A flock of birds swoops under colorful Buddhist prayer flags at the Boudhanath Stupa in Kathmandu, the capital of the Federal Democratic Republic of Nepal. Photo by Jenny Fang, unofficial photographer of the SBI International Outreach Committee visit to Nepal.
If there is something more important to our profession than communication, I haven’t found it.

A few months ago, I performed a 2-site ultrasound-guided biopsy on a deaf patient, the first such patient that I’ve encountered in my career. In fact, the circumstances felt so unique that I was acutely aware of the extraordinary requirements for communicating with deaf people. First, the patient needed hands to communicate in American Sign Language (ASL). Second, deaf people, in addition to observing hand gestures, rely heavily on lip reading, facial expressions, and other visual cues in communicating with nonsigners. We needed unencumbered eye contact, not because I can read ASL—I can’t—but because she needed to see my eyes to know that I was seeing her. She needed to see that I was listening and we were communicating.

Many of you have probably had a similar experience. However, our situation was made all the more exceptional because my sonographer, Liz, who is fluent in ASL, is also deaf. This was no accident. We scheduled them together because I needed an interpreter. Therefore, in our procedure room, I was the only one who could hear me speak.

I have worked with Liz for many years and she is 1 of only 4 deaf sonographers practicing in the United States (Liz, personal communication). Established in 1880, the National Association for the Deaf (NAD) is a national civil rights organization of, by, and for deaf and hard-of-hearing individuals in the United States of America (https://www.nad.org). The NAD represents the United States to the World Federation of the Deaf. The NAD has been instrumental in promoting and protecting the rights of deaf people. If you haven’t had the pleasure of working with someone who is deaf and an expert at reading lips, it is utterly fantastic. With practice, training, and hearing aids, Liz can express herself verbally quite well. I’ve never had trouble understanding her.

Despite my complete ignorance of ASL, Liz understands me as long as I face her when I am talking. Our discussions, therefore, are efficient and precise. Compared with my interactions with all those who can hear, I speak less, listen more, and maintain nearly constant eye contact with Liz. I choose my words carefully for succinct and precise meaning. She presents complete patient histories without a single wasted word. It is clear that she listens to patients and relays their symptoms and concerns accurately. I know from my interviews with patients that Liz loses nothing in translation, and I listen very carefully while making eye contact so Liz knows that I understand. Sometimes we use facial expressions alone to communicate comprehension, confusion, or agreement.

On this day, in this room, with these 2 deaf people, we satisfied some special requirements in order to communicate effectively. The patient needed at least 1 hand free to sign. I positioned her ipsilateral arm above her head like I always do. Then I cleansed and prepared to drape the biopsy site but there was a problem. Most patients lay their contralateral hand across their abdomen or at their
side or sometimes at the shoulder. I usually cover that hand as I drape, but I couldn’t conceal this patient’s contralateral arm. The sonographer also needed her hands free to label and capture images and to sign. My hands were busy with the needle and the probe. Had I known any ASL, signing would have been out of the question. But my eyes and lips were available. I could speak and Liz could understand me as long as we were looking at each other. The patient also needed to make eye contact with Liz and me to know we were listening; this was simultaneously simple and critical to maintaining the patient’s trust during the procedure. My eyes moved purposefully throughout the procedure from the probe to the monitor to Liz and the patient, stopping long enough to confirm that I was targeting accurately and listening effectively.

Liz, the patient, and I were all smiling at the end of the procedure. We thanked each other with gestures, glances, and embraces. Regardless of the results, we all felt connected and grateful for each other throughout the experience. Long after the patient had departed, I remained struck by the singular circumstances and how present I felt. When I remarked about this to Liz she signed and said, “There’s always a first time for anything.” She and the patient reminded me that a change in routine can momentarily blur the edges of our world and then bring us sharply into focus. And that communicating effectively with every patient and colleague at every moment is a task and privilege that should never be underestimated or taken for granted.
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As we enter a new year, I would like to focus this President’s Column on an important practical topic: breast imaging economics. The breast imaging economic environment influences our ability to accomplish our SBI mission and to practice our value of patient-centered and evidence-based care. Understanding the payment environment helps us face challenges and embrace opportunities to improve patient outcomes.

Current Procedural Terminology Codes and Payments

There has been much recent activity in breast imaging Current Procedural Terminology (CPT) codes and payments. For the 2017 calendar year, the Centers for Medicare & Medicaid Services (CMS) adopted new CPT codes for diagnostic and screening mammograms (77065, 77066, 77067) and bundled computer-aided detection (CAD) with mammogram services. For 2018, the proposed CMS Medicare Physician Fee Schedule maintains the 2017 CPT and add-on codes for digital breast tomosynthesis (DBT) for screening and diagnostic mammograms (77063, G0279). Proposed CMS payments for breast imaging services in 2018 remain within 1% of 2017 payments for mammograms, ultrasounds, and biopsies. The proposed 2018 global payment for bilateral breast magnetic resonance imaging (MRI) is 6% to 7% higher than in 2017. In the setting of limited resources, this stability of breast imaging payments is good news for our practices and patients. Potential challenges remain, such as the 50% reduction in the technical component of mammogram payments proposed in 2017, which would have negatively impacted patient care. Fortunately, this reduction was not enacted in 2017, and it is not present in the proposed 2018 schedule.

Other Breast Imaging–Specific Considerations

Payment for DBT mammograms has been challenging for practices and patients. The add-on CPT codes for DBT were established in 2015, and research studies have shown that screening with DBT added to full-field digital mammography improves diagnostic accuracy, results in health plan cost savings, and is cost-effective per quality-adjusted life year. However, CPT codes and scientific evidence do not guarantee payer reimbursement. Although CMS has reimbursed for DBT since 2015, private payers have lagged behind. Recently, significant progress has been made in coverage across the United States. Overall, DBT coverage for insured women across all payer types is now 70% or greater in most states.¹ At the time of this writing, 9 states have mandated coverage of DBT, often through advocacy by state radiology societies and leaders or through state legislation expanding the regulatory definition of...
mammograms to include DBT. DBT is currently available at 42% of Mammography Quality Standards Act–accredited facilities and on 28% of accredited units.²

On a more fundamental level, concerns persist regarding screening mammography coverage for our patients. The Affordable Care Act (ACA) passed in 2010 requires private payers to cover screening mammograms with no cost sharing to patients. However, the ACA requires coverage of services with a US Preventive Services Task Force (USPSTF) grade of B or higher. As we know, the USPSTF Breast Cancer Screening Recommendations in 2009 and 2016 designated screening mammograms for women ages 40 to 49 years as grade C and biennial screening for women ages 50 to 74 years as grade B. This placed the coverage of annual screening mammograms starting at age 40 years at risk. There are now 2 mechanisms by which such coverage is preserved. The first is the Protecting Access to Lifesaving Screenings (PALS) Act, which places a moratorium on the ACA implementation of USPSTF recommendations for breast cancer screening. The PALS Act was passed in 2015 and extended until 2019. The second is through ACA section 2713, which requires coverage of preventive services without cost sharing according to Health Resources and Services Administration (HRSA) guidelines. In 2016, HRSA guidelines were updated to specify screening mammography starting as early as age 40 years and as frequently as annually.

Other Broad Economic Trends

The economics of breast imaging reflect trends across radiology and medicine. Bundling of services, as occurred with CAD and mammograms in 2017, remains a significant trend. The move from component to bundled coding and payment for services “typically” performed together is expected to increase. Bundling is often associated with decreased reimbursement compared with the component model. In 2014, bundled breast biopsy codes resulted in a 30% to 50% reduction in professional payments. However, the 2017 bundled CAD and mammograms did not result in decreased reimbursement. In the future, CAD and breast MRI may be bundled.

Another trend in reimbursement is private-payer “steering” of patients to less costly locations of service. Anthem recently enacted policies in 9 states to no longer routinely pay for computed tomography or MRI at hospital outpatient settings. Instead, patients are steered to freestanding outpatient locations to avoid hospital-based fees. Anthem requires justifications and a review process if hospital outpatient settings are selected. There are many potentially detrimental consequences to this approach, including prioritization of cost over patient access, long travel distances, and interruption of continuity of imaging and clinical care.

Summary

As across health care, breast imaging economics are evolving. We can influence economics in many ways. We should support the ACR, SBI, and state society efforts to achieve and maintain coverage that benefits patients. We must provide breast imaging care that is evidence-based and of high quality and value. And finally, we should embrace and shape innovative economic models that benefit our patients, such as bundling from “screening to diagnosis.”
President’s Column, continued from previous page

As always, I thank you all for the hard and impactful work that you do every day. I look forward to continuing our work together to achieve the mission and uphold the values of the SBI. 🌟

Wendy DeMartini, MD, FSBI
President, Society of Breast Imaging

REFERENCES


The 2017 Radiological Society of North America (RSNA) Scientific Assembly and Annual Meeting was packed with reports of new and exciting advances in radiology. As always, the RSNA meeting was also a great opportunity to catch up with friends and colleagues. Some SBI committees were able to take advantage of this and gathered in Chicago to work on their initiatives and agendas. Here are updates on their progress.

Scientific Advisory Committee: The Scientific Advisory Committee has developed 5 white papers over the past year and has more that will be completed for 2019. The committee is currently reviewing the task of developing position papers for the society. The white papers can be found at www.sbi-online.org/RESOURCES/WhitePapers.aspx.

Awards Committee: After careful review of nominations, the Awards Committee has selected Linda Warren, OBC, MD, FRCPC, FACR, FSBI, for the 2018 Gold Medal award. A fellow of the SBI since 1991, Dr Warren is currently a clinical professor in the Department of Radiology at the University of British Columbia in Vancouver, Canada. Her clinical research has included screening mammography, interpretive skills in breast imaging, and computer-aided detection.

Patient Care and Delivery Task Force: The task force continues its work developing white papers on screening guidelines and supplemental screening for women with dense breasts as well as patient communication and education. Members of the task force have worked closely with the ACR Patient and Family Care Commission to share SBI resources for development of a tool kit. The SBI recently became an affiliate member of the ACR/RSNA jointly sponsored website www.radiologyinfo.org. The website is a great resource for patients seeking more information about diagnostic radiology.

Newsletter Committee: The newsletter committee formally welcomed Nina Watson, MD, and Eric Rosen, MD, FSBI, to the group. They will spearhead a new wellness column that will debut in the second issue of 2018. The committee welcomes feedback, suggestions, and article submissions for the newsletter.
Through medical training, radiologists attain extensive technical knowledge and skills. This expertise is requisite for our chosen career path. However, many radiologists do not receive formal education in another critical skill for physicians: emotional intelligence (EI). A high EI has been shown to improve several important aspects of medicine, including the doctor-patient relationship, teamwork, communication ability, stress management, and leadership.¹ Breast imagers may especially benefit from high EI because of the emotionally charged nature of our subspecialty.

EI refers to one’s ability to recognize his/her own emotional state, identify others’ emotional state, and then navigate both to produce a positive outcome. Daniel Goleman popularized the mixed model of EI, dividing it into 5 components: self-awareness, self-regulation, motivation, empathy, and social skill.²

In some ways, the most fundamental building block of EI is self-awareness. A radiologist with high self-awareness recognizes her emotions and goals and appreciates their effect on her performance. For example, a breast imager with high self-awareness knows that her performance decreases with time pressures. To prevent performance deterioration, she opts against online screening mammogram interpretations and chooses batch reads. In this scenario, the online interpretation model would frustrate the radiologist, potentially causing downstream negative interactions with patients, colleagues, and staff.

Self-regulation refers to one’s ability to control his/her emotional impulses. Radiologists with high self-regulation are excellent change agents because in response to a problem, they gather evidence before formulating action plans. For instance, a breast imager with low self-regulation is told that his radiology group will no longer purchase biopsy equipment from his preferred vendor because of cost concerns. The breast imager angrily complains to colleagues about how terrible management is and that “they just don’t understand.” This response is nonproductive and diminishes morale. A more productive response would have been to try to understand the rationale behind the decision and develop alternative solutions or support the change.

The third EI component, motivation, is self-explanatory. Highly motivated individuals constantly seek improvement and work toward their goals even in the face of adversity. For example, a breast imager notices that patients are returning for screening callbacks an average of 2 weeks after the screening examination. She feels that this delay is excessive, and during off hours she works with her team to decrease the waiting period to 2 days. The breast imager celebrates her team’s achievement and other team members feel inspired to optimize other aspects of their workflow.

Individuals with high empathy recognize the emotional states of others and respond accordingly. Clearly, empathy is critical for compassionately communicating suspicious findings to patients. In
addition to patients, breast imagers work with teams of people, including technologists, front-office staff, nurses, surgeons, and oncologists. It behooves radiologists to identify multiple emotional states to facilitate communications. For example, a newly hired breast imager informs the lead technologist that all of the sonographers are labeling images incorrectly and they’ll need to set up a group education session. This suggestion inadvertently demoralizes the sonographers and they begin gossiping that this new radiologist is haughty. Seemingly routine critiques may lead to unexpected emotional responses. The radiologist should have considered his words more carefully and realized that the sonographers may interpret this suggestion as a public signal of failure.

Social skill refers to the ability of managing relationships by controlling one’s own and others’ emotions in order to achieve a goal—that is, to persuade. Returning to the preceding example, a newly hired radiologist with high social skill realizes that the sonographers may react negatively to public criticism. As a new hire with high self-regulation, he also suppresses his desire to immediately critique the established staff. Instead, he persuades the lead technologist to organize a monthly continuing education course for the staff. He schedules the ultrasound session as the first session but later includes other topics for mammography and nursing. Although it is time-consuming, the staff views this as a positive change and as a corollary, it improves their skills in multiple subjects, not just ultrasound.

Reflecting on important interactions can foster improvement of our EI. In some instances, one may ask trusted colleagues or hire a formal coach to provide feedback. The key is to acknowledge EI’s importance and expand our EI skills, just as we do with our technical medical knowledge. The investment will improve morale, the work environment, job satisfaction, and the patient experience.

REFERENCES
The quality and variety of breast imaging research presented at the 2017 Radiological Society of North America (RSNA) physics sessions were excellent. Here are selected highlights that I found personally interesting.

Let’s start with a deep learning application. No, not one to find breast cancer in mammograms or distinguish benign from malignant lesions on ultrasound. There are many academic sites and companies working on those types of problems. Instead, this presentation focused on dose reduction and was entitled “Virtual High-Dose Technology: Radiation Dose Reduction in Digital Breast Tomosynthesis (DBT) by Means of Supervised Deep-Learning Image Processing.” It was presented by Junchi Liu, who is a graduate student of Kenji Suzuki, PhD, at the Illinois Institute of Technology, in collaboration with Laurie Fajardo, MD, MBA, FACR, FSBI, a breast imager from Park City, Utah. In their work, they trained a neural network using the DBT projections of a cadaver breast embedded with simulated microcalcifications imaged at twice the clinical dose. They then input to the trained neural network DBT projection images taken at 20% of a clinical dose. The neural network was able to remove noise from the image and reconstruct the data to produce DBT slices that have noise properties similar to those of an image taken at 120% of the clinical dose. By training the neural network on a high-dose cadaver image, the network could recognize important features in DBT images, distinguishing them from image noise. The resulting image visually preserved the important structures of the image and greatly reduced the noise. There appeared to be some artifacts, but they looked minor. More rigorous evaluation needs to be performed, but the technique looks, if not promising, at least interesting.

Another interesting application of deep learning was from a group at the University of California, San Francisco, and presented by Hari Trivedi, MD. They reported on training a deep learning model to detect breast cancer on screening and diagnostic mammograms. One of the difficulties when using deep learning is that large volumes of data are needed for training, and collecting, storing and transferring them can be difficult. The novel application of deep learning in this case was to search through the DICOM headers of a large number of cases to find appropriate ones for training. That was not the main thrust of their paper, but it was interesting and could accelerate future deep learning applications.

Two other physics talks on DBT, not involving deep learning, were noteworthy. The first was presented by Aldo Badano, PhD, from the Food and Drug Administration (FDA), and was entitled “Digital Breast Tomosynthesis as a Replacement of Full-Field Digital Mammography for the Detection of Breast Cancer: An Open-Source, In-Silico Clinical Trial.” This presentation was the product of many years
of research from his colleagues at the FDA to develop a virtual clinical trial—that is, a large-scale simulation of digital mammography and DBT using multiple models for the breast, breast lesions, imaging physics, and radiologist readings. They compared their simulation performance to published clinical trials. They showed that for digital mammography the in silico performance was comparable to published trials with actual patients and radiologists. The ultimate goal of this research is to be able to simulate clinical trials with many different imaging conditions and scenarios that would otherwise be impractical with actual patients.

The second DBT talk was presented by Hailiang Huang, MS, who is a graduate student of Wei Zhao, PhD, from the State University of New York at Stony Brook. It was entitled “Comparison of Contrast-Enhanced Dual Energy Mammography (CEDEM) and Contrast-Enhanced Digital Breast Tomosynthesis (CEDBT) for Lesion Assessment and Radiation Dose.” They used a Siemens MAMMOMAT Inspiration tomosynthesis system to image 12 patients, all of whom had either a BI-RADS 4 or 5 lesion and were scheduled for a biopsy. They performed a side-by-side comparison and found that CEDBT provided better lesion margin identification and reduced structural noise due to background parenchymal enhancement and motion compared with CEDEM, but the intensity of lesion enhancement was lower. The difference could be due in part to the wider angular sampling of the Siemens system compared with other DBT systems.

Finally, I would like to comment on a talk from a breast session. It was entitled “Detecting Breast Cancer in Mammography: How Close Are Computers to Radiologists?” Now of course we all know what the answer is going to be: they are comparable. This talk was from the physics group in Nijmegen University and was led by Ioannis Sechopoulos, PhD. They obtained images from previously performed observer studies and ran them through a commercial computer-aided detection (CADe) system. They then compared the performance of the CADe system, which is a sensitivity and specificity point, with the performance of the radiologists who participated in the observer studies, which were displayed as curves. The points (CADe system) generally fell within the spread of the different curves (1 for each radiologist). Before you worry about your job, there is one large caveat that the presenter did not mention. Several years ago, David Gur and his colleagues from the University of Pittsburgh demonstrated what is known as the “laboratory effect”: radiologists perform differently in observer studies than in a true clinical setting. In fact, radiologists generally perform slightly better clinically than they do in observer studies. So the conclusion from the talk is that computers are as good as radiologists in observer studies. It remains to be seen if computers are as good as radiologists in true clinical practice, although in my opinion computers will soon be as good as the average radiologist reading screening mammograms in clinical practice.
Breast magnetic resonance imaging (MRI) has proven success in the conventional clinical applications of detecting malignancy, evaluating response to neoadjuvant chemotherapy, and determining extent of disease. The diverse and far-reaching research presented at the 2017 Radiological Society of North America (RSNA) annual meeting highlights the versatile nature of breast MRI extending far beyond these traditional applications. The following summary includes a few of the interesting topics presented.

Laura Heacock, MD, MS, New York University Langone Health, reported on tumor and peritumoral texture features demonstrated on dynamic contrast-enhanced MRI (DCE-MRI) and correlated these features with tumor biomarkers as well as response to chemotherapy. The results indicate a correlation between whole-lesion entropy (a texture feature) and pathologic complete response (pCR) in both triple-negative and ERBB2-positive (formerly HER2-positive) tumors. Additional texture features (whole-lesion skew and peritumoral kurtosis) were similarly associated with pCR in ERBB2-positive tumors. In addition, peritumoral texture features strongly correlated with percent volume change. These results led Dr Heacock to conclude that pretreatment whole-lesion and peritumoral texture features may be reliable in predicting tumor biomarkers and response to chemotherapy.

Another project highlighting the power of radiomics in ERBB2-positive tumors was discussed by Nathaniel Braman, a PhD candidate with Case Western Reserve University. The team hypothesized that the ERBB2-enriched subtype of ERBB2-positive tumors, which tends to respond well to chemotherapy, may be distinguishable from ERBB2-nonenriched tumors by radiomic analysis of the peritumoral region on DCE-MRI. Pretreatment MRI examinations were retrospectively analyzed with molecular subtyping in 42 patients with ERBB2-positive tumors. Texture features were computed both within and around the tumor in concentric enlarging rings at 3-mm increments, up to 15 mm. Although the sample size was small, results indicate that peritumoral features in the ring between 9 and 12 mm predict the ERBB2-enriched subtype with an area under the receiver operating characteristic curve (AUC) of 0.85. Furthermore, the combination of intratumoral and peritumoral features predicted pCR to chemotherapy with an AUC of 0.79. The findings suggest that radiomic features in the peritumoral region may enable noninvasive subtyping of breast tumors and increase the ability to predict chemotherapy response.

Keiko Tsuchiya presented data from the University of Chicago comparing electronic property tomography (EPT), an estimate of tissue conductivity that does not require gadolinium, with standard DCE-MRI to distinguish benign from malignant lesions. Fifty (35%) benign and 91 (65%) malignant
lesions segmented on DCE-MRI images were registered to phase-encoded turbo spin-echo images. The mean lesion conductivity obtained from phase-encoded turbo spin-echo images and the signal enhancement ratio obtained from DCE-MRI images were compared. The mean conductivity of malignant lesions was found to be significantly higher than that of benign lesions. In addition, there was no significant difference in AUC between mean conductivity and signal enhancement ratio. The team concluded that mean conductivity measured by EPT may be comparable to standard DCE-MRI in distinguishing benignity from malignancy. The group did caution that although EPT does not require contrast, DCE-MRI is currently needed for segmentation.

The results of ACRIN 6702 were discussed by Savannah C. Partridge, PhD, of the University of Washington. This multicenter trial tested the value of diffusion-weighted imaging (DWI) in distinguishing benign from malignant breast lesions when added to DCE-MRI. Ten institutions enrolled patients with BI-RADS 3, 4, or 5 lesions detected on MRI performed with both DCE-MRI and multi-b-value DWI. Benign or malignant lesion status was determined by biopsy or 1-year follow-up. Mean apparent diffusion coefficient values were significantly lower in malignant lesions, allowing an apparent diffusion coefficient threshold to be calculated at 100% sensitivity. Combining this threshold with BI-RADS increased specificity and positive predictive value, allowing a reduction in the biopsy rate of BI-RADS 4 lesions by 22% (no reduction was observed in BI-RADS 5 lesions). Dr Partridge concluded that adding DWI to DCE-MRI increases specificity without compromising sensitivity and may result in a decrease in unnecessary biopsies.

Ritse M. Mann, MD, PhD, of Radboud University (Nijmegen, the Netherlands), discussed an ultrafast DCE-MRI protocol used at his institution, made possible with a view-sharing sequence (time-resolved angiography with stochastic trajectories [TWIST]) that allows for high temporal and spatial resolution in under 3 minutes of acquisition time. The protocol also includes pre- and postcontrast T1 sequences but excludes a T2 sequence. The data presented indicate no significant loss in sensitivity but a significantly higher specificity of TWIST as compared with a full diagnostic protocol (81% vs 77%, \( P < .001 \)).

In summary, research continues to expand and redefine the clinical utility of breast MRI. This summary includes a minority of the stunning research presented at RSNA in 2017 and highlights the rapidly evolving applications of MRI. Stay abreast of the quickly advancing field as exciting research will undoubtedly be unveiled at the SBI meeting in April 2018.
The theme of the 2017 Radiological Society of North America (RSNA) annual meeting, “Explore. Invent. Transform,” encourages us to advance our field. A review of archived issues of Radiology fosters appreciation for the many advancements in the realm of breast imaging procedures. In the December 1950 issue of Radiology, Dr U. V. Portmann’s article, “Treatment of Cancer of the Breast,” stated, “When there is doubt about the character of a small breast tumor, the safest procedure for biopsy is immediate excision …. If the tumor is benign, no other treatment is necessary; if malignant … in most cases, radical mastectomy will be performed.” Sixty-seven years later core biopsy is often the first step in diagnosis of a breast mass. New technology could reduce false-positive procedures and excision of biopsy-proven benign breast masses, and new protocols may aid surgical management.

Alyssa Watanabe, MD, presented the data from an interesting multicenter investigation of a quantitative computer-aided detection (CAD) algorithm that differentiates benign and malignant calcifications for biopsy selection. The algorithm is based on a combined use of artificial intelligence and deep learning and physics that provides a level of suspicion through qualitative scoring. The investigators reviewed 10,500 consecutive cases from 3 different institutions. The predictions using quantitative CAD (qCAD) were compared with expert radiologists’ reads. Of the 391 cases sent to biopsy, 302 were benign and 89 were malignant (including ductal carcinoma in situ). The algorithm detected 100% of the confirmed cancer cases. If the biopsy recommendations had been based on the algorithm, 21% to 70% of benign biopsies could have been avoided. The qCAD was more accurate than the radiologists in classifying breast calcifications on mammograms. The use of artificial intelligence in mammography may reduce false-positive breast biopsy results and enhance detection of breast malignancies.

Carrie M. Rochman, MD, of the University of Virginia, presented the results of a single-institution investigation to evaluate the safety, feasibility, and efficacy of ultrasound-guided high-intensity focused ultrasound (USgHIFU) ablation for the treatment of fibroadenomas. USgHIFU provides noninvasive thermal ablation of fibroadenomas with real-time ultrasound guidance during treatment. Twenty women with palpable breast fibroadenomas were enrolled. Histologic confirmation of the fibroadenomas by core-needle biopsy was required. Patients underwent treatment with a therapeutic ultrasound device (Echopulse, Theraclick). During treatment, multiple sonications were delivered within the mass to achieve coagulative necrosis. Changes in tumor size, toxicity, cosmesis, and patient experience were recorded immediately after treatment and at 3, 6, and 12 months thereafter. The mean pretreatment tumor volume was 1.8 cm³. The mean reduction in volume of the fibroadenoma at 12 months was 1.12 cm³ (65%). All adverse events were grade 1 or 2, with mild pain being the most commonly reported. No skin burns, damage to adjacent structures, or other significant adverse events were observed. USgHIFU could be a future option for partial ablation of breast fibroadenomas.
Hee Jung Mood, MD, of MD Anderson Cancer Center, reported the results of a single-institution study to evaluate the success rates of clip placement, clip identification, and clip retrieval in metastatic axillary nodes to facilitate targeted axillary dissection. A retrospective review of 2 cohorts was performed. Data from the second cohort were collected after changes were made to the ultrasound image-capture protocol for documentation of clipped lymph nodes. The new protocol included measurement of the distance from clip to skin in transverse and longitudinal planes at the time of placement. Success rates of clip placement, clip identification, and clip retrieval were compared with clinicopathologic features in cohort 1 and also between the 2 cohorts. In cohort 1, failure in clip identification was associated with a larger number of abnormal lymph nodes at diagnosis, perinodal clip placement, thinner cortex after neoadjuvant chemotherapy, and a greater distance of the node from the skin. Cohort 2 had a higher rate of successful clip placement and clip identification than cohort 1. Optimal techniques for clip placement, including location within the cortex and detailed imaging after placement, help improve the ability to identify and retrieve clipped axillary nodes after neoadjuvant chemotherapy.

This represents only a sampling of the great research and topics that were discussed at the RSNA 2017 annual meeting. Breast procedures continue to be an active area of research and we can look forward to additional interesting presentations at the SBI meeting in Las Vegas, Nevada, in April 2018.

REFERENCE

any of us look forward to attending national and international meetings for the opportunity to learn about exciting new research, review important topics, network with colleagues and practice innovators, and catch up with old friends. However, clinical and personal obligations may preclude many from attending. Enter the Radiological Society of North America (RSNA) Virtual Meeting, a meticulously curated experience for those who cannot make the journey but still desire access to much of the content. This year, I took advantage of the discounted in-training registration for the virtual meeting to enjoy a few talks streamed live and on demand.

The Breast Imaging: Politics and Practice session was extremely informative, with practical insight into challenges facing mammographers across the country. Daniel Kopans, MD, FACR, FSBI, of Harvard University, gave an excellent talk titled “Alternative Facts’ in Breast Cancer Screening” and highlighted the historical context and scientific studies that influenced changes in screening recommendations. He stressed the importance of critical analysis of study design and statistics to identify faulty methods such as inappropriate age grouping, as in the 1993 study published in the *Journal of the American Medical Association* by Kerlikowske et al,¹ or poor randomization, as in the Canadian National Breast Screening Studies. It is a talk many will likely find useful to advocate for annual screening mammography beginning at age 40 years.

Wendy DeMartini, MD, FSBI, of Stanford University, spoke of breast imaging economic challenges and gave an overview of Current Procedural Terminology codes and their reimbursement as well as challenges and opportunities mammography faces in 2018 and beyond. Overall, there is relatively little change in payment for mammography and a 6.6% positive change for breast magnetic resonance imaging (MRI) for 2018. Dr DeMartini touched on the challenges regarding potential bundling of breast cancer screening services and patient steering by insurers. She highlighted victories in screening mammography coverage, such as the extension of the Protecting Access to Lifesaving Screenings (PALS) Act to 2019 and the Health Resources and Services Administration (HRSA) guidelines described in the Affordable Care Act. The PALS Act enacted a moratorium on Affordable Care Act implementation of the 2009 and 2016 US Preventive Services Task Force recommendations, and the HRSA guidelines, updated in 2016, recommend initiation of annual or biennial mammography screening for women between ages 40 and 50 years.

Stephen Feig, MD, FACP, FSBI, of the University of California, Irvine, addressed the controversial topic of overdiagnosis and overtreatment of screen-detected breast cancers. He spoke on the difficulties of evaluating overdiagnosis and the importance of long follow-up periods, adjustment for lead time and...
Highlights From RSNA 2017: The Virtual Meeting, continued from previous page

risk status, and comparison with accurate breast cancer incidence rates. Studies with shorter follow-up periods and those that do not account for the overall increasing incidence of breast cancer lead to excessive estimates for overdiagnosis.

The Case-Based Review of Breast session, directed by Jiyon Lee, MD, of New York University, was informative and a great review of mammography with an emphasis on target metrics. Priscilla Slanetz, MD, MPH, FACR, FSBI, of Beth Israel Deaconess Medical Center and Harvard Medical School, presented cases highlighting the use of the ACR Appropriateness Criteria. In addition, she reviewed target metrics for mammography and the Mammography Quality Standards Act audit. Jean Seely, MD, FSBI, of the University of Ottawa, in addition to showing many management-centered cases, reviewed target performance metrics and fundamentals of the screening mammography audit. Dr Seely encouraged the audience to improve their performance by reading more cases and reviewing cancers found on screening and the outcome of recalled cases. Peter Eby, MD, FACR, FSBI, of Virginia Mason Medical Center, reviewed indications for breast MRI and the use of ACR Appropriateness Criteria. Dr Eby used cases to explore nuances in performing MRI audits and the proper use of BI-RADS assessments. Ritse Mann, MD, PhD, of Radboud University in the Netherlands, showed several cases of MRI aiding in breast cancer staging and its use in high-risk screening.

Jay Parikh, MD, FACR, FSBI, of MD Anderson Cancer Center, discussed the essentials of integrating digital breast tomosynthesis (DBT) into practice, with topics ranging from finances/reimbursement to personnel training to workflow considerations. Dr Parikh brought up practical issues such as workstation equipment necessary to view tomosynthesis studies and the space required for storage of DBT exams. Sarah Friedewald, MD, of Northwestern University, reviewed the latest data in support of the use of DBT and walked through practical troubleshooting techniques to aid in lesion localization on tomosynthesis. Kathleen Brandt, MD, of the Mayo Clinic, showed many challenging DBT cases and potential pitfalls encountered with synthesized mammogram images.

We invite you join in the conversation on Facebook by liking the SBI page and following us on Twitter @BreastImaging.
Outside the area of breast imaging, the session titled “The Newly Hired Radiologist: Lessons for Aspiring, New, and Experienced Radiologists” was well received. The assembled panel included early- and late-career radiologists in academic and private practice settings. Anastasia Hryhorczuk, MD, compared the characteristics of different generations and discussed how practices may change as radiologists of the traditionalist and baby boomer generations are replaced by millennials and those of Generation X. Kate Hanneman, MD, reviewed the impact of social media and patient portals. Dr Hanneman emphasized the importance of clarity and error-free radiology reports as more patients gain access. She also illustrated many examples of how technology can be harnessed for radiology education using tools such as YouTube, Twitter, and Poll Everywhere.

The virtual meeting is a wonderful resource that many trainees and veterans should use if unable to attend the meeting in Chicago. The virtual meeting platform is very user friendly, with technological support staff available during live-streamed lectures. For those looking to prepare for board examinations, the Case-Based Review sessions provide many teaching cases and the Essentials sessions are a great review of radiology topics. Given the scope of the RSNA annual meeting, trainees of all levels will be able to find an area of interest. Visit https://www.rsna.org/Virtual/ for more information.

REFERENCE
SBI New Fellow Inductees

On Monday, November 26, 2017, at the SBI Fellows meeting at the Radiological Society of North America annual meeting, the following SBI members were inducted as fellows:

- Lars Grimm, MD, Duke University
- Christiane Hakim, MD, Magee-Womens Hospital of the University of Pittsburgh Medical Center
- Katie Hunt, MD, Mayo Clinic, Rochester
- Su-Ju Lee, MD, University of Cincinnati Medical Center
- Elizabeth McDonald, MD, University of Pennsylvania
- Donna Plecha, MD, University Hospitals Cleveland Medical Center
- John Scheel, MD, University of Washington School of Medicine
- Jean Seely, MD, University of Ottawa
- Susan Weinstein, MD, University of Pennsylvania

Front row (left to right): Susan Weinstein, MD, FSBI; Donna Plecha, MD, FSBI; Christiane Hakim, MD, FSBI; Daniel Kopans, MD, FACR, FSBI, chair of the Fellows Committee; SBI President Wendy DeMartini, MD, FSBI; Su-Ju Lee, MD, FACR, FSBI; Elizabeth McDonald, MD, FSBI. Back row: Jean Seely, MD, FSBI; John Scheel, MD, FSBI; Lars Grimm, MD, FSBI; Katie Hunt, MD, FSBI.
I am fortunate to work at a large teaching hospital and dedicated comprehensive cancer center. At the main hospital, residents and fellows perform most of the biopsies alongside the attending physicians. At 2 of our satellites, the attending physicians perform the biopsies. We also have a nurse available at most sites. Delivering results to the patient in a timely and sensitive manner is an integral part of the biopsy and important for any trainee to master.

First the good news...
When the biopsy results are benign, a trainee or nurse usually calls the patient. Likewise, if the pathology findings are “high risk” and require surgical excision, the trainees usually handle this as well.

Then the bad...
When performing biopsies on lesions that are likely malignant, I often convey my level of suspicion to patients so they aren’t taken completely off guard when the results come in. For cases that show cancer, the referring physician is generally contacted first, as many will prefer to call patients themselves. Even if referring providers have called patients, I usually follow up with a call to ask how they are doing and if they have any questions. I think this lets patients know we care about them and are not just technicians.

However, sometimes the providers want us to call patients first. It is important to remember that for patients, receiving this news is a life-changing event. They will remember that phone call for the rest of their lives. After briefly telling a patient I have received the results of the biopsy, I ask if it is a good time to talk. I generally get right to the point, telling them that the results unfortunately do show cancer. If I have prepared them ahead, it may not be such a shock. I always follow up the (bad) news immediately with any positive twist I can, such as “it is small,” “the treatment for cancers that are caught early is excellent,” etc. I also assure patients that we have a team of experts who will take good care of them. Giving patients concrete next steps about receiving that care helps them immensely. It is also important to understand that patients, in the
Delivering Biopsy Results: How I Do It – Part 2, continued from previous page

heat of the moment, will often not process the news quickly enough to consolidate questions in their minds. I usually give them my contact information in case they think of questions after the phone call.

In my experience, most patients end up sincerely thanking me. I have patients tell me years later that they remember how kind I was during their biopsy and the phone call. We have a profound impact on people’s lives during a time of stress. It’s important to make it a positive one.

Delivering Biopsy Results in an Academic Medical Center With Radiologists

By Mary Scott Soo, MD, FACR, FSBI

Duke University Medical Center’s faculty and fellows contact all imaging-guided breast biopsy patients by telephone to discuss biopsy results, usually 1 to 3 days after the procedure, as soon as pathology results are available in the electronic medical record system. Given our large regional patient population, contacting patients by phone allows them to hear results sooner than if they had to return for a clinic appointment for a face-to-face discussion and obviates the need for additional travel. A survey of our breast biopsy patients has confirmed that telephone communication is preferred over waiting longer to receive results in person. This seems particularly practical for the majority of patients whose results will be benign and concordant, providing more immediate relief from worry about results.

To enhance communication, on the day of the procedure we give patients a biopsy results fact sheet developed in our practice. The fact sheet outlines common biopsy results and their significance. When contacting patients by phone, the radiologist refers to a specific item on the fact sheet, reducing the need for patients to scramble to write down unfamiliar terms. We then identify ourselves as the breast imaging radiologist who performed the biopsy. Next we ask if the timing is good to discuss the results and if they are in a safe place to talk (eg, if they are driving a car, we ask that they call us back when no longer driving). For benign results requiring no further workup, we immediately mention the good news, providing instant relief from worry and hopefully enabling patients to process the remainder of the discussion with less distraction. For patients with malignant, discordant, or atypical results, we describe the findings and avoid phrases such as “the results were positive,” which patients could misinterpret. We describe the meaning of the diagnosis and recommendations for further treatment, and we tell patients to expect contact heat of the moment, will often not process the news quickly enough to consolidate questions in their minds. I usually give them my contact information in case they think of questions after the phone call.

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from a scheduler within 24 hours to arrange further appointments (surgery, radiation, or medical oncology, as appropriate). Finally, we check for understanding of information relayed and answer any questions.

Our direct communication of biopsy results to patients has been a long-standing practice, with high patient and referring clinician satisfaction. Because conversations range anywhere from 2 to 20 minutes according to medical complexity and patient needs, we make these calls when there will be few distractions and patients can have our full attention (eg, at the end of the day) to establish rapport. Understanding patients’ reactions and attentive listening fosters compassion, enhances communication and patient satisfaction, and helps us anticipate questions and concerns. This process helps us develop comfortable discussions with patients, is not necessarily time consuming, and helps patients through an emotional and vulnerable time. When it is done well, with the patient’s needs ahead of our own, the communication process is often personally rewarding for the radiologists too.
new networking group for the advancement of women in informatics is garnering momentum: RADxx. This initiative, led by Geraldine McGinty, MD, MBA, FACP, breast radiologist and chief contracting and strategy officer at Weill Cornell Medicine, and Mini Peiris, chief marketing officer at Ambra Health, was established to cultivate mentorship and networking opportunities for women in radiology, informatics, and information technology management, as well as to bring diversity to informatics leadership. This initiative was unveiled at the 2016 meeting of the Radiological Society of North America (RSNA) and spurred interest in informatics among women in all subspecialties and career levels of radiology.

At the 2017 meeting of the RSNA, RADxx held a reception on Tuesday, November 28. It was an incredibly successful event, with over 180 people in attendance, demonstrating the stalwart support and interest of the radiology community. The first annual RADxx Awards were as follows: Advocate (Dr Tessa Cook, Department of Cardiothoracic Radiology at the University of Pennsylvania in Philadelphia), Trailblazer (Dr Katherine Andriole, director of research strategy and operation at Massachusetts General Hospital), Champion (Dr Curtis Langlotz, professor of radiology and biomedical informatics at Stanford University), and Rising Star (Dr Judy Wawira Gichoya, fourth-year radiology resident at the University of Indiana). To read more about the awards, please visit www.radxx.ambrahealth.com/awards/.

The third RADxx tweet chat was held on October 5, 2017, hosted by Dr McGinty and Dr Amy Kostenas, neuroradiologist and associate professor at the Mayo Clinic. The questions revolved around how imaging informatics leaders got into informatics, how many years it took to get to their current positions, training programs that helped informatics leaders the most in their careers, how informatics has helped at every career stage, and career options that are open to those with expertise in imaging informatics. The tweet chat could be tracked with the hashtag #RADxx (a hashtag is a way of tracking material on a certain topic on social media). The chat had 4.3 million impressions (interactions or replies generated by tweets) and over 816 total tweets!

RADxx will be hosting its fourth tweet chat in late January with the topic “New Year, New You—Career Guidance You Can Use.” Please follow Ambra Health on Twitter (@ambrahealth) for updates on the tweet chat.

RADxx receptions will tentatively be held at the upcoming Healthcare Information and Management Systems Society Annual Meeting as well as the Society for Imaging Informatics in Medicine Annual Meeting. More information will be released in the coming months.
RADxx: A Networking Group for Women in Informatics, continued from previous page

Informatics is far-reaching and is applicable to all radiology subspecialties, including breast imaging. According to Dr McGinty, “We need to stop putting a fence around informatics and all need to be informaticians to optimally position ourselves for the future.”

Last, RADxx is open to women and men throughout radiology and informatics. All are welcome! For more information on RADxx, including how to sign up for updates, upcoming events, and the newsletter, please visit www.radxx.ambrahealth.com.

**SBI & ACR Breast Imaging Symposium**

APRIL 12-15, 2018
The Cosmopolitan of Las Vegas
Las Vegas, Nevada
There was a popular saying in Canada in the 1980s which went something like this: “When the United States has a cold, Canada sneezes.” This sentiment alludes to many long-standing core similarities between the 2 nations. When it comes to health care, however, the historical differences are much more marked.

Health care in Canada is a publicly funded federal government responsibility to provide universal coverage for “medically necessary” services allocated on the basis of need rather than the ability to pay. The application of health care programs, on the other hand, is a provincial responsibility. Canada comprises 10 provinces and 3 territories. In 1984, the Canada Health Act established benchmarks for provinces and territories to receive full federal cash transfers to support the health programs. The provinces and territories are required to provide reasonable access to medically necessary hospital and doctors’ services. In the application of this broad mandate, there are provincial variations in the delivery of medical care. Health care is limited across all of Canada, particularly for technologies such as magnetic resonance imaging (MRI), access to specialists, and nonurgent surgeries. To address this concern 10 years ago, the provinces and territories committed to a patient wait times guarantee. However, increased demand and costs related to the aging population and complexity of medical treatments and techniques has exacerbated the challenge.

The burden of breast cancer is similar to that in the United States, with 1 in 8 Canadian women expected to develop it in their lifetime, which translates to 26,300 new cases this year. Breast cancer screening programs exist throughout Canada, with slight fluctuations as to age of onset, screening interval, and how women are invited to participate. Similar to the ACR, the Canadian Association of Radiologists oversees a mammography accreditation program to standardize quality across the country. Radiologists must interpret a minimum of 1000 screening mammograms yearly to obtain accreditation, and the vast majority are generalists.

The Canadian National Breast Screening Study (CNBSS) was performed between 1980 and 1985 and had 2 arms, 1 for women in their 40s (CNBSS 1) and 1 for women from 50 to 59 years of age (CNBSS 2). The CNBSS failed to demonstrate a benefit to screening, an outlier conclusion attributed to improper randomization (palpable cancers in the screening arm) and poor mammography quality.
The CNBSS is thus often excluded, as it should be, from historical analyses of screening mammography’s efficacy. However, the data continue to influence screening recommendations in Canada.

Successful breast screening in Canada has led to a 40% mortality reduction in breast cancer in the past 35 years. In 1988, Linda Warren, OBC, MD, FRCPC, FACR, FSBI, successfully convinced the British Columbia government to introduce the first standardized breast cancer screening program. The most populous province, Ontario, followed in 1990, and Quebec, the second largest province, followed in 1998. Today, almost all Canadian women are covered by a structured screening program. The exception is in Nunavut, the least populous and most northern Canadian territory, which extends to the Arctic Circle. The Canadian Partnership Against Cancer is actively working to improve First Nations, Inuit, and Métis cancer control through collaboration with local communities.

The Canadian Breast Cancer Screening Database compiles data on screening performed within each regional program. Most programs invite women for screening beginning at age 50 years and recommend biennial mammograms with a stop age of 75 years. There are 2 programs that also recommend annual screening for women aged 40 to 49 years and 2 programs stop at age 70 years. The overall national participation rate for women aged 50 to 69 years is 53% (range, 32% to 65%); this rate is 62% for women with any mammographic evaluation within the previous 2 years. Although most screening is performed in clinics, mobile vans roam the more remote areas of Canada to increase screening opportunities. Performance of Canadian screening programs is on target, with an invasive cancer detection rate of 3.7/1000 screens, 63% of screening-detected cancers measuring less than 15 mm, and 76% of cases node negative at the time of diagnosis. The only parameter slightly above target is the recall rate, nationally at 7.4%.

In 2011, the Canadian Task Force on Preventive Health Care Guidelines recommended that women 50 to 69 years old, and probably also those 70 to 74 years old, should undergo routine screening every 2 to 3 years; routine screening was not recommended for women in their 40s. These conclusions were very similar to the 2009 guidelines published by the US Preventive Services Task Force and caused a similar outcry among Canadian medical professionals. The Canadian Association of Radiologists swiftly reinforced its recommendations for annual screening of women aged 40 to 49 years and screening every 1 to 2 years for women aged 50 to 74 years, with continued regular screening as long as women remain in good health.

In 2011, Ontario initiated the first Canadian high-risk screening program for women with a greater than 25% lifetime risk of breast cancer, adding annual breast MRI to mammography. Many other provinces have also adopted official guidelines recommending annual MRI screening for high-risk
Breast Imaging in Canada, continued from previous page

Women. Diagnostic MRI is widely available, as it is worldwide, and indications for its use have evolved in recent years, particularly when it comes to preoperative staging, with MRI now used only in specific clinical circumstances.

Although supplemental ultrasound screening for high breast density has gathered much attention in the United States in the past decade, there is no breast tissue density legislation in Canada and ultrasound screening is not reimbursed in many provinces. Currently, 5 of the 12 regions with screening programs recommend annual mammography for women with greater than 75% breast density.

Digital breast tomosynthesis in the diagnostic setting is gaining ground throughout Canada. It is currently used for screening only in Alberta, although several regions are now evaluating the option of introducing screening tomosynthesis. The Tomosynthesis Mammography Imaging Screening Trial, led by Etta Pisano, MD, FACR, FSBI, includes several Canadian participating centers.

We are dedicated to the highest-quality patient care and enthusiastically embrace future opportunities. We created the Canadian Society of Breast Imaging in June 2017, with Jean Seely, MD, FRCPC, FSBI, as our first president. Canadian breast radiologists continue to educate the public regarding the potential benefits of screening and enlighten them about the overall role of radiologists. We are united in our conviction of the benefits of our daily clinical work and its beneficial impact on the lives of millions of Canadian women.

REFERENCE

The SBI Goes to Nepal

By Jessica Leung, MD, FACR, FSBI

The SBI and the Breast and Thyroid Society of Nepal (BATSON) collaborated to deliver a joint conference in early October 2017 in the ancient and majestic city of Kathmandu, capital of the Federal Democratic Republic of Nepal. It was my privilege to organize and teach at this course along with John Lewin, MD, FACR, FSBI, and Sughra Raza, MD, FACR, FSBI.

Interest in and commitment to breast imaging and breast care were tremendous and heartwarming among both junior and senior radiologists attending this course. Training opportunities are limited in Nepal. Many young radiologists train abroad, primarily in neighboring China. This often means leaving their families and homes to simultaneously learn the Chinese language and radiology, neither of which is simple. I am most impressed by their dedication.

Left to right: Dr Raju Pradhan, member; Dr Sharma Paudel, joint secretary; Sughra Raza, MD, FACR, FSBI; Dr Birendra Joshi, president; Jessica W. T. Leung, MD, FACR, FSBI; Prof. Ram Kumar Ghimire, president of Nepal Society of Vascular and Interventional Radiology; John Lewin, MD, FACR, FSBI; Dr Amrit Koirala, member; Dr Dan Bahadur Karki, member; Dr Anamika Kashyap Jha, treasurer. Not pictured are additional members of the BATSON Executive Committee: Dr Umesh P. Khanal (vice president), Dr Prakash Kayastha (general secretary), and Dr Ghanshyam Gurung (past president). Breast and Thyroid Conference (BTCON) 2017 was organized in association with the Nepal Radiologists’ Association, Nepal Society of Vascular and Interventional Radiology, and Ultrasound Society of Nepal.
Dr. Birendra Joshi, a respected radiologist and educator in Nepal, is the heart, spirit, and president of BATSON. He is committed to the core mission: “…easy access to treatment, increased awareness, providing best treatments to patients.” In a developing country with limited resources, he and his team work tirelessly and creatively toward the goals of education, access, and improving overall patient care. Two guest speakers from India also lectured and shared their insights: Dr. Smriti Hari and Dr. Tulika Singh, both of whom are founders of the Breast Imaging Society of India and known to the SBI through our International Outreach visit to India last year.

I organized the conference around 3 primary themes: education and dissemination of information, technology and advanced imaging, and cost-effectiveness and accessibility. The 3 speakers incorporated these themes while lecturing on fundamentals of mammography and ultrasound, BI-RADS, diagnostic breast imaging workflow and organization of an efficient comprehensive breast imaging center, core biopsy (technical, interpretive, and imaging-histologic concordance), magnetic resonance imaging, digital breast tomosynthesis, and contrast-enhanced mammography. Each of us also showed interactive multimodality cases and conducted small-group workshops on ultrasound-guided core biopsy using breast phantoms. These activities were fun-filled and enjoyed by both attendees and speakers alike.

There is no universal breast cancer screening program in Nepal at this time, and most screening is achieved using ultrasound. We discussed the scientific evidence that screening mammography reduces breast cancer mortality and morbidity. We hope to work together to determine the best and most appropriate breast cancer detection and diagnostic tools for maximum benefit to patients in Nepal.

John, Sughra, and I sincerely appreciate the hospitality and graciousness of our hosts and made lasting friendships from this trip. We took away something special and meaningful that is unique to each of us. Commonly, we all loved the food in Nepal, particularly a spicy lentil dish called dal—I liken this dish to Texas baked beans from my home. And, of course, we were awestruck and humbled by the inspiring nearby Himalayas. Nepal is a developing country with needs in breast imaging and breast health. Just as the mountains in Nepal are high, so are the dedication, energy, and wisdom of the Nepalese radiologists. We hope to continue our trek alongside them, in the forms of training observerships and nonprofit organizational assistance. If any of you are interested in joining this trek, please contact me.
Only in Las Vegas can you see the Eiffel Tower, the Statue of Liberty, a great pyramid of Egypt, and an erupting volcano all within walking distance. And only in Las Vegas can you experience the world’s largest breast imaging conference in 2018. The Annual Symposium for the SBI will be held April 12 through 15 in the Entertainment Capital of the World, Las Vegas, Nevada.

The 2018 symposium will build on the phenomenal success of the 2017 course and will have something for everyone. The mantra for the symposium planning committee was “Practical”: every aspect of the 2018 course will provide attendees with useful information they can readily incorporate into daily practice.

The theme for the plenary sessions on day 1 will be “Screening,” with talks specifically geared to enhance your skills with practical advice and guidance. For example, a talk titled “Mythbusters: Screening Edition” will set the record straight on screening myths. Other talks will provide practical ideas for improving your screening performance with traditional 2-dimensional mammograms as well as digital breast tomosynthesis. Since current screening programs often include other modalities, screening ultrasound will be covered along with new approaches to faster abbreviated magnetic resonance imaging protocols. Finally, the morning will conclude with a talk on how to reach underserved and underscreened populations.

The theme for day 2 is “Improving Outcomes by Doing Less.” This session will include an important discussion by both a breast imager and an invited pathologist on a practical approach to dealing with high-risk breast lesions diagnosed on needle biopsy. Albert Losken, MD, a plastic surgeon from Emory Healthcare, will show us all what is possible in the world of oncoplastic surgery. The keynote lecture will be delivered by the acclaimed breast surgeon Monica Morrow, MD, from Memorial Sloan Kettering Cancer Center, on the topic “Doing More with Less: Update on the Surgical Approach to Margins, DCIS, and the Axilla.”

The Saturday plenary session will feature speakers suggesting ways that radiologists can “Own It” and provide more value to patients and referring clinicians by “owning” and directly dealing with more patient clinical care issues. For example, these talks will show how breast imagers can incorporate concepts from the ACR’s Imaging 3.0 campaign into a breast imaging practice. Other talks will suggest ideas for radiologists to go even further in caring for breast patients than they do already, such as treating as well as diagnosing breast infections. Finally, 2 different speakers will suggest thoughtful ideas for improving the patient experience in the breast imaging clinic.
The topic for the last morning session on Sunday, April 14, will be “Advanced Imaging of the Breast.” Mark Michalski, MD, from Massachusetts General Hospital, will improve our understanding of deep learning and artificial intelligence. Other advanced imaging topics to be covered include practical information on radiomics and ideas for bringing contrast-enhanced mammography into your practice. The final event of the morning will be a competition between the audience and a panel of faculty in a good-natured battle of wits interpreting complete unknowns live and without a net!

Refresher courses are always extremely well received at the annual symposium, and these will be presented as usual in the afternoons on days 1 through 3. The refresher courses provide time for more in-depth discussions covering a wide variety of topics. If you are hoping to hear practical imaging advice, you will be rewarded by workshops on assessing calcifications, working up asymmetries and architectural distortion, and evaluating and managing lymph nodes, among many others. Case conferences will allow you to challenge yourself to make the finding and determine the management before time runs out.

If you prefer workshops on managing your career and your practice, speakers will cover topics on incorporating formal risk assessments into your daily practice, optimizing your breast imaging reports, auditing yourself and your colleagues, and dealing with medicolegal issues when things go wrong. For members in training and those closer to the start of their careers, there is a workshop on surviving your first year in either private practice or academia and a discussion on how to interview for a job while simultaneously assessing the practice and an offer if all goes well.

For those who are interested in the very latest research hot off the presses, scientific sessions will be presented each afternoon along with the refresher courses. Only the most relevant, interesting, and well-constructed studies from among more than 200 submissions were accepted for oral presentation or e-poster presentation at the symposium.

Continuing with the overall theme of “Practical,” the annual symposium includes many technical exhibits showcased by dozens of manufacturers and vendors. You will have the opportunity to see, assess, and lay hands on the latest imaging equipment, picture archiving and communication system displays, and biopsy devices, along with many other software and hardware solutions to address the needs of a busy or growing breast practice. All in 1 place. How practical!

If all of that isn’t enough to keep you busy, SBI is again offering a preconference workshop on digital breast tomosynthesis (additional registration required). This workshop will provide 8 hours of initial training in digital breast tomosynthesis, including information on Hologic, GE, and Siemens systems, on Wednesday, April 11.

Given all this year’s symposium has to offer, we hope to see you in Las Vegas in April. We guarantee you will walk away a winner.
Mike Linver, MD, FCR, FSBI, has been playing music and singing songs for decades. Folk music is his favorite. Sometimes he reveals his lifelong devotion to breast imaging by writing new lyrics to familiar tunes.

Dr. Linver, how did you become inspired to write and play music?

I have always been inspired by music, even as a child. I also love to write poetry and was soon combining words with music and composing my own songs. Within our family, I also wrote new words to personalize well-known popular songs for family birthdays and other special occasions. When I got more involved in teaching and lecturing about breast imaging, I soon realized that using the power of music to teach a few breast imaging concepts and, at the same time, infuse a relaxing interlude into the more tedious, might just work. Consequently, I started writing musical breast imaging parodies about 15 years ago and still occasionally insert them into my talks. The response has been overwhelmingly positive. I really believe that these “songs” have helped to drive home some key teaching points and provide some comic relief that serve to keep attendees more actively engaged. The music has given me yet another opportunity to fuel my own passion to teach high-quality breast imaging which makes a difference in the world!

The breast imaging community is diverse, and there is artistic talent that lives and breathes among us. We define art broadly to include all visual and literary forms such as drawings, paintings, photography, cartoons, and poetry. We welcome artistic submissions from all SBI members in any subject. We also invite SBI members to nominate nonmembers whose art pertains to our field of breast imaging. Please contact Louise Miller, RT(R)(M), FSBI, at louise@mammographyeducators.com and Jiyon Lee, MD, at Jiyon_L@hotmail.com with your submissions and nominations. Please provide a brief paragraph that addresses the following questions. Artist: why did you choose the subject and what does the art mean to you? SBI member: what does the piece of art mean to you and why do you want to share it with SBI Newsletter readers?
Here is one example of how Mike combines music and medicine:

**Intraductal Papilloma**
(To the tune of “Supercalifragilisticexpialidocious”)

Intraductal papilloma now demands an answer—
When we find it in the breast it might become a cancer.
So we’re forced to needle loc it like some Bengal Lancer—
Then we hope pathology will give the final answer!

Intraductal papilloma is a thing of beauty,
Hidden well within the duct like secret pirate booty.
Finding it on ductogram becomes our public duty
Since we know malignancy grows out of such a cutie!

Intraductal papilloma has no sense of humor—
It can be upstaged from ADH to nasty tumor.
Now the scientific journals tell us it’s no rumor:
Cancer cells grow fat there like American consumer!

**Ms Miller, what does Dr Linver’s music mean to you and why do you wish to share it with SBI Newsletter readers?**

Mike Linver has been a longtime colleague, friend, teacher, and mentor to me. While those are aspects I treasure most about him, perhaps I have been more impressed and entertained by his unique creativity and musical talents as a vocalist and composer over the years and have personally been honored with my own song. Try rhyming Louise with Belize. He did it! We thought it would be fun to share some of his favorite tunes with you. Maybe a sing-along at your next department party? I know they will make you smile! ♠
The Enhancing Quality Using the Inspection Program (EQUIP) initiative is a step the Food and Drug Administration has undertaken to ensure continued improvement in mammography quality. In this article, we offer technologists and radiologists suggestions for a successful EQUIP inspection.

I. Get organized! The lead technologist should organize an EQUIP binder that contains the following:

1. A copy of the regulation
2. A written policy and procedure document used by the facility to ensure compliance
   a. Documented time and date for image reviews
   b. Specific corrective action processes; examples include the following:
      i. Feedback and recommendation protocols
      ii. Review of positioning technique articles and/or textbooks (example references provided at the end of this article)
      iii. Positioning training with Food and Drug Administration/ACR–qualified instructors
3. Documentation of completed reviews for each technologist

II. Be consistent.

1. Develop a tickler file for image review for each technologist. This is important especially with a large technologist staff so reviews can be conducted throughout the year.
2. Use consistent terminology and forms that can be found online.

III. Emphasize positives. In addition to corrective actions, congratulate technologists for jobs well done! Technologists regularly encounter challenging patient positioning that prevents the “perfect” image from being obtained. Positive feedback boosts morale.

There is no magic to mammography and some patients provide extreme challenges. Technologists must be up-to-date with the most effective, consistent, and reproducible
positioning methods. The changes from film-screen to full-field digital mammography (FFDM) to
digital breast tomosynthesis (DBT) are not addressed in the most recent ACR manual of
positioning (1999) because the example photographs were published prior to the FFDM era. To
better address positioning for FFDM and DBT, the SBI offered a series of newsletter articles and
recent webinars covering current standards for mammography positioning. These resources would
serve as excellent references for your technologists as they prepare to meet the aforementioned
EQUIP quality improvement initiatives. To conclude this article, we provide quick tips for common
positioning pitfalls as you prepare for EQUIP.

**Common positioning errors**

Skin folds, missing tissue, and motion are the 3 most common reasons for technical callbacks. When noticed, they can usually be corrected at the time of initial service.

I. **Skin folds** can hide abnormalities even with DBT. The inability of the technologist to see the
tissue on the underside of the breast can obscure skin folds until the image is already obtained. By
placing the hand under the breast while positioning the craniocaudal view and behind the breast
while positioning the mediolateral oblique view, the technologist can smooth the skin more
evenly. Surgical scars can exacerbate skin folds. During the positioning, the technologist can pull
back slightly on the skin to smooth out the tissue around the scar.

II. **Inadequate visualization of (or missing) breast tissue** is another common reason for a
technical callback. The technologist should review prior imaging to compare the amount of tissue
previously acquired and should also compare the symmetry between the right and left breasts.
Also important is the posterior nipple line. The distance from the nipple to the chest wall should
be within 1 cm on the craniocaudal and mediolateral oblique views.

III. **Motion artifact** occurs most commonly in the left lower inner quadrant because of cardiac
motion. Technologists may want to check this area with the magnification tool while reviewing the
images in the room on the workstation. Breathing instructions can further reduce motion.

In summary, although the EQUIP process can be daunting, the information presented in this
article will help you prepare. The key is detailed organization and cooperation with radiologists
and technologists. Rather than being a punitive process, EQUIP is a unique opportunity to improve
and provide the best in team-delivered patient care.
**ADDITIONAL RESOURCES**


The first national Annual Scientific Meeting of the Indonesian Women’s Imaging Society (IWIS), in collaboration with the SBI, was held November 2-4, 2017, in Bandung, Indonesia. Dr Bonnie Joe, of UCSF, led the stellar team of Dr Emily Conant, of the University of Pennsylvania; Dr Victoria Mango, of Memorial Sloan Kettering Cancer Center; Dr Juliette The, of Boca Radiology Group; and SBI Executive Director Yasmeen Fields, who represented the SBI International Education Outreach Committee.*

IWIS is a recently created society with 20 members committed to developing a breast imaging program in Indonesia. Indonesia lacks a national breast cancer screening program and has sparse percutaneous biopsy availability. Currently, most mammography units are used for diagnostic purposes, and over 70% of breast cancer is diagnosed at a late stage. Despite the relatively small society...
The SBI at the First Indonesian Women’s Imaging Society Meeting, continued from previous page

membership, the meeting drew nearly 200 attendees. We were ready to share our knowledge with this eager group.

We were warmly met by the members of the IWIS, under the direction of Dr Kardinah, and the trove of gracious radiology residents who ensured that all logistics and details were expeditiously executed. On the first day, we provided challenging multimodality case presentations to radiologists. One highlight was an “Ask the Expert” session, in which a local radiologist showed ultrasound cases and questioned Dr The onstage, reminiscent of a residency hot seat. The audience was thoroughly engaged. Dr Joe received grateful applause after stating we would share our lecture slides with the audience following the conference. The first day’s session ended with a photo session with the IWIS members and radiology residents.

Later that evening, we attended a faculty dinner at a restaurant called Miss Bee Providore, specializing in local and Western foods, where the IWIS bestowed custom-made “pink ribbon” batiks upon us. Batik is a pictorial fabric and a specialty of Indonesia. We enjoyed conversation and additional insight into the practice of breast imaging in Indonesia.

The next day, the formal conference and plenary session began with “Indonesia Raya” (the Indonesian national anthem), a hymn for the radiologists of Indonesia, the banging of the gong, and a ribbon-cutting ceremony. We provided lectures on the evidence to support breast cancer screening; how to address screening controversies; screening with ultrasound, tomosynthesis, and magnetic resonance imaging; auditing; and how to assess calcifications.

That night, the ceremonies continued with a dinner and cultural dance at the hotel and playing the angklung, a local woodwind instrument. We also met the other visiting professor, Dr Clemens Kaiser, from Germany.

We finished the SBI portion of the conference on the third day with Dr Mango’s lecture on BI-RADS 3 assessments and an SBI faculty panel discussion to address questions from the audience. The questions again enlightened us on the discrepancies and surprising commonalities in breast imaging between our 2 countries.

The graciousness of our hosts and our mutual exchange of ideas will linger with us long after we return to the United States and resume our daily lives.

*The SBI International Education Outreach Committee seeks to identify and partner with emerging breast imaging societies outside the United States to cosponsor educational programs designed to improve knowledge and clinical care worldwide. Educational programs are designed collaboratively with the host society. The SBI is currently compiling a database of members interested in being involved in these efforts. To learn more, please see www.sbi-online.org/education/InternationalEducationOutreach.aspx.
A 38-year-old woman without significant medical history presents to her gynecologist 1 week after onset of intermittent pain in her right breast. She also felt a lump and a separate tender “cordlike” structure in the lateral portion of the same breast. No history of trauma or other inciting event was endorsed. Further diagnostic evaluation was performed at an outside facility. How would you interpret the following images (Figures 1 and 2)?

Figure 1. Diagnostic craniocaudal (CC) and mediolateral oblique (MLO) mammogram of the right breast. The anterior triangle skin marker indicates the palpable lump and the posterior triangle skin marker indicates the “cordlike” structure.
**Mondor Disease Associated With Invasive Ductal Carcinoma, continued from previous page**

Figure 2a. Ultrasound image of the anterior palpable lump.

Figure 2b. Ultrasound image of the posterior palpable cord reveals an anechoic, tubular, superficial structure with minimal internal vascularity. The left side of the image is closer to the nipple and the right side is closer to the axilla.
On the diagnostic mammogram, there is a subtle focal asymmetry in the central breast, 2 cm from the nipple (Figure 3, blue oval). There is also a superficial dilated vessel in the upper outer breast, corresponding to the marker placed on the palpable cord (Figure 3, blue arrows). On the ultrasound, at the site of the palpable lump, there is a hypoechoic solid mass (Figure 2a) with internal vascularity (not shown), correlating with the mammographic focal asymmetry. Additionally, in the region of the palpable cordlike abnormality, there is a linear, beaded, hypoechoic, tubular structure with mild internal vascularity (Figure 2b). This was thought to represent a dilated vein with features suggestive of superficial thrombophlebitis. Last, an abnormal lymph node in the right axilla was also discovered and described (Figure 2c). The examinations were assessed as BI-RADS 5, and biopsy was appropriately recommended for the central mass and the axillary lymph node. Core-needle biopsy of the mass and the abnormal lymph node revealed a triple-negative, grade 3, invasive ductal carcinoma and metastases, respectively.

Figure 2c. Ultrasound image of the right axilla shows a homogeneous, hypoechoic mass or lymph node with circumscribed margins.
By the time the patient was seen at our multidisciplinary breast cancer conference a few weeks later, her right breast pain and palpable tubular abnormality had resolved. Further imaging was obtained for a complete workup, including breast magnetic resonance imaging (MRI). MRI revealed a mass in the central breast, consistent with the biopsy-proven right breast cancer. There was also a second focus of enhancement in the upper outer quadrant (Figure 4). On review of the external images, a small mass associated with the proximal end of the dilated vessel could be visualized in this region (Figure 2b), and a repeat ultrasound was recommended. The repeat ultrasound showed near resolution of the previously noted dilated vessel and a small adjacent mass with suspicious features (Figure 5). A core biopsy of this mass was recommended and subsequently done, revealing a second focus of invasive ductal carcinoma.

Following this second breast biopsy, a right partial mastectomy with axillary dissection was performed. Surgical pathology revealed 4 separate foci of tumor, with 2 out of 14 lymph nodes positive for metastasis.
Mondor Disease Associated With Invasive Ductal Carcinoma, continued from previous page

Figure 4. Breast MRI subtracted maximum-intensity projection demonstrates a central enhancing mass (blue arrowhead) as well as an additional small, suspicious mass in the right upper outer quadrant (blue arrow).

Figure 5. Repeat ultrasound of the right breast reveals a hypoechoic solid mass with an irregular shape (blue arrowhead) and near-complete resolution of the previously noted adjacent dilated vessel (blue arrow).
**Mondor Disease Associated With Invasive Ductal Carcinoma, continued from previous page**

This case illustrates superficial thrombophlebitis (Mondor disease) and reminds us that this entity, although inherently benign, can sometimes be the first presentation of breast cancer. Mondor disease commonly affects the thoracoepigastric veins coursing obliquely through the lateral aspect of the breast.¹ Some potential risk factors for development of this condition are breast surgery, breast biopsy, inflammatory processes, breast cancer, and trauma, but it is often idiopathic.² A dilated vessel, which could be mistaken for a dilated duct, is the most common mammographic appearance. Sonographically, the thrombosed vessel appears as a superficially located, tubular, anechoic structure with a beaded appearance that usually does not show flow on color or spectral Doppler studies.² Mondor disease is self-limited and does not require anticoagulation, although nonsteroidal anti-inflammatory drugs and hot compresses can improve symptoms.

Although uncommonly reported, Mondor disease has been described in patients with a cancer diagnosis that may have otherwise been delayed. Direct tumor compression of venous structures by primary masses and/or ipsilateral lymph node metastases could incite Mondor disease, but direct causality has not been definitively established.¹³ Catania et al reported that 8 of their 63 patients with Mondor disease had breast cancer and strongly suggested that mammography be performed in all cases, even when the physical examination findings are otherwise normal.⁴ At minimum, breast imagers should be aware of this condition’s pathophysiology, presentation, and imaging findings to avoid missing an associated breast cancer.

**REFERENCES**

Professor Jack Cuzick, PhD

By Peter R. Eby, MD, FACP, FSBI; Jiyon Lee, MD

Much of what we know has been validated by scientific investigation and published in web-accessible journals for all to see. But there is so much more we learn through daily experience and interaction with our colleagues and patients. Where is that stored? How can we access it? If we are lucky, a talented veteran colleague will impart wisdom at opportune moments. Our series of articles called “What I’ve Learned” is designed to transmit the experience of our leaders far beyond the halls of their own breast centers to the many young dedicated custodians of the future of breast imaging.

Professor Jack Cuzick, PhD, developer of the Tyrer-Cuzick breast cancer risk model, from Queen Mary University in London, England, recently received the Cancer Research UK Lifetime Achievement Award. He is also a Fellow of the Royal Society and Commander of the British Empire. Jiyon Lee, MD, and I interviewed Dr Cuzick in his office in the Wolfson Preventive Medicine Institute in London.

Where are you from?

Southern California.

How did you end up here?

The short answer is I married a British woman. The long answer is I came to England in 1970 to ride motorcycles and be a Masters student at Westfield and Queen Mary for a year. I bought a Norton Commando 750 for £440. I rode around England with another mathematician, named Richard Peto. I took the motorcycle back to California for 4 years to do my PhD from 1971 to 1975. I gave up the motorcycle when I moved to New York in 1975. Riding a motorcycle in New York seemed like suicide.

Who was the biggest influence on your career?

Sir Richard Peto, who heads the Clinical Trial Service Unit in Oxford, was my inspiration for thinking about real clinical problems. I was trained as a mathematician and worked at Columbia from 1975 to 1979 after my PhD. My thesis was on the oscillations of stochastic processes. I did a lot of work on that but I became more interested in epidemiology and clinical trials rather than theoretical questions.

What advice would you give to a brand-new member of your team?

Most of my trainees are mathematicians. I tell my team to think about real-world problems and understand the medical issues and consequence of the data. There's no such thing as context-free statistics.
What is your guiding principle?

I didn't decide this in advance, but it has held up in retrospect. I like working on the boundary between 2 subjects. That is where I find the excitement. The boundary between mathematics and medicine is exciting and prevention trials, where I spend most of my time, place me on the tightrope between clinical treatment and epidemiology.

If you could do it all over again, would you change anything? What? Why?

I debugged Fortran software as a high school and college student to make a living. I am much happier doing science than computing. But some of the new computing and artificial intelligence stuff is more interesting and has made me wonder what life would have been like if I went down that path.

What is the best advice you ever received?

Richard Peto made it clear that the most important thing to do was go after big questions. Don't go "stamp collecting" for little things. Choose something that is important.

Has that always paid off?

I think so. I was the statistician on a clinical trial of tamoxifen in the early '80s to prevent breast cancer recurrence and the results confirmed this benefit. I also observed that tamoxifen prevented new cancers in the contralateral breast. This was unexpected and I published the paper in Lancet in 1986. In 1992 the world realized this was important and we started IBIS-1 [International Breast Cancer Intervention Study 1], and NSABP [National Surgical Adjuvant Breast and Bowel Project] started a trial too. Later I was the statistician for the ATAC trial of the aromatase inhibitor anastrozole for adjuvant treatment of breast cancer and, as in the 1980s, I was able to see the data confirming the preventive ability of that drug before anyone else. In 2003 we started IBIS-2 to evaluate anastrozole for prevention in high-risk postmenopausal women.

What is the worst advice you ever received? Why?

I grew up in a little town called El Segundo that was a working-class town with a Standard Oil refinery. My father couldn't figure out why I would want to be anything other than an engineer in an oil refinery. He advised me to get a job in the refinery or be an engineer somewhere and make a lot of money. It was always obvious to me that I would go into mathematics. I was good at it from age 3. But he couldn't understand why I wanted these theoretical academic jobs.
What was your greatest obstacle?

I was interested in becoming a doctor but one of the early obstacles in the ’70s in the USA was that unless you had an MD you couldn’t do any significant research. I couldn’t get involved in designing a study and framing the question, all the interesting and important stuff. But at Oxford I could do all that. Sir Richard Doll was the Regius professor there and he would let you do that if you were good and could do the work.

I was a good mathematician but not a brilliant one. I was better off working in the area of practical science rather than theoretical mathematics. There are 2 types of mathematicians: geometric mathematicians, who think in pictures, and algebraists, who think in symbols and language. They are quite different. I am completely visual. I think in pictures.

When did you realize you were visual?

When I couldn’t learn Italian. I have no skill with languages.

What do you think about the future of medicine and math?

The future of medicine is in real trouble because of the costs associated with the bureaucracy of clinical research. Most trials fail because they aren’t big enough to get a valid answer. They aren’t big enough because bureaucratic costs prevent the research from being comprehensive and having the appropriate statistical power.

Taking a low-dose aspirin every day reduces cancer overall by 10%, with the biggest reductions in colorectal, stomach, and esophageal cancer. It was a serendipitous side effect observed from cardiovascular trials. I’d love to run a pragmatic trial with 40,000 people of low- versus standard-dose aspirin with 5 versus 10 years of treatment and 20 years of follow-up. The medicine is cheap, but bureaucratically imposed costs and unnecessary regulation are major obstacles.

It is critical to have long-term follow-up for all these questions. The most interesting things happen much longer after the 5 years at which studies often close. The follow-up of the tamoxifen trials show that the risk of recurrence continues to decrease for at least 10 years after patients stop taking it and may be lifetime.

What has your spouse taught you?

She is a photographer and when I came here I was taking photographs. I wanted to print them and I managed to get into her class and become teacher’s pet. She taught me all about photography, which has become a passion. Landscapes and flowers are my specialties.

What have your kids taught you?

I have a daughter (40), a plant geneticist, and a son (38), a musician, and I have 2 grandchildren, aged 8 and 9. My kids taught me how different people can be. They are very different from me, at
WHAT I’VE LEARNED

Professor Jack Cuzick, PhD, continued from previous page

the micro-level. My grandchildren are great fun. I send them postcards during my travels but they
can’t read my handwriting. They aren’t shy about telling me. So now I print them carefully.

What have your students taught you?

The students read the literature that I can’t keep up with. I learn a lot from them that way. And
they are all from different backgrounds and bring new computer science algorithms and theoretical
statistics to our team.

What is your favorite food?

I am a member of the Scotch Malt Whiskey Society. Most of the flavor in scotch comes from the
wood from which the cask is made. Most scotch, even single malt, is a mix of scotch from different
casks of the same vintage. But the Society tastes scotch from a single cask and provides it to
members. You must be sponsored to join the society. I’ve learned 2 things. First, I’ve learned to lock
the cabinet where I store the whiskey. Second, the only danger of drinking these whiskeys is that
you will never again be satisfied by anything you buy in the store.

What is the most important part of your life outside of medicine? Why?

I organize a trip with half a dozen colleagues every 2 or 3 years. The first was H. G. Wells’ lost world
of Jurassic Park in northern Venezuela where the Table Mountains separate ecosystems and species.

What is your favorite place to visit?

Chile, Peru, Bhutan, and Madagascar are my favorite locations. Peru has everything except
infrastructure. It has mountains, Inca culture, the best part of the Amazon jungle, and new orchid
species are still being discovered there. The Atacama in northern Chile/southern Peru is one of my
favorite locations in the world.

Why do you take these trips?

I just love the wild. ☺

This photograph of Big Sur in California was captured by Dr. Cuzick on one of his many travel
adventures.
# Upcoming Events & Activities

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<td><strong>February 15-17, 2018</strong></td>
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<td>Cairo, Egypt</td>
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<td>SBI – Egyptian Society of Women’s Health Breast Imaging Symposium</td>
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<td><strong>February 28 - March 4, 2018</strong></td>
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<td>Vienna, Austria</td>
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<td>European Society of Radiology Annual Meeting</td>
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<td><strong>March 9-14, 2018</strong></td>
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<td>Las Vegas, NV</td>
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<td>National Consortium of Breast Centers Annual Conference</td>
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<td>Orlando, FL</td>
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<td>National Comprehensive Cancer Network Annual Conference</td>
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<td><strong>April 12-15, 2018</strong></td>
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<td>SBI/ACR Breast Imaging Symposium</td>
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<td>American Roentgen Ray Society 2018 Annual Meeting</td>
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<td>Orlando, FL</td>
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<td>Association of University Radiologists 66th Annual Meeting</td>
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<td><strong>May 19-23, 2018</strong></td>
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<td>Washington, DC</td>
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<td>ACR 2018 Annual Meeting</td>
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For a listing of other society events please check out the SBI Calendar of Events at [www.sbi-online.org](http://www.sbi-online.org).

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Please consider supporting the Society of Breast Imaging Research & Education Fund. This initiative supports the education program by offering a travel stipend of up to $2,000 to residents and fellows whose original scientific abstract is selected for presentation at the SBI/ACR Breast Imaging Symposium. Future seed grants for research to further advance breast imaging will also be supported by the fund. To make a donation, please visit: [bit.ly/SBIREFund](http://bit.ly/SBIREFund)