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SETTING THE PACE

CEO ART COLLINS SAYS MEDTRONIC DEVICES ARE MELDING ELECTRONICS AND MEDICINE TO TRANSFORM PATIENT CARE.

NEW PACEMAKERS MONITOR PATIENTS FROM A DISTANCE.

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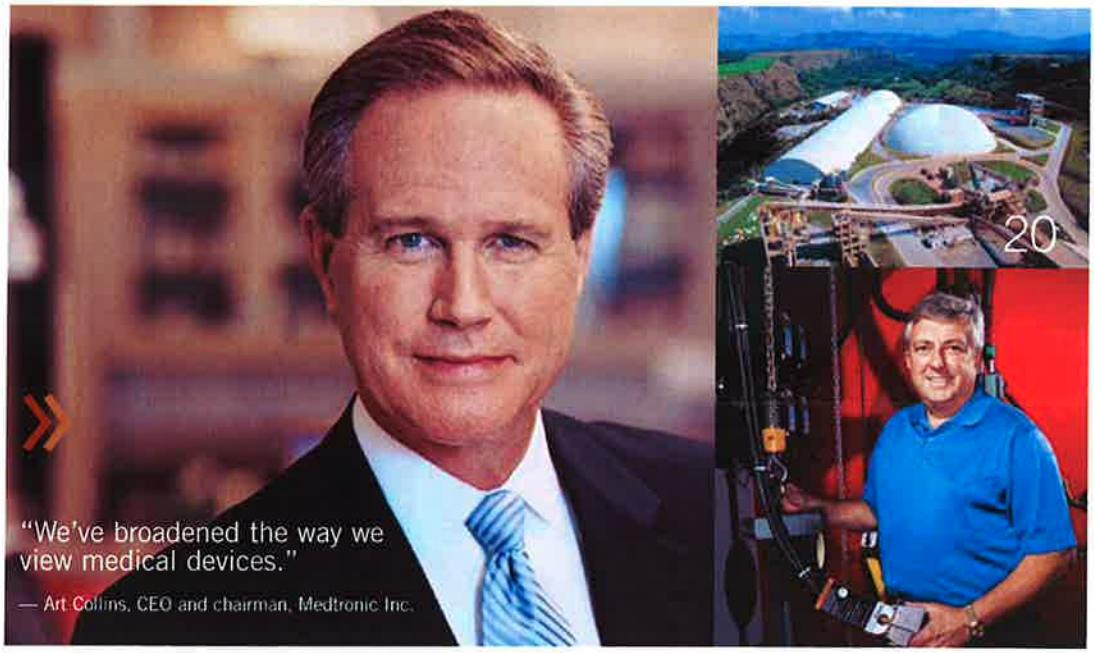

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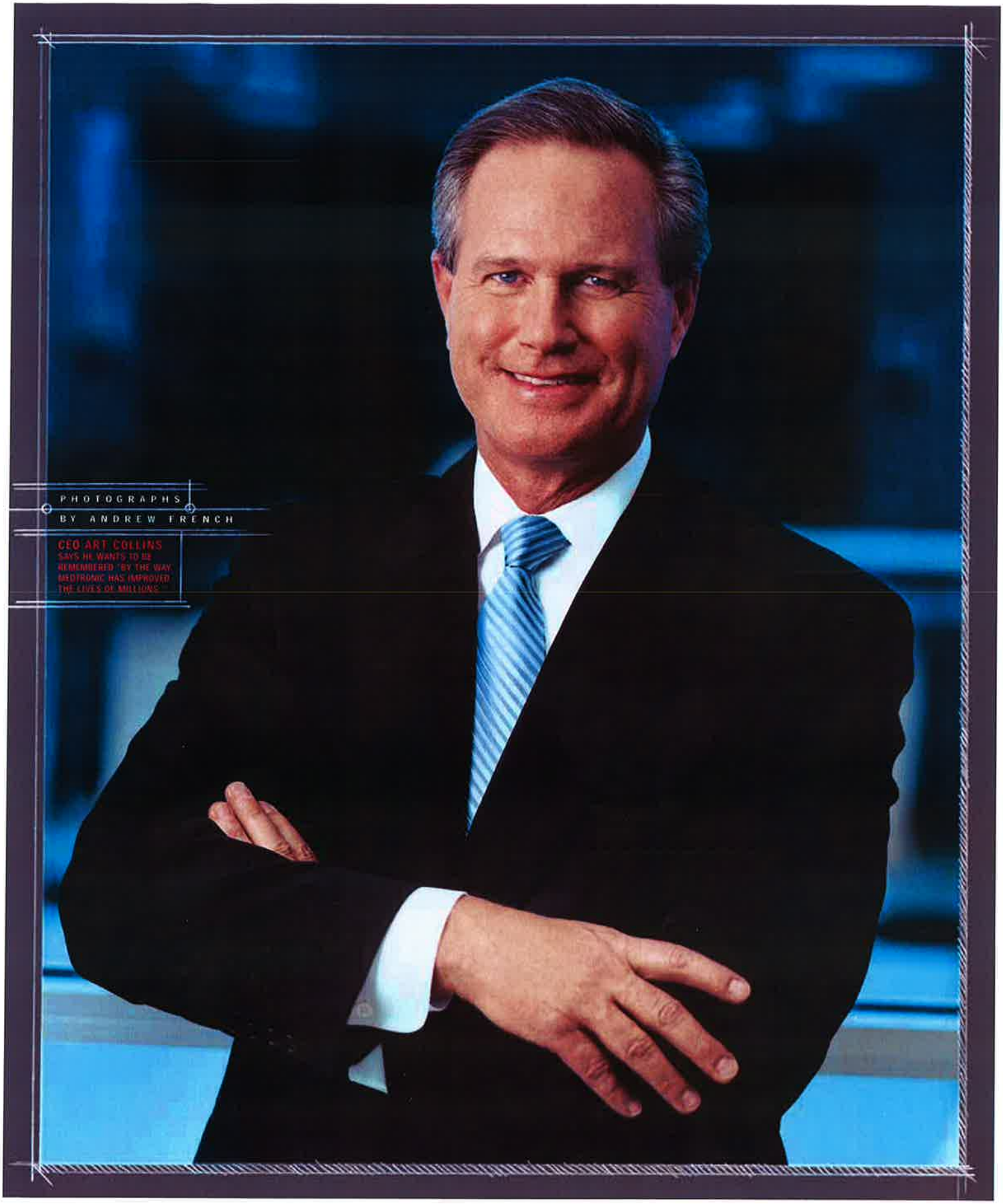


PHOTOGRAPHS
BY ANDREW FRENCH

CEO ART COLLINS
SAYS HE WANTS TO BE
REMEMBERED "BY THE WAY
MEDTRONIC HAS IMPROVED
THE LIVES OF MILLIONS."

A COMPANY WITH HEART

AND OTHER MEDICAL DEVICES TOO! CEO ART COLLINS IS MOVING MEDTRONIC BEYOND PACEMAKERS TO PROVIDE LIFELONG SOLUTIONS FOR PEOPLE WITH CHRONIC DISEASES.

BY JULIE MOLINE

JERRY WILDENAUER was diagnosed in 1996 with Parkinson's Disease. Tremors, the disease's hallmark, weren't the 54-year-old chiropractor's most troubling symptom: He says rigidity and difficulty with speech, coordination and balance were making life unbearable. After eight years of worsening symptoms, this former athlete says, he could not tie his shoes. As deterioration continued, his only option, he insists, was surgery. Doctors implanted two sets of electrodes in his brain, connected by thin silicone-coated leads to a neurostimulator device that they set under the skin beneath his collarbone. As the device was turned on, Wildenauer recalls, "it was literally instantaneous. One minute I was in pain, my face was frozen and I shuffled instead of walked. The next minute the pain was gone, my limp was gone and I could smile."

The device that Wildenauer reports brings him and 30,000 others relief is called Activa. **MEDTRONIC INC.** (MDT) — whose name combines the words medical and electronics — indicates that Activa sends electrical signals that interfere with a Parkinson's patient's defective neural transmissions. "It works with technology similar to a pacemaker," says Art Collins, CEO and chairman, "using pulses of electricity to address a physical abnormality."

IT STARTED WITH THE HEART

Today, 57 years after electrical engineer Earl Bakken and his brother-in-law Palmer Hermundslie founded Medtronic to develop a pacemaker prototype they had invented in a Minneapolis garage, electronic-pacing technology remains at the literal heart of the company, says Collins, noting that the Cardiac Rhythm Disease Management business, or CRDM, supplied nearly half of Medtronic's $11.3 billion 2006 revenues. In addition to pacemakers, which regulate heartbeat, usually for hearts that beat too slowly, CRDM products include implantable cardioverter defibrillators (ICDs), which deliver a shock if the patient experiences sudden cardiac arrest or a dangerously fast heart rate. Medtronic reports that more than 250,000 patients received ICD implants globally in 2005 alone.

But the 47 percent of Medtronic fiscal 2006 revenues that came from cardiac devices is down from 65 percent two years earlier, as Medtronic researchers expand their focus from the heart. Besides Parkinson's, Medtronic says, its devices target neurological disorders such as chronic pain, severe spasticity and other movement disorders, as well as gastrointestinal and urological disorders such as overactive bladder and enlarged prostate. Medtronic is studying neurostimulation for the treatment of epilepsy and depression. The company reports it also makes spinal as well as ear, nose and throat devices (which generate a reported 22 percent of revenues); insulin pumps and continuous glucose monitors (part of the diabetes business, which represents some 7 percent of revenues); and vascular and cardiac surgery devices such as stents, catheters and artificial valves (about 15 percent of revenues).

SETTING THE PACE FOR GROWTH

The wearable, external pacemaker that was Medtronic's first product in 1957 was roughly the size of a paperback book, says Collins. According to company lore, Bakken was inspired by a *Popular Electronics* article on how to build a metronome, and his invention, like that metronome, was powered by a nine-volt battery. An implantable version followed in 1960. Today's pacemakers, says the company, are about the size of a pocket watch, and the semiconductors and lithium batteries that power them are protected by titanium cases welded shut by lasers.

Collins says that much of Medtronic's R&D focuses on information technologies, biomedical engineering and semiconductor technologies; its own vertically integrated chip plant in Tempe, Ariz., produces the integrated circuits that run most of its devices. That focus on applied science is one reason why pacing devices tell only part of the Medtronic story, says Collins. As the company has grown at a 15 percent annual growth rate over the past five years, he says, it has entered treatment areas that have nothing to do with pacing.

A NATURAL PROGRESSION

"It was a natural progression," points out Dr. Stephen Oesterle, senior vice president, medicine and technology. "Our expertise in treating heart-rhythm problems led to new lines of business in cardiac surgery and treatment of vascular disorders. The expertise we gained by surgically implanting devices led us to pursue applications in the treatment of diabetes, using implantable insulin pumps and continuous glucose monitors."

Some new Medtronic devices are innovative enhancements to cardiac surgery instruments. The Medtronic Octopus Evolution Tissue Stabilizer, introduced this year, is used in beating-heart operations such as a coronary bypass, Oesterle notes. He says the device's suction pods hold the heart's surface tissue stable while a surgeon attaches a transplanted vessel around blockages in the coronary arteries. "The stabilizers can hold, lift and rotate the beating heart so the surgeon can have better access to coronary arteries," Oesterle explains. He adds that beating-heart procedures can be safer alternatives to using traditional heart-lung machines, which pump and oxygenate the patient's blood if the heart must be stopped for repairs.

Another innovation is the artificial intervertebral disc, used in Europe and Australia and undergoing clinical trials in the U.S., the company says. The Bryan artificial disc, made of a gel-like elastomer nucleus between two titanium-alloy shells, along with the PRESTIGE disc, a metal-on-metal articulated design, are both attractive alternatives to spinal fusion, the most common form of surgery for treating cervical degenerative-disc disease, says Oesterle. He explains that the 200,000-odd cervical procedures that doctors perform each year in the U.S. to remove impingements on the spinal cord or nerves involve implanting bone graft and a metal plate that fuses the vertebrae together. That, Oesterle says, reduces the patient's range of motion. The artificial disc, he says, allows for increased flexibility.

MEDTRONIC HAS MOVED BEYOND CARDIAC DEVICES BY INVESTING IN INFORMATION TECHNOLOGIES, SEMICONDUCTORS AND BIOMEDICAL ENGINEERING (CLOCKWISE: IMPLANTABLE PACEMAKER, DEFIBRILLATOR AND HEART MONITOR).

Collins says that calling Medtronic a pure-play medical-devices company is no longer accurate. "We're a medical technology company," he explains. "We've broadened the way we view medical devices so they're not simply ways to deliver therapy, but now can monitor a patient's condition." (See "Expanding the Walls of the Cardiologist's Office," page 19.)

Interactive devices, says Collins, signal Medtronic's foray into comprehensive patient management, which includes monitoring and diagnostics in addition to therapeutics. In the case of the InSync Sentry, the cardiac resynchronization therapy defibrillator treats sudden cardiac arrest. Its sensors also collect and store heart-rate information and detect, then report, when fluid builds up in the lungs as the heart fails. Armed with such knowledge, physicians can quickly intervene, potentially avoiding hospitalization, explains the CEO. "The result," says Collins, "is improved medical outcomes at a much lower cost over the life of the therapy."

The CEO adds that Medtronic has devices in clinical trials that track blood sugar, body temperature, patient activity, heart rate and pressure inside the heart 24 hours a day. Such diagnostic devices "give doctors even more preventive capability," he says.

COLLINS' JOURNEY

The move toward diagnostic applications was natural for Collins, 59, who spent 14 years at **ABBOTT LABORATORIES** (ABT), from 1986 to 1992, as a vice president in charge of worldwide medical diagnostic business units. He joined Medtronic in 1992 as corporate executive vice president and president of Medtronic International with responsibility for all company operations outside the U.S. Taking on the COO role at the beginning of 1994, he rose to president in 1996, and was named CEO in 2001 and chairman a year later.

Collins says his parents — a doctor and a registered nurse — fostered his lifelong fascination with health care. But his interest in the sea won over medical school, he notes, and Collins became a naval officer after graduat-

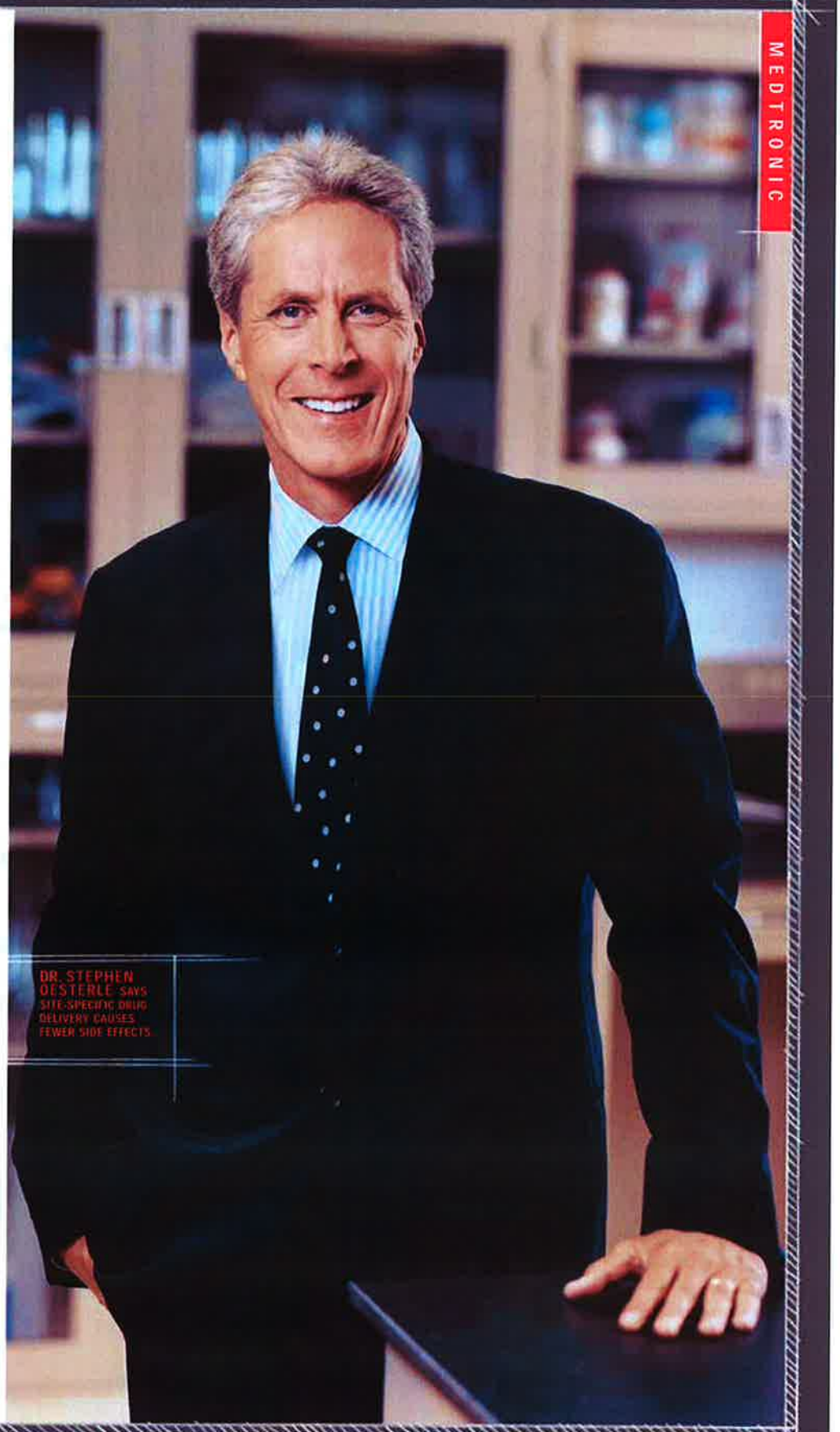
ing from Miami University of Ohio in 1969. Although he left the service in 1973 to pursue an MBA at Wharton, Collins says, he still has the confident, slightly formal demeanor of an officer. He adds that his military background "taught me how to delegate and understand the importance of attracting and motivating talent." It also helped to develop his leadership skills. "There I was, at age 21, leading a division of men, from 18-year-old kids to 55-year-old salts who'd seen parts of the world that I'll never see," he laughs. "It was a great opportunity to learn quickly and evolve as a leader."

Some of that military discipline remains. Colleagues note Collins' penchant for drawing up five-year plans for personal and professional goals. He speaks often on the importance of balance — of work and family life, risk and reward. "We encourage people to try new things, recognizing that they'll make mistakes. That's the nature of our business," Collins says. His colleagues say he takes an intense interest in all areas of the business, from scrubbing in to watch surgical procedures involving Medtronic products to welcoming new employees.

New employees take part in a "mission and medallion" ceremony that Collins says is a rite of passage every employee attends six months after joining Medtronic. He and other officers recap the company history and give each newcomer a bronze medallion engraved with the company's credo: "The first mission is to contribute to human welfare by application of biomedical engineering in the research, design, manufacture and sale of instruments or appliances that alleviate pain, restore health and extend life."

GROWTH STRATEGY

Medtronic has grown to a reported 36,000 employees in 120 countries, up from 13,000 employees just a decade ago, through organic growth and acquisitions, partnerships and joint ventures. "Our focus is on advancing those markets we're already in," Collins explains. "More than



80 percent of growth in the last 10 years can be attributed to new product introductions and the expansion of therapies for new patient groups."

Collins proudly points to the "patent wall," a sculpture anchoring the courtyard of the company's modernist Minneapolis campus, which showcases some of the 14,000 patents Medtronic has received since its founding, including 8,000 that are still active. Last year, the company upped R&D expenditures by 17 percent to more than $1.1 billion, or about 10 percent of revenues, he says. In the last 12 months alone, Medtronic added 750 research, clinical and technical personnel to support what analysts call a "robust" pipeline. Collins counts more than 200 clinical trials currently under way.

ACQUISITIONS

In addition, in the past six years, Medtronic reports, it has acquired 15 companies in an effort to enter new markets quickly. Among them: Sofamore Danek Inc., which helped grow Medtronic's spine-product business; Arterial Vascular Engineering, which helped it gain traction in the competitive coronary-stent market; and MiniMed Inc., which let Medtronic jump to market leader in diabetes pumps and monitoring devices. Diabetes management is a $1 billion worldwide market, with annual growth of 15 percent to 20 percent, according to estimates from Jefferies & Co., the financial advisory group that is part of **JEFFERIES GROUP INC.** (JEF).

Acquisitions are also supplemented by minority-interest investments in emerging or start-up technology companies. Over the past several years, more discipline has been brought to the selection process, and investment has shifted from publicly held companies to privately held ventures.

Rather than being "swayed by the emotion of a deal," Collins insists that Medtronic consider only targets that add strategic value. "By and large, we operate in highly underpenetrated markets, where only a percentage of the individuals who could benefit from the therapy have received it," Collins notes. For example, he says, insulin pumps and continuous glucose monitors vastly improve upon the needle-stick blood test, but only one-fourth of the target U.S. population uses insulin pumps and a far fewer fraction has access to glucose monitors. "Outside the U.S., those figures are much lower," he adds.

Overseas markets are growing particularly fast, Collins reports, noting that Medtronic is especially beefing up its sales staff in Southeast Asia. China, he says, where Medtronic has had a presence for about 10 years, is one of the company's fastest-growing markets. "Even if you take 5 percent of the population that can afford these products, you have tremendous market potential," he says, adding that the medical-devices business in India is showing double-digit growth.

THE EXPERTISE GAINED FROM SURGICALLY IMPLANTING HEART DEVICES LED MEDTRONIC TO APPLICATIONS IN TREATING DIABETES INCLUDING INSULIN PUMPS (BELOW) AND GLUCOSE MONITORS.

PARTNERING

Medtronic indicates it also teams with partners to further develop devices. For example, the company reports using a drug from Abbott Labs for its drug-coated stent that is approved in Europe and under regulatory review in the U.S. Its intrathecal baclofen (ITB) therapy device, explains Oesterle, relieves severe spasticity by delivering small amounts of baclofen, a drug from **NOVARTIS AG** (NVS), via a Medtronic pump to an area where fluid flows around the spinal cord. Site-specific drug delivery, according to Oesterle, means fewer side effects than when patients take the drug orally.

Collaboration allows Medtronic to push the envelope on new approaches to patient care, says Collins. "We're seeing convergence — of biotechnology and biologics with medical devices, and of diagnostics with in-vivo therapy. This convergence is transforming patient care, and is creating exciting opportunities for the company," he says.

For example, affiliations with biotech partners have led to a new treatment for bone grafts used in spinal fusion, Oesterle says. A bone morphogeneic protein developed by the Genetics Institute (part of Wyeth-Ayerst Research, a division of **WYETH** [WYE]) encourages the body to build new bone tissue, he notes, eliminating the need for painful hip-bone harvesting surgery.

Another technique being developed with a joint venture partner, the injection via a Medtronic catheter of immature muscle cells directly into damaged hearts, is being tested in France, says Oesterle. The cardiac cell-therapy market potential, he says, could reach over a billion dollars per year. As a sim-

ple outpatient procedure, Oesterle adds, "it is much easier on patients, who often aren't good surgery candidates because their hearts are so impaired." He notes that it is also significantly less costly and less disruptive, since the recovery period is brief.

In a video on a Medtronic Website, comedian Jerry Lewis tells his own story of healing. He said he had been in pain for 37 years, largely from injuries sustained by performing his own stunts. By 2002, Lewis said, the pain had become so excruciating he considered taking his own life, but Medtronic's "pain pacemaker," a neurostimulator that allows patients to control their pain, was so effective, he said, that he was able to resume working on his book and telethons.

Collins indicates that the excitement surrounding Medtronic goes beyond profit potential. Instead of describing the company in terms of its position as a market leader, he emphasizes that it is in the business of improving — and saving — lives. "Every five seconds, a Medtronic product saves or substantially improves a life somewhere in the world," Collins says.

THE HOLIDAY PROGRAM

That statistic moves from an abstraction to flesh and blood at the annual holiday program, attended by patients who visit Minneapolis to meet the employees whose efforts led to their recovery. "Our most important meeting isn't the annual shareholders' meeting or the annual investors' conference," Collins says. "It's the holiday program."

The CEO says the highlights of the event are unscripted stories that patients and their loved ones tell about how Medtronic products changed their lives. The testimonials are broadcast via teleconference to all Medtronic locations around the world, and have an enormous impact on employees, Collins says.

"Those stories are what I want to be remembered for," Collins says. "Not the consecutive string of profitable quarters, but the material way in which Medtronic has improved the lives of millions of people." □

BETTMAN/CORBIS

EXPANDING THE WALLS OF THE CARDIOLOGIST'S OFFICE

Some 5 million Americans suffer from heart failure, and about 550,000 new cases are diagnosed every year, reports the American Heart Association. Medtronic estimates that the direct and indirect costs of treating heart failure in the U.S. alone in 2004 topped $25.8 billion, two-thirds of which went to hospitalization and home nursing care.

Medtronic has taken an all-inclusive approach with its implantable cardiac resynchronization therapy defibrillator (CRT-D). Not only can its Concerto cardiac devices help strengthen the heart's pumping action, says Medtronic, as defibrillators they also deliver electrical jolts if the patient has an episode of tachycardia (a dangerously fast heartbeat) or an irregular heartbeat, or if he or she goes into sudden cardiac arrest. As monitors, says the company, they tell doctors if something is wrong with a patient anywhere in the U.S. As communication devices, they alert doctors and intervene in adverse conditions.

Heart-failure patients, even those with ICDs, must be monitored regularly since they're at a four to six times greater risk of sudden cardiac arrest than the general population, notes Collins. He says wireless telemetry allows the patient to be monitored away from a hospital; the data tells the cardiologist whether the device is performing as it should and whether therapy should be adjusted. The approach, says Collins, moves therapy away from being reactive to being proactive.

A patient using the Medtronic CareLink Network to remotely monitor an implanted cardiac device holds a mouselike transmitter over his or her chest and pushes a button on a portable monitor, about the size of a computer keyboard. Collins explains that the monitor automatically dials a toll-free number and sends information to a secure server, from which a clinician can use the Internet to access the patient's data on heart rate and rhythm. The newer Concerto CRT-D and Virtuoso ICD devices, he says, utilize the Medtronic CareLink Network platform, along with additional wireless telemetry features, to deliver information remotely and automatically.

If the heart quivers uncontrollably (a condition known as atrial fibrillation) or if the patient goes into cardiac arrest, the devices treat the arrhythmia and alert doctors via pagers or text messages. If necessary, according to the company, the doctor can respond and request that the patient come to the office for a checkup or go to the ER.

Nearly 80,000 patients and 1,000 clinics have enrolled in the Medtronic CareLink Network since it was instituted in the U.S. in 2002, says the company. Still, adds Collins, "we believe that 85 percent of heart-failure patients in the U.S. who need ICD therapy have not yet received it."

The Chronicle ICD, Medtronic's heart-failure device now in clinical trials, tracks pressure inside the heart, body temperature, patient activity and heart rate. Such monitoring, says Philip B. Adamson, director of the Heart Failure Institute at Oklahoma Heart Hospital in Oklahoma City, means "It's no longer enough to wait until patients develop symptoms of worsening heart failure — patients and physicians need technology, like Chronicle ICD, that has the potential to provide an early and accurate indication of deterioration in heart failure status, thereby allowing clinicians to take appropriate preventive measures."