A Change of Pace

By Kim Kiser

Earl Bakken’s name has long been synonymous with Minnesota’s high-tech medical device industry. Now he’s a champion for low-tech therapies and healing environments.

The Minnesota State Fair isn’t the kind of place one would expect to find the former head of an $11 billion company. But there, in the middle of the University of Minnesota building, a cinderblock structure flanked by noisy food-on-a-stick vendors, sits one of its most famous alumni, Earl Bakken, inventor of the implantable cardiac pacemaker and founder of Medtronic, Inc.

Wearing a maroon-and-gold flowered Aloha shirt under a black sport jacket, Bakken looks more like a basement inventor returned from vacation than a retired corporate executive. For the 82-year-old, who moves about with the aid of a walker, the fair appearance is just one of the 20-plus speaking and meet-and-greet engagements he’s attended during his four-week stay in Minnesota. He’s there, he says, to try to sell young people on careers in engineering and medicine.

Instead, people old and young line up to thank, shake hands with, or have their picture taken with Bakken, the man whose inventions have given them or someone they know a few more good years of life.

Over the din of the Pronto Pup and corn dog crowd, Bakken says he estimates that 25 percent of the fairgoers this September Friday have in some way been touched by a Medtronic product. Bakken counts himself among that subset. With a Medtronic pacemaker, stent, and insulin pump keeping him going, he chuckles when he talks about being a walking advertisement for the company he founded.

Bakken goes on to explain that the company’s products—and the people who make them—improve or restore a life every five seconds, a figure he wants to see drop to four seconds as the company adds to an armamentarium that includes defibrillators, heart valves, drug pump and infusion devices, and artificial spinal discs.
Earl Bakken, who retired to Hawaii in 1991, is a living example of what he calls “blended medicine.” He has three Medtronic devices, and he relies on complementary therapies such as Reiki, a Japanese technique for stress reduction and relaxation, to keep him healthy.
Not only is Bakken responsible for starting the Fortune 500 company that continues to make lists of the most respected and admired firms in the United States, he also can take credit for launching the implantable medical device industry here.

"Much of the medical device industry in Minnesota owes its existence to Earl Bakken and the development of Medtronic," says Joe Price, J.D., a partner at Faegre & Benson, a law firm in Minneapolis. Price, who represents medical device companies in his practice, met Bakken in the 1980s, when Price was a member of the board of Medical Alley (now LifeScience Alley), a trade association of Minnesota device and biomedical companies.

Price considers Minnesota the center of the universe for companies that make cardiovascular devices and Bakken the godfather to companies such as St. Jude Medical, Cardiac Pacemakers Inc. (now part of Guidant and Boston Scientific), Helix BioCore (now ATS Medical), and Minntech—just a few that were started by former Medtronic employees.

"He had the ability to see something in the 1950s that other people hadn't seen," Price says. "When you think about the many people today whose lives have been saved by the development of implantable cardiovascular devices, you track that all back to Earl and a garage and the development of the first pacemaker. He was the guy who got it rolling."

The 80/20 Rule

Today, Bakken’s office is a far cry from the 800-square-foot garage in northeast Minneapolis where he and his brother-in-law, Palmer Hermundslie, started a two-person business in 1949 repairing electronic devices for hospitals (see “Humble Beginnings,” p. 30). Looking out over the atrium of Medtronic’s World Headquarters in Fridley, it is a modest space filled with reminders of those early days: framed pictures from the movie Frankenstein, which got him interested in electricity as a child and later inspired him to study electrical engineering; components of pacemakers that ran off car batteries; one of the first implantable pacemakers; and a replica of the door to the garage where it all began; in addition to posters of his new home, the island of Hawaii.

Bakken, who retired to the Kohala Coast on the northwest side of the Big Island in 1991, inhabits this office about three times a year when he comes back to Medtronic to do "mission and medallion" ceremonies, at which new employees receive a company medallion and learn about its beginnings and its mission—to give people additional years of active life that they otherwise would not have had. "A doctor can’t do that," Bakken says.

At one of the two ceremonies last August, he told the 200 people in the audience how getting FDA approval to sell the first implantable pacemaker in 1960 opened up all sorts of possibilities for pacing devices that could stimulate not just the heart but also the stomach and the brain. It was an example of what Bakken describes as "Ready, Fire, Aim," developing a product to meet a need, then later looking for other ways to apply the technology.

But as the company grew and its products became a staple in hospitals around the world, Bakken became aware of another element critical to restoring health—the role the mind plays in healing the body.

He started hearing about how patients of certain doctors had better outcomes in terms of the effectiveness of the high-tech devices they received than those of other physicians. Bakken noticed that the patients for whom high-tech devices worked best had doctors and nurses who convinced them that indeed the technology was going to make them better. "The reality of the phenomenon became clearer and clearer," he wrote in his autobiography, One Man’s Full Life, "that so much of what we do in conventional Western, or allopathic, medicine depended on belief, or, more specifically, on turning on the healer within us."

Bakken’s fascination with the way things other than drugs and technology affected health and disease intensified as he became interested in principles such as chronobiology, the study of how the body’s rhythms affect health, and “cyberphysiology,” a phrase he invented to describe the mind’s influence on the physical body.

In 1983, Bakken invited friends into his home to discuss the idea of human potential. That small discussion group grew into the Archaeus Project, a think tank now based in Hawaii that’s made up of professionals with backgrounds in science, technology, business, medicine, and the humanities. The group honed in on the role alternative and holistic medicine could play in improving the quality and reducing the cost of health care and has been involved with projects promoting the practice of such care in Hawaii.

One of the people Bakken met during those discussions was Papa Henry Auwae, a master of Hawaiian medicine who relied on herbal remedies and other traditional treatments. "He said that the herbs that he furnishes and the devices that companies such as ours furnish, and the sur-
Healing in Hawaii
When Bakken retired to Hawaii, he intended to do the kind of things retired people do: walk the beach and lay in his hammock. “After two or three weeks of that, I couldn’t stand it anymore,” he says, quietly.

He got involved with the Friends of the Future, an organization of what he describes as “far-sighted individuals” who were seeking solutions to problems facing the state, including the fact that the 30,000 residents of the northern section of the Big Island had higher-than-average rates of diabetes, hypertension, heart failure, and stroke, and were served by only one small clinic. Those who suffered heart attacks or were involved in traffic accidents had to be transported to hospitals in Hilo or other parts of the island hours away.

Bakken learned that a group had been trying to get a hospital built in the area for decades. “There were never enough people in our area on the north side of the island to make it happen until the 1980s, when we got an insur-gence of tourism and resorts,” says Susan Pueschel, who was working as an EMT on the north side of the island at the time and is now director of public relations and communications for the Bakken Foundation.

By 1989, the group had incorporated as a nonprofit board and had received an $800,000 planning grant from the state. “We had 90 percent hope and a 10 percent chance of getting it built at that point, even after we got the appro-priation,” says Pueschel. The board needed a plan, funding, a certificate of need from the state, and agreement from lead-ers of communities in the area on where to put the hospital.

Sharon Vitousek, M.D., an internal medicine physician who was a member of the nonprofit’s board when she learned about Bakken through her husband, who was doing legal work for him. Vitousek found out that Bakken had served on the boards of several hospitals in Minnesota, and her group needed someone with hospital board experience to help them move ahead. She approached Bakken about getting involved.

But Bakken wanted to do more than put up money; he wanted to share with the community his vision for health care in 2010—that it would be consumer-driven, that patients would use the Internet to learn more about disease and healthy living, and that people would use money from health savings accounts to pay for care. “He was way ahead of his time on the need to support health literacy and informed patients,” says Vitousek.

Bakken agreed to serve on the hospital’s board under the condition that they not build what he describes as a “warehouse for sick bodies.”

As planning for the 40-bed acute care facility began, he put his inventor, engineer mind to work. He wanted to create a facility that epitomized what he calls “blended medicine.” It would incorporate the best of technology—ultrasound equipment, a 1.5-Tesla MRI machine, a 64-slice CT scanner, a bone densitometer, and a state-of-the art sleep lab, and the best of complementary medicine—acupuncture, healing touch, quiet gong, massage therapy, and guided imagery. It would have rooms that could accommodate entire families with doors that opened to the outside and windows that brought in natural light to keep patients’ bodies in synch with the sun. And it would have gardens and natural land-scapes, and places for spiritual icons and ti plants that “filter out bad spiritual energy.”

“He saw that in health care things had gotten so out of whack, gone so far toward the technology side and away from the humanistic side that he saw this as an opportunity to bring back in the human, caring, loving, spiritual side of healing and health care,” says Pueschel, who was the hospi-tal’s first development director.

The transplanted Minnesotan eventually helped raise about half the funding for the $25 million facility and served as its board president from 1991 until 1999. Since North Hawaii Community Hospital opened in Kamuela in 1996, it has been recognized nationally for safety and its emergency and radiology services, and it has been named a “hospital with heart” by Modern Maturity magazine.

Physicians, hospital administrators, even former Health and Human Services Secretary Tommy Thompson have visited the facility to see high-tech, high-touch medicine in action. And Bakken has been recognized by the Native Hawaiian community. In 2005, leaders presented him with the large white hook made from a walrus tusk that he wears around his neck—a talisman reserved for high chiefs. In addition, a civic group once named him the “non-Hawaiian who has done the most good for the Hawaiian people.” These were honors he never dreamed of receiving when he moved to the island 15 years ago.

“...
Earl Bakken takes the stage at Medtronic’s World Headquarters in Fridley in front of 200 new employees, greets them with a heartfelt “Aloha,” and encourages them to visit him any time they’re on the Big Island of Hawaii, Bakken’s retirement home. “I want to know what’s going on at Medtronic,” he tells them and makes sure that the employees, who are gathered for the company’s mission and medallion ceremony, don’t leave without a card with his address and phone number on it.

The ceremony, which Bakken officiates twice a year, is an opportunity for newer employees to learn about the company. The idea is that by understanding the company’s mission they’ll do a better job, Bakken explains. And that job is to improve patients’ lives.

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But back in 1949, the year Bakken founded Medtronic, he wasn’t thinking of transforming lives. Instead, he stumbled onto an idea for a business. Bakken was working on his master’s degree in engineering at the University of Minnesota; his wife at the time was working as a medical technologist at what is now Abbott Northwestern Hospital. While waiting to pick her up from work, Bakken got to know some of the physicians and technicians. When they found out he was studying engineering, they asked him to take a look at electrical equipment that wasn’t working properly. At the time, hospitals didn’t have staff to fix such equipment, and when a flame photometer or electrocardiogram machine broke down, it had to be taken to a radio shop or shipped back to the manufacturer for repair.

Bakken, who was often able to fix the equipment, realized he had found a career niche: servicing electrical medical equipment.

With his brother-in-law, Palmer Hermundslie, Bakken set up shop in the Hermundslie family garage at 818 19th Avenue, NE in Minneapolis, an 800-square-foot structure that became Medtronic’s first headquarters. Hermundslie handled the finances and Bakken did the repairs and built the occasional piece of custom equipment. During their first month of business, they grossed all of $8, according to Bakken’s autobiography, One Man’s Full Life.

To supplement their income, Bakken and Hermundslie became sales reps for the Sanborn Company, which made multichannel readers. Those readers ensured that EKG and EEG machines had good connections and that vital signs such as blood pressure were being recorded properly. They saw the sales job as a way to get into hospitals and ultimately sell them on the equipment repair business.

The job took Bakken to the office of C. Walton Lillehei, M.D., at the University of Minnesota. Lillehei was trying to save babies who were born with congenital heart defects and had insufficiently oxygenated blood. The process of repairing the heart defects often led to heart block, a condition in which the heart is unable to conduct the electrical impulses that sustain a steady beat.

Lillehei relied on an external pacemaker that needed to be plugged into a wall socket to keep the children’s hearts beating. The device worked until October 31, 1957, a day that became known as Black Thursday, when the power went out all over the Twin Cities. One child who was on a pacemaker died during the three-hour outage.

Lillehei asked Bakken if there was a way to create a battery back-up for the pacemaker. Bakken went to work and added a car battery the size of a gallon of milk with an inverter to convert six volts to 115 to run the AC pacemaker. The charged battery would keep the pacemaker running for three to four hours—enough time to move the patient to a location that had power.

But the device was cumbersome. So Bakken dug
Dreaming Big

But making dreams happen is something Earl Bakken has been doing all his life. He explains that he keeps a pen and paper beside his bed so he can capture his ideas day or night. “When I dream, it’s usually right after the lights have been turned out. There in bed my mind starts working.”

Those dreams were the inspiration for the first battery-operated, transistorized, wearable pacemaker and later the first implantable pacemaker, the implantable insulin pump, a hospital that incorporates allopathic and alternative medicine, and a list of other projects—some complete, some still works in progress.

One dream Bakken wants to see come true soon is making “heart-brain medicine” a new specialty. He witnessed the connection between the heart and the brain in the 1960s, when he was working with doctors to see what happened to the heart when they stimulated the carotid sinus nerve. The heart, he explains, is a sensor organ that tells much of the body how to operate, and the brain emits signals that can cause the heart to malfunction. Those connections are why neurological conditions such as depression can place someone at greater risk for cardiovascular disease and why electrical impulses gone awry can cause atrial fibrillation. “There’s so much of this—one organ causing the problem in another organ—yet doctors never talk together so they miss a lot of the aspects of caring for the patient and looking at the whole patient,” Bakken says.

But when he tried to develop the concept in Minnesota in the late 1970s, it went nowhere. “Everybody turned me down. They said, ‘We need a new heart hospital.’ I said, ‘No you need a new heart/brain hospital.’”

Quoting Papa Henry, Bakken says that we miss 80 percent of what it takes to restore health and that one reason for this is the way physicians are taught. “We train people on organs. We train them on the lungs or the heart or the brain. It’s nonsense,” Bakken says. “The body isn’t built that way. We have to get back to putting the body together so physicians can break down these silos and start talking about the whole body.”

When cardiologists from the Cleveland Clinic toured North Hawaii Community Hospital, they became intrigued with Bakken’s idea, and in 2004, Bakken provided the clinic with $17.2 million for the Earl and Doris Bakken Heart-Brain Institute. Researchers there are now studying the interactions between the heart and brain. Doctors from the clinic are also working with staff in Hawaii to improve cardiac and stroke care at the hospital.

Although Bakken hasn’t been able to establish a similar institute in Minnesota, he has influenced the way medical students from the University of Minnesota, Twin Cities campus, are trained. In 2003, Dean Deborah Powell, M.D., visited the hospital on the Big Island and was so impressed that she wanted to find a way to give medical students the chance to see how high-tech and high-touch medicine can work together. “It was so focused on this respectful caring for patients and trying to understand where patients were coming from. That was something quite unusual in my experience,” she says of what she observed. For the last two years, Bakken has arranged for a handful of fourth-year medical students from the university to spend three weeks at the hospital.

About the time the medical school sent its first students to Hawaii, the school’s development office got a call from the Bakken Foundation asking how they would use a gift if they were to receive one. “I gave them about 10 different ways I would use it, and in a few weeks Mr. Bakken sent twice as much as they mentioned,” says Powell. The dean used the money to fund a scholarship and hold two retreats that brought together doctors, faculty members, nurses, representatives from the col-
In its varied forms, home telehealth has been shown to be a valuable tool in monitoring and managing chronic illness. Its use will likely increase in coming years. Physicians should understand how home telehealth operated by home care agencies and other organizations can help ensure patient adherence to care plans recommended by evidence-based guidelines. Telehealth technologies can help physicians extend their ability to manage patients with chronic illnesses. But policy and reimbursement barriers must be overcome if this to become a reality.

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REFERENCES

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college of education, the dean of the college of liberal arts, medical students, and experts from around the country to discuss what they would change about medical education in this country if they could. Those discussions were the catalyst for MED 2010, an overhaul of the University of Minnesota’s medical school curriculum, making it more flexible and more learner-centered (see Minnesota Medicine, June 2006). “I told Earl that his gift, which I totally didn’t expect, had started this process of transforming medical education,” Powell says. “It was so unexpected, but he really stimulated us to think differently.”

Think differently is what Bakken would like to see all physicians do. Bakken, who credits not only Medtronic’s technology but also complementary therapies such as myofascial release, Reiki, craniosacral therapy, and Swedish massage for keeping him free of health problems “a lot of people my age have,” would like to see high-tech, high-touch medicine become the standard of care.

And he would like to see more physicians dream—to think of the possibilities, whether it’s improving on one of Medtronic’s devices or finding ways to incorporate ancient techniques such as qigong into surgery—and to not be afraid to act on those dreams.

“We get into this nonsense of organizations that have all sorts of meaningless regulations,” he says. “I’m not saying that we do something so quickly that we lose track of the quality. You don’t have to. That first pacemaker I made for Walt Lillehei we did in four weeks. From the time we talked about it, four weeks later, we were saving kids’ lives. What’s wrong with that?”

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