown to the wolves. It's a very supportive learning environment."

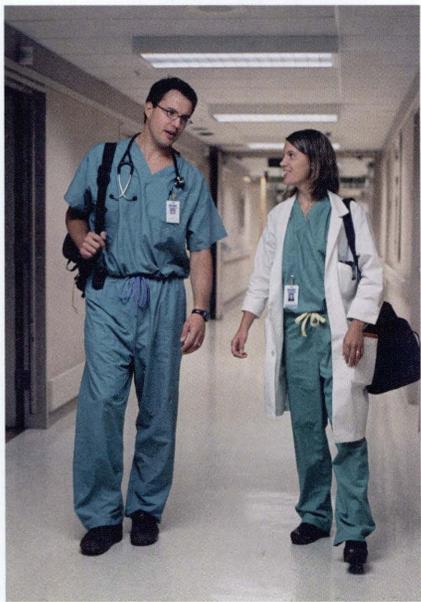
If all that weren't enough, Ruzanic married fellow medical student Rachel Wenner in September 2003. Wenner is also at HCMC, in her first year of a four-year dermatology residency.

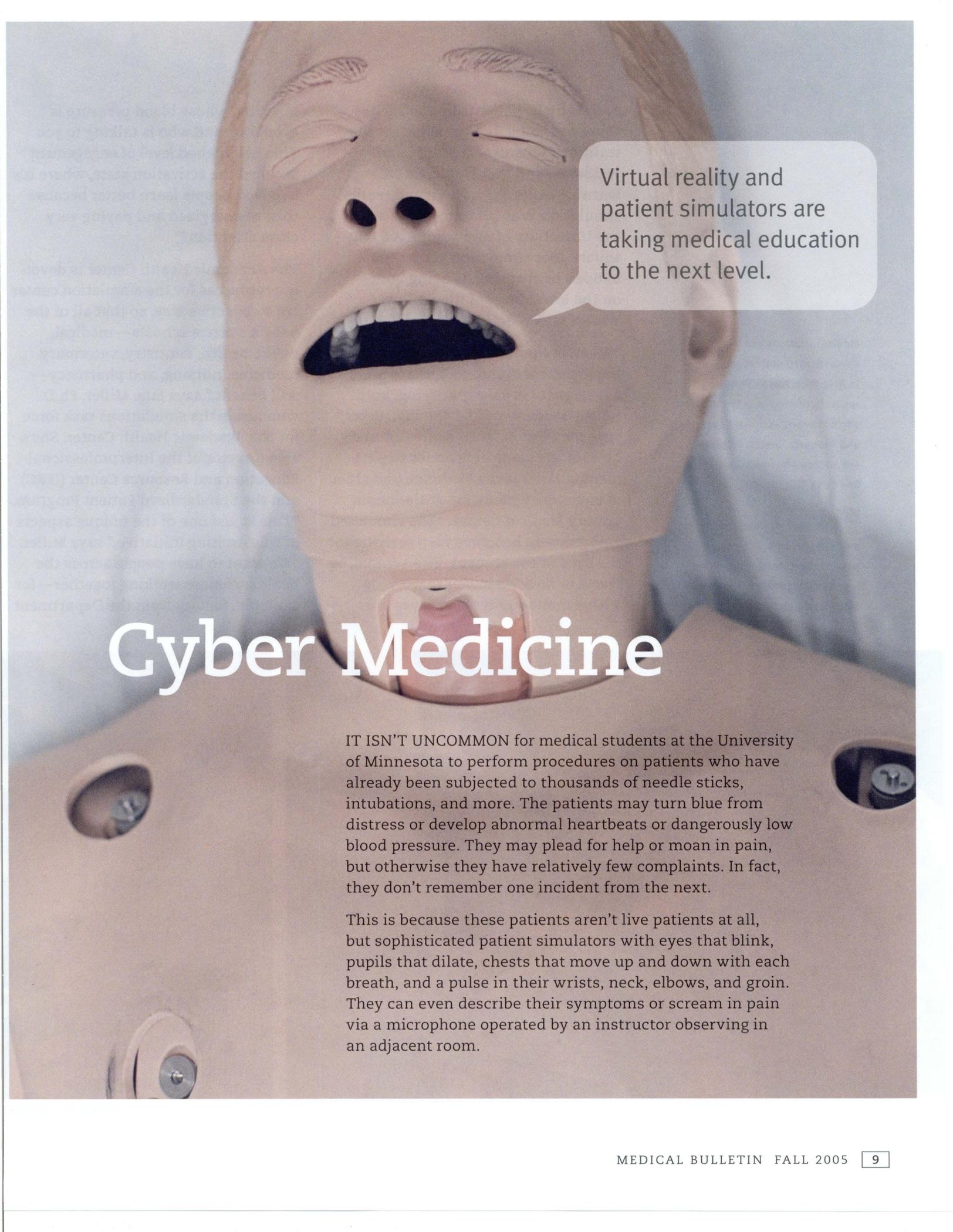
What's it like being a medical resident married to another medical resident? Hectic, for one thing, Ruzanic says. Great, for another.

"We're both very busy and we don't have much time together. But we both understand what the other is going through; there's a lot of empathy," he says. "It's a crazy life we're living, but it's fun. We feel very lucky to be in this profession." MIB

BY MARY HOFF

Husband-and-wife team Ted Ruzanic, M.D., and Rachel Wenner Ruzanic, M.D., have to work to balance their personal lives with the demands of their medical careers. Both are first-year residents at Hennepin County Medical Center.





Virtual reality and patient simulators are taking medical education to the next level.

Cyber Medicine

IT ISN'T UNCOMMON for medical students at the University of Minnesota to perform procedures on patients who have already been subjected to thousands of needle sticks, intubations, and more. The patients may turn blue from distress or develop abnormal heartbeats or dangerously low blood pressure. They may plead for help or moan in pain, but otherwise they have relatively few complaints. In fact, they don't remember one incident from the next.

This is because these patients aren't live patients at all, but sophisticated patient simulators with eyes that blink, pupils that dilate, chests that move up and down with each breath, and a pulse in their wrists, neck, elbows, and groin. They can even describe their symptoms or scream in pain via a microphone operated by an instructor observing in an adjacent room.

Increasingly, patient simulators like these are being used to augment the training of medical students and residents, and this emphasis on learning skills through virtual reality simulation is about to increase at the University of Minnesota. A 5,000-square-foot simulation center, slated to open next spring, is being built on the lower level of the Phillips-Wangensteen Building.

“When students interact with one of these patient simulators, the level of engagement is very gratifying, both for the student and for the instructor,” says Joe Clinton, M.D., professor and head of the Medical School’s Department of Emergency Medicine and chief of emergency medicine at Hennepin County Medical Center. “The simulated environment becomes very realistic in the eyes of the student. The adrenaline starts to flow when you’re working with a mannequin whose eyes are

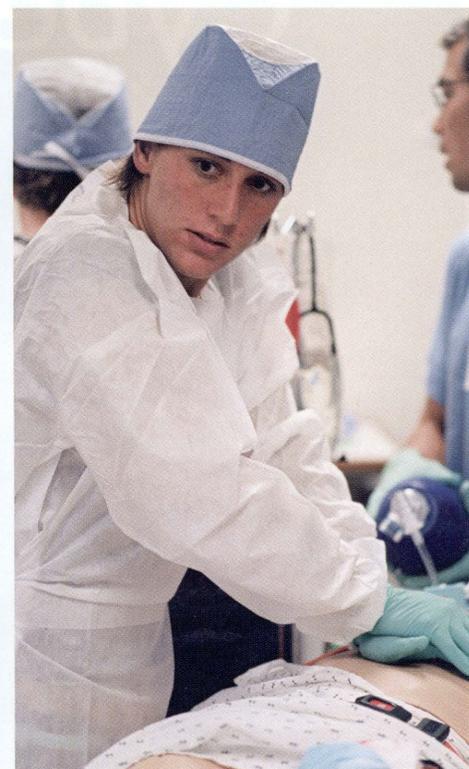
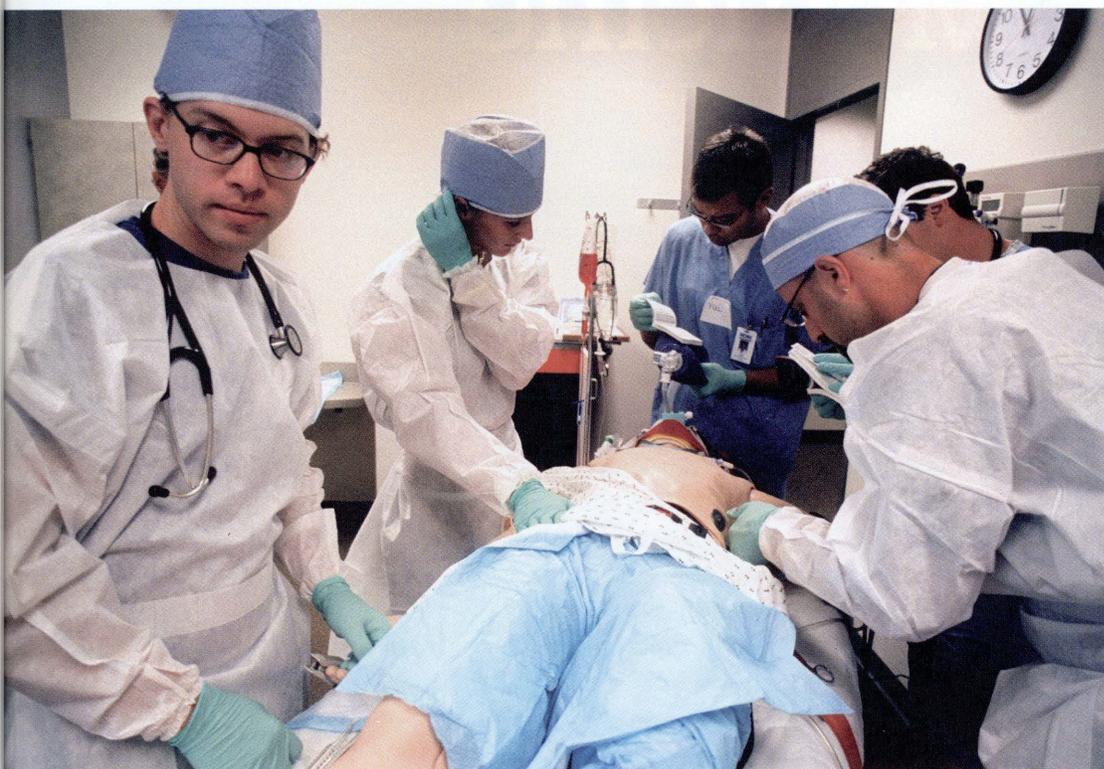
blinking, whose blood pressure is dropping, and who is talking to you. This heightened level of engagement is called the activation state, where it’s believed people learn better because they’re energized and paying very close attention.”

The Academic Health Center is devoting resources for the simulation center “in a collective way, so that all of the health science schools—medical, public health, dentistry, veterinary medicine, nursing, and pharmacy—will benefit,” says Jane Miller, Ph.D., who heads the simulations task force for the Academic Health Center. She’s also director of the Interprofessional Education and Resource Center (IERC) and the Standardized Patient Program. “This is just one of the unique aspects of this exciting initiative,” says Miller. “We want to have people across the health sciences working together—for example, faculty from the Department

Medical students use a sophisticated patient simulator to help them learn life-saving resuscitation skills at the University’s Interprofessional Education and Resource Center. Pictured are Andrew Thompson (left) and Erika Miles (right).



To see video footage of medical students using the patient simulator during a training session, go to www.mmf.umn.edu/mb/simulation.



PHOTOS: RICHARD ANDERSON

When students interact with one of these patient simulators, the level of engagement is very gratifying, both for the student and for the instructor.

– Joe Clinton, M.D., professor and head of the Medical School's Department of Emergency Medicine

of Anesthesiology working with students from the school of nursing, veterinary medicine, or dentistry.” The new center also has a commitment to designing and building new patient simulators based on each user's educational needs and applications.

Inspiration springs from experience

One key to the design and building of these simulators is Robert Sweet, M.D., a urologic surgeon and Medical School alumnus who's returning to Minnesota this fall as a new faculty member and the newest leader on the Academic Health Center's virtual reality and simulation sciences team.

Working under stressful circumstances before mastering a skill has long been required of medical students and residents alike. Sweet has his own story. As a second-year resident, he was in the operating room attempting a surgical resection under the supervision of an attending surgeon when a sea of blood suddenly obscured his view.

“I had to rely on what I had read in textbooks, but my attempts to reorient myself were of no avail, and the case was rapidly taken over by the attending surgeon,” he explains. “A one-hour hands-on training opportunity was suddenly reduced to 75 seconds.”

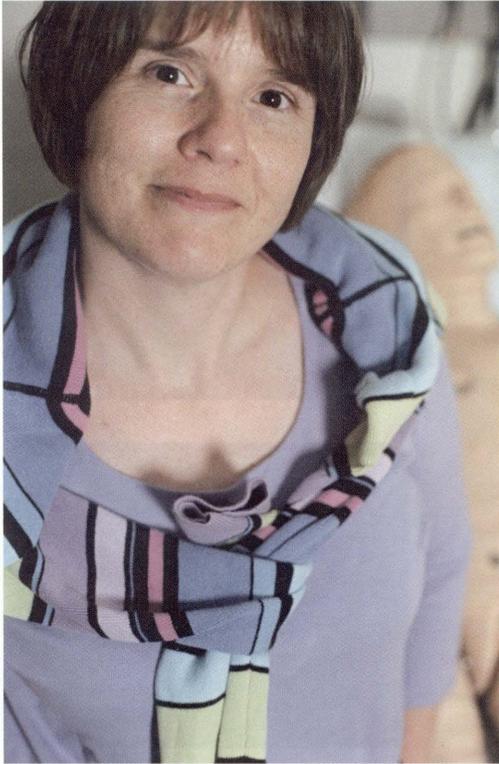
Feeling frustrated and defeated, Sweet watched the remainder of the procedure on the video monitor in the operating room and wondered how he was ever going to master the procedure himself. “I wondered how my

predecessors, without the use of double-headed scopes or video, had acquired their skills. And of course it was practice—on live patients in the operating room.”

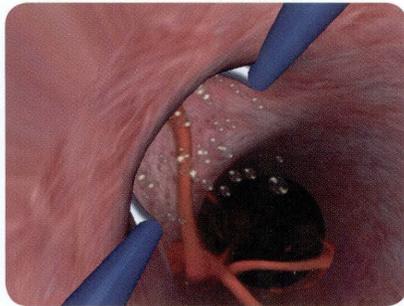
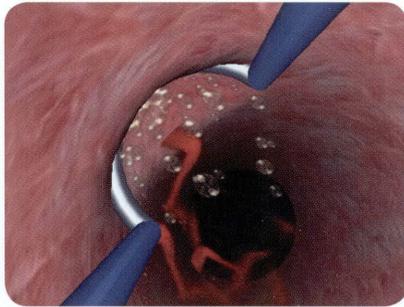
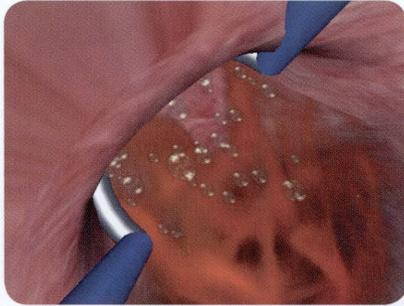
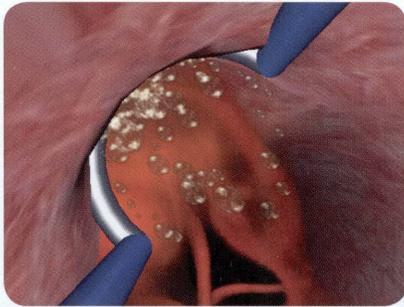
As he continued to watch the monitor, it occurred to Sweet—a member of the video game generation—that a transurethral resection of the prostate (TURP) was like a video game, and therefore there must be some way to train resection skills outside the operating room. Thus began his entry into the world of simulation and virtual reality.

During his residency at the University of Washington in Seattle, Sweet found collaborators at the university's Human Interface Technology Laboratory, where they'd already built and validated a virtual reality TURP simulator from the ground up. When presenting his work at an international conference for virtual reality researchers, he met and was captivated by Richard Satava, M.D., who was then at Yale University. “Dr. Satava is considered by many to be the grandfather of medical virtual reality simulation,” says Sweet. “I consider myself lucky to have worked with him.”

Soon afterward, Satava came to the University of Washington, where Sweet studied under him for two years while they spearheaded the launch of the Institute for Surgical and Interventional Simulation. As Sweet settles into his new role, he says, “I'm eager to take what I've learned from him and apply it to the enormous resources available at the University of Minnesota.”



Jane Miller, Ph.D., says the University's new simulation center has a commitment to designing and building patient simulators based on each user's educational needs and applications.



A cross-disciplinary approach

Sweet explains that a successful simulation program requires expertise from three disciplines—medical science, cognitive science, and computer science—but it helps to include people who have cross-disciplinary experience as well. “Right now there are many engineers doing virtual reality who know nothing about medical applications, and surgical educators who know nothing about virtual reality. Everyone involved in this initiative needs to be facile with the two other fields. You want computer science engineers and surgical educators who know how to design and execute validation studies.”

Educational and instructional design will be key components of the simulation program. For instance, Sweet and his engineering colleagues might sit down with an ophthalmology professor who requests a simulator for cataract surgery. With the help of a cognitive scientist, the team would define the skill sets necessary to perform cataract surgery: cognitive, psychomotor, visual-spatial, and affective (which encompasses things like mood and concentration level).

These are still frames from a virtual-reality simulator used to teach urologic surgeons how to perform a transurethral resection of the prostate (TURP). This simulator, designed by Rob Sweet, M.D., was recently licensed to Medical Education Technologies, Inc., to be used at hospitals and medical schools across the country.



To view a virtual reality tour of the human urethra, prostate, and bladder, go to www.mmf.umn.edu/mb/virtual.

“To be useful, the design of simulators must be driven by the curriculum designed by the subject matter—in this case, the ophthalmologist,” notes Sweet. “And simulation doesn’t take the place of didactic lectures or patient experience. It should augment those two.”

There are many types of simulators used for medical training; however, interactive learning is the common thread. There are cognitive simulators that train in strictly cognitive skills such as learning and rehearsing the steps involved in a hernia operation. Simulators for basic skills teach things like the navigation skills necessary to do a procedure. Simulators for simple tasks might involve skin suturing, while simulators for complex tasks might involve stitching two open vessels together. And simulators such as the TURP simulator can be used to learn and practice a complete procedure.

Simulators can be composed of physical models, which may look and feel like real tissue, while virtual reality simulators involve navigating lifelike instruments in a computer-generated model. Some simulators are a combination of virtual and physical models.

Simulation and patient safety

Simulation in medical education dovetails with an increased nationwide focus on patient safety. Borrowing from the aviation industry’s model, the American Society of Anesthesiologists (ASA) was the first physician specialty organization to embrace simulation in an effort to increase patient safety and reduce soaring malpractice insurance premiums in the mid-1980s.

As ASA leaders examined the outcomes in various perioperative scenarios, one of the things they identified was the enormous risk associated with a few extremely rare complications. For example, malignant hyperthermia is a rare but potentially fatal reaction that can develop quite suddenly in an anesthetized patient. "This condition occurs perhaps one or two times a year in a large medical center, and it requires an immediate and appropriate response—an intravenous injection of one particular drug," according to Richard Prielipp, M.D., head of the Department of Anesthesiology and holder of the J. J. Buckley Chair in Anesthesiology.

"There were no patient simulators when I was an anesthesia resident, and during my entire residency I never saw a patient who developed malignant hyperthermia," says Prielipp. "The only exposure I got was from monographs and lectures, and reading about a case like this in textbooks isn't adequate preparation. Now, with patient simulators, we can set up and practice algorithms to become proficient at all sorts of skills, such as the complex algorithm in a rare but critical anesthesia emergency like malignant hyperthermia. With simulation, we can give someone endless opportunities to practice this until there is demonstrated competency."

Many patient safety issues relate to not only the competence of the individual surgeon or anesthesiologist but also the teamwork required in any crisis situation. For example, how well do the surgeon, the nurse, and the anesthesiologist communicate in the surgery suite, especially when something goes wrong? During a code blue, which responder determines that a patient

has had a cardiac arrest and has not just choked on a piece of food from the hospital tray? Simulation can be used to provide students and residents with a closer approximation of reality and give them the skills they will need in a team setting.

Simulation jump-starts students' skills

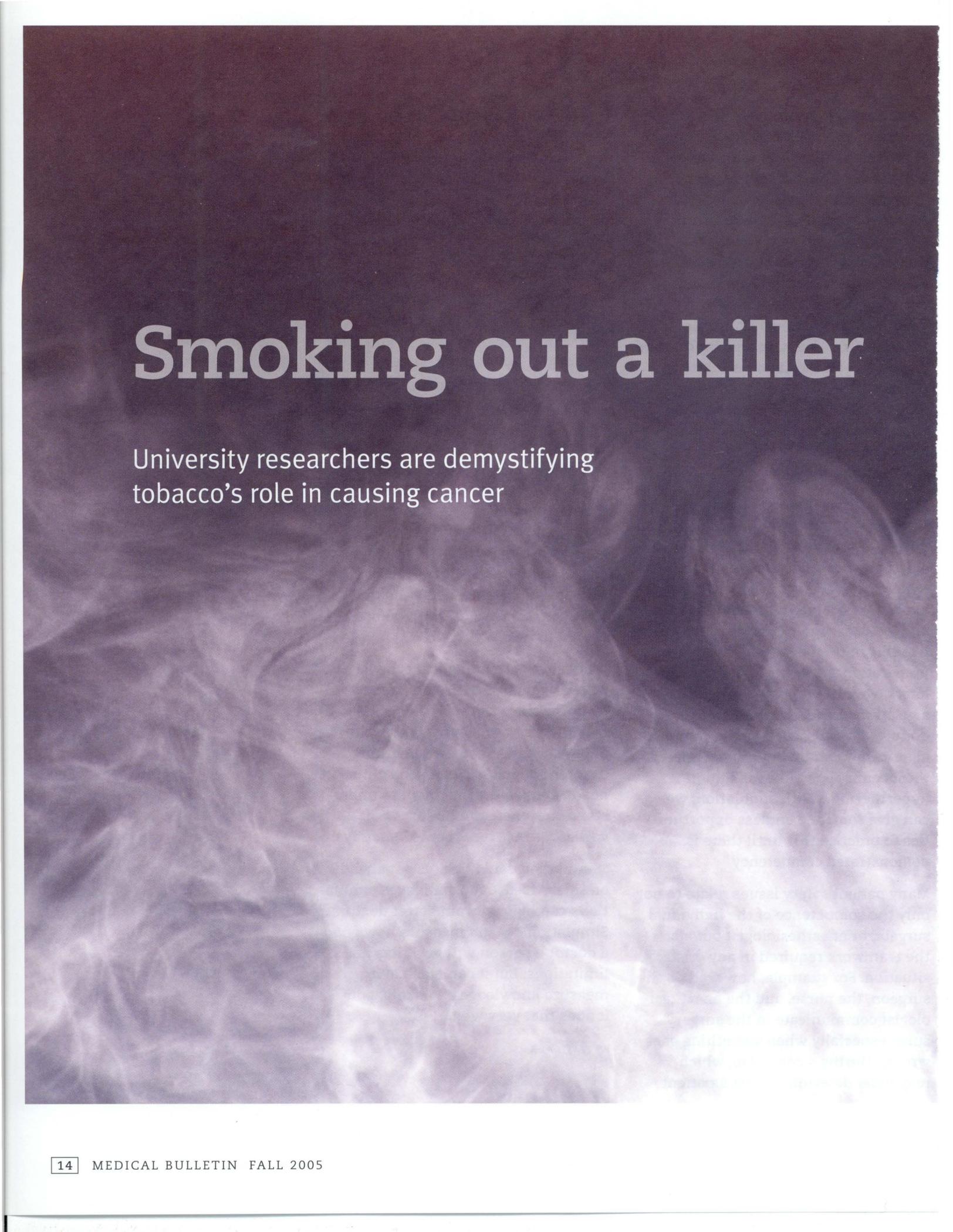
"Medical students come to the University wanting to do real work and offer real skills, and in the past they spent two years in the classroom before they could get out there and do anything," explains Kathleen Watson, M.D., senior associate dean for education at the Medical School. "What simulation does is jump-start their education by giving them experiences that will allow them to do straightforward tasks safely. I compare this to when I was unleashed on the perhaps-not-unsuspecting but tolerant public. I needed to do maybe 15 sticks in a patient's arm before I could draw blood."

Watson says that medical schools haven't changed their approach to teaching since the early 1900s. "We teach to what we expect, and we're always surprised when something different happens. Yet a good clinician needs to have the judgment to understand that there are hundreds of variations on every theme," she says.

"Simulation could help us get ahead on this. At least at a skill level, simulations can help us train better doctors. Simulation doesn't measure how good a doctor a person will be. It has its limitations. But it can teach and measure knowledge and skills, and it does that very well." MB

BY FAITH ADAMS

Simulators can be composed of physical models, which may look and feel like real tissue, while virtual reality simulators involve navigating lifelike instruments in a computer-generated model. Some simulators are a combination of virtual and physical models.



Smoking out a killer

University researchers are demystifying tobacco's role in causing cancer



here is a reason why people have labeled cigarettes “cancer sticks.” When smoked, tobacco products cause 87 percent of lung cancers and account for about 30 percent of all cancer deaths. In the 1980s, the U.S. surgeon

general declared that cigarette smoking is the “major single cause of cancer mortality in the United States.” Each year in the United States, tobacco smoke kills 400,000 smokers and about 50,000 nonsmokers—more deaths than those caused by alcohol, car accidents, suicide, AIDS, homicide, and illegal drugs combined.

Researcher Stephen Hecht, Ph.D., can confidently recite the sobering statistics linking cancer with smoking. He has steeped himself in tobacco-related cancer research for more than 30 years, almost a decade of which has been at the University of Minnesota Cancer Center. And if someone tells him he is obsessed, he is unlikely to deny it.

“You can’t come up with new research questions and findings unless your mind is prepared, and preparing your mind doesn’t happen by sitting under an apple tree,” explains Hecht, who holds the Wallin Land-Grant Chair in Cancer Prevention and the American Cancer Society Research Professorship and codirects the University’s Transdisciplinary Tobacco Use Research Center. “It happens by thinking about this stuff every single day, not to mention in your sleep.”

Hecht and his colleagues, many of whom work within the Cancer Center, have committed their careers to identifying and staving off the threats that tobacco poses to health, particularly when it comes to cancer. It is a mission that is both multifaceted and mind-boggling.

Tracking cancer’s path

For Hecht, knowing that tobacco causes cancer is not good enough. He and his team want to know why cancer occurs in those who smoke—as well as why it doesn’t. There are more than 60 cancer-causing substances, or

By knowing which steps in the cancer development process are most important, one can come up with drugs or find naturally occurring substances that can influence those steps — and eventually, perhaps, prevent tobacco-related cancer in those exposed.

— Stephen Hecht, Ph.D.,
University of Minnesota
Cancer Center

carcinogens, in tobacco smoke. But despite smokers' uniformly intense exposure to these carcinogens, only about 20 to 25 percent of smokers actually get lung cancer. Why the majority remain cancer-free is a puzzle that Hecht and his colleagues are close to solving.

A major contribution to the team's progress has been their discovery of what scientists call "biomarkers," the particular byproducts that develop after the body metabolizes tobacco-specific carcinogens. For example, the strongest carcinogen linked to tobacco use is a chemical commonly known as NNK. Researchers at the Cancer Center have found that the most reliable biomarker for NNK is a metabolite called NNAL—an essential key to understanding how harmful tobacco toxins really are in humans.

Once the metabolites of the carcinogens form in the body, they react chemically with the DNA in genes, which causes substances called DNA adducts to form. Hecht and his colleagues (as well as other researchers) have found that DNA adducts are "absolutely critical" in the development of cancer because they change the sequence of DNA and can lead to uncontrolled cell growth, the basic step to cancer. The good news is that once the DNA adduct forms, the body usually has a DNA repair process that can fix the DNA and remove the adduct.

"All of these steps—from exposure to metabolism to the development of DNA adducts to the repair process—can vary from individual to individual," says Hecht. "Gradually, our team is discovering the intricacies of the

process: why some people metabolize cancer-causing substances better than others, and why some people are better able to remove them from the body more effectively."

Studying tobacco and cancer at such a molecular level is critical to preventing further disease, says Hecht. "By knowing which steps in the cancer development process are most important, one can come up with drugs or find naturally occurring substances that can influence those steps—and eventually, perhaps, prevent tobacco-related cancer in those exposed."

Reducing smokers' risk: Too good to be true?

As any smoker will admit, kicking the habit is easier said than done. Most smokers in the United States want to quit. But while 41 percent of smokers actually attempt to quit in a given year only 4.7 percent successfully stop for 3 to 12 months. So when smokers are told that they may be able to reduce their tobacco-related cancer risk without quitting, it can sound pretty attractive.

For Dorothy Hatsukami, Ph.D., and her colleagues, however, healthy skepticism comes by way of sound science. "Years of research have found that nicotine is incredibly addictive when delivered as a tobacco product, and some smokers switch to tobacco products that they think are safer—for example, light or ultralight cigarettes—to allow themselves to continue smoking," says Hatsukami, who directs the University of Minnesota Transdisciplinary Tobacco Use Research Center and holds the Forster Family Professorship in Cancer Prevention. "Our goal is to protect the public from being misled about these products." Using the

Dorothy Hatsukami, Ph.D., is using the biomarkers identified through the research of colleague Stephen Hecht, Ph.D., to study the true cancer risk of cigarettes labeled “light” and “ultralight.”

biomarkers Hecht and his colleagues have identified, the TTURC team is exploring the effectiveness of various methods for reducing harm associated with smoking.

One way that tobacco use can be purportedly less harmful is through the use of so-called “reduced-exposure” tobacco products, which tobacco manufacturers have developed over the past several years. Some work by altering the tobacco curing process. Others work by adding chemicals or genetically modifying the tobacco. By enlisting study participants to use the products and then measuring the level of NNAL and other biomarkers, the team has determined that the reduced-exposure products currently on the market are ineffective in reducing disease. They hope that the results of these and future studies will have a positive impact on public health.

“The main point in doing this work is to make sure consumers are informed,” says Hatsukami. “Of course, tobacco companies currently have the right to continue to sell their products with as many toxins in them as they wish. But what we can do is provide more strong evidence for the need for FDA regulation, which may then require the tobacco companies to reduce toxin levels in their products.”

Using “light” cigarettes was once touted as a way to reduce disease risk. In response to the U.S. surgeon general’s landmark 1964 report that declared a link between cigarette smoking and

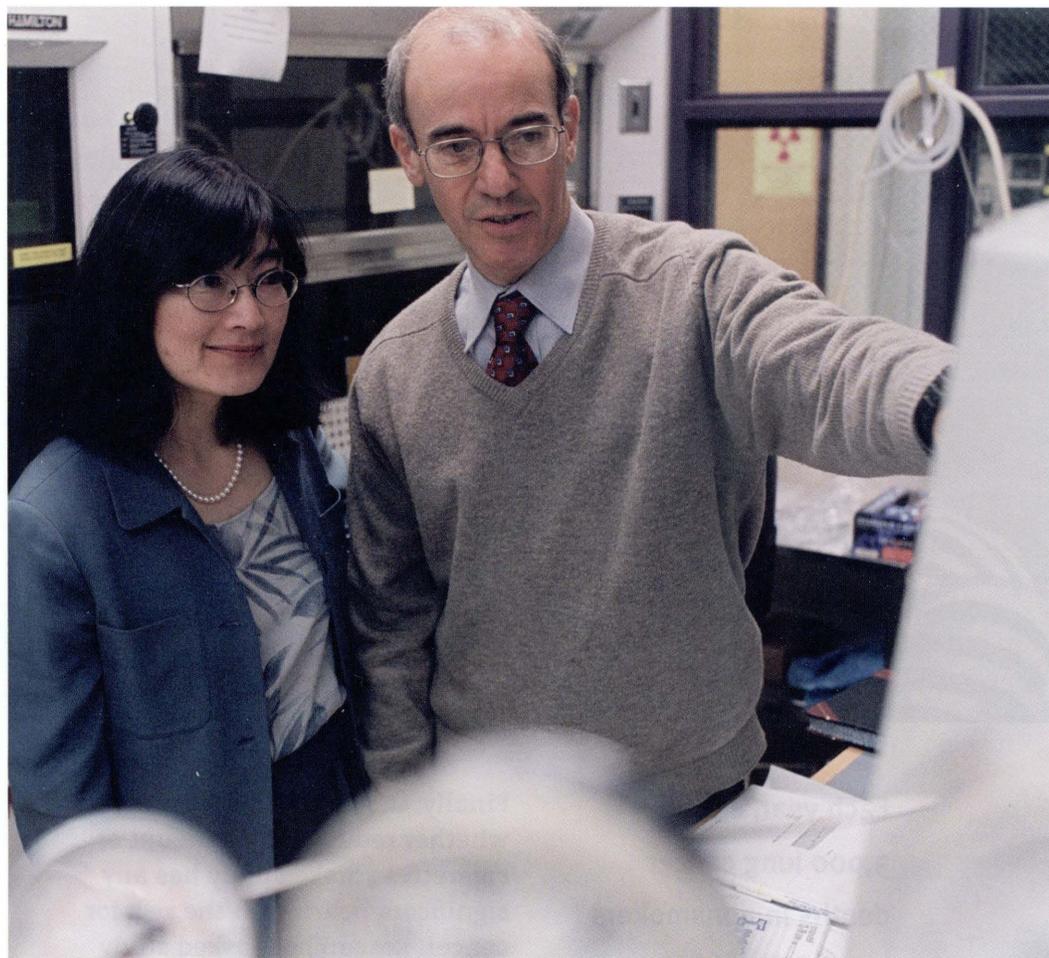


PHOTO: RICHARD ANDERSON

cancer, tobacco manufacturers introduced filters and lowered the machine-measured levels of tar and nicotine levels that their cigarettes produced. The implication to consumers is that lower-tar or light cigarettes are somehow associated with reduced risk. But when Hecht and his colleagues measured the levels of NNAL among smokers of regular, light, and ultralight cigarettes, they found no significant differences among the three groups.

“With no detectable difference, we have to conclude that there would be no decreased risk for lung cancer in smokers of ultralight and light cigarettes,” explains Hecht. “So the findings reinforce the message to consumers that these products really aren’t safer at all.”

For most smokers, reducing the number of cigarettes smoked per day – even significantly – may not improve their cancer risk. The best way to reduce disease continues to be quitting altogether.

– Dorothy Hatsukami, Ph.D.,
University of Minnesota
Cancer Center

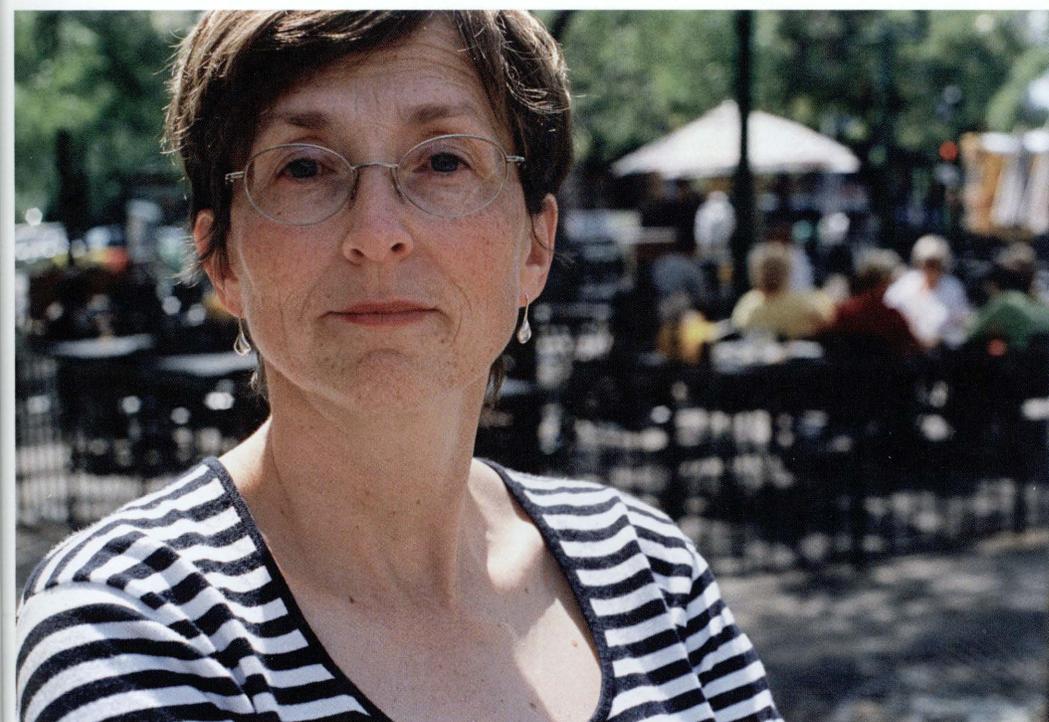


PHOTO: RICHARD ANDERSON

Each year, about 3,000 lung cancer deaths in nonsmokers are attributable to environmental tobacco smoke. In one study, lung cancer rates were 20 percent higher in women who work or live in smoky environments compared with those not exposed to tobacco smoke.

Finally, the TTURC team has explored whether reducing the amount of cigarettes smoked daily has any significant bearing on the risk for cancer. Researchers asked study participants to reduce their smoking by 50 to 75 percent, then they measured their NNAL levels. While the reducers did lower their levels of this carcinogenic biomarker, the decreases were modest compared with how much they reduced their cigarette intake. Reducing cigarettes by 55 percent to 90 percent, for instance, yielded an NNAL reduction of only 27 to 51 percent.

“The take-home message here is that for most smokers, reducing the number of cigarettes smoked per day—even significantly—may not improve their cancer risk,” says Hatsukami. “Smokers who cut back may even be compensating by taking larger puffs of the cigarette or puffing more frequently, which may counteract whatever benefits could occur from the cigarette reduction itself. The best way to reduce disease continues to be quitting altogether.”

Public health researcher Kristin Anderson, Ph.D., has authored groundbreaking studies on passive smoke in public places. The results show that nonsmokers exposed to smoky casinos, bars, and restaurants have significantly higher levels of cancer-causing substances in their bloodstreams.

Insights on secondhand smoke

In the past few years, several counties and cities in Minnesota have enacted smoking ordinances that prohibit smoking in public venues, including restaurants and some bars. Despite the fervor surrounding these new ordinances, some people are still unaware—or unconvinced—that exposure to environmental tobacco smoke can cause cancer in nonsmokers.

Each year, about 3,000 lung cancer deaths in nonsmokers are attributable to environmental tobacco smoke. In one study, lung cancer rates were 20 percent higher in women who work or live in smoky environments compared with those not exposed to tobacco smoke. These figures can be tough to ignore.

But if there remains any doubt about the connection between secondhand smoke and cancer, public health researchers Kristin Anderson, Ph.D., and Ozlem Tulunay, M.D., hope they can dispel it for good. The two, along with fellow investigators, have completed studies examining the connection between exposure and increases in tobacco-specific cancer-causing chemicals in the body. Anderson examined the effects in nonsmokers exposed to secondhand smoke in casinos, while Tulunay analyzed how environmental tobacco smoke affects employees who work in bars and restaurants that permit smoking. In both studies, the nonsmokers were exposed to passive cigarette smoke for several hours.

The results showed significant increases in nonsmokers' NNAL levels in both situations. In the casino study, NNAL levels increased more than twofold. In the bars and restaurants study, nonsmoking employees had up to 4.5 times more total NNAL in their blood after working their shift.

"I think the public health message is that it's not a benign exposure," says Anderson, an associate professor in the School of Public Health. "It is a potentially harmful exposure because we have carcinogens in our blood and body that would not be there if we did not have that exposure. And lung cancer is just one of many health effects possible through passive smoke exposure."

The road ahead

The work on cancer-related tobacco research moves forward at a frenzied pace. But for the investigators involved, it seems to be the pace that's most comfortable. While they are publishing their work with one brand of reduced-exposure tobacco product, they are working on another. As they use NNAL and other tobacco-related biomarkers to examine the toxicity of smoking, they continue to evaluate precisely how effective these markers are in predicting cancer in humans. While they work to identify those who are most susceptible to developing cancer, they are also identifying the mechanisms of addiction—what makes people so hooked on nicotine—and what can be done to combat that addiction.

Most recently, Hatsukami has been working with Paul Pentel, M.D., and other colleagues to develop and test a so-called "nicotine vaccine." The goal is to stimulate the immune system to

deliver less nicotine to the brain and, therefore, fewer pleasurable effects from smoking. The vaccine has shown promising results, according to Hatsukami, and the team plans to do clinical trials with it in the near future.

"The fact that our work involves so many different research angles demonstrates how all-encompassing it can be to combat tobacco-related cancer," she says. "You have to focus on the biomolecular level of exposure, examine the toxicity of the tobacco products themselves, find ways to prevent initiation and addiction in the first place, identify and support those policies that reduce the incidence of smoking, and help people who want to quit. It's really an interdisciplinary effort."

It may seem to be a long and winding road, but to Hecht, the public health impact of his team's work is already upon them.

"All of our work ties together," says Hecht, and it all contributes to the general effort to protect consumers via taxation (also known as "user's fees"), legislation (such as smoking ordinances), public education, anti-tobacco advertising, and smoking cessation.

"We're making a difference now, certainly," he says, "but we also know we can't stop. We've only scratched the surface." ^{MB}

BY JEANNE METTNER

Breakthrough research holds promise for treating Alzheimer's

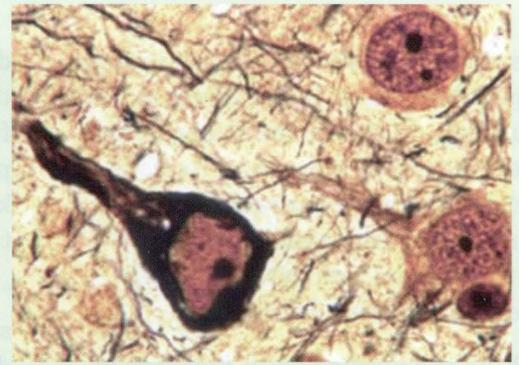
SCIENTISTS HAVE LONG BELIEVED that the effects of Alzheimer's disease are irreversible. Now, new research out of the University of Minnesota is turning those old presumptions upside down. For the first time, researchers have figured out a way to reverse memory loss in mice with dementia—a breakthrough discovery that offers hope to the more than 4 million Americans living with Alzheimer's disease.

The research team first manipulated the genetic makeup of the mice so that they developed significant brain degeneration with symptoms of increasing memory loss similar to what those with Alzheimer's disease experience. They then further designed the mice so the transgene that causes these symptoms could be "turned off."

The team predicted that under these conditions, memory loss would be halted. However, the results surpassed their expectations: The mice's symptoms were reversed—in other words, they regained memory.

"Most Alzheimer's disease treatments focus on slowing the symptoms or preventing the disease from progressing," says lead investigator Karen Hsiao Ashe, M.D., Ph.D., "but our research suggests that in the future, we may be able to reverse the effects of memory loss." Ashe holds the Edmund Wallace Tulloch and Anne Marie Tulloch Chairs in Neurology and Neuroscience.

"If meaningful improvement in function is a real possibility, that will make it much easier to test experimental treatments," says William H. Thies, Ph.D., who oversees medical and scientific



This neurofibrillary tangle is from a seven-month-old mouse brain. The picture shows a healthy neuron to the right and a damaged neuron to the left. University of Minnesota researchers now suspect that neurofibrillary tangles like these are a symptom of Alzheimer's, not a cause of the disease.

affairs for the Alzheimer's Association. "That could accelerate drug development significantly," he adds.

The research results were published July 15 in the journal *Science* and widely reported in the local and national media. MB

Minnesota partners with Belgian university to advance stem cell research

Two days after the Stem Cell Institute opened the doors to its new home in the McGuire Translational Research Facility, leaders from the University of Minnesota met with peers from Katholieke Universiteit Leuven (Catholic University of Leuven, Belgium) to sign a ceremonial pact to develop joint and collaborating stem cell institutes. The affiliation agreement will pave the way for an academic alliance between the two institutions, including an exchange of faculty and students, joint research projects, and conferences.

Earlier this year, University officials announced that Catherine Verfaillie, M.D., director of Minnesota's Stem Cell

Institute, will return to her home country to lead the Stem Cell Institute in Leuven. "I am excited to return to Belgium," says Verfaillie, "but I am most excited by the potential to take our stem cell research efforts to a more global level." Verfaillie will remain on the University of Minnesota faculty for the next two years as she works to build the transatlantic partnership.

"For researchers to realize the full promise of stem cells and this science, nothing is more important than the global relationship we are building," says Frank Cerra, senior vice president for health sciences at the University of Minnesota.

Established in 1425, Leuven is the oldest Catholic university in Europe and, with 30,000 students, one of the largest in northern Europe. Its Stem Cell Institute is considered one of the top five in Europe.

The University of Minnesota Stem Cell Institute, established in 1999, has more than 500 people in 17 schools and centers participating in stem cell research. It is the world's first interdisciplinary institute dedicated to uncovering the potential of stem cells to improve human and animal health. MB

Two Medical School leaders named to national posts

MARC SWIONTKOWSKI, M.D., head of the Department of Orthopaedic Surgery, has been selected as the 118th president of the American Orthopaedic Association, the world's oldest and most distinguished orthopaedic association.

"I look forward to assisting in the continuous advancement of the organization and working with the leaders of orthopaedics to tackle the issues we face," says Swiontkowski.

A codirector of the University's Clinical Outcomes Research Center, Swiontkowski also serves on the University of Minnesota Physicians board and the American Board of Orthopaedic Surgery. He is also on the executive committee for the American Board of Medical Specialties.



LOUIS LING, M.D., associate dean for graduate medical education, has been named president of the American Board of Emergency Medicine. The board is responsible for setting the credentialing requirements and examinations to evaluate physicians who are seeking certification in emergency medicine.

"It's an honor for me to assume this position," says Ling, who earned his medical degree at the University of Minnesota. "With the concept of continuous certification, it is a challenge to develop new methods of evaluation that are valid and not burdensome for physicians."

Ling is a past president of the Society for Academic Emergency Medicine. He's practiced emergency medicine at Hennepin County Medical Center for more than 20 years. MIB



Stem cell discovery may open a door to future treatments

Researchers at the University of Minnesota have identified a group of 14 genes that affect the development and function of blood stem cells. This promising discovery brings scientists one step closer to harnessing the power of stem cells to treat diseases such as blood disorders, leukemias, and lymphomas.

Every day, blood stem cells divide and differentiate to generate roughly 200 billion new blood cells in an average adult's bone marrow. To maintain their numbers over time, blood stem

cells can also divide and give rise to new blood stem cells through a process called self-renewal. Until now, the unanswered question was which genes control the self-renewal and differentiation processes, and how these genes can be used to influence—or regulate—these processes.

"If we can find a way to coax blood stem cells to self-renew and thus expand in the laboratory, doctors will have more options in treating diseases," explains Catherine Verfaillie, M.D., who directs

the University's Stem Cell Institute. For example, this research provides insight into how to stimulate blood stem cells to multiply so scientists can generate enough cells from a single umbilical cord to treat more patients.

The research was published in the July issue of the journal *Public Library of Science Biology*. Verfaillie holds the Andersen Chair in Stem Cell Biology and the Edmund Wallace Tulloch and Anna Marie Tulloch Chairs in Stem Cell Biology, Genetics, and Genomics. MIB

Once again, University hospital ranks among the best

THE UNIVERSITY OF MINNESOTA Medical Center, Fairview is now ranked among the nation's best in 10 specialties, according to the *U.S. News & World Report* "America's Best Hospitals 2005" issue.

This news puts the medical center—the core teaching facility for the University of Minnesota Medical School—in elite company. Of more than 6,000 hospitals in the country, only 176 scored high enough to rank in even one of the 17 specialties surveyed.

"It's fantastic news," says hospital president Gordon Alexander, M.D. "[It] shows the breadth of talent we have in this organization. It's physicians, nurses, researchers, therapists, and other caregivers making a difference in the lives of our patients every day."

The 10 specialties where the University of Minnesota Medical Center, Fairview, ranked among the nation's top 50 are: cancer; ear, nose, and throat; geriatrics; gynecology; hormonal disorders; kidney diseases; neurology/neurosurgery; orthopaedics; respiratory diseases; and urology.

In 2004, the hospital was ranked in seven specialties. MIB



Minnesota researchers lead benchmark study on bone marrow transplantation

Patients who are undergoing bone marrow transplants from unrelated donors face the risk of a potentially lethal complication known as graft-versus-host-disease (GVHD). To prevent this, doctors usually rely on one of two strategies: depleting the T-cells that cause GVHD, or suppressing the T-cell function through immunosuppressive drug therapy.

In an effort to better understand the relative success of these two strategies, University of Minnesota researchers led colleagues at 16 other U.S. institutions

in conducting the largest study to date on patients with leukemia and related disorders.

While the trial results showed similar survival rates, the study is the most comprehensive on record, evaluating not only clinical outcomes but also the accompanying resources, costs, and quality of life. Because of the vast amount of information collected, the study will likely serve as the benchmark for all future studies in this patient population.

John E. Wagner, M.D., was lead author of the study. Wagner is director of the

Division of Pediatric Hematology-Oncology and Blood and Marrow Transplantation as well as scientific director of clinical research at the Blood and Marrow Transplantation program and Stem Cell Institute. He holds the Albert D. and Eva J. Corniea Chair and the Variety Children's Association Chair in Molecular and Cellular Therapy.

The study was published in the August 3 online issue of *The Lancet*. MIB

Duluth medical volunteers visit 58 public schools to promote brain awareness

Student, faculty, and staff volunteers from the Medical School–Duluth took their show on the road this past spring, visiting 144 classrooms across Minnesota as part of Brain Awareness Week 2005. The presentations reached approximately 4,460 students—twice as many as last year—in public schools as far away as Austin, Morris, and Warroad.

The program was also introduced to some of the state's reservation schools, thanks to a collaboration with the Uni-

versity's Center for American Indian and Minority Health.

This year's vast expansion was accomplished during spring break with help from 59 medical students, some of whom used the opportunity to fulfill the community service component of their Medical School preceptorships.

The medical student volunteers were joined by 10 Medical School–Duluth faculty members, 2 UMD faculty members, 4 preceptors, 5 postdoctoral

and staff members, and 13 undergraduate biology students.

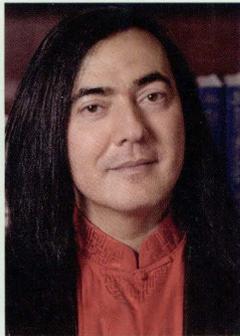
Brain Awareness Week is an international initiative started in 1996 to further the public's understanding of neuroscience.

The University of Minnesota's participation is sponsored by the Academic Health Center, Medical School, Minnesota Medical Foundation, and the graduate program in neuroscience. MB

University hires world leader in developmental psychopathology

Dante Cicchetti, Ph.D., is joining the University of Minnesota faculty this fall in a dual appointment in the Medical School's Department of Psychiatry and the Institute of Child Development in the College of Education and Human Development.

Widely regarded as the world's leading figure in developmental psychopathology, Cicchetti received his doctorate in clinical psychology and child development at the University of Minnesota in 1977. He will hold the McKnight Presidential Chair and eventually the Harris Endowed Chair. He will also become director of a major interdisciplinary center in collaboration with the city of Minneapolis.



“Hiring a leading light like Dante Cicchetti dovetails with the priority we've placed on making the U of M a leader in understanding human development across the lifespan,” says University president Robert Bruininks. This is one of eight interdisciplinary initiatives Bruininks and his administration have identified as key to sustain-

ing and growing the University as a top public research institution.

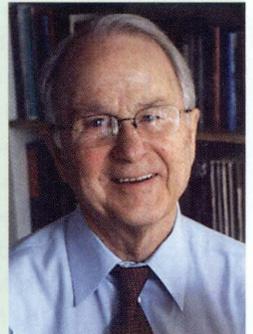
Cicchetti comes to Minnesota from the University of Rochester in New York, where he's been on the faculty since 1985. MB

Professor honored for lifetime service to children

In June, the Department of Pediatrics presented the prestigious Gold-Headed Cane Award to Paul Quie, M.D., who is recognized as an exceptional pediatric researcher, educator, and clinician.

“It is an honor to be recognized by people you work with,” says Quie. “They know the good and the bad.”

Quie is a Regents Professor of Pediatrics in the Infectious Diseases Division and codirector of the University of Minnesota's International Medical Education and Research (IMER) program. He has been on the Medical School faculty since 1958. MB



New position to lead clinical research initiatives

THIS FALL, JASJIT SINGH AHLUWALIA, M.D., M.P.H., is joining the University faculty in a newly created position as executive director of the office of clinical sciences in the Academic Health Center, associate dean for clinical research in the Medical School, and professor in the Department of Medicine. In this role, he will be charged with developing collaborative interdisciplinary research programs and new clinical research initiatives. He will also continue to pursue his own research interests, which center on smoking cessation and health care disparities among minority populations.

“Dr. Ahluwalia exemplifies the latest generation of clinical investigators, combining outstanding scientific skills with commitment to clinical research programs that improve the health of our communities,” says Deborah Powell, M.D., dean of the Medical School.

Ahluwalia earned his M.D. and M.P.H. from Tulane University in 1987 and completed residency training in internal medicine at the University of North Carolina School of Medicine at Chapel Hill. He also received his M.S. from the Harvard School for Public Health.

In June 2004, Ahluwalia was named a fellow of the Association of American Medical Colleges Council of Deans. Most recently, he was professor and chair of the Department of Preventive Medicine and Public Health at the University of Kansas School of Medicine and director of the school’s M.S. degree program in clinical research. MIB

After 41 years, McCollister says goodbye

Robert McCollister, M.D., may have officially retired last winter, but you’d never know it by visiting his office on the sixth floor of the Mayo Building. After 41 years at the University of Minnesota Medical School—most of them as associate dean of curriculum affairs—he’s still reporting to the office to write student evaluations, help with admissions, and sort through the stacks of memories that accumulate during a long and dedicated career.

Over the years, McCollister has seen firsthand how the Medical School has evolved to meet the needs of students, patients, and the changing health care field. Hired in 1964 as a part-time assistant dean of student affairs, he arrived at the University at a time when the Medical School was developing a new constitution, formally adopted in December 1965. Soon after, he was invited to join the dean’s office in support of the Educational Policy Committee, an initiative led by Richard

Ebert, M.D., head of the Department of Medicine, to examine and redefine the Medical School’s curriculum. Some of the committee’s work can still be found in today’s curriculum, including its emphasis on pathophysiology, early experiences with patients, and a flexible scheduling policy that allows third- and fourth-year students the chance to explore specialties, research projects, additional electives, and international study.

McCollister also says he’s encouraged by the growing number of students pursuing opportunities to study and practice overseas. Such opportunities were promoted even before the Office of International Medicine was established in 1997; now, with more financial assistance, the number is growing even higher, to the benefit of everyone.

“Students were always number one for all of us who worked in the Office of Curriculum Affairs and in Student Affairs,” he says. “Even in times when resources were extremely limited, the



PHOTO: MARK ENGBRETSON

emphasis was on treating all students equally and fairly.”

Retirement may finally allow McCollister more leisurely hours; however, the transition may not come easily. “I look forward to joining the many other faculty members who continue to contribute their efforts on behalf of the Medical School,” he says. MIB

President's Column

Alumni Connections

DEAR ALUMNI AND FRIENDS of the MEDICAL SCHOOL:

I AM HONORED to begin my service as president of the Medical Alumni Society. I have served for five years on the society's general board of directors and have learned a great deal from our previous presidents, Dick Carlson and Gene Ollila.

A strong University-based medical school is essential to our state. In Minnesota, the majority of practicing physicians were educated at the University of Minnesota Medical School and its affiliate teaching hospitals in some way — either through residencies, fellowships, or the medical degree program. In addition, 53 percent of last year's graduates began residency training in Minnesota.

Alumni support comes in different ways, and it is vital to our Medical School's strength. Support may include political advocacy, financial contributions, doing volunteer work such as student mentoring, or simply supporting the Medical School in conversation.

After completing 12 years of education at the University of Minnesota, I have seen firsthand the importance and value of committed alumni involvement in

University programs. I began my studies here in 1983 as an undergraduate child psychology major and went on to earn my law and medical degrees at the University.

I'm looking forward to working with Dean Powell and the Medical Alumni Society board to develop new goals for the next few years and to see new initiatives completed.

The lines of communication are open with you, our alumni, and with the community at large. As we move forward, I welcome your ideas, comments, and feedback. You can reach me through the Medical Alumni Society at MAS@mmf.umn.edu. You can also get help finding a classmate or update your contact information by sending an e-mail to this address.

I'm looking forward to moving ahead as president, and I welcome your help in maintaining and advancing our outstanding Medical School.

Sincerely,

Martin J. Stillman, J.D., M.D., '97
President, Medical Alumni Society

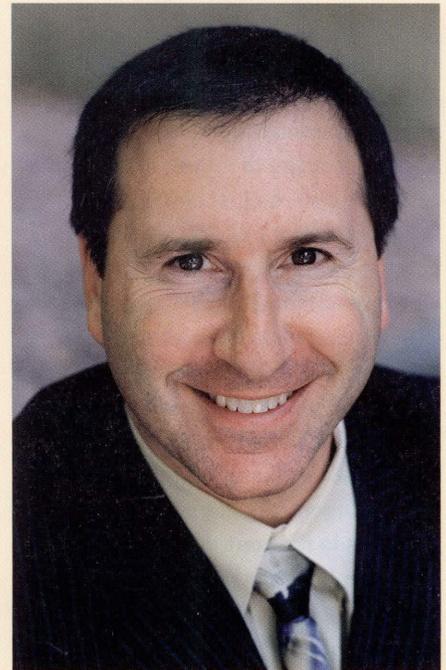


PHOTO: RICHARD ANDERSON

MEET THE NEW PRESIDENT

NAME: Martin J. Stillman, J.D., M.D.

AGE: 39

PROFESSIONS: Internist at Hennepin County Medical Center; assistant professor of medicine at the University of Minnesota; attorney

EDUCATION: B.A. in child psychology from the University of Minnesota, 1987; J.D. from the University of Minnesota Law School, 1993; M.D. from the University of Minnesota Medical School, 1997

FAMILY: wife Amy Susman-Stillman, Ph.D., is a child psychologist; son Jacob is 5½; daughter Ruby is 3

HOBBIES: anything with family, especially camping, exercising, and traveling

Dr. Stillman was featured in the June 2005 issue of *Minnesota Medicine*, a publication of the Minnesota Medical Association. To read the full article, visit www.mmaonline.net/publications/MNMed2005/June/Stillman.html.

Alumni Spotlight | Mark Banks

On a mission to stamp out smoking

IT'S FAIR TO SAY that Mark W. Banks, M.D., never planned to get into the health insurance business. As he followed his desire to influence the future of health care, he just landed there.

"Careers, just like life, are sort of created by serendipity," says Banks, who graduated with the Class of 1976.

Serendipity has been good to Banks, who is now president and CEO of Blue Cross Blue Shield of Minnesota. He took his first crack at health care administration in 1981 as a member of the Peer Review Organization, one of the first attempts in the country to evaluate quality in health care. Four years later, he joined a small health plan in St. Paul called Coordinated Health Care while continuing his work as an internist at what was then known as St. Paul-Ramsey Medical Center.

Mark has an unwavering commitment to reducing tobacco in Minnesota. He's provided the resources needed to make an impact on smoking rates.

— Marc Manley, M.D., Center for Tobacco Reduction and Health Improvement

Eventually, Coordinated Health Care merged with Blue Cross, and Banks "came along with the baggage," he says. Banks became a full-time administrator and worked his way up the ladder. In 2000, he was promoted to president and CEO. With 2.6 million members, Blue Cross Blue Shield is now Minnesota's largest nonprofit health plan.

Under Banks's leadership, the company is pushing forward to create a healthier Minnesota by attacking the underlying factors that contribute to the most common causes of preventable death in the state: tobacco use, physical inactivity, and poor nutrition.

But it's in the area of tobacco use that Blue Cross is doing some exceptionally interesting—even groundbreaking—work.

In 1994, the company teamed up with the state of Minnesota to file a landmark lawsuit against the tobacco industry, seeking to recover damages for excess health care costs it paid because of smoking-related illnesses for its fully insured groups.

The lawsuit was settled in 1998 for \$412 million. Blue Cross—with Banks, who served as president and chief operating officer at the time—then devised a way to use that money to help make the state a healthier place to live and work.

Under an initiative called A Healthier Minnesota, \$241 million was set aside for smoking cessation, heart disease prevention, and cancer prevention programs during a 10-year time frame. Another \$30 million was earmarked for community clinics, plus \$70 million for a state plan for hard-to-insure individuals and about \$30 million for payouts from a soon-to-be settled class-action suit filed by individual, supplemental Medicare, and group insurance buyers.

Knowing that the money from the lawsuit could be tied up in litigation for several more years, Blue Cross started funding the disease prevention efforts internally. The company established the Center for Tobacco Reduction and Health Improvement immediately following the 1998 settlement to start fighting the



PHOTO COURTESY OF BLUE CROSS BLUE SHIELD OF MINNESOTA

state's leading causes of preventable death. Banks, for one, didn't want to wait any longer.

"As a physician, Mark has seen the suffering caused by tobacco use," says Marc Manley, M.D., the center's executive director. "As CEO of Blue Cross, he understands the financial costs of smoking. Mark has an unwavering commitment to reducing tobacco in Minnesota. He's provided the resources needed to make an impact on smoking rates. He has remained committed to this work, even when the company has been criticized for it."

Between 1999 and 2003, Blue Cross has seen the number of its adult members who smoke drop from 14.7 percent to 12.4 percent—a 15 percent decrease.

Banks isn't ready to stop there. He wants Minnesota to have one of the lowest smoking rates in the country again. Blue Cross is poised to repeat the study, and he is hoping for another big drop in the percentage of smokers.

"We'd love to get [the smoking percentage of the company's membership] down to single digits," Banks says, "and that's hard."

With a little serendipity, who knows what's ahead? **MB**

Remembering Alumni Reunion Weekend 2005

IN MAY, MORE THAN 180 Medical School alumni and another 139 guests descended on the University of Minnesota campus to celebrate Reunion Weekend 2005.

The celebrations started May 20 with Alumni Day at the Medical School, where alumni from eight celebrating classes between 1945 and 1995 heard updates on medical education and research at the University, toured ophthalmology and neurosurgery labs, and learned about the contents of a 1911 time capsule found last year during renovation work at Jackson Hall. Later that evening, distinguished alumni and friends were honored at the Alumni Recognition Banquet.

The weekend's festivities concluded on May 21 with individual class dinners at the McNamara Alumni Center. Members of the Class of 1950 were especially pleased with the location of their reunion dinner, the Heritage Gallery, where they were surrounded by reminders of great moments in University of Minnesota history.



LEFT Addy Murtaugh and Ralph Swanson, M.D., Class of 1955, share a smile and a hug at the reunion. Murtaugh's late husband, Robert Murtaugh, M.D., was one of Swanson's classmates.



BELOW Frederic Nemer, M.D., Julie Ollila, Barbara Milstein, and Howard Milstein, M.D., pose for a picture at the Class of 1970 dinner. Nemer and Milstein were celebrating their 35th reunion.



To see more photos from Alumni Reunion 2005, go to www.mmf.umn.edu/alumni/reunions.

Call for physician mentors

If you are a physician in the Twin Cities area, you're invited to help strengthen the connection between the community and today's medical students by taking part in the Connections mentoring program.

The program — offered cooperatively by the Medical School, Medical Alumni Society, Minnesota Medical Foundation, and Hennepin and Ramsey Medical Societies — pairs about 100 medical students with community physicians each fall. This gives students the opportunity to learn from someone who has made the transition from medical school to the real world of being a doctor. Mentors often learn from their students, too.

Registrations are due by Friday, October 21. Mentors and students will have a chance to meet at the Connections program kickoff breakfast on Friday, November 18.

To sign up for the program — or to learn more about being a mentor — visit www.mmf.umn.edu/goto/mentor. You may also call Emily Heagle at 612-624-9161 for more information. MIB

"A reunion like this is so treasured because of the memories it invokes," says Richard Simmons, M.D., cochair of the Class of 1955 reunion. "It was wonderful to see the familiar faces — some with a few more lines and wrinkles after 50 years or so." MIB

PHOTOS: TIM RUMMELHOFF

Don't miss Reunion Weekend 2006

Plans for the next round of class reunions are already in the works. This spring, the Medical School graduating classes of 1946, 1951, 1956, 1966, 1971, 1976, 1981, and 1996 will be invited to reconnect with their classmates and check out the latest developments at their alma mater on May 19 and 20, 2006.

As the date approaches, more information will be posted on the Minnesota Medical Foundation Web site at www.mmf.umn.edu/alumni/reunions. Information is also available by calling the alumni office at 612-624-9161 or 800-922-1663. MIB

In Memoriam

ROBERT C. AHLSTROM, M.D., Class of 1954, Braham, Minnesota, died December 21, 2004, at age 85. He is survived by his wife, Maxine, and four children.

ROBERT D. BLOMBERG, M.D., Class of 1939, Edina, Minnesota, died December 4, 2004, at age 89. He served in the navy in World War II at Pearl Harbor and in the Western Pacific. He practiced internal medicine in Minneapolis and in 1975 became chief of staff and director of professional activities at Abbott-Northwestern Hospital. He is survived by his wife, Ella, and three children.

WILLIAM A. BURROWS, M.D., Class of 1942, Sumner, Washington, died March 26 at age 88. He served in the navy during World War II in the South Pacific. He was a general practitioner and surgeon in the Puyallup Valley, Washington, for more than 40 years. He was preceded in death by his first wife, Loretta. He is survived by his second wife, Alberta, and five children.

MERRILL D. CHESLER, M.D., Class of 1942, Scottsdale, Arizona, died June 8 at age 86. He served in the army in World War II in Europe. He practiced plastic surgery for 30 years at Mount Sinai Hospital in Minneapolis and helped establish a cleft lip and palate clinic at the University of Minnesota. He was preceded in death by a son. He is survived by his wife, Grayce, and three children.

JAMES R. DOYLE, M.D., Class of 1949, Scottsdale, Arizona, died June 3 at age 82. He served in the army in World War II in Europe. He practiced general medicine and obstetrics in Rochester, Minnesota, and Arizona. He was preceded in death by his wife, Mary. He is survived by six children.

JOHN M. GROGAN, M.D., Class of 1943, Englewood, Colorado, died March 9 at age 86. He is survived by his wife, Jane, and three children.

EMERY A. JOHNSON, M.D., Class of 1954, Rockville, Maryland, died June 26 at age 78. He was a former assistant surgeon general and the longest-serving director of the Indian Health Service, part of the U.S. Department of Health and Human Services. He worked for the Indian Health Service throughout his career as a reservation staff physician and administrator. He is survived by his wife, Nancy, and four children.

KENNETH E. JOHNSON, M.D., Class of 1946, Mesa, Arizona, died June 1 at age 82. He served in the army during the Korean War. He practiced nephrology in Phoenix, Arizona, and was the first president of the Arizona Kidney Foundation. He was preceded in death by his wife, Joann. He is survived by three children.

THEODORE J. KONIG, M.D., Class of 1951, Prescott, Arizona, died April 14 at age 85. He served in the army during World War II. He worked as an internist for Kaiser Permanente in Los Angeles and San Bernardino, California. He is survived by a sister and two nieces.

FREDERICK H. LOTT, M.D., Class of 1939, Minneapolis, died April 1 at age 90. He practiced for almost 40 years as head pathologist at Northwestern Hospital in Minneapolis. He is survived by his wife, Artis, and three children.

DONALD P. McCORMICK, M.D., Class of 1941, Sun City, Arizona, died July 11 at age 90. He served in the army in World War II in Europe. He practiced surgery in Minneapolis from 1948 to 1984 and was a staff member at St. Mary's, Abbott, Methodist, North Memorial, and Unity hospitals. He is survived by his wife, Sylvia, and six children.

RICHARD A. NESS, M.D., Class of 1954, Goodyear, Arizona, died December 18, 2004, at age 77. He served in the navy and practiced ophthalmology during his career. He is survived by his wife, Dorothy, and five children.

CARL G. OELJEN, M.D., Class of 1968, Spokane, Washington, died August 13, 2004, at age 62. He served in the army in Vietnam. He practiced orthopaedic surgery in Wisconsin and Washington; since 2001 he practiced at the Veterans Administration Hospital in Spokane. He is survived by his wife, Carol, and two children.

ROBERT J. RICHARDSON, M.D., Class of 1938, Bloomington, Minnesota, died February 27 at age 91. He served in the army, practiced otolaryngology in Minneapolis, and was a clinical professor of medicine at the University of Minnesota. He is survived by his wife, Helen, and four children.

BERNHOFF R. SKOGMO, M.D., Class of 1940, Mitchell, South Dakota, died May 9 at age 90. He served in the army during World War II in the West Indies and Europe. He practiced family medicine in Mitchell, South Dakota, for 36 years before retiring in 1983. He is survived by his wife, Mildred, and five children.

JOSEPH L. WHELAN, M.D., Class of 1942, Grosse Pointe Woods, Michigan, died May 15 at age 87. He served in the army air forces during World War II. He established the first private neurology practice in Detroit in 1949 and was an assistant clinical professor of neurology at Wayne State University. He is survived by his wife, Gloria, and two children.

MICHAEL E. YABLONSKI, M.D., Class of 1967, New York City, died April 25 at age 64. He practiced ophthalmology, taught at Mount Sinai School of Medicine in New York, and was head of the Ophthalmology Department at the University of Nebraska Medical Center in Omaha from 1990 to 2000. He was preceded in death by a son. He is survived by his fiancée, Eileen, and seven children.

CLARENCE DENNIS, M.D., Ph.D.,

St. Paul, died July 11 at age 96. In 1951, he performed the world's first open-heart surgery using a multiple-screen blood oxygenator, a device he developed at the University of Minnesota. Although the patient died, his work on the heart-lung bypass machine was considered a major step forward in the cardiovascular field.

He earned a master's degree in physiology and a Ph.D. in surgery from the University of

Minnesota in 1938 and 1940, respectively. He received his medical degree at Johns Hopkins University.

He is survived by his second wife, Mary, four children, and two stepchildren.



WILLIAM H. KNOBLOCH, M.D.,

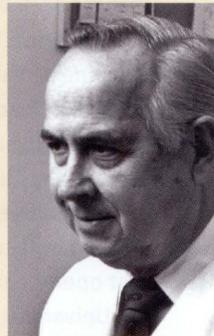
Frederic, Wisconsin, died June 20 at age 78. He served in the navy in World War II. He received his medical degree from the University of Oklahoma School of Medicine in 1952 and completed his residency in ophthalmology at the University of Minnesota in 1963. He joined the Department of Ophthalmology in 1964 as the first retinal specialist in Minnesota and served as director of the Vitreoretinal Service, interim department chair, and residency program director.

Knobloch received many awards including the University of Minnesota Medical School's Outstanding Teacher Award, the University of Minnesota Medical Alumni Society's Harold S. Diehl Award, and the Minnesota Academy of

Ophthalmology's Budd Appleton Award for service in ophthalmology.

In addition to teaching, he practiced in surgery and diseases of the retina until he retired in 1994. The William H. Knobloch Retina Chair at the University was established in his honor by thousands of his patients and the Minnesota Lions Club.

He was preceded in death by his first wife, Vel, and two children. He is survived by his second wife, Donna, and five children.



LEONARD M. SCHUMAN, M.D., Edina,

Minnesota, died May 31 at age 92. Schuman was a University of Minnesota professor emeritus and researcher who served on the first U.S. surgeon general's Committee on Smoking and Health from 1962 to 1964 and contributed to the first formal declaration from the government that smoking causes cancer. Schuman agreed to serve on the surgeon general's committee because he was a pack-and-a-half-a-day smoker. After reviewing the more than 6,000 pieces of literature, he and other panel members issued a unanimous report that there was a clear connection between smoking and disease. He quit smoking cold turkey.

Schuman received his M.S. in 1939 and M.D. in 1940, both at Case Western Reserve University in Cleveland. He began his career as a commissioned officer in the U.S. Public Health Service in 1941. In 1954, he joined the School of Public Health at the University of Minnesota and established the country's first doctoral program in epidemiology.

He was preceded in death by his wife, Marie. He is survived by two children.



Wangensteen the teacher

Former trainees credit him with encouraging and inspiring them to test their ideas

He said it himself: the best teachers are those who inspire excellence in others. Under that definition, Owen H. Wangensteen, M.D., Ph.D., ranks among the best of the best.

From 1930 to 1967, Wangensteen headed the University of Minnesota's Department of Surgery, where he broke ground in treatments for bowel obstruction and duodenal ulcer. And perhaps even more important, he trained many surgeons during his tenure who have gone on to blaze their own trails.

Wangensteen trained F. John Lewis, M.D., Ph.D., who led the world's first successful open-heart surgery in 1952 using hypothermia. Another Wangensteen trainee who participated in that surgery, C. Walton Lillehei, M.D., Ph.D., introduced the technique of cross-circulation in 1954. "In that development,

I was only the sideline cheerleader and the waterboy," Wangensteen once told an audience at the University of Minnesota. Richard A. DeWall, M.D., also a Wangensteen trainee, introduced the heart-lung machine a year later. Heart surgeries using a refined version of that heart-lung machine are still performed hundreds of times a day all over the world.

Wangensteen's "strong and abiding interest in research" is the reason that open-heart surgery was born at the University of Minnesota, says John S. Najarian, M.D., Wangensteen's successor as chairman of the Department of Surgery.

Two lions of transplant surgery also earned their Ph.D.s under Wangensteen's watch: Christiaan N. Barnard, M.D., Ph.D., the South African surgeon who performed the first human heart transplant in 1967, and Norman E. Shumway, M.D., Ph.D., the American who devised the technique for heart transplants.

Wangensteen never worried about his students rising to glories above his own, says J. Ernesto Molina, M.D., Ph.D., the last student to earn his Ph.D. under the great teacher. In fact, he says Wangensteen was proud when they did.

"He was never jealous," Molina says. "I had never seen a doctor like him. He considered himself just the helper to get everyone ahead."

Under Wangensteen's direction, the Department of Surgery rose to national acclaim. He remained deeply committed to his residents and fellows, who were like family to him. Wangensteen founded



When he was once asked to quantify Wangensteen's achievements, former Medical School Dean Harold S. Diehl chose to focus on his ability to inspire and develop young physicians. "It is an ability which great teachers possess and through which they gain a type of immortality."

Plant a tree for prosperity in the orchard of your profession. It will give you enduring satisfaction though you may never live to see it mature; its growth can project your image and wishes far into time and space.

— Owen H. Wangensteen, M.D., Ph.D.

the Surgical Forum at the American College of Surgeons as a chance for up-and-coming surgeons to share their ideas and research findings.

When Wangenstein spoke to his peers, he wouldn't cite what was written in the textbooks, Najarian says. Instead, his talks were based on research and experience. And he always brought a historical context to the conversation.

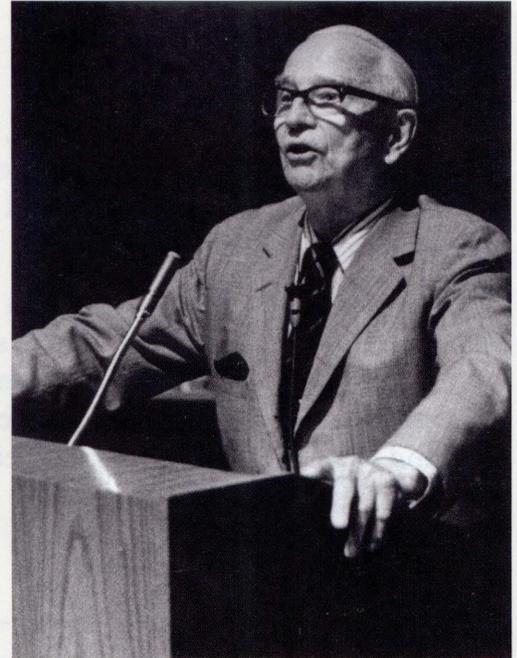
During Wangenstein's retirement, he wrote a book called *The Rise of Surgery: From Empiric Craft to Scientific Discipline*, written with his wife, Sarah Davidson Wangenstein. He also regularly attended grand rounds and remained an active member of the department.

The University has recognized his teaching efforts in many ways. In 1962, Wangenstein earned the Medical Alumni Society's first Harold S. Diehl Award for his outstanding contributions to the Medical School. In 1966 he was

named a Regents Professor. In 1982 — the year after he died — the Department of Surgery established the Wangenstein Award for Excellence in Teaching in his honor.

Many surgeons who went on to accomplish groundbreaking work credit Wangenstein for giving them the encouragement and freedom they needed to explore new ideas, new methods, and new devices.

And that had always been Wangenstein's mission. As he once proclaimed in an article for the *Journal of the American Medical Association*: "Plant a tree for prosperity in the orchard of your profession. It will give you enduring satisfaction though you may never live to see it mature; its growth can project your image and wishes far into time and space." ^[MIB]



REFLECTIONS FROM THOSE WHO KNEW HIM BEST

He wanted you to know not only how to do something, but why. He wanted you to come up with something new and innovative and change the future.

– Henry Buchwald, M.D., Ph.D., bariatric surgeon who produced the first implantable infusion pump

He was always encouraging people to explore new ideas. There were no obstacles. If he thought it was a worthwhile project, we could do it.

– J. Ernesto Molina, M.D., Ph.D., cardiovascular and thoracic surgeon

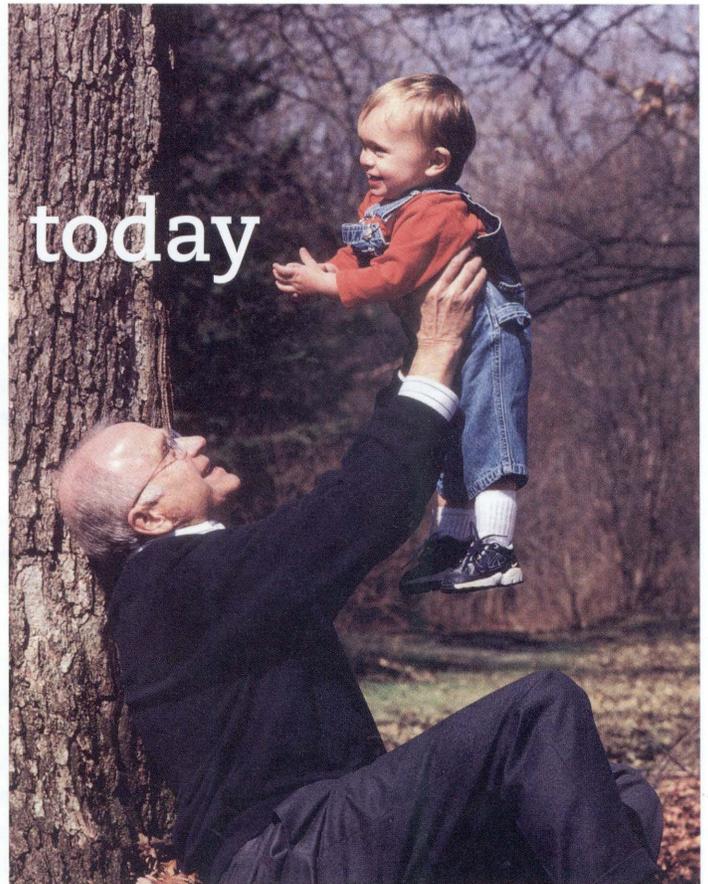
He was kind of a walking encyclopedia of surgical history, having lived through the developments of surgery from the turn of the century on.

– John S. Najarian, M.D., transplant surgeon and former chair, Department of Surgery

Plan tomorrow's cures today

At the University of Minnesota, we seek to shatter medical boundaries—to eradicate disease, conquer disability, and educate tomorrow's medical pioneers.

You can help make our vision a reality by including the Minnesota Medical Foundation in your estate or financial planning. For more information, call 800-922-1663 or 612-625-1440 and ask for Gift Planning. You can also e-mail us at legacy@mmf.umn.edu.



Please send me information on:

- Creating a legacy — in my will — in a trust — using IRA assets — other: _____
- Charitable trusts
- Charitable gift annuities
- Donating assets (appreciated securities, real estate, etc.)
- Other: _____

- I have remembered the Minnesota Medical Foundation in my will/trust.
- I would consider including the Minnesota Medical Foundation in my will/trust.

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE _____ BIRTH DATE _____

E-MAIL _____

Please send this coupon to: Minnesota Medical Foundation, Office of Gift Planning,
200 Oak Street SE, Suite 300, Minneapolis, Minnesota 55455-2030

Or visit our Web site at: www.mmf.umn.edu/goto/tomorrowscures

Minnesota Medical Foundation

The Minnesota Medical Foundation is a nonprofit organization that provides support for health-related research, education, and service at the University of Minnesota Medical School and School of Public Health.

For more information about the Minnesota Medical Foundation or to update your address, please contact us at:

Minnesota Medical Foundation
McNamara Alumni Center
University of Minnesota
200 Oak Street SE, Suite 300
Minneapolis, MN 55455-2030

612-625-1440
800-922-1663

mmf@mmf.umn.edu
www.mmf.umn.edu

The University of Minnesota is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, color, creed, religion, national origin, sex, age, marital status, disability, public assistance status, veteran status, or sexual orientation.

2004-2005 BOARD OF TRUSTEES

Beth Erickson CHAIR
John M. Murphy Jr. VICE CHAIR
Paul Citron SECRETARY
George E. Maas TREASURER
James P. Stephenson IMMEDIATE PAST CHAIR

Catherine Agee
Mark Allison*
Albert Andrews Jr.
Atum Azzahir
Anthony Baraga, M.D.*
Joel L. Boyd, M.D.
David M. Brown, M.D.
Robert H. Bruininks, Ph.D.*
David S. Cannom, M.D.
Richard A. Carlson, M.D.
Anne D. Carrier
Frank B. Cerra, M.D.*
Raymond G. Christensen, M.D.
Norman A. Cocke III
Kenneth W. Crabb, M.D.
James L. Craig, M.D., M.P.H.
Timothy J. Ebner, M.D., Ph.D.*
John R. Finnegan Jr., Ph.D.*
N. Jean Fountain
Don J. Hodapp
Gregory Howard
Josie R. Johnson, Ed.D.
Sidney Kaplan
Richard L. Lindstrom, M.D.
Fred A. Lyon, M.D.
R. Frederick McCoy Jr.
J. Michael McQuade, Ph.D.
David L. Mona
Alice Mortenson
Stephen N. Oesterle, M.D.
Treva Paparella*
Ronald J. Peterson, M.D.
Susan B. Plimpton
Deborah E. Powell, M.D.*
Jon L. Pryor, M.D.*
Stacy D. Rubsam*
Robert N. Schulenberg, M.D.
Randolph C. Steer, M.D., Ph.D.
Richard L. Stennes, M.D., M.B.A.
Mary K. Stern, CFA
Martin J. Stillman, J.D., M.D.*
Roby C. Thompson Jr., M.D.
Reed V. Tuckson, M.D.
Leslie C. Turner
Richard J. Ziegler, Ph.D.*

*Ex officio members

AFFILIATES

Bob Allison Ataxia Research Center
International Hearing Foundation
University Pediatrics Foundation

STAFF LEADERSHIP

Brad Choate
PRESIDENT AND CEO
Carl J. Bendorf
VICE PRESIDENT, DEVELOPMENT
Catherine Henry
VICE PRESIDENT, MARKETING
AND COMMUNICATIONS
Cynthia J. Kaiser
CHIEF FINANCIAL OFFICER AND
VICE PRESIDENT, OPERATIONS

MEDICAL BULLETIN

Susan Cozzolino
EDITOR
Faith Adams
Nicole Christiansen
Mary Hoff
Jeanne Mettner
WRITERS
Richard Anderson
Tim Rummelhoff
PHOTOGRAPHERS
Woychick Design
DESIGN AND PRODUCTION
Sexton Printing
PRINTING AND DISTRIBUTION

MINNESOTA
MEDICAL
FOUNDATION

at the University of Minnesota

McNAMARA ALUMNI CENTER
UNIVERSITY OF MINNESOTA
200 OAK STREET SE, SUITE 300
MINNEAPOLIS, MN 55455-2030

Nonprofit Org.
U.S. Postage
PAID
Minneapolis, MN
Permit No. 155

When you support the Minnesota Medical Foundation, you're backing a winning team of doctors and researchers working to defeat disease and disability. Give, and help them fill in the blanks. • 1-612-625-1440 • www.mmf.umn.edu



© 2005 Minnesota Medical Foundation