

By Stephen Filmanowicz

**I**n Bangladesh, serious obstacles stand between the 30,000 women who contract breast cancer in a given year and the care they need.

Poverty is pervasive, health insurance almost non-existent. And four of five women are Muslim with a strong preference for female physicians — a rarity in the largely rural nation.

One aspect of Bangladeshi life, however, is uncharacteristically easy — staying connected by wireless phones.

Even in rural areas, mobile service is plentiful. In the capital, Dhaka, mobile devices outnumber people. And so 8,000 miles away at Marquette, Dr. Sheikh Iqbal Ahamed is leading a team of researchers and software developers to put better medical care in the palms of women's hands.

Through a grant from the International Breast Cancer Research Foundation, the associate professor of mathematics, statistics and computer science is developing phone-based programs to help breast cancer patients stay in touch with their medical teams. That can make a huge difference to women who can't easily leave home, explains Dr. Rumana Dowla, a Bangladesh-based palliative care specialist dedicated to improving care delivery in rural areas.

"Often she has to leave her young child with someone and cook food before she leaves home," Dowla says. "She may need to walk a few kilometers to reach the road where a rickshaw operates."

The phone applications are aimed at the 80 percent of Bangladeshi patients diagnosed at an advanced stage, when pain management becomes a chief goal. Demonstrated to patients during a fact-finding trip this January and due for incorporation into care regimens this spring, the software's first iteration guides

patients through a nine-question survey that mirrors what a doctor would ask at an office visit: How tired are you? How bad is your pain? How strong is your appetite? With a few clicks, the answers are sent to a server. Using their own mobile phones, doctors can access data and graphs for each patient. Algorithms detect significant changes, prompting alerts that may lead a doctor to adjust treatment.

A Bangladesh native himself, Ahamed made a timely entry into the field of wireless computing as a doctoral student in the 1990s and has seen his research output and reputation rise along with the field's subsequent boom. When he established his UbiComp Lab at Marquette soon after arriving in 2003, "ubiquitous computing" involved systems of wireless sensors, processors and transmitters — often tucked in walls or on street poles — performing tasks such as operating home appliances or tracking buses. The smart phone explosion brings expanded meaning to the term, putting devices loaded with processor power, advanced sensors and other gizmos in the hands of people from all walks of life.

In Bangladesh, doctors expect big initial impact from the simplest app — a text-message survey that functions on basic phones. But Ahamed and his team

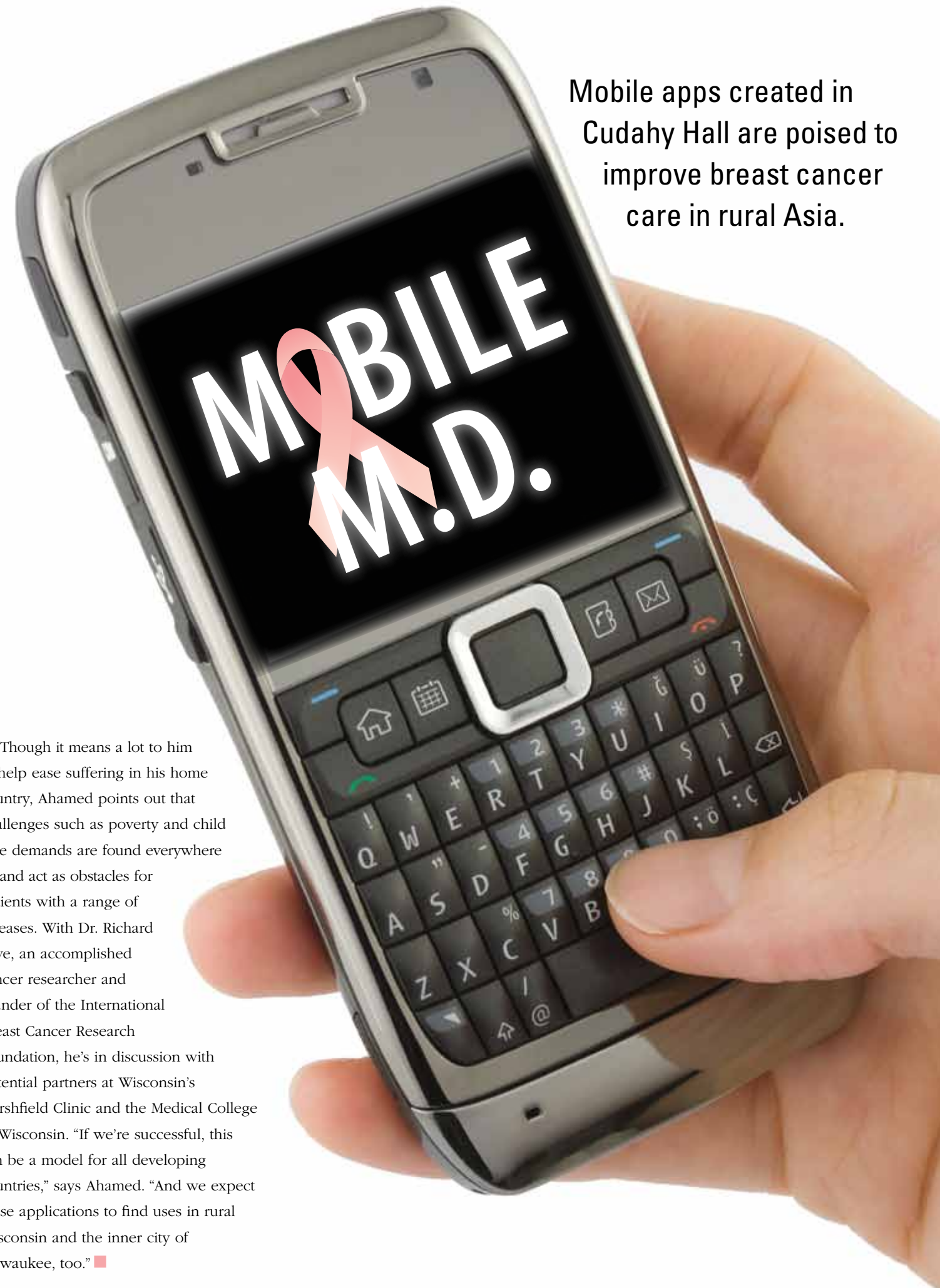
are rapidly developing advanced features for smart phones, such as a spoken version of the survey for patients who cannot read. A partnership with a Bangladesh nonprofit will put 20 app-equipped Nokia smart phones in the field on a pilot basis.

And well before such devices penetrate the countryside, Ahamed expects to be ready with features that use a phone's motion sensor to assess activity level and that sync its camera with facial recognition software to assess severity of pain. "In five years, this touch screen will be a low-end phone," he says of the Nokia they're currently working with in the lab. "We're constantly keeping up with new phones and operating systems, but that's what we enjoy."



Dr. Sheikh Iqbal Ahamed

Mobile apps created in Cudahy Hall are poised to improve breast cancer care in rural Asia.



Though it means a lot to him to help ease suffering in his home country, Ahamed points out that challenges such as poverty and child care demands are found everywhere — and act as obstacles for patients with a range of diseases. With Dr. Richard Love, an accomplished cancer researcher and founder of the International Breast Cancer Research Foundation, he's in discussion with potential partners at Wisconsin's Marshfield Clinic and the Medical College of Wisconsin. "If we're successful, this can be a model for all developing countries," says Ahamed. "And we expect these applications to find uses in rural Wisconsin and the inner city of Milwaukee, too." ■