Along with Minnesota’s finest pickles and pigs, thrill rides and mini-donuts, there was a new and unusual attraction at the State Fair this year.

It was a side show of sorts, but you wouldn’t have found it along the Midway near the oversized iguana. It was at the University of Minnesota’s booth in the Education Building, where School of Public Health faculty and staff were displaying used human lungs to show the effects of smoking.

There were six lungs, two healthy lungs from nonsmokers, two affected by emphysema, and two from lung cancer victims. Ian Greaves, associate dean of the School of Public Health, said spectators were surprised to see just how destructive smoking can be to lung tissue.

Next year, the school plans to expand the exhibit with preserved organs that show effects of alcohol abuse and an unhealthy diet (such as eating too many Pronto Pups and cheese curds).

Earlier in the week, the Medical School attracted a crowd with a collection of human and animal brains, which they used to explain how the brain works and how neuroscience research can lead to cures for Alzheimer’s disease, Parkinson’s disease, and spinal cord injuries, among other brain disorders. Neuroscience faculty and staff gave a brain on a stick—a brain-shaped eraser on a pencil—to spectators.

Each of the Academic Health Center’s seven schools had its day at the fair to showcase education, research, and outreach programs. Physicians, pharmacists, dentists, nurses, veterinarians and other health care professionals were on hand daily to answer questions. And “Health Talk & You,” the AHC’s health information talk show was broadcast live from the fairgrounds.

More than 130 faculty and staff volunteered their time to make this event a success.

Peggy Rinard
Country clinicians:

Rural health programs train doctors, pharmacists, nurses, and dentists for Minnesota’s small towns. Page 7
Amy DeLong is one of 13 Native Americans who graduated from the Medical School last year. After completing a residency at Hennepin County Medical Center, where she recently cared for triplets in the neonatal intensive care unit, she will practice at a tribal clinic. See story page 10.
CROSSING DISCIPLINES

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The Biomedical Engineering Department is putting medical tests on microchips and creating an array of miniature electronic instruments.

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Viola Pelfrey has been a Dental Clinic patient since 1927.

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Side Show
School of Public Health gives Fairgoers a good look at bad lungs.
In a light-filled laboratory on the seventh floor of the new Basic Sciences and Bio-medical Engineering building, a technician applies a drop of blood to a tiny square of etched silicon. In a few minutes, he will know whether its owner carries a gene for a form of muscular dystrophy.

Genetic tests like this one usually require a laboratory full of expensive equipment, cost about $1,000 dollars each, and are available only to people who live near or can travel to a medical research center. But Ron McGlennen, a genetics researcher, and Dennis Polla, an electrical engineer, have reproduced the capabilities of that laboratory on a disposable microchip that costs about $10.

The project is one of about two dozen being developed in the Department of Biomedical Engineering’s Microtechnology Laboratory. Using technology borrowed from the computer and engineering industries, Polla and McGlennen, co-directors of the Microtechnology Laboratory, and their colleagues, are creating an assortment of miniature gadgets that could herald a new generation of smaller, better, and cheaper medical machinery.

Interest in applying new microelectronics technology to health care has been growing for the past several years says Polla, who created the Microtechnology Laboratory and recently became head of the Department of Biomedical Engineering, a joint venture between the Medical School and Institute of Technology. But Polla believes the University is leading the way in the field, and may be the ideal setting for this technology to flourish.

Only a few other universities (Stanford, MIT, Cornell, Berkeley, and Michigan) have laboratories for making integrated circuit microchips. None of these has a medical school adjacent, as the University does. The close proximity is a real advantage, Polla says, because engineers, scientists, and physicians are in contact with each other on a daily basis. Added to that, UM has a legacy of bio-medical engineering achievements and unmatched connections with local manufacturers such as Medtronic and St. Jude.

The new gadgets, the lot of which would fit in the palm of your hand with room to spare, fall into a few categories: microchips for detecting everything from blood pressure to hereditary diseases, tiny fluid pumps for drug delivery, and microsurgical instruments. Some of the microchips for detecting everything from blood pressure to hereditary diseases, tiny fluid pumps for drug delivery, and microsurgical instruments. Some of the microchips are designed to be implanted and to relay information to a laboratory through a modem. Fluid pumps and microsurgical or micro-imaging devices often fit on the end of a very fine probe that can be used to reach the heart, brain, or other organs without surgery.
Here are a few examples:

- A pump on a pinhead-sized probe used to deliver drugs into the brain to treat Parkinson’s disease and Alzheimer’s disease;
- A sensor for monitoring pressure in the heart or brain;
- A fiberoptic probe for diagnostic imaging;
- A motorized microsurgical needle to inject sperm into an ovum for *in vitro* fertilization;
- Personal monitoring systems for blood chemistry, blood pressure, and other vital signs.

Several devices have moved “serendipitously” from the Microtechnology Laboratory to companies for further development, says Polla, meaning that companies have contacted him after reading about the new technology in a journal or hearing him speak at a meeting. So far that’s led to collaborations with local, national, and international companies, including Medtronic, Elcor Surgery in Texas, (the world’s largest producer of ocular surgery instruments) and Sulzer Medical in Switzerland, which has enlisted Polla’s help to develop an implanted device that will minimize pain following spinal surgery.

In the future, Polla plans to work with industry in a much more deliberate way, by enlisting industry scientists to work on teams with University engineers, scientists, and physicians to find innovative solutions to common medical needs.

Polla has been overwhelmed with the support he’s had from everyone from the legislature and the regents to biomedical companies, the Medical School and the Institute of Technology, as well as from students. “Everyone is on board,” he says. “This is the right time to be doing this, and Minnesota is the right place.”

**Peggy Rinard**

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**EQUINE RESEARCHER**

ELIZABETH SANTSCHI LEADS A PAINT HORSE TREATED AT THE VETERINARY TEACHING HOSPITAL.

**PATHWAY TO PERFECTION**

**GENETIC MAPPING PUTS ANIMAL IMPROVEMENT ON THE FAST TRACK.**

Peering through the morning fog, Paul Vrotsos could see that Lightning Babe, his paint horse mare, had a fresh foal at her side. Eager as a kid at Christmas, he hiked across the pasture to greet the new arrival—only to have his heart sink to the bottom of his boots when he saw it. Pure white, it was obviously a victim of an inherited disorder known as lethal white syndrome, which affects not only coat color but also digestive function. Like hundreds of paint horse foals born each year, this animal would be dead within hours.

Vrotsos, who had just lost a foal to lethal white the previous year, was crushed. “I said, ‘All right, I’ve had it. Can someone help me, please?’” he recalls.

Fortunately, Vrotsos, a manager at the College of Veterinary Medicine’s Large Animal Teaching Hospital, knew someone who could. He called on Elizabeth Santschi, an assistant professor of veterinary medicine who specializes in equine research.

Collaborating with colleagues Stephanie Valberg and Jim Mickelson, Santschi began to search for the genetic roots of the problem. Within a year the team had found the mutation that causes lethal white syndrome and developed a blood test for it. Vrotsos and other paint horse breeders are now using the test to avoid matings likely to yield lethal white foals.

Santschi’s research is an example of one of the hottest areas in animal breeding today—the development of genetic tests to identify individuals likely to pass on particular desirable or undesirable traits. Though still in the early stages of development, such tests hold tremendous promise for improving breeders’ ability to rapidly and efficiently encourage desirable traits and cull undesirable ones.

“Farmers have been doing this for centuries through selective breeding,” says Charles Louis, a professor in the College’s Department of Veterinary Pathobiology. “We aren’t doing anything different. We’re just changing the rate of change.”

Louis led the College’s way into the fast-growing field of genetic testing in the late 1980s when he discovered the candidate gene for porcine stress syndrome, a disorder that causes pigs to die suddenly when stressed. Today, a blood test that resulted from that knowledge is saving the pork industry millions of dollars each year, and developing further tests for improving swine has become a focal point for research in the College.

Louis is searching for bits of DNA, known as markers, that can be used to locate genes controlling desirable traits such as superior...
Yes, nurses do research

Nursing research may not lead to cures that make headlines, but it improves quality of life.

Alice spends most of her days sitting alone in a nursing home, feeling tired and refusing to take part in activities. At age 83, she knows her final years will be spent here. Like 50 percent of nursing home residents, Alice is showing signs of depression.

Depression is one of the most common health problems in nursing home patients. And although it can be successfully treated, too often it isn’t even recognized. That’s what led Muriel Ryden and Mariah Snyder, School of Nursing faculty members, to take on a research project to study the cost effectiveness of using advanced practice nurses to diagnose and treat depression and other common nursing home ailments, such as incontinence.

During the course of their six-month study, they instructed advanced practice nurses (nurses with master’s degrees) to implement national “best practice” guidelines for treating these health problems in two nursing homes. A third home was used as a control group.

The experiment worked. Severity of depression and incontinence decreased dramatically among patients in the two homes, and savings in equipment and labor more than paid for the cost.

Finding better ways to manage longterm illnesses, promote health, and prevent disease are the goals of many research projects at the School of Nursing.

“Nurses do research on the unglamorous aspects of illness,” says Dean Sandra Edwardson. “Their work helps patients with the very personal activities of daily living.”

Perhaps, she speculates, that’s why few people associate nurses with research. “Nurses aren’t often involved in developing the sorts of life-saving procedures, drugs, or instruments that grab headlines,” she explains.

But School of Nursing faculty bring in more than $1 million dollars a year in research funding from the National Institutes of Health and other government and private sources, as well as $2 million in training grants.

“Almost all tenured or tenure-track faculty members have at least one research project pending, active, or just finishing up,” says Laura Duckett, associate professor and director of research. “If they don’t, they are preparing manuscripts or pursuing funding for new projects.”

Through the years, School of Nursing researchers have made some remarkable discoveries that have changed the way nurses deliver care. An example, Duckett says, is the pioneering research on home care for dying children conducted by Ida Martinson, a former University faculty member.

“When I first came to the University [in 1977],” Duckett recalls, “the concept of caring for dying children at home was not widely accepted. Ida showed that children feel better and more secure at home. She also showed that if parents can be taught caregiving skills, they prefer to keep their children at home.”

More recently, nursing research has led to patient care improvements in many other areas, including care of the elderly, breastfeeding, and pain management.

“Nurses do research on the unglamorous aspects of illness,” says Dean Sandra Edwardson.

Examples of studies in progress include:

- assessing the effects of hope and guided imagery on immune system response;
- developing techniques to prevent hearing loss in construction workers;
- helping Native American youths overcome family, social, and economic stresses, and avoid substance abuse and other destructive behavior;
- developing safe ways for bone marrow transplant patients to discontinue morphine use;
- and helping care-givers manage the difficult behavior of Alzheimer’s patients.

In coming years, Duckett says, the school hopes to increase research funding. “We have a lot of talent in the School of Nursing and we need to enable everyone to pursue research.”

Continued from Page 5

meat quality and decreased fat content. Larry Schook, associate dean for research, is heading efforts to find markers for improved ovulation and growth rates. And Schook and colleague Craig Beattie recently began a five-year collaboration with the French department of agriculture to further improve knowledge of the swine genome.

Though pigs are clearly the primary focus for genetics research here, the work is moving out to other species. Encouraged by their success with lethal white, Mickelson and Valberg are searching for the DNA defects behind various equine neuromuscular diseases. Vivek Kapur, an assistant professor in the Department of Pathobiology, is gathering genetic information he hopes will one day allow turkey breeders to select for disease resistance and desirable growth traits. And Jane Armstrong, a professor in the Department of Small Animal Clinical Sciences, is working with postdoctoral associate Pat Wilkie to identify markers that might be used to encourage positive traits or select against detrimental ones in various breeds of dogs.

“These efforts illustrate how we have been able to capture information from cellular and molecular biology to solve real-world problems,” Schook says, adding that “recent legislative support and President Yudof’s research initiatives will provide additional opportunities for outreach based on molecular biology.”

Elaine Cunningham

Mary Hoff
One Thursday last summer at the clinic in Eden Valley, Minnesota (pop: 732), medical student Rochelle Wolfe saw two dozen patients with complaints ranging from chest pains to tonsillitis. That morning, she made a 12-mile trip to the hospital in Paynesville (pop: 2,275) to examine a newborn baby. At the hospital, she was asked to help with a case of Shy-Drager’s disorder, a rare neurological disease that Wolfe had taken an interest in during her first year of medical school.

“I’m loving it here,” said Wolfe, a second-year student at the University of Minnesota’s School of Medicine in Duluth. “The scope of practice in a small town is so broad I’m getting experience that I’d never get in a clinic in the city.”

Wolfe is one of several students assigned to Paynesville through the Rural Health School, a school without walls that places health professions students in rural hospitals and clinics. Based at the Duluth School of Medicine it was established by the state legislature in 1996 to help small towns meet their needs for health care providers. The school teams medicine, pharmacy, and nursing students with rural practitioners in Moose Lake, New Ulm, Grand Rapids, Staples, Willmar, and Paynesville, the newest RHS site. The 50 or so students who take part in the program annually have been well-received. In Moose Lake, for example, local vocational-technical students built a house for the students to live in.

The Rural Health School is just one of a growing number of University health education programs aimed at training (and wooing) clinicians for Minnesota’s small towns. The Medical School offers the Rural Physician Associate Program (RPAP),

Continued Page 8
Rural Family Practice Residency, and Rural Observation Experience. The School of Nursing collaborates with six other graduate nursing programs statewide on Minnesota Partnerships for Training, the Collaborative Rural Nurse Practitioner Project, and Health Information Access for Rural Nurse Practitioners. The College of Pharmacy offers the Pharmacy Rural Education Program (PREP). The School of Dentistry features the Migradent program and rural “externships.” And the School of Public Health collaborates with state and University partners on the Minnesota Migrant Health Promoter Program.

All indications are that the rural health programs are working. The number of primary care physicians sought by rural communities dropped from 266 in 1995 to 169 last year, and the demand for nurse practitioners, physician assistants, and certified nurse midwives declined from 106 in 1995 to just 51 last year, according to a 1998 report of the Minnesota Center for Rural Health. Much of the credit goes to the University of Minnesota’s rural health programs, said Terence Hill, executive director.

The key to the success of these University programs may be their interdisciplinary approach. Teamwork spreads scarce human resources farther, and it relieves the sense of isolation that discourages many young health professionals from working in small towns.

“Traditionally, the doctor is the commander of the team,” says Byron Crouse, director of the Rural Health School. “He or she barks orders, and everybody else carries them out. In this new model, leadership is shared by various health professionals.”

In Paynesville last summer, for example, College of Pharmacy alum Laura Odell, Pharm.D., headed a team of Rural Health School students that included UM Duluth medical student Rochelle Wolfe, College of Pharmacy student Todd Lemke, pharmacy resident Shara Mihm, nurse practitioner student Debora Nugent, and RPAP student Carrie Fenna. Odell and her group all worked at the Paynesville Area Health Care System, a single building that houses a hospital, clinic, and nursing home. As they cared for patients they looked for ways to redefine their roles and work together more effectively.

Odell also heads medication management teams for patients on anticoagulation drugs (blood thinners) and for people being treated for diabetes and osteoporosis. Working with pharmacy students, and with staff nurses and physicians, she monitors drug dosages, drug interactions, and patient compliance—doing work, in other words, that physicians usually do. She rarely dispenses medication, the traditional duty of a pharmacist.

Working in this small town health complex gives Odell, who grew up in a small town, a chance to get to know patients in a way that just isn’t possible in big cities. For her, that’s one
of the advantages of this kind of practice.

“I enjoy the slower pace and the warmth of the people,” she says. “When I got married, I got all kinds of gifts from my patients. One woman cross-stitched a beautiful picture for me. A 93-year-old guy whose daughter owns the Ben Franklin store downtown brought me a whole set of Rubbermaid products. Patients who hadn’t even been invited to the wedding sent me cards.”

She and her students return the generosity. Odell is a Brownie leader and member of the Friends of the Library. As part of their program, Rural Health School nursing, medicine, and pharmacy students recently built a float to promote skin cancer awareness for a parade in nearby Roscoe (pop: 141).

Odell and her husband, a College of Pharmacy graduate from Willmar, never intended to live in a town as small as Paynesville, she says. But pharmacy professor Don Uden, a coordinator of rural pharmacy programs, talked them into giving the town a try. He persuaded Laura with a grant from the College of Pharmacy’s Peters Institute to start the Paynesville pharmacy clinic, and lured her husband with promises of good fishing.

Having decided they are as happy with Paynesville as local residents seem to be with them, the Odells are building a house along nearby Rice Lake where they plan to stay for a long, long time. They hope that two or three other graduates of the University’s rural health programs will decide to join them in a life full of rewards and free of big city hassles.

Jack Hayes and Peggy Rinard

Since its founding in 1971, the Rural Physician Associate Program (RPAP) has sent more than 860 third-year medical students to over 100 small Minnesota communities for nine-month internships. A remarkable 64 percent of former RPAP students who stayed in Minnesota after medical school now practice in rural areas. RPAP has served as a model for the Rural Health School and for many other regional and national programs.

The Rural Family Practice Residency, operated by the Medical School’s Department of Family Practice and Community Health, is a three-year program to train rural family doctors. Residents spend the final two years in regional medical centers in Waseca and Mankato, which serve outlying rural communities.

The Rural Observation Experience gives 50 incoming medical students annually a chance to spend three days working alongside rural family physicians.

The School of Nursing collaborates with six nursing and physician assistant programs statewide on three programs to help nurses living in rural areas become nurse practitioners, physician assistants, or certified nurse-midwives, who carry out many of the functions of primary care physicians. Programs include Minnesota Partnerships for Training, funded by a $1.3 million grant from the Robert Wood Johnson Foundation; the Collaborative Rural Nurse Practitioner Project; and Health Information Access for Rural Nurse Practitioners, funded by the National Library of Medicine.

The School of Dentistry’s Migrant program sends teams of faculty, dental, and dental hygiene students to rural areas every summer to provide care for migrant farm workers and their children. Last year the the School also provided care for more than 250 Bosnian refugees and migrant workers in the Fergus Falls area, and for the Sisseton-Wahpeton Tribal Community and Canterbury Downs workers. The school plans to open dental clinics and training sites in Hibbing and Fergus Falls.

The Minnesota Migrant Health Promoter Program teaches migratory farm workers how to promote good health in migrant labor camps near Owatonna and Blooming Prairie. A collaboration among the School of Public Health, the College of Agriculture, Food, and Environmental Sciences, and Minnesota Department of Health, the program certifies participants in first-aid and cardiopulmonary resuscitation, and educates them on a wide range of other topics. The program also sponsors regular immunization clinics and nutrition education fairs.

Through the Academic Health Center’s Telemedicine Network, students, faculty, and medical specialists on the Twin Cities campus and at Fairview-University Medical Center can consult with outstate physicians, students, patients, and administrators in a dozen locations via interactive television.
When 13 American Indian students stepped forward last spring to receive M.D. degrees and beaded stethoscopes, they set a University of Minnesota record as the largest single group of Indians to become physicians.

In the past three years, the University has become a national leader in graduating American Indian physicians, producing a total of 26 with 12 more graduations expected in the next two years. If everyone stays on course, the U will graduate more American Indian physicians in five years than it did in the 18 previous years.

Much of the credit for this success goes to the University’s Center of American Indian and Minority Health, directed by physician Gerald Hill, which seeks out gifted Native American high school and college students for special programs at the School of Medicine in Duluth and the Twin Cities Medical School that prepare them to meet the health care needs of their culture.

A member of the Klamath and Paiute tribes of Oregon, Hill came to the program in 1991 hoping to increase student enrollment and encourage graduates to return to their native communities to practice medicine. “Such a valuable resource shouldn’t be wasted,” says Hill. “That’s what I saw happening.”

A physician practicing in an Indian community must learn to work with traditional healers and spiritual leaders, according to Hill. “If you don’t understand the relationship between the spirit and healing, Indian people will not trust you and will shut you out.”

As a child, Hill never dreamed of being a physician. During his senior year in high school he worked 48 hours a week in a plywood mill. He didn’t exactly know what college was, but figured a college graduate could get a better job than the one he had at the mill.

Hill liked science because it explained the world. So he decided to major in pharmacology at the University of Washington, spending his spare time as a volunteer at a Seattle Indian Health Board clinic. One day an Indian about Hill’s age walked by wearing a white coat and carry-

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<th>1998 Native American graduates of the Medical School and their tribes:</th>
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<td>Tiffany Beckman</td>
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<td>Leech Lake Chippewa</td>
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<td>Dennis Bethel</td>
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<td>Creek/Cherokee</td>
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<td>Debra Bowker</td>
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<td>Cheyenne River Lakota</td>
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<td>Leroy Clark</td>
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<td>Cheyenne River Lakota</td>
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<td>Amy DeLong</td>
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<td>Kansas DuBray</td>
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<td>Cheyenne River Lakota</td>
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<td>David Hell</td>
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<td>Turtle Mountain Chippewa</td>
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<td>Kristin Quinn</td>
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<td>Susan Sloan</td>
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<td>Eastern Cherokee</td>
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<td>Gladys Wyles</td>
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<td>Cherokee/Blackfoot</td>
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<td>The Center for American Indian and Minority Health recruits and trains Native American physicians to bridge tribal and clinical cultures.</td>
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Across cultures

Amy DeLong, a member of the Ho Chunk tribe of Wisconsin, with three new friends in the neonatal intensive care unit at Hennepin County Medical Center.
ing a stethoscope. In a flash Hill found his calling. “I had never considered medicine as an option for an Indian,” he recalls.

Amy DeLong, one of this year’s new physicians, had not considered medicine as an option either. A member of the Ho Chunk tribe of Wisconsin, she rarely even saw a doctor while she was growing up. Then as an honors student in college, she was inspired by a friend who planned a career in medicine.

DeLong applied to the U’s School of Medicine in Duluth, but lost interest after looking at a map and deciding Duluth was too far north, too far from home and too cold. Hill recognized her potential, however, and persuaded her to come to Duluth for an interview. “Dr. Hill was the first Native American doctor I’d ever met,” recalls DeLong, “I was very impressed with him and with the program.”

At Duluth, DeLong discovered the study skills that got her into medical school weren’t good enough to keep her there, but she wasn’t alone. “My classmates got me through,” says DeLong of the Native American students who helped each other over the rough spots. Friends made a difference, but the bright light at the end of the tunnel was her internship at the Black River Falls Clinic in Wisconsin, which serves the Ho Chunk tribe.

“The clinic reminded me that I was not always going to be taking classes and tests,” says DeLong, who is now a family medicine resident at Hennepin County Medical Center. When she completes her training she plans to practice at the Black River Falls Clinic.

As a medical school graduate, DeLong joins Hill as a member of a new tribe of Indian physicians who share a special bond.

“We all took different routes,” Hill says of the paths that Indian physicians follow to reach their destination. But we share the knowledge that somehow we’ve got here, and that the ‘somehow’ is a miracle.”

**First-year medical student publishes study in New England Journal of Medicine.**

Most medical students dream about seeing their names in The New England Journal of Medicine. Amy Hakim didn’t have time to do any dreaming. Her study on the health benefits of walking, completed before she even entered the University’s Medical School, was published in the prestigious journal during her first year.

Hakim conducted the study last summer, after completing masters’ degrees in epidemiology and economics at the University of Virginia. Her advisor, Robert Abbott, professor of biostatistics at the University of Virginia, encouraged her to take the project on as an exercise in compiling statistical data and writing a successful academic paper.

She chose to look at health benefits of low-impact exercise in the elderly because there was little known about the subject.

Beginning with results of the Honolulu Heart Program, which tracked the cause of death of a large group of men of Japanese descent over 12 years, she focused on 707 nonsmoking retired men between the ages of 61 and 81. In essence, she found that those who walked two miles or more a day had nearly half the mortality rate as those who walked less than a mile a day.

When the article came out last January, Hakim and Abbott, who collaborated with her on the study, were thrust into the media spotlight for weeks, answering calls from reporters across the country. Hakim now has a pile of clips from more than 300 newspapers as souvenirs of her experience. The story was also reported on the CBS, NBC, and ABC evening news, by National Public Radio, and by local television and radio stations across the country.

Hakim says it was the simplicity and practical value of the finding that prompted the New England Journal to accept the story and triggered the flurry of media coverage.

“The key was that this is something most older people can do to improve their health,” Hakim says. “And it confirmed what doctors and patients suspected. Now physicians have a basis for recommending daily walking to their older patients.”

Hakim can’t predict when her next study will be published in a journal as influential as NEJM, but she and her advisor aren’t resting on their laurels. They have already published two more studies. One, which appeared in the June issue of the Journal of Clinical Epidemiology, looks at coffee drinking as a risk factor for stroke in older men with hypertension. Men who drank three cups of coffee a day were twice as likely to have a stroke as those who didn’t drink any coffee. Another, published in July in the American Journal of Cardiology, shows that men’s cholesterol levels tend to decline after the age of 65, regardless of risk factors such as hypertension, even though incidence of heart disease increases.

Hakim says she plans to continue her work as breaks in her Medical School schedule allow.
Who says kids don’t like science?

BIONEERS DAY CAMP FEATURES BLOOD, GUTS, AND BIOENGINEERING.

Who says kids don’t like science? Certainly not the Blood Gushers, a team of 10- to 15-year-olds who spent a couple weeks in August tinkering with brains, bones, hearts, lungs, and intestines in University labs. Nope, the Gushers love science, the ickier the better as far as they’re concerned.

The Gushers were among 36 kids from St. Paul public schools who wrote essays to qualify for scholarships to attend the Bioneers day camp, funded by the Howard Hughes Medical Institute and co-sponsored by the Academic Health Center and the Science Museum of Minnesota.

Participants broke up into teams, to which they applied quaint and colorful names, and then devoted themselves to study of the human corpus. For inspiration, they viewed an actual human brain and skeleton. Then they got down to the serious business of designing their own biomedical devices, another part of the program.

“There’s this guy who has lower back pain,” says 12-year-old Blood Gusher Emmanuel who goes to Ramsey Junior High School in St. Paul. He labors busily on a drawing of a man with an exposed spinal cord. “We’re trying to make up something that will cure it. So, what we did was make this thing so that if he’s jogging or something he can turn this dial that’s connected to his spine and it gives him a little shock and the pain goes away.”

Emmanuel doesn’t know it but, with a little scientific information about the spine and the electrical impulses that produce pain sensations, his group has reinvented the artificial pain suppressor, an actual medical apparatus used to intercept pain signals.

The Gushers, who obviously have a gift for naming things, dub their device the Speedo Energizer and devise a slogan: “A charge a day keeps the pain away.”

But the Bioneers don’t stop at inventing a device. The next step is to market their product as would be done with an invention by a real biomedical scientist. The Gushers, who obviously have a gift for naming things, dub their device the Speedo Energizer and devise a slogan: “A charge a day keeps the pain away.” Clearly, they’re on their way to careers as entrepreneurial biomedical engineers.

The idea here is to increase the kids’ interest and awareness of science,” says Neil Spencer, director of the camp and head of the Minnesota Educational Theatre. An actor, Spencer plays a variety of characters during the camp, including Fig Newton, great-great grandfather of Sir Isaac Newton, and a stripe-shirted referee who enforces rules by which the kids must abide.

He also helps kids put on anatomy-related mini-dramas. One recent afternoon Spencer led the kids in a version of the game Capture the Flag which they renamed Heart Attack. Some of the kids were disease-fighting white blood cells and some were ribs protecting the heart from injury.

Besides their visits to the Museum of Questionable Medical Devices, Medtronic, and 3M, the young Bioneers found the construction of edible white blood cells (ingredients: sponge cake, strawberries, sugar glaze, Raisinets, and lots of whipped cream) especially edifying, according to 11-year-old David of Woodbury Elementary School.

“It was practically a shortcake, so we ate it,” David says.

(For information about Bioneers camp, refer to www.mbbnet.umn.edu/youthbeat/biomedcamp.html)
Wonder who got stuck reading the millions of tobacco company documents we kept hearing about during the Minnesota vs. Big Tobacco trial? Well, it was the AHC’s own Cheryl Perry, professor of public health and key expert witness on tobacco efforts to get kids to start smoking. Okay, so she didn’t read them all, just a stack of them a couple feet taller than she is.

Having served as scientific editor of the 1994 U.S. Surgeon General’s Report on “Preventing Tobacco Use among Young People,” Perry caught the eye of the state attorneys as they were preparing a lawsuit to recover costs of treating smokers. In late 1995 they asked her to be a witness.

“In the fall of 1996, I began to get tobacco industry documents,” says Perry who proved a formidable opponent of the tobacco interests during her three days of testimony in March. “They were hand-delivered in a locked file cabinet. By strict confidentiality agreement, I could not talk about them to anyone.”

Month after month, she pored through the documents, often stumbling across startling evidence of the companies’ determination to sell cigarettes to younger and younger youths. “Replacement smokers,” they called them. Perry kept a file of incriminating quotations.

“However intriguing smoking was at 11, 12, and 13, by age 16 or 17, many regretted their use of cigarettes for health reasons and because they feel unable to stop smoking when they want to,” read one 1977 document titled, “Project 16, Report of Imperial Tobacco Limited.”

“It was shocking,” Perry says. “I had no idea those companies had paid so much attention to very young people.”

From mountains of documents, Perry culled 20 pages of incriminating excerpts which she essentially committed to memory because she would not be allowed to take notes to the witness stand. She also wrote a 100-page expert witness report that tobacco industry lawyers worked hard to tear apart both at a six-hour, pre-trial deposition and in court.

They failed. By all accounts, Perry and her work held up beautifully during the deposition in which tobacco lawyers not only grilled her about her report but about her personal life. They were looking for anything they could use to discredit her future testimony.

Those who know her would tell you that you won’t find much dirt in Perry’s life, except maybe on the bottom of her hiking boots.

An international authority on the prevention of alcohol and tobacco abuse as well as obesity and heart disease, she doesn’t smoke, doesn’t drink more than a little wine with supper, and has never been caught up in a scandal, personal or professional. She claims she tried a cigarette once in her high school ofﬁce, when she was 13, for research purposes. (She couldn’t finish it.) In short, she was the tobacco companies’ worst nightmare.

During even the most frantic and demanding parts of the trial, when some lawyers and witnesses subsisted mostly on coffee and candy bars, she swam or used the treadmill daily, ate “healthfully” (she’s a vegetarian), and tried not to drink much coffee.

She needed the strength that regimen gave her when she underwent withering cross examination by tobacco lawyers. Luckily she’d been drilled by state lawyers for weeks before that. Toughened up, as it were.

“I actually had to become a little bit mean,” says Perry who is the personification of Minnesota nice. But she feels the hard work and temporary changes in temperament were worth it, especially considering that the case was ultimately settled out of court for between $5 billion and $6 billion, some of which will go toward anti-smoking efforts.

“..."It was shocking," Perry says. “I had no idea those companies had paid so much attention to very young people."

She couldn’t have done it, she says, without the support of her public health colleagues, some of whom sat nervously biting their nails and shielding their eyes during her testimony for fear she would buckle under the pressure. She never did.

Expertise, collegial support, exercise, and good nutrition helped get her through this test of wills, but Perry had a secret weapon that gave her the edge from the start.

“It was shocking," Perry says. “I had no idea those companies had paid so much attention to very young people.”

Cheryl Perry, School of Public Health professor, was scientific editor of the U.S. Surgeon General’s Report “Preventing Tobacco Use Among Young People.”

■ Jack Hayes
For generations, Frogtown has been a starting point for immigrants—most recently Southeast Asians—on their way to the American dream. That has shaped its unique character and produced a wealth of ethnic restaurants and cultural organizations. But as with any culturally mixed, largely low-income urban neighborhood, Frogtown has its problems: the city’s highest rate of lead poisoning in children, high unemployment, half of families living in poverty, deadly house fires, abandoned property, many residents who do not speak English well, and high illiteracy.

In short, Frogtown is precisely the kind of neighborhood Jesse Goodman, professor of medicine, was looking for when he wanted to try an idea he had about preventing community health crises.

“When there’s a crisis in a neighborhood like Frogtown—a chemical spill at a factory for example—there is this collision of cultures,” Goodman says. “People don’t know each other and can’t talk to each other, so responses tend to be reactive and not to lead to long-term solutions that benefit everyone. I wondered if the University, environmental agencies, health agencies, and neighborhood organizations could get together before there was a crisis.”

Before starting Frogtown-COPE: A Community Partnership for a Healthy Environment, Goodman consulted block clubs; development organizations; Hmong, Lao, and Vietnamese associations; and other groups. And he won the support of the U of M Medical School, the School of Public Health, St. Paul-Ramsey County Department of Public Health, Pew Trusts-Health of the Public program, Allina and HealthEast foundations, and Northern States Power.

Then he signed onto School of Public Health alumni Tim Burkhardt and Patricia Ohmans to work with community members on door-to-door surveys of Hmong and Vietnamese households. A separate survey of mostly non-immigrant residents was also done.

The Hmong and Vietnamese surveys showed that their most pressing environmental concerns were not chemical spills or abandoned industrial property, but household hazards. Forty-two percent of residents of Vietnamese background, the survey showed, had never heard of lead poisoning, 54 percent of Hmong respondents had never heard of carbon monoxide poisoning from furnaces, and 89 percent of Vietnamese surveyed said they didn’t know what asbestos was, let alone that it was hazardous.

The survey provided the substance for an action plan. Frogtown resident Khoi Nguyen, a local Vietnamese leader who had single-handedly done the initial survey in the Vietnamese community, taught members of the 80 households he surveyed about fire safety, hazardous chemicals, lead poisoning and other hazards. He installed smoke detectors and cabinet locks to protect children from toxic household chemicals, showed residents how to wash away lead-laden paint chips and debris, arranged home energy audits, and passed along fact sheets in Vietnamese on other dangers.

“Sometimes they send information about health to Vietnamese people, but they don’t read it,” says Nguyen. “Some don’t speak English and some cannot read well. You have to go explain to them.”

A dozen Hmong community members carried the word about home health and safety to 300 Hmong households. By the time the work in the Hmong community was finished late last year 200 smoke detectors had been installed and 369 more distributed; 550 safety latches were installed on cabinets (600 were distributed altogether), and hundreds of 911 stickers were stuck on telephones.

Three months after the visits to Hmong households, two community educators went back to 53 of the homes and found that all of them had at least one working smoke detector and 80 percent had two or more. Eighty percent had poison control information stickers posted, and 60 percent had working latches and locks on cabinets storing household poisons. Goodman and colleagues declared the project a success.

“We know that the kinds of things we did in Frogtown reduce injury and death,” says Goodman. “And they save everybody money in the long run.” Before the COPE project ended earlier this year, he says, two reports were received of families alerted to fires by smoke detectors.

“If the efforts of Frogtown-COPE prevented even one fire, the entire project likely would pay for itself,” he says.

Jack Hayes

![Project COPE community educator Khoi Nguyen tells the Vo Chau family how to use a smoke detector.](image-url)
Viola Pelfrey shows off her teeth, straightened at the Dental Clinic in 1927 with advanced technology called braces, for dental hygiene student Heidi McFarlane.

Viola Pelfrey has been faithful to the School of Dentistry’s clinic since she got her braces there in 1927.

The year was 1927. Twelve-year-old Viola Nelson, whose teeth were so crooked they overlapped, and her mother, Adla, had taken the streetcar up Cedar Avenue, transferred at seven corners, and gotten off at Church Street, where the first of three buildings that housed the School of Dentistry was located.

The clinic was a huge room filled with rows of patients in hard wooden chairs, students and professors in white coats moving among them. Viola liked the busy atmosphere and the sound of buzzing machinery that filled the air. When she was seated, she watched with interest as dentists worked on patients to either side of her.

Braces, which were relatively new in 1927, were quickly prescribed for Viola. Ancestors of today’s color-sparkled plastic models, these were heavy brownish wire affairs with heavy brown metal posts anchored to each tooth. For the next three years, Viola would be torn between her natural inclination to talk and smile and her desire to keep her mouth closed and her braces out of sight.

Viola and her mother made weekly visits to the clinic to have her braces tightened. Upon their return home, Viola always had soup and ice cream for lunch because her teeth ached too much to chew. After a while, she took the streetcar to the clinic by herself.

“I never felt a bit scared because everyone was so friendly,” she said. Although she saw different student dentists over the years, she came to know the dental assistants who were on staff and to think of them as friends.

Finally, when she was 15, her braces were removed for her confirmation. Even so, she remembers, she didn’t smile for her confirmation photograph because she wore a retainer. Not one to throw things away, Viola still has the retainer in a trunk in the attic — the attic of a house on 17th avenue, where she has lived since she was seven.

After the braces came off, Viola continued to go to the clinic for dental care, even though there were dentists closer to home.

Although she now needs only routine cleanings and check-ups, Viola has had cavities filled, roots canaled, and several teeth crowned in gold at the Dental Clinic. Amazingly, she has never needed Novocaine. Even in the days before high-speed drills. Even for root canals. “They tell me I have a very high pain threshold,” she says with a big smile that shows all of her teeth. Now 83, she still has all of her own teeth, an achievement she credits to the School of Dentistry. Both of her parents needed false teeth.

A contented person by nature, Viola clearly doesn’t go out of her way to make changes in her life. She lives in the same house where she lived with her parents in 1927. She has attended only two churches, both in the same denomination, both in south Minneapolis. And she and her husband, Clyde Pelfrey, have been married for 53 years. But she doesn’t see a doctor on a regular basis, preferring to rely on vitamins, a healthy diet, and a positive attitude.

Not one to throw things away, Viola still has the retainer in the attic — of the house on 17th avenue, where she has lived since she was seven.

She says the reason she has stayed with the Dental Clinic for so long is because in 71 years she’s simply never been unhappy with the care.

“The students have to do the work right because the professors check it,” she says.

Viola now visits the clinic every four months to have her teeth cleaned. She and Clyde, also a patient, take the bus rather than the streetcar, and their destination is a little different than in 1927. While Viola has lived in the same place for 71 years, the dental clinic has moved three times. It’s now located in Moos Tower, a modern steel-and-concrete structure at Delaware and Harvard streets, about a block away from the original site.

The clinic itself is still a large room, but dividers between chairs give patients a little more privacy than they had in 1927. Viola misses watching what’s happening on either side of her, but says most of the other changes have been for the better. The reclining vinyl chairs are much more comfortable than the hard wooden chairs of the 1920s.

“They’re just beautiful, and so comfortable you could go to sleep in them,” Viola says. “And I just love the water drills,” she adds, her eyes lighting up.

Peggy Rinard