Key Takeaways:

- In 2012, a radiologist from Brigham and Women’s Hospital in Boston initiated a breast cancer detection training program at a Rwanda hospital.
- The program eventually grew into an intensive eight-week workshop to educate and certify local doctors and nurses in diagnostic ultrasound and ultrasound-guided core needle biopsy.
- The program has saved more than 100 women from unnecessary biopsies, allowing them to receive minimally invasive needle biopsies rather than surgical biopsies.

In the last two years, more than 40 percent of women visiting a northern Rwandan cancer center with breast abnormalities were able to avoid unnecessary biopsies thanks to the educational and training efforts of dedicated physicians, including radiologist Sughra Raza, MD.

For several years, Raza, associate professor of radiology at Harvard Medical School and breast imaging radiologist at Brigham and Women’s Hospital (BWH) in Boston, has trained local Rwandan doctors and nurses at a newly established cancer center called the Butaro Cancer Center of Excellence Rwanda’s Burera District. In 2016, Raza spearheaded an eight-week intensive diagnostic ultrasound and ultrasound-guided core needle biopsy training program, which now includes a train-the-trainer component that positions Rwandan staff to train other providers.

Before Raza began the training program, the center’s physicians had limited access to breast imaging and therefore had no means to noninvasively evaluate breast abnormalities. Any time they discovered a suspicious lump during a manual breast exam, they had no choice but to perform a surgical excisional biopsy to determine the nature of the finding. “Without imaging, even if it’s a solid mass, you can’t tell if it’s a benign mass or a malignant mass unless you do tissue diagnosis,” Raza says. “They were doing the tissue diagnosis as an invasive surgical procedure — and we were able to offer core needle biopsy as a less-invasive alternative that could provide an early diagnosis.”

Global Perspective

Educated and trained in medicine in the United States, Raza visited Pakistan in 1991 to care for her hospitalized mother. The exposure to healthcare in a limited-resource environment reminded her about care inequities worldwide and made it clear that one way she could have a meaningful impact and also highlight the important role of radiology in medicine was by sharing her expertise with others, when possible. “Providing valuable care shouldn’t end at the U.S. borders,” Raza says. “The more we can do collaboratively to reach out to other parts of the world, the better off we will all be.”

Raza started her international outreach in the early 1990s when she worked at Boston’s Beth Israel Hospital. At that time, she accepted the invitation to be the radiologist on a team of experts that helped establish women’s health clinics with a focus on ultrasound in obstetrics and gynecology in the recently independent Armenia and Ukraine. Around the same time, she met the founders of Partners In Health® (PIH), an international healthcare nonprofit that helps low-resource countries build and sustain public health systems, and was deeply moved and impressed by what they had already achieved in Haiti and other locations around the world. Raza began collecting medical equipment donations for PIH and continued to volunteer with other groups.

Over time, Raza became more deeply involved in international outreach as a breast imaging specialist. In 2012, PIH approached her about training Rwandan providers to use ultrasound to detect breast abnormalities and guide biopsies. With the support of her colleagues at BWH and Dana Farber Cancer Institute (DFCI), Raza was eager to help. “Here was an opportunity to develop a learning environment, with clinical
infrastructure support, from the ground up. It offered the potential to make a real sustainable difference,” she says. “The fact that BWH and DFCI both have a long history of supporting global philanthropic work made this decision even easier."

Care Gap

When Raza visited Rwanda for the first time in 2012, she gave lectures and led hands-on training for diagnostic breast ultrasound and ultrasound-guided biopsies during a week-long oncology symposium that PIH held at its clinic in the eastern village of Rwinkwavu. By the following year, PIH opened a new hospital in Butaro and gradually moved most of its breast cancer care there.

At that time, Lydia E. Pace, MD, assistant professor of medicine at Harvard Medical School and the director of the Women’s Health Policy and Advocacy Program in the BWH Connors Center for Women’s Health and Gender Biology, was interviewing women at the Butaro clinic for a research project about the care delays they experienced leading up to their breast cancer diagnoses. Through the interviews, she found that delays associated with seeing a healthcare provider and getting referrals for biopsies increased the likelihood of metastatic cancer at diagnosis among women in Rwanda.

Pace was concerned about the limited availability of screening mammography in Rwanda and the number of women she was seeing with late-stage breast cancer as a result. “I met and cared for a lot of women in Butaro with breast cancer, many of whom were young and presenting with Stage III or IV disease,” Pace says. “It was such a devastating thing to see, so my colleagues and I brainstormed strategies to diagnose and treat women sooner.”

Pace and her colleagues eventually came up with the Rwanda Breast Cancer Early Detection Project (BCEDP), a multipronged initiative funded by the Breast Cancer Research Foundation that includes patient and provider education, consistent screening through clinical breast examinations, and improved diagnostics. Raza’s ultrasound training supports these efforts — providing a relatively inexpensive diagnostic tool in a country with scarce resources.

“At low- and middle-income countries like ours, where the number of radiologists and other clinicians is limited, breast ultrasound can be an effective tool to evaluate breast masses and lesions, especially for rural populations that have few care options,” says Jean Marie Vianney (JMV) Dusengimana, breast health project manager with PIH in Rwanda. “Ultrasound is simple to use and provides a cost-effective alternative to diagnostic mammography. And, most importantly, it can help us avoid many biopsies and help with early-detection strategies.”

Ultrasound Training

When she first started offering the breast ultrasound training, Raza took two weeks of vacation a year to travel to Rwanda. During these early trips, she taught local nurses and doctors how to assess breast abnormalities using ultrasound.

With two portable ultrasound machines that the local team previously acquired, she showed the providers how to identify breast abnormalities and how to differentiate between simple cysts and solid masses in breast tissue. Such training would spare patients with cysts from unnecessary surgeries and help providers determine whether solid mass findings were highly suspicious. From there, providers could make an educated decision about whether a biopsy was required, Raza explains.

For cases that required biopsy, Raza trained local doctors and nurses how to perform core needle biopsies. During these minimally invasive procedures, providers use ultrasound guidance to insert a needle into a targeted lesion and remove a tiny tissue sample for pathological testing. Raza and the Butaro team organized simulation training, allowing the providers to practice on breast “phantoms,” usually chicken breasts or cuts of beef, before performing the procedure on patients.
Jean Bosco Bigirimana, nurse and oncology program manager at PIH in Rwanda, says Raza’s guidance helped the providers know when and how to perform biopsies without surgery. “It was invaluable training,” he says of the overall experience.

**Expanded Program**

While the training was going well, Raza eventually realized that once she left Butaro, the providers were having trouble consistently using what they had learned in practice. This was largely because they were overburdened with clinical duties and perhaps not facile enough with the procedures to do them efficiently and with confidence. “I learned with some dismay that for six months nobody had done a single core needle biopsy, which was frustrating but made me realize that for such training to be sustained a more concentrated effort was needed;” she says.

Collaborating closely with Pace, whose BCEDP was well under way, Raza wrote a proposal to close this care gap. In the proposal, which Raza submitted to PIH and Rwanda Ministry of Health leadership at the Butaro Cancer Center of Excellence, she suggested creating an intensive eight-week comprehensive training effort that would engage a selected group of providers more directly — teaching them how to not only conduct ultrasound diagnostics and core biopsies but also how to handle the biopsy results so they could determine, for example, whether surgery was necessary or not.

Raza knew she would need assistance with the more intensive program and approached her department chair about recruiting some of her colleagues to help. Seeing this as part of the global health mission of BWH, the chair granted Raza and two other colleagues in the breast imaging division, Elisabeth Frost, MD, and Dylan Kwait, MD, two weeks each to travel to Rwanda. The BWH team then taught scanning methods, working with the trainees as they identified patients in the breast clinic who needed diagnostic imaging. This hands-on approach allowed trainees to ask questions and observe optimal scanning strategies during real exams.

Raza and her colleagues also delivered lectures that covered specific diagnostic techniques, biopsy procedures, radiology-pathology correlation, results delivery, follow-up care, and management recommendations. From there, they conducted simulation training, using chicken breasts stuffed with olives as mass phantoms, until the trainees were ready to perform the procedures on patients.

“We spent one-on-one time with each trainee until they were comfortable with visualizing and maneuvering the needle safely and accurately,” Raza says. Each trainee watched, assisted with, and eventually performed patient biopsies with supervision. The number of closely supervised diagnostic examinations and biopsies varied among trainees but all were held to the same standards of safety checklists, proper techniques, and performance of safe, accurate scans and biopsies.

**Meaningful Results**

After a few days of practicing with the phantoms, the trainees and trainers scanned patients independently. Each group used specially designed forms to record their findings and compare them to assess the trainees' accuracy and sensitivity. “This exercise allowed us to measure the trainees’ ability to find a lesion on ultrasound imaging and their ability to categorize findings as most likely benign or suspicious,” Raza says. “All of the participants were enthusiastic, keen on learning this useful new skill and committed to continuing

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**Case Study:**  
**Radiology in Rwanda**

Continued from previous page
Providers in Rwanda are now using ultrasound to detect breast abnormalities.

learning through practice. They did an amazing job, and we left feeling confident that they would significantly improve breast health for women seeking care at Butaro Cancer Center of Excellence.”

Specifically, Pace says, the data show that from January of 2016 to September of 2017, the trainees performed 307 diagnostic breast ultrasounds and ultimately diagnosed 56 women with breast cancer. Of the 255 women with breast masses noted on ultrasound, 149 had a biopsy (58 percent). The remaining 42 percent of patients avoided biopsies because the trainees knew how to use ultrasound to determine whether a mass is benign.

Vestine Rugema, a breast health trainer and mentor from Rwanda’s Ministry of Health and the Butaro Cancer Center of Excellence, appreciates all of the time Raza and her team spent with local providers and applauds the results. “The breast ultrasound training added value to our clinic, minimizing unneeded surgical biopsies,” she says.

Remote Mentoring

In the two-and-a-half years since the initial intensive training program ended, Raza has returned to Butaro annually to conduct refresher courses, thanks to continued BCRF funding. During her most recent visit in March of 2018, she designed and administered special train-the-trainer exams that include written education, image-based case study tests, and observations of actual scanning and biopsy procedures to ensure safe and proper techniques.

Four trainees who scored 85 percent or higher on the exams and passed the practicals were certified as trainers and can now train others in the Burer District in diagnostic breast ultrasound and ultrasound-guided core needle biopsy techniques. “It was very moving to witness the immense sense of accomplishment and pride among the trainees as they achieved what they had worked so hard to learn,” Raza says. “As far as we know, they are the first group of healthcare workers in Rwanda with focused training in using diagnostic breast ultrasound to evaluate and care for patients with breast symptoms and perform ultrasound-guided core biopsies at the local point-of-care level.”

When Raza is not in Rwanda, she provides remote mentoring to the Butaro team, which holds a breast clinic every Thursday. When Butaro providers determine that a patient needs ultrasound evaluation, they proceed to the exam and save pertinent images of any findings. At the end of the day, they send Raza a synopsis and key images of each case that required ultrasound along with their interpretations and recommendations for follow-up care. Raza reviews the cases and provides input usually within a few hours.

“It’s incredibly helpful,” says Shabani Kasimu, MD, who is one of the four certified trainers and who now heads the department of obstetrics and gynecology at Nyagatare District Hospital in Eastern Rwanda. “For me, this is better management of time, money, and, most importantly, patients.”

Raza is honored to contribute in any way possible on the international stage and encourages other radiologists to consider sharing their expertise to improve care — and relationships — globally. “I think volunteering internationally is important, especially now when the world seems to be heading toward more divisiveness,” she says. “Radiologists play a vital role in patient care and are well poised to make these connections at home and abroad.”

Next steps:

• Partner with international organizations, such as PIH, to volunteer your services as a medical expert.

• Maintain constant lines of communication with the physicians and support staff where you’ve volunteered to sustain ongoing educational efforts.

• Provide continuous follow-up with aid organizations to see how you can potentially expand services in the future.

Share Your Story

Have a case study idea you’d like to share with the radiology community? To submit your idea please click here.

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