HEALTHCARE 2.0

NEW INNOVATIONS IN TECHNOLOGY, RESEARCH, AND CARE WILL CHANGE THE WAY WE LOOK AT WELLNESS

by Mo Perry

Stories of today's healthcare innovations can be awe-inspiring—scientists can grow a human ear on the back of a mouse? *Really?* But sometimes they seem as though they might as well be in the realm of science fiction: fascinating to ponder, but hardly relevant to our lives or those of our loved ones. Here are several Minnesota companies, researchers, and institutions bringing immediate innovation to common health concerns that may impact you and your family today.

ICONS THROUGHOUT © BLOOMUA - FOTOLIA.COM **ILLUSTRATIONS THROUGHOUT** PHILIP WRIGGLESWORTH

OPENING PATHWAYS FOR HEART-DISEASE PREVENTION AND TREATMENT

One in every four deaths in America today is the result of heart disease, which remains the leading cause of mortality for both men and women. The battle to reduce these numbers is waged on two fronts—early detection and prevention, and treatment of existing disease—and cardiologists at the University of Minnesota are making major advances in both areas.

Interventional cardiologist Dr. Ganesh Raveendran with University of Minnesota Physicians is leading a trial of a new imaging system that allows doctors to detect certain especially dangerous plaques in a patient's blood vessels. These so-called "lipid-rich," fatty, cholesterol-laden plaques have been connected with an increased risk for heart attack, and identifying them early could save lives.

Today, when a patient arrives at the hospital with symptoms of a heart attack, an angiogram is performed to determine the level of artery blockage. If there's significant blockage, the patient typically receives a stent to open up the blood vessel. Yet there are cases seemingly less urgent that might also need treatment. "We see many people with blockages of 20, 30, or 40 percent," says Raveendran. "But these lower amounts can also lead to a fatal problem."

The key to whether a low-level blockage poses potential danger is the amount of lipid-rich plaque it contains. Raveendran expects use of the new system, a tiny ultrasound device inserted into a patient's artery, to be widely available around 2017.

For patients whose heart disease is being treated with stents, U of M cardiologist Dr. Gladwin Das is researching the potential use of bio-absorbable materials. Traditional stents, made of metal, remain in the blood vessel permanently—in some cases, this can lead to restenosis (a re-narrowing of the vessel).

"The healing process is over within three to six months of inserting the stent," says Das, "and then there's no role for that piece of metal that remains in the body. A bio-absorbable stent that could be implanted and resolve completely, leaving a normal, healthy artery, is the Holy Grail of interventional cardiology."

Such a device was approved in Europe several years ago and has since been widely used abroad with a great deal of success. Das is working on a domestic trial of the device that he hopes the FDA will approve for general use by summer or fall. "I'm very excited about the potential of this device," he says. "My prediction is that in the next four to five years the majority of coronary stents used in U.S. patients will be bio-absorbable."

PREVENTING YOUTH SPORTS INJURIES

As young competitive athletes become increasingly specialized and train year-round, they're experiencing the kind of repetitive-stress injuries that used to be the exclusive territory of the pros. Twin Cities Orthopedics has partnered with six area high schools to deliver its program of specialized sports medicine directly to students at their schools. The program, which also was successfully implemented at Augsburg and the University of St. Thomas, focuses on injury prevention, proper warm-up techniques, and on-site physical therapy and treatment. "We don't just treat the athletes," says company CEO Troy Simonson. "We coach them how to train better to help them remain injury-free and be more successful in the long run."

TCOMN.COM

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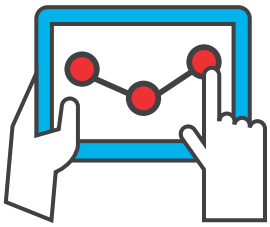


DIGITAL HEALTH COACH

Many employers sponsor health and wellness programs for workers, including incentives for exercising regularly and quitting smoking—but their effectiveness is always dependent on employees getting (and staying) involved. The Minneapolis-based start-up RedBrick Health is partnering with companies including Medica and Cargill to apply innovative behavioral science to members' engagement in health and wellness goals. They've designed digital tools that mimic video games, with each health milestone (such as consistently walking a certain number of steps per day) moving the user to a new, more challenging "level," and that will send text messages to provide timely reminders to take medication or to power down electronic gadgets at bedtime. RedBrick uses knowledge of habit formation, motivation, and psychology to help its clients' members and employees stay as invested in their own wellness as those who foot the bill for it. REDBRICKHEALTH.COM

NO-LIMIT DOCTORS VISITS

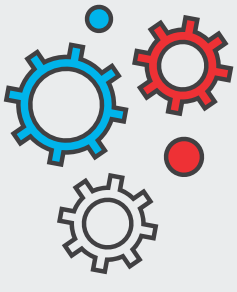
PrimaCare Direct, a cooperative of Minnesota primary-care clinics, is looking to supplement health-care coverage for those with high-deductible insurance plans. Their model treats primary healthcare less like a sit-down restaurant with an a-la-carte menu ($100 for a lipid panel, $150 for an x-ray) and more like an upscale buffet, where a monthly membership fee grants unlimited access. For a cost of $75 a month, a patient receives access to physicians, wellness care, chronic-disease care, and in-patient procedures. While members are advised to keep a traditional health-insurance policy to cover hospital or specialty care, PrimaCare Direct aims to cover 90 percent of most members' health care needs—those that can be addressed at the clinic without ever worrying about a co-pay or additional bill.
PRIMACAREDIRECT.COM

REDBRICK ANDERS HOLINE

TEAMWORK FOR CHRONIC PAIN

Chronic pain or a nagging injury can cause patients to bounce back and forth between chiropractors, physical therapists, and orthopedic specialists in pursuit of relief. Today, sufferers can take a cue from the Minnesota Vikings, who partnered with Orthology for the 2014 NFL season. Orthology offers each patient a collaborative team made up of a physical therapist, chiropractor, and soft-tissue specialist working together from the same playbook. The goal is to help clients, who also include skier Lindsey Vonn, to recover rapidly from injuries and to relieve chronic pain. **ORTHOLOGY.COM**

ORTHOLOGY RYAN TAYLOR **SHOES** © SETE - FOTOLIA.COM



BEAMING UP COMPLEX CANCER TREATMENT

Cancer treatment in cases involving children, young adults, and those patients with tumors close to critical organs can be complicated because of the precision required and the need to minimize damage to surrounding tissue. Such patients at Mayo Clinic will soon have access to a critical tool: proton beam therapy, technology that uses finely controlled radiation that can "paint" tumors deep in the body with charged particles that damage the cancer cells' DNA and hinder their ability to reproduce. New treatment facilities are being constructed at both the Minnesota and Arizona Mayo Clinic campuses, and the Rochester clinic aims to start treating patients this summer. **MAYOCLINIC.ORG**

ENGAGED ELDER CARE

The new Gardens in St. Paul is Minnesota's first and (for now) only nursing home that follows the cutting-edge Green House Project model, designed to nurture and attend to the complete well-being of senior residents and combat the feelings of loneliness, boredom, and helplessness that those in traditional nursing homes can experience. The Gardens is made up of six Green Houses; each accommodates no more than 10 residents, each of whom enjoys their own private bedroom and bathroom. Meals are cooked from scratch in the open kitchen, where all are welcome to participate in cooking and meals are eaten family-style at a large table. The facility boasts a lower ratio of caregivers to residents (one for every five, as opposed to one for 10 to 12 in conventional nursing homes), and homey touches such as twice-weekly happy hours help to foster an environment that feels far more like a community than an institution.

THEGREENHOUSEPROJECT.ORG

WORLDWIDE ACCESS TO VITAL TECH

The MRI (magnetic resonance imaging) is invaluable as a diagnostic tool for brain and spinal-cord conditions ranging from multiple sclerosis to cancer to aneurysm, but when it's needed outside major urban centers, patients are frequently out of luck. Traditional MRI machines are bulky and non-portable, and today only about 5 percent of the world's population has reasonable access to them due to financial, physical, and logistical barriers. But the University of Minnesota's Center for Magnetic Resonance Research was recently awarded two federal grants to develop a new portable MRI technology. The compact unit can be transported to populations in underdeveloped areas, and its ability to be used outside a traditional laboratory setting means more thorough data on subjects in their everyday environments and more natural body positions than the traditional lie-down test, says radiology professor Dr. Thomas Vaughan, the project's co-principal investigator.

CMRR.UMN.EDU

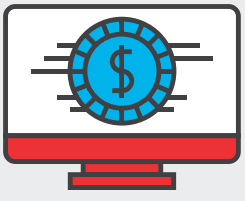
BELOW NICHOLAS MCINTOSH PHOTOGRAPHY, COURTESY OF THE GREEN® HOUSE PROJECT

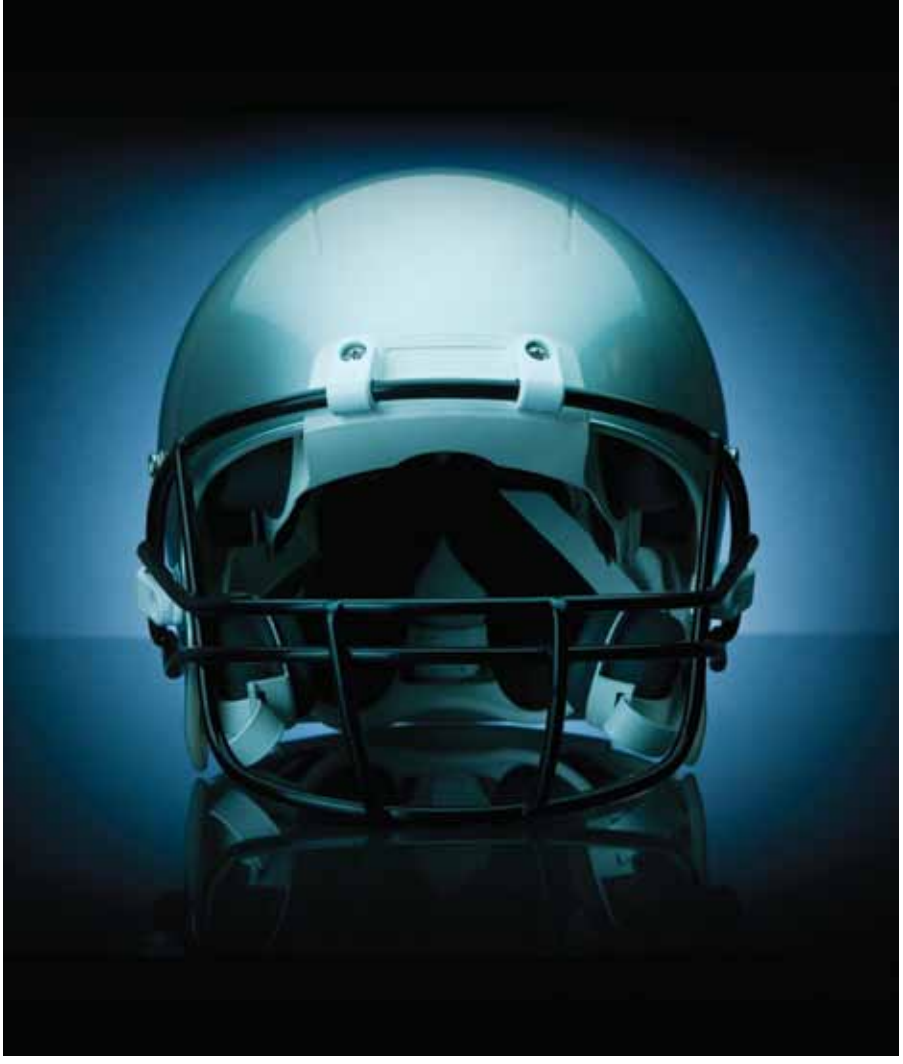
IMMEDIATE ACCESS, CONTROLLED COSTS

In 2012, Thompson Aderinkomi and his wife took their 1-year-old child to the doctor four times over the course of a month for a single bout of pneumonia. Like many Americans, they had a high insurance deductible, which resulted in hundreds of dollars in medical bills—some for visits in which the doctor simply sent them home. The experience inspired Aderinkomi to found the medical start-up RetraceHealth, where he is now CEO (as well as a MNsure board member).

The company facilitates primary and preventive care for Minnesotans by bridging online and in-person treatment. Utilizing a combination of video consultations and in-home visits by advance practice nurses, RetraceHealth operates with Medicare and Medicaid, as well as major insurers, and aims to prevent more than a third of unnecessary trips to the ER while also cutting down on long wait times to see physicians (especially for underserved populations). Its video consulting represents a much cheaper way to deliver care for routine concerns, controlling costs for both patient and provider.

RETRACEHEALTH.COM





HELMET © IMG_191 - FOTOLIA.COM

A ROBOT TEAM DOC

Concussions pose a serious health risk for all athletes who play contact sports, from those in the NHL all the way down to pee-wee football, and healthcare professionals are unanimous that diagnosis on the spot is crucial. But what about the sidelines of games at which a trained physician isn't available?

Soon, if a high-school football player takes a nasty hit and is walked to the sidelines, groggy and shaking his head, he might be put through a concussion test by VGo, a 4-foot-tall robot equipped with a camera and a screen. *Friday Night Lights*, meet *The Jetsons*.

In 2013, a VGo robot was on the sidelines for every Northern Arizona University football game—including away games, when he was packed into a box and schlepped onto the bus with helmets and other gear (treatment most human neurologists might resent).

"With the NFL using a sideline neurologist at all their games, we knew it was only a matter of time until collegiate-level teams followed suit," says Mayo neurologist Dr. Bert Vargas, who heads up the VGo robot project. He cites the huge number of football teams playing across the country, making it prohibitive for a trained neurologist to be present at each game.

With robots acting as eyes and ears, a single neurologist can be "virtually" on the sidelines at several games at once, and combining broadcast images with views from the robot's camera can lend a complex view of any particular injury. When the VGo's concussion assessments were compared with simultaneous evaluations performed by a doctor who was physically present, the results from the remote assessments were almost exactly the same as those from the physician, Vargas says.

The next step is to make the VGo technology more portable and affordable, possibly using smartphones, tablets, or wearable technology such as Google Glass in place of robots. "We eventually want to be able to extend this technology to high schools in rural areas and youth athletes—populations that don't have good access to specialty concussion care," says Vargas. MAYOCLINIC.ORG M