Welcome 2015 Fellows!

From left to right, Emily Conant, MD, Catherine Giess, MD, SBI President Elizabeth Morris, MD, and Christoph Lee, MD

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A colleague recently shared a story with me that was interesting, surprising, and disappointing all in the same moment. This accomplished radiologist and expert breast imager described how, in October, prompted by the new recommendations from the American Cancer Society, a fellow in the program became very interested in the controversy over screening mammography. This fellow, described as “brilliant,” wanted to learn as much as possible about every aspect of screening. Logically, the fellow queried the attending radiologists: “Where can I find the information that I need?”

At first glance we can all agree that inspiring the best and brightest of the next generation of breast imagers is a success. But a closer look suffused me with surprise and disappointment. I wasn’t disappointed in the fellow, whom I had never met and remains anonymous, but I was surprised that this question had to be asked. I was disappointed that the SBI wasn’t the obvious answer to a physician who had decided on breast imaging as a specialty, completed an interview process, and become immersed in a focused training program. After a longer look, I was disappointed in myself as a purported contributing member of the SBI. I found that I rarely discuss the SBI with my residents. I discuss all aspects of breast imaging, patient care, BI-RADS®, procedures, controversies, recommendations and best practice. I provide guidance on how to talk to patients and listen to them. I coach residents on preparing reports and interacting with sonographers and technologists. But I rarely look them in the eye and ask “What do you know about the SBI?”

Should I be bothered by this phenomenon? Mammography still hits the headlines when new research appears in peer-reviewed journals. My impression is that the media attention mammography receives exceeds all other radiological examinations by orders of magnitude. Many highly visible newspaper, radio, television, and internet outlets covered the new recommendations from the ACS. Who do the news outlets turn to when they have questions and need answers? Where do radiologists look? Fellows? Residents? Non-radiologist physicians? Technologists? Patients?

The SBI should be the first place everyone visits for answers. Why? The SBI was founded by the very people who developed mammography and fought for high quality. Mammography experts
built this specialty and know its intricacies and nuances better than any other people on the planet. They lobbied, published, informed, and advocated. These dedicated physicians created the BI-RADS® atlas that is the model for liver, lung, prostate, and thyroid cancer screening atlases in development. Current members revise the atlas and accredit clinical sites throughout the country. They journey to other nations to guide developing screening programs around the world. They are asking the next hard questions, performing the research and advancing technology and patient care. The experts are among us. We know it. We need to help everyone else know it.

The SBI has recently remodeled the entire website. The new interface is visually and functionally much improved. There is a new section called “End the Confusion” that addresses all the different screening recommendations. There are new areas dedicated to social media such as Twitter and Facebook. The SBI Forum has been reinvigorated and is the place for questions, advice, and answers about current practice. The Resources page includes Policy and Position statements on all things related to breast imaging as well as a specific page for Screening. You can also find the Mammography Saves Lives campaign. There is a section about Fellowships and a Career Center. The SBI can and should be the first place everyone visits for answers about breast imaging.

Ultimately, our society is only as great as the combined virtues of its members. I haven’t been doing enough at the local level. I am challenging myself and you, our members, to promote the expertise of the SBI that has been earned through years of hard work and dedication. Visit the new and improved website. Take a minute in your next lecture or in between cases to show residents and fellows what the SBI is and where they can find answers. Talk to your technologists and sonographers about how they can be members. Encourage them to join; there are no dues for membership as a resident or fellow! Mention or follow the SBI on Facebook and Twitter (@BreastImaging). Tell your colleagues—radiologists and other providers—about the SBI and online resources such as End the Confusion. And last but not least: tell your patients where they can find answers about screening. Together, with just a few extra words and minutes, we can become the society that everyone turns to for answers about breast imaging. 

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President’s Column: Choosing Breast Cancer Screening: “Personalized” Medicine

The USPSTF final recommendations for screening mammography were published in early January. Not surprisingly, the recommendations have not changed since 2009 in spite of the fact that both the USPSTF and the American Cancer Society agree that yearly screening starting at age 40 saves thousands more lives from breast cancer than screening every other year starting at age 50. The Task Force emphasized the limitations of mammography rather than the uncontested lifesaving benefit of mammography performed annually beginning at age 40 when finalizing their choices. I refer you to the SBI website to understand the repercussions of these disastrous recommendations. In addition to an excellent microsite called Endtheconfusion.org, there are numerous facts and articles that you will find helpful as practicing breast imagers. Needless to say, the SBI's response was swift and our voice was heard. A large number of our members individually wrote compelling op-eds and letters to the editors that were successfully published in local and national newspapers, magazines, and online sources. We were organized and effective in getting our message out. Annual screening saves lives and needs to be available to women age 40 and above.

Interestingly, somewhat buried in the recommendations is the sentence “Women deserve to be aware of what the science says so they can make the best choice for themselves, together with their doctor.” The SBI strongly believes that women should have the opportunity to make informed screening choices AND they should be assured insurance coverage for those decisions. As the USPSTF recommendations are written, women may not be guaranteed coverage for their choice. The USPSTF recommendations would effectively take away a woman's choice. Fortunately, Congress, through the PALS act, is supporting a woman's right to choose screening mammography by delaying any changes to insurance coverage based on the USPSTF recommendations for two years. This gives us breathing room and the chance to preserve coverage for women who want access to these lifesaving exams.

The emphasis on personal choice and individualized recommendations which are at the center of the USPSTF policy brings me to the topic of this column: Personalized Medicine. You can't pass a medical magazine these days without seeing the words “personalized” or “precision” plastered across the front page. This is a road that we are all headed down. The benefits can be enormous. The great future hope is that every person will be treated according to their unique genome (that now can be fully sequenced for under $1,000). Care can be customized to the patient's genotype thereby eliminating trial and error and the “average” patient. For cancer treatment, one size does not fit all.

But in breast cancer screening one size DOES fit all. We should be wary of individuals or groups who think that we can “personalize” screening. Some, like the USPSTF, recommend delayed screening.
while others recommend the “choice” of no screening due to a lack of recognized risk factors. Women need to know that 70% of breast cancer occurs in individuals without identifiable risk factors. Clearly the personalized risk-adjusted approach does not work for breast screening, yet there is a proliferation of these tests which give false assurance in this era of customizable medical care.

Therefore, I would like for us as a community to embrace and define the buzzword “personalized” in a different way. My call for action is to help MORE women participate in screening and not try to restrict access or apportion access based on unproven risk assessments. If women could communicate with us we could identify those who are at elevated risk and offer information and counseling. We need to do a better job of getting women screened, plain and simple. As a community we need to accept the fact that a large number of women don’t get screened. If this is a personal choice, so be it. However, I suspect there are many women out there who would like to get screened but don’t know how or face too many barriers. It is our responsibility as a community to help. Listening to the choices that women make about their health is one of the cornerstones of our society. Now more than ever women need the SBI. If we really are passionate about saving lives, the question is how do we more effectively communicate to the many women who currently don’t have that choice? What are your ideas? The SBI is listening.

In appreciation to our members and staff,
The annual scientific meeting of the European Society of Breast Imaging (EUSOBI) was held in London, England from October 2–3, 2015. Drs. Elizabeth Morris and Murray Rebner represented the SBI and gave lectures. Dr. Morris spoke on Breast MRI in the era of personalized medicine and Dr. Rebner spoke about dense breasts and their implications for the patient and physician. This marked the fifth time that leaders from one society have attended and participated at the other’s scientific meeting. The exchange of speakers indicates the continued effort on the part of the SBI and EUSOBI to strengthen their relationship and to foster excellent education in breast imaging on an international level.

The venue for the meeting was the Methodist Central Hall Westminster in downtown London. The building itself is steeped in history. It was designed by the famous British architect Edwin Alfred Rickards and was completed in 1911. It was erected to mark the centenary of the death of John Wesley, noted Anglican minister and theologian who was one of the chief founders of the Methodist movement.

There were over 650 attendees at the meeting including many from outside Europe. Despite the many languages spoken, all the presentations were given in English. The major conference room which had theater seating was completely filled for the plenary lectures. Other ornate wood-paneled rooms served as break-out rooms and display sites for the vendors who sponsored the conference.

Unlike our SBI annual scientific meeting where the majority of registrants are general radiologists who do breast imaging as part of their practice, the EUSOBI attendees are radiologists who predominately perform breast imaging. As a result, there were no refresher courses and the program contained more “cutting edge” research talks than we have at our annual conference. There were talks on experimental molecular and functional ultrasound imaging of breast cancer, hyperpolarized MRI, Ultra-high field-MRI and PET-MRI, functional infrared imaging for risk assessment of breast cancer and Cerenkov-imaging (Cerenkov luminescence imaging is an emerging hybrid modality that utilizes the light emission from many commonly used medical isotopes). The technologies described were fascinating and the potential benefits to patients are exciting.

Similar to our meeting there were lectures on imaging and therapy. Topics discussed included preoperative imaging, imaging before, during, and after neoadjuvant chemotherapy, imaging for shaping radiation therapy, plus breast cancer in a lymphoma survivor after mantle radiation therapy. The lectures were excellent and, like ours, they were strongly evidence-based with many current references included in the presentations.
A keynote lecture was given by Dr. Luigi Cataliotti from Florence, Italy. His topic was “the axillary enigma” and was well received by the audience. EUSOBI also gave a gold medal to an individual member in recognition of his outstanding contributions to breast imaging. This year the honoree was Norwegian Per Skaane who has been one of the pioneers in the field of digital breast tomosynthesis (DBT). His research has shown that DBT is superior to standard digital mammography in that it has a higher cancer detection rate and lower recall rate (1). Furthermore, he demonstrated that reconstructed 2D images generated from the original acquired DBT data set are equivalent to standard 2D digital mammography images (2). This effectively lowers the radiation dose of a DBT screening mammogram by half. Dr. Skaane is certainly deserving of this high honor.

Another unique feature of the conference was a lecture dedicated to the problems related to breast imaging in underdeveloped countries. This year the country in question was Brazil. Dr. F. Kestelman from the Brazilian College of Breast Radiologists described the challenges his country faces in implementing a national screening program.

The meeting also had a debate-style session where the pros and cons of pathology as the gold standard for diagnosis and therapy recommendations were argued. A young scientist session where trainees presented papers was held and an award was given to the best presentation. Finally, a case-based quiz with EUSOBI faculty serving as participants was held and the contestants performed admirably. The social highlight of the meeting was a guided tour and dinner at the House of Commons.

Overall, I thought that the annual EUSOBI scientific meeting was very successful. Unlike our annual scientific meeting which runs for three and one-half days, the EUSOBI meeting takes place over only two days. Each day lasts for almost 12 hours. Endurance is definitely needed and several stimulants throughout the day are a must. Nevertheless, the quality of the meeting, as well as the different venues, warrants your attendance at a future meeting.

REFERENCES
Getting to Know the SBI Newsletter Committee

By Peter R. Eby, MD, FSBI

I couldn’t be more proud of the Newsletter Committee. They have eloquently penned fantastic content for your quarterly reading pleasure. Each is an adept writer yet they have many other hidden talents. Some veteran members will be replaced with rookies during the annual meeting of the SBI this April. Before they go I want to give you all an opportunity to get to understand what else makes them tick. Below are two lists. One (obviously) is an alphabetical list of the current committee. The other is a list of little known facts about them. I challenge you to match the member with a fact. The answers will be presented in Austin at the SBI meeting and, if you cannot attend, in the second issue of the 2016 newsletter. Good luck.

List of Committee Members:
1. Ann Brown
2. Stamatia “Toula” Destounis
3. Peter Eby
4. Rob Gutierrez
5. Karen Hodgens
6. Jiyon Lee
7. Jessica Leung
8. Mike Linver
9. Louise Miller
10. Bob Nishikawa
11. Liane Philpotts
12. Christine Puciato
13. Shadi Shakeri
14. Gary Whitman
15. Rita Zuley

List of Fun Facts:
A. Played football at Yale.
B. First person in the United States, along with spouse, to get married after meeting through a computer dating service.
C. Became a centerfold for the first time in 2016.
D. Collects cookbooks.
E. Can eat an entire watermelon in one sitting and has seen every James Bond movie.
F. Has a Shih Tzu whose registered name is Oscar the Ewok.
G. Has run 25 marathons with a personal best time of 3 hours, 27 minutes.
H. Favorite place to be is with family inside their Airstream trailer, no matter where it is parked.
I. Is a painter and has had an oil painting hung in a museum.
J. Once lifted an elderly patient’s breast during an examination and saw change fall out from under the inframammary fold and roll across the floor. We both burst out laughing as she explained that she always keeps her money in her bra!
K. My three boys are my life.
L. Lives in a log cabin in the mountains that was built over 100 years ago. In less than one hour I can drive to a foreign country, the ocean shore and the desert floor.
M. Has two first place medals and one third place medal from karate competitions.
N. Makes the best Side Car cocktail west of the Mississippi and has sampled sushi on five continents.
O. Built beds for children in Costa Rica and Honduras with a nonprofit called SOFTLY.
We hope to see you soon at our upcoming 2016 SBI/ACR Breast Imaging Symposium, taking place from April 7–10 in vibrant Austin, Texas. Our 2015 course was a great success with nearly 1,000 attendees. The 2016 Symposium program has been updated and enhanced with new topics and speakers to further improve the educational experience.

Over the four-day 2016 Symposium, leading experts in breast imaging and breast cancer diagnosis and treatment will provide the latest information on a wide variety of highly important topics. Attendees will gain valuable knowledge and practice skills in the evolving discipline of breast imaging. As in prior courses, the 2016 Symposium will provide general session plenary lectures each morning, and focused refresher course workshops and scientific sessions in the afternoons. The course is designated by the ACR for up to 22.25 AMA Category 1 credits, 10 SAM credits, and 22 Category A credit hours of the ARRT.

Particular highlights of the 2016 Symposium include an expanded scientific program. Original scientific content was inaugurated with excellent outcomes in 2015, providing a new venue to advance the field of breast imaging through research and scholarly education. The 2016 Symposium incorporates a greater number of sessions for oral abstracts, and offers multiple e-posters for review at convenient lobby kiosks. Entirely new to the 2016 Symposium are refresher course sessions specifically designed for members-in-training, and also sessions particularly created for technologists.

In addition to skilled breast imaging speakers, the 2016 Symposium will include expert lecturers from breast cancer medical oncology, surgery, and pathology. These multidisciplinary talks include the keynote lecture “Trends in the Systemic Management of Breast Cancer” by Larry Norton, MD, from Memorial Sloan Kettering Cancer Center, an “Update on the Surgical Management of Breast Cancer: What Happens After Imaging?” by Henry Keurer, MD, PhD, from MD Anderson Cancer Center, and “Breast Cancer: Understanding your Pathology Reports” by Kim Allison, MD, from Stanford University Medical Center.

The 2016 SBI Award recipients will also be honored at the Symposium. The esteemed recipients are Carol Lee, MD, for the Gold Medal Award, Shawn Farley of the ACR for the Honorary Fellow Award, and Ed Hendrick, PhD, for the SBI Special Recognition Award.

The general session on Day 1 will focus on Screening and the State of Breast Imaging, with lectures on updated breast cancer screening guidelines, tools for addressing screening controversies, screening with digital breast tomosynthesis, ultrasound and state-of-the-art breast MRI, and the current economics of breast imaging.
SBI/ACR Breast Imaging Symposium 2016 Preview
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On Day 2 the general session will emphasize Biology and Treatment. Lectures will include innovations in molecular imaging and therapy, pre-operative imaging for newly diagnosed breast cancer, our keynote lecture on systemic management, and an update on the surgical management of breast cancer.

Day 3 will be directed at Patients, Protocols and Pathology. Plenary lectures will cover mammographic breast density, risk assessment, modalities for high risk screening, the EUSOBI international perspective on screening by Gabor Forrai, MD, PhD, President of EUSOBI, and understanding pathology reports.

Day 4 will focus on Challenges in Breast Imaging Practice. Plenary lectures will focus on surveillance of women with a history of treated breast cancer, imaging and management of the axilla, probably benign findings, breast imaging outcomes benchmarks, and the always-popular interactive cases and BI-RADS® with the experts.

If all this content isn’t enough to entice you to attend the symposium, Austin has a little something for everyone. Take an electric bicycle tour, visit the Cathedral of Junk, watch roller derby, visit the Lady Bird Johnson Wildflower Center and, of course, get some BBQ. Last but not least, Austin is the self-proclaimed live music capital of the world. We hope to see you in April!
Overdiagnosis

By Sally Friedewald, MD, Janice Sung, MD, FSBI, Peter R. Eby MD, FSBI, and the Breast Screening Leadership Group

Overdiagnosis, defined as: “breast cancer detected at screening that would not have been diagnosed by usual care or become clinically evident in a woman’s lifetime” is often cited as a major risk of screening by those opposed to mammography. High quality screening mammography provides earlier detection and reduces mortality from breast cancer. Some have suggested that 0–50% of all breast cancer represent overdiagnosis from screening.

It is important to acknowledge the difference between invasive and in situ cancers when discussing overdiagnosis. There is no data that proves overdiagnosis of invasive cancer. However, the indolent nature of some DCIS allows the possibility of low levels of overdiagnosis. It is also important to acknowledge that critics of screening primarily object to possible overtreatments of DCIS rather than the simple act of diagnosis.

DCIS triggers operations, radiation therapy, and hormonal suppression recommendations that carry costs related to time, expense, self-image, and potential side effects. Usual care may not be optimal care. Some low grade in situ disease may remain non-invasive for a decade or more and not have an impact on quality of life or mortality. Adherence to the standard of care in such cases could be considered overtreatment. However, recent research suggests that identification and treatment of DCIS decreases the subsequent incidence of invasive cancer (1). Unfortunately, we cannot accurately predict, either by imaging or histology, the patient-specific timing or severity of progression, yet. We need to actively participate in refining standards to reduce overtreatment.

The most reliable way to calculate overdiagnosis is to examine randomized controlled trials, where a population is divided into two groups; one group undergoes screening, and the other control group does not. If the number of cancers detected in each group is equivalent after long-term follow up there is no overdiagnosis. However, those patients participating in screening are likely to have their cancers detected earlier compared to the control group. Any excess number of cancers detected in the screened group, compared to the unscreened group, after long-term follow up represent the overdiagnosed cancers. Long-term follow up is critical in order for the non-screen detected cancers to become clinically apparent.

In the randomized Malmo trial, screening mammography detected approximately 10% more cancers than in the control group at 15 years of follow up (2). Two other randomized control trials (Two County and Gothenburg Trials) estimated even lower rates of overdiagnosis at 1% (3). Therefore,
reliable estimates using large databases and long-term trends in women over 40 indicate that 1–10% of cancers diagnosed on screening mammography may represent overdiagnosis with only as much as 1% representing invasive cancer (4).

Some researchers have used population and epidemiologic data to estimate overdiagnosis by subtracting the expected incidence of cancer from the observed incidence. It is important to note that this approach is severely limited by the inability to identify which patients participated in screening. The SEER registry provides robust data regarding observed incidence that are not linked to screening information. Defining the expected incidence of breast cancer is critical for correct calculation of overdiagnosis. Overdiagnosis is minimal if the expected incidence is close to the observed incidence. For example, overdiagnosis is 5% if we were expecting 100 cancers and found 105 in the screening population. But overdiagnosis is 50% if we were expecting 70 cancers and found 105. This illustrates how critical the estimate of expected cancers can be to the calculation of overdiagnosis.

In 2012, Bleyer and Welch used a “best guess” (exact words in the published article) to calculate overdiagnosis. Interestingly, they used data from women under 40 years-old to estimate the number of expected cancers. Ultimately, the authors predicted that the annual increase in breast cancer was a mere 0.25% and estimated that 31% of all breast cancer represents overdiagnosis (5). However, there are flaws with this estimation. Breast cancer is uncommon in women under 40. It does not accurately reflect the incidence in women older than 40 who harbor the vast majority of cancers. In addition, as noted by Kopans in a careful analysis of the Bleyer and Welch article, the authors combined DCIS and invasive cancers for their estimates (6). Other data, using the population in question, are available and more reliable.

Helvie et al used data from the Connecticut tumor registry spanning four decades (1940–1982) and found the incidence of breast cancer increased 1.2% per year (7). Among women 40 and older in
Overdiagnosis, continued from previous page

the SEER database, incidence increased 1.3% per year from 1977–1982. These annual percentage changes are 4–5 times higher than the estimate published by Bleyer and Welch. In the United Kingdom incidence has increased between 0.7 and 2.3% per year in women 40 and older. Using these estimates of expected incidence, overdiagnosis accounts for less than 10% of all cancers detected and the majority are DCIS.

Autopsy studies are another way to estimate overdiagnosis by counting the cancers that had not become “clinically apparent.” On average, 1.3% of women had undetected invasive breast cancer and 8.9% had DCIS at autopsy (8). It is unlikely that overdiagnosis exceeds the incidence of undetected disease in autopsy studies.

The exact frequency at which overdiagnosis occurs is unknown and remains overemphasized by the critics of screening. The highest reliable estimates remain less than 10% with only 1% representing invasive disease (9). There are two ongoing challenges. We need to develop non-invasive imaging techniques that consistently distinguish which findings will impact patients and further reduce the low levels of overdiagnosis. Until that technology is available we need to collaborate to refine therapy paradigms to minimize overtreatment, the real downstream effect of diagnosis (10). In the meantime we should continue to screen because it reduces mortality and treatments for breast cancer through early detection.

REFERENCES


Screening in the 40–49 Age Group

By Bonnie Joe, MD, PhD, FSBI, Elissa Price, MD, Brett Parkinson, MD, and the Breast Screening Leadership Group

Although abundant scientific evidence can be cited to support screening in the 40–49 age range, the topic has engendered long-standing controversy which was heightened when the United States Preventive Services Task Force (USPSTF) issued guidelines in 2016 recommending against routine screening in this age group (1).

Recent articles of the SBI Newsletter have summarized the benefits of screening mammography in general and several important points bear repeating. Randomized controlled trials (RCT) have consistently demonstrated an 18–29% mortality reduction related to screening women in the 40–49 age range (2). While most of us would consider this a substantial benefit, it is important to remember that RCTs underestimate the benefit of screening due to issues of noncompliance and contamination in the two groups. Note that RCTs compare women invited to screening (not women actually screened) with those not invited. Thus, deaths from breast cancer in women invited to screen but not attending mammography count against the screened group. Similarly, women who are invited to screening but who choose to undergo mammography and have their lives saved as a result are counted (contamination) in the unscreened group (3).

Analysis of data from population service screening compares mortality rates of women who actually undergo screening mammography to those who do not. These studies demonstrate even greater benefit of screening mammography to reduce mortality up to 50% (4). Considering that service screening provides an indication of how mammography performs in the “real world,” one would think this evidence compelling, yet the screening debate continues and in particular, the 40–49 decade remains highly controversial despite the continually mounting evidence.

In 2016, the USPSTF recommended against routine screening in the 40–49 age group citing that harms outweighed the benefits (1). This represents a subjective judgment regarding the risks and benefits of mammography without quantitative scientific valuation of factors such as anxiety or the number of recalls that are worth a death from breast cancer. The USPSTF panel did not include any doctor specializing in breast cancer and many breast cancer specialists disagree with the USPSTF. Women in their 40s can and do develop aggressive life-threatening breast cancer. Waiting for a cancer to grow to a size where it can be felt by a woman or her doctor is dangerous. The goal of screening mammography is to find cancers before they can be detected on physical exam. Not only does screening mammography in 40–49-year-old women save lives, it also results in the detection of smaller tumors, resulting in less aggressive surgery, the possible omission of radiation therapy and elimination of expensive and toxic chemotherapy (5). When cancers are detected on mammography before they can spread to other parts of the body, the likelihood of cure is increased (6,7). A meta-analysis of the RCTs that included women 40–49 found a statistically significant mortality reduction after 10 or more years of follow up. In particular, data from the five Swedish RCTs yielded a significant 29% mortality reduction in women 40–49 (8).
Recently published data from the Breast Cancer Surveillance Consortium found that cancers diagnosed in premenopausal women on an annual (11–14 month) screening interval had more favorable prognostic characteristics than those diagnosed on a biennial (23–26 month) screening interval, adding further support to annual screening in this younger age group (9). All of the CISNET models used by the USPSTF and the American Cancer Society (ACS) show that the most lives are saved by annual screening starting at the age of 40 (10,11).

As Daniel Kopans, MD, FACP, FSBI, reminds us “none of the parameters of screening—recall rates, biopsy recommended rates, or cancer detection rates—change suddenly at the age of 50 or any other age” (12). The suggestion that only high-risk women should choose to screen starting at age 40 ignores the fact that 75% of breast cancers are diagnosed in women with no identifiable risk factors. A study of 40–49-year-old women with screen detected breast cancers found the majority had neither strong family history nor very dense breast tissue (13). An analysis by Hendrick and Helvie published in the *American Journal of Roentgenology*, using the Task Force’s 2009 methodology, showed that if women ages 40–49 are not screened, and those 50–74 are screened biennially rather than annually, at current compliance rates approximately 6,500 additional women in the U.S. would die from breast cancer each year (11).

In October 2015, the ACS published updated breast cancer screening guidelines. The new “hybrid” protocol recommends annual screening from 45–54 transitioning to biennial screening starting at age 55 versus continuing annual screening (14). While the nuances of “strong” (screen at age 45) versus “qualified” (screen at age 40) recommendations are subtle, it is important to emphasize the ACS recommendation that women should have the opportunity to begin annual screening between ages 40–44. Their conclusion that the majority of women would want annual screening beginning at age 40 shows that they agree that the most lives are saved by annual screening starting at 40.

Although women and their doctors may choose screening mammography starting at age 40, if insurance does not cover the service access may be limited to those who can afford it. The USPSTF recommendations give a “Grade C” rating to screening women in the 40–49 age group, which means that insurance coverage is not mandated. Thus, supporting legislation efforts such as the PALS Act...
Screening in the 40–49 Age Group, continued from previous page

(Protecting Access to Lifesaving Screening, H.R. 3339 and S. 1926) is vitally important (15). The PALS Act was passed in December 2015, and provides a two-year moratorium delaying the implementation of USPSTF recommendations for screening mammography.

The USPSTF and the ACS have stated clearly that the most lives are saved by annual screening beginning at 40: “The USPSTF found adequate evidence that mammography screening reduces breast cancer mortality in women aged 40 to 74 years” (1). It is unfortunate that the USPSTF and ACS go on to recommend strategies that make choices for women that will cost lives and require them to "opt-in" for a mammogram. The SBI recommends annual screening beginning at 40 because it preserves access, has the greatest chance of saving lives and acknowledges the right of each woman to choose.

REFERENCES

Breast Imaging Fellowship Match

By Gary J. Whitman, MD, FACR, FSBI

At the SBI Fellows meeting at the Radiological Society of North America (RSNA) meetings in 2014 and 2015, there were discussions on ways to improve the breast imaging fellowship interview and selection process. Over the past several years, breast imaging fellowships have become more competitive. In fact, some candidates would interview and program directors would ask for a firm commitment to accept a position on the day of the interview. If the candidate wished to consider other programs, the candidate might travel to another site, participate in the interview process, and then be told that the program would not be making any offers to candidates for a few weeks. In addition, interviews were beginning earlier and earlier in residency. In some cases, the candidates had very little experience with breast imaging to inform their commitment to the specialty.

The current interview and selection process is in disequilibrium, with negative consequences for the candidates and the fellowship programs. The SBI assessed the situation and formed the Breast Imaging Fellowship Committee, chaired by Dr. Gary Whitman, and the members include Drs. Rachel Brem, Phil Evans, Debra Monticciolo, and Murray Rebner.

As the SBI Breast Imaging Fellowship Committee investigated the current fellowship selection system, it became clear that a Breast Imaging Fellowship Match Program was needed. The match should alleviate some of the stress and anxiety that has been associated with the fellowship selection process.

The match program will allow applicants and fellowship programs the opportunity to consider all options before making a decision. The match will establish uniform timelines and ensure a fair and transparent selection process. Residents will apply to breast imaging fellowship programs approximately one year before entering fellowships. This schedule should allow the residents ample exposure to breast imaging before making an informed decision about fellowship training.

Programs have until June 1, 2016, to sign a memorandum of understanding with the SBI regarding participation in the Breast Imaging Fellowship Match Program. With the new match process, all participating programs will agree not to hold any interviews in 2016. The first match is being planned with the following timeline:

- March 2, 2017: Registration Opens
- April 27, 2017: Ranking Opens
- June 1, 2017: Ranking Closes
- June 15, 2017: Match Day
- July 1, 2018: Training Begins

Breast imaging fellowship programs must be accredited or affiliated with an Accreditation Council for Graduate Medical Education program (an institution’s residency program meets this criterion). Fellowship programs must sign a sponsorship agreement and agree to the timeline set by the National Resident Matching Program, the organization that will manage the Breast Imaging Fellowship Match.
The last several years have seen an increased emphasis on culturally competent and inclusive healthcare. In 2011, the National Transgender Discrimination Survey shed light on injustices and disparities faced by transgender individuals in the United States. The transgender community is at risk due to higher rates of alcohol and tobacco abuse, nulliparity, obesity, and mental health issues (1-3). Many avoid medical care due to past negative experiences or fear of discrimination (1). Of those who responded, 28% were subjected to harassment and 19% were refused treatment because of their transgender status. In response, initiatives like Healthy People 2020 from the Department of Health and Human Services were developed to improve lesbian, gay, bisexual, and transgender (LGBT) health. The Human Rights Campaign began publishing a Healthcare Equality Index annually highlighting leaders in LGBT-centered care.

At a time when transgender and gender non-conforming individuals are becoming more visible and accepted in society, we are challenged with incomplete information about their specific health needs. Nevertheless, breast care in this population is essential. The breast imaging suite can be a dauntingly gender-specific place for patients who already fear being mis-gendered or subjected to micro-aggression in the medical setting. Small efforts on our part can go a long way to creating a safe space for all patients in breast imaging.

Who is Transgender?

“Transgender” is an ever-expanding non-binary umbrella term (as evidenced by the 50+ gender options currently on Facebook) that encompasses any individual whose gender identity or expression differs from the traditional one assigned to them at birth. In contrast, cis-gender individuals identify conventionally with their natal or biological sex.

A common misconception is that gender identity depends on gender expression, natal sex, and sexual orientation when, in fact, these concepts are independent of each other. For example, I could be biologically female and identify as a woman but reject all traditional female gender expressions and never paint my nails or wear pink or put on dresses or make-up and be attracted to men. Also, I could be born a woman, express my gender with ultra-feminine characteristics and only be attracted to women. Why is this important? Making assumptions about a patient based on their outward appearance can be harmful.

Some transgender individuals choose to socially, medically, or surgically alter their physical appearance to better match their gender identity and some do not. Transitioning is a process and
Delivering Better Care to Transgender Patients in Breast Imaging, continued from previous page

people can be at different stages of the process with different endpoints. These patients who were historically called male-to-female and female-to-male transsexuals are now commonly called transgender women and men. Understanding every nuance of gender identity is not necessary to do our jobs well and be professional. Rather, our increased awareness can help us better understand the individual needs of our diverse patients.

Unique Breast Concerns

Transgender women receiving long-term hormone therapy with estrogen and/or progestin may be at increased risk of breast cancer given the link established by the Women's Health Initiative study in postmenopausal women (4). In transgender women on hormone therapy, it is important to realize that breast tissue does develop, and many of the benign and malignant entities we commonly diagnose in natal women can also be found in transgender women (5). The timeline of their development is determined by a patient’s hormonal age rather than chronological age. Additionally, transgender women often have breast augmentation, which may require imaging evaluation.

The risk of breast cancer is decreased for transgender men who undergo “top surgery” which involves subcutaneous mastectomy, nipple repositioning, and liposuction to contour the chest wall. Transgender men may present at the breast center with post-surgical issues following reduction mammoplasty or top surgery (5).

A transgender patient’s goals with regard to their transition can significantly affect their feelings toward breast imaging. For example, a transgender man who desires but cannot obtain top surgery may experience significant dysphoria with breast-related issues. On the contrary, breast development can be a source of pride for transgender women. Sensitivity to a patient’s feelings can help you engage patients appropriately. Although research is limited, screening mammography is recommended for transgender men and women in certain clinical scenarios, see Tables 1 and 2 (3,5). Breast self-examination is also encouraged.

Culturally Competent Care

At every step of the process, it is vital for patients to encounter culturally competent care. Staff can be trained to use patients’ preferred names and pronouns in a respectful manner. In unclear situations, it is appropriate to ask, rather than to assume. Let the patient educate you. If you make a mistake, simply apologize and get it right the next time.

Misidentification in a public space is a privacy violation that can make transgender patients and potentially other patients feel unsafe. When calling a patient from the waiting area, use gender-neutral language and their last name instead of a gendered first name or suffix. Take care writing a work excuse to avoid sharing information that could compromise patient privacy, such as the fact that they sought breast care.
Consider the language you use when referring to a gender-specific body part like the breast. For example, a transgender woman may prefer the term “breasts” and perceive the word “chest” as micro-aggression against her gender identity. A transgender man may prefer the term “chest.” The best practice is to ask what terminology the patient prefers or if they would rather have you point to the body part on a chart.

A Welcoming Environment

Simple changes in forms, signage, and layout at your office can help patients of varying genders feel more comfortable. Consider revising your intake forms and medical records to be LGBT inclusive (2). Allow patients to complete forms with preferred name, pronoun, and gender to alleviate anxiety for themselves and staff.

Design the waiting, imaging, and changing rooms to be gender neutral by avoiding excessive use of pink or female imagery. Designating a unisex or single staff restroom has become common practice. However, most breast imaging departments still have exclusive changing rooms and common waiting areas for women. While transgender women may feel comfortable in such areas, transgender men may feel uneasy and exposed. One alternative is to bring transgender men from a general waiting area directly into the mammography suite to change.

Table 1. Screening recommendations for transgender women

<table>
<thead>
<tr>
<th>Transgender women with:</th>
<th>Recommendation(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past or current hormone use in patients ≥ 50 years old</td>
<td>Annual mammography if the patient has additional risk factors:</td>
</tr>
<tr>
<td></td>
<td>• Estrogen AND progestin use for &gt; 5 years</td>
</tr>
<tr>
<td></td>
<td>• BMI &gt; 35</td>
</tr>
<tr>
<td></td>
<td>• Family history</td>
</tr>
<tr>
<td>No hormone use</td>
<td>Routine screening is not indicated unless the patient has other known risk factors, e.g. Klinefelter syndrome, BRCA mutation</td>
</tr>
</tbody>
</table>

Table 2. Screening recommendations for transgender men

<table>
<thead>
<tr>
<th>Transgender men with:</th>
<th>Recommendation(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction mammoplasty or no chest surgery</td>
<td>Breast exam and screening mammogram as recommended for natal women</td>
</tr>
<tr>
<td>Bilateral mastectomy</td>
<td>Annual chest wall and axillary exams</td>
</tr>
<tr>
<td>Preoperative evaluation</td>
<td>Mammography only if patient meets usual natal female criteria</td>
</tr>
</tbody>
</table>

Consider the language you use when referring to a gender-specific body part like the breast. For example, a transgender woman may prefer the term “breasts” and perceive the word “chest” as micro-aggression against her gender identity. A transgender man may prefer the term “chest.” The best practice is to ask what terminology the patient prefers or if they would rather have you point to the body part on a chart.
Developing and prominently displaying patient and employment non-discrimination policies that include sexual orientation and gender identity can signal acceptance. Photographs, magazines, and patient education materials can be posted to reflect the diversity of your patients; for instance, transgender flags and handouts or brochures on LGBT topics.

Many of these considerations will not affect your cis-gender patients but they have the potential to make a huge impact on the experience of your transgender patients. This is where breast imagers can make a real difference.

REFERENCES


SAVE THE DATES!

2016 Case-Based Review & Advanced Breast Imaging Course: DIGITAL BREAST TOMOSYNTHESIS

September 17-18, 2016
San Diego, CA
The SBI Goes Global!

By Mike Linver, MD, FACR, FSBI

For the first time, the SBI is taking a conference overseas! Under the leadership of Drs. Murray Rebner and Elizabeth Morris, the SBI International Education Outreach Committee was created last year with the purpose of partnering with breast imaging societies in other countries. The idea is to create stronger bonds with breast imagers in those countries while simultaneously elevating the level of knowledge and expertise in breast imaging among those radiologists.

Almost immediately, the SBI was approached by Dr. Leon Janse Van Rensburg of the Radiological Society of South Africa (RSSA) who, in conjunction with the newly-formed Breast Imaging Society of South Africa (BISSA), proposed a joint breast imaging conference to be held in a resort near Capetown. The committee found his proposal a perfect opportunity for its first joint venture, and through the efforts of Drs. Rebner and Van Rensburg, the first Breast Imaging Congress sponsored jointly by the RSSA, BISSA, and SBI will take place May 5–8, 2016, at the Spier resort in Stellenbosch!

Drs. Jessica Leung, Maxine Jochelson, Reni Butler, Wendy DeMartini, and I will speak and represent the SBI at the Congress. We responded to Dr. Van Rensburg’s requests regarding lecture topics, and will be covering all aspects of breast imaging, with emphasis on Tomosynthesis, MRI, Risk-based Screening, Ultrasound, and Cutting Edge Technologies. Several local speakers will be participating in the program, including a pathologist and a breast surgeon, so there will be an interdisciplinary element as well. The entire program, with details about the Congress site and registration form, can be accessed at rssa2016bissa-sbi.co.za.

As a side benefit to the host country, the SBI is offering membership to interested members-in-training and practicing radiologists there. By doing so, the SBI hopes to create a stronger international contingent in its membership as the next step in becoming a truly inclusive international organization.

The SBI International Education Outreach Committee has already received invitations to participate in other joint conferences from breast imaging societies in several other countries. If this first effort in South Africa proves as successful as hoped, then you can soon expect to see the SBI logo displayed around the world!
What I’ve Learned:
Edward A. Sickles, MD, FACR, FSBI

By Jessica W. T. Leung, MD, FACR, FSBI

From the early days of direct-exposure film mammography to the latest sophisticated tomosynthesis images, breast imaging has blossomed from a small and somewhat limited subspecialty to a multimodality, patient-centric field that is leading the way in value-added radiology and evidence-based medicine. Few of us have experienced or contributed as much to the field of breast imaging as Edward A. Sickles, MD, FACR, FSBI. The following interview with Dr. Sickles allows us a first-hand look into his reflections, remembrances, and lessons learned.

You have had a long and illustrious career. What is the single biggest advance in breast imaging that you have seen?

The application of mammography in screening breast cancer because it is the only thing that we do that has been proven to extend life. Screening mammography is widely performed all over the world, and it has been applied effectively. It is undoubtedly the advance that has had the greatest impact.

What do you consider to be your single most important contribution to the field of breast imaging?

My clinical service, training of radiologists, and research have all been equally meaningful to me. In terms of contributing to the field, I was the first one to use magnification techniques in breast imaging. I also promoted the importance of auditing your breast imaging practice early on. And I developed the “probably benign” classification as a unique BI-RADS® assessment category. Among these, I cannot choose one.

OK, if you cannot choose your single most important contribution to the field, then what is your single biggest achievement in life?

Being a good person. Living an honest and good life.
What I’ve Learned: Edward A. Sickles, MD, FACR, FSBI, continued from previous page

I know that some of your very best friends and sources of support are your colleagues in breast imaging. That is very special. How did that come about?

In the beginning, it was a matter of proximity. The specialty [of breast imaging] was in its infancy. The field grew stronger, and the technology became more effective and more widely used. I saw the same people at the meetings and gradually got to know them. We became friends because we were people of like interest — that’s just the way it worked.

Looking back, what is the one thing you would do differently in your life?

There are very few things that I have done that I regret. I have been extraordinarily lucky in making decisions that I did not know was the right decision at the time, but that in retrospect was clearly the best decision: marrying my wife, buying my house [in San Francisco], staying at UCSF for my entire career. I have been very, very lucky and at the right place at the right time. I think that luck plays a bigger role in life than people would like to admit. I am very content with how my life has turned out.

What is your best piece of advice for the young radiologist just starting out or for the senior radiologist considering retirement?

To the young radiologist, I would say that it is important to choose what he or she likes to do and not choose a field or job simply out of convenience. Nowadays, there are lots of opportunities to do fellowships or some sort of subspecialized training, and young radiologists should take advantage of them to find out what he or she really likes. To the senior radiologist, I would recommend retirement if there are other things you would like to do in your life, and not because you no longer like your work. When you retire, you should have at least one year of activities planned, and preferably two. Too often radiologists have not done this, and end up regretting retirement.

How can the breast imager minimize medicolegal risk?

Breast cancer has all sorts of social connotations beyond the illness itself, and what we breast imagers use to make decisions leave a permanent trail. But I don’t think radiologists should practice in fear. The best defense is to be a really good radiologist. Anyone can make a mistake, but striving for excellence will reduce exposure. Use BI-RADS®. While it does not inoculate you from malpractice, BI-RADS® has been accepted as standard of care. Anyone in the United States not adhering strictly to BI-RADS®, anyone who thinks that he/she knows how to practice breast imaging without BI-RADS®, is taking a malpractice chance.

How can the breast imager handle emotional burn out?

Diversify your professional experience (expand your practice to include new or different imaging). Look for ways to cut back if possible. Always try to keep your work challenging, interesting, productive, satisfying. I try as much as I can to leave the professional issues at work and not bring them home. Having a spouse in medicine who understands has helped me a lot.
Why does screening mammography seem so political these days?

Screening has been a political topic since I started breast imaging in the 1970s. The nature of controversy may have shifted from criticism A to B to C to D, and the criticisms may wax and wane, but they always resurface. I think that a good deal of the controversy is related to costs, though no one seems to want to talk about that. Mammography has been such an effective screening tool that it is very widely implemented, which results in societal costs, and some people are looking for ways to do less of it; to reduce the scope, in order to save money. But we as physicians should look at the individual. Politicians are elected to make decisions for society at the sacrifice of the individual, and they should have the courage to inform the electorate when they do that. But the topic of cost-containment has been studiously avoided.

Who are your heroes?

My wife, who is my lifelong source of strength. Alex Margulis, my first Chair at UCSF. My innumerable breast imaging colleagues, and the physicians that I have trained—I am proud of my legacy.

What is the best advice you have received?

The best advice that I have ever received came from my late father, and there were two pieces of advice. Don't complain about paying taxes—because if you are paying taxes, then that means you are making money. Don't just make major purchases based on what you can afford today, but buy what you can afford in the near future, assuming you know predictably what you will earn in the near future.

You have flown over 3 million miles on United Airlines and have achieved the elite status of 1K member for life. You have lectured and traveled so very extensively. What is your favorite place in the world?

My favorite place is my home. If there is only one place in the world to be, that is where I would choose. But if you are asking me where I would like to visit, then I would say either the major cosmopolitan cities of the world or unique places of nature such as national parks. I like the two extremes. I like so many places, and my "favorite" would depend on where I have just been to, where I am at, or where I am about to go. That is one of the greatest pleasures of retirement—I can do anything or go anywhere I choose.

Dr. Sickles has been an academic radiologist for over 40 years at the University of California San Francisco and has trained generations of breast imagers, including myself. He is currently retired on-paper, but continues to perform 20% clinical work and 100% education. He is a Founding Member of the SBI and a Gold Medalist. He lives with his medical school sweetheart and pediatrician wife, Dale, of 49 years on a hill overlooking the beautiful San Francisco Bay with views of both the Golden Gate and Richmond Bridges. He is an avid expert bird-watcher and enjoys the opera.
Breast Ultrasound was again showcased at the 2015 Radiological Society of North America (RSNA) Annual Meeting. Attendees were provided many opportunities to learn about both automated and handheld breast US, as well as breast density legislation that is sweeping the nation.

The week started with a Breast Series entitled *Hot Topics in Breast Imaging*. The session included several presentations on whole-breast US and breast density laws. Liane Philpotts, MD, FSBI, from Yale presented her 5-year experience in Connecticut following the enactment of Public Act No. 09-41 (1). Dr. Philpotts and her co-authors compared the performance of the exam in their first year with the performance in the fifth year. They found significantly fewer false positives and higher PPV for screening US five years after the legislation, demonstrating the benefit of experience. Also in this session, Su Hyun Lee, MD, PhD, and colleagues from Seoul, South Korea, presented on the use of US elastography and color Doppler US in a screening US environment (2). Results demonstrated that the combined use of elastography and color Doppler US can increase PPV of screening US for breast cancer detection, ultimately reducing the number of unnecessary biopsies and short-term follow-up examinations.

On Tuesday, results from a large prospective study conducted by Rosalind Candelaria, MD, and her team from MD Anderson Cancer Center, presented in the session on *Emerging Technologies in Breast Imaging* (3). Their study compared cancer detection rates of Full Field Digital Mammography (FFDM) and Digital Breast Tomosynthesis (DBT) and FFDM+DBT+ Whole Breast US (WBUS), compared to FFDM alone, in the staging of patients with a recently diagnosed breast cancer and patients with suspicious findings on mammography or US. The ipsilateral and contralateral breasts were both evaluated. The interim study results demonstrated a greater increase in cancer detection in both the ipsilateral and contralateral breasts when adding WBUS to FFDM, in comparison to DBT being added to FFDM. In the contralateral breast, findings from FFDM+DBT changed surgical management in 1%, compared with 20% for FFDM+DBT+WBUS findings.

Erin Neuschler, MD, of Northwestern University presented findings from a reader study performed using a new type of breast US called Opto-Acoustic (OA) imaging (4). The technology uses laser optics and ultrasound imaging to show dual functional findings (hemoglobin de-oxygenation) and morphology (angiogenesis) for the evaluation of breast masses. Cases were obtained from a large multi-center pivotal study. The purpose was to assess the potential ability of OA to downgrade BI-RADS® scores in benign masses. Though these are preliminary results, study investigators propose that BI-RADS® category 3, 4a, and 4b masses could potentially be downgraded using OA. The results of a large pivotal study will be evaluated for confirmation of the reader study findings.

Breast US elastography was discussed during several oral presentations throughout the week.
Shin Ho Kook, MD, PhD, and colleagues from Seoul, South Korea, presented their findings evaluating the diagnostic performance of shear-wave elastography with maximum visual color elasticity assessment in addition to B-mode to determine the value as a compliment to B-mode imaging (5). The study found improvement in specificity and PPV without improvement in overall diagnostic accuracy.

Contrast enhanced US (CEUS) was evaluated in comparison to contrast enhanced MRI (CE-MRI) in the evaluation of breast cancer patients receiving neoadjuvant chemotherapy in a presentation given by Sandy Lee, MD, of the University of Southern California (6). The prospective study found a strong correlation in tumor size between CEUS and CE-MRI and a trend suggesting that CEUS has better degree of correlation and agreement to tumor size at surgical pathology than CE-MRI. CEUS was also found to be a valuable tool for determining percent necrosis and peak intensity.

Attendees at RSNA this year were also able to hear presentations regarding other applications of US technology such as predicting tumor response to neoadjuvant chemotherapy, identification of US features that can demonstrate estrogen receptor positive breast cancers, and cancer detection with breast US versus breast MRI in the newly diagnosed patient. In addition, refresher courses reviewed current US technology and its benefits and provided opportunities for hands-on US biopsy workshops.

REFERENCES

There were fewer breast imaging physics talks at RSNA this year compared to previous years. Nonetheless, there were some good and important talks. I will highlight three here.

The first talk was by James Mainprize, PhD, from the Sunnybrook Research Institute, entitled “Validation of a Quantitative Masking Index for Digital Mammography.” He and his colleagues developed a quantitative measure of the masking effect of normal fibro-glandular tissue in the breast. The method divides a mammogram up using a grid and then calculates the power spectrum for each grid element. The power spectrum is a measure of the local breast density and parenchymal texture. The power spectrum measure (slope of the spectrum) is used in a detection-task signal-to-noise ratio (SNR) model. An observer study, using simulated images and lesions, was then conducted to show that the perceptibility of a lesion correlated with their modeled SNR. More testing is needed to determine the accuracy and robustness of the model.

The second talk was by Katharina Holland, MSc, from Radboud University Medical Center, entitled “Optimisation of the Selection of Women with an Increased Risk of a Masked Tumour for Supplementary Screening.” This group also had two other papers on the topic of masking. In this paper they retrospectively analyzed digital mammograms from 87 women who had an interval cancer and 870 women with normal screening mammograms. They looked at five different measures: one was the percentage dense area and the other four areas were related to the volumetric breast density. They examined the ability of these five measures to predict who had an interval cancer. The measure that worked the best was the percent area where dense tissue thickness exceeded 1 cm. This measure predicted an interval cancer in 20% of the positive cases, with a 5% false positive rate.

The ultimate goal of this line of research is to select a subset of women with dense breasts who would benefit from supplemental screening. The basic difference between the approaches is that the Holland study computed a global measure while the Mainprize...
method calculated local measures at specific locations within the mammogram. The latter method could be used to direct radiologists to a specific area within the image where a cancer could be hiding. There were two other talks on masking from the group at the University of Pennsylvania, led by Despina Kontos, PhD, but I did not have the opportunity to see them.

Third, Martin Yaffe, PhD, FSBI, from the Sunnybrook Research Institute, gave an excellent overview of digital breast tomosynthesis (DBT). He described image reconstruction and artifacts, and discussed what radiation dose should be acceptable. I think the most important message of his talk was that DBT systems are not optimized from an image acquisition, reconstruction, and display perspective. He showed a table of the physical characteristics of at least six different commercial DBT systems available within as well as outside the U.S. There were very few similarities across manufactures for the different characteristics. For example, the number of projections collected ranged from 9 to 25 and the scan angle ranged from 11 to 50 degrees. So while DBT effectively increases sensitivity and specificity, there is room for improvement. A true optimization will require tradeoffs, so a joint effort by physicists and radiologists will be necessary.

Lastly, there were a number of refresher courses discussing big data and deep learning. Deep learning is a relatively new branch of machine learning that uses multiple processing layers within a complex structure to discover relationships in large data sets. On the commercial side, this is a fast-growing industry in and outside of medical imaging. There were at least three companies that I saw, including IBM Watson, that were using deep learning to extract information from large volumes of images, including mammograms and DBT. This ties into radiomics and radiogenomics. Some of the results look quite impressive, but scientific detail about methodology was sparse, so the actual effectiveness of these techniques remains unclear. Nevertheless, deep learning is the new buzzword and a topic that you will be hearing more about in 2016 at RSNA.
A 43-year-old woman presented with a red, hot, swollen and painful left breast and underwent treatment for mastitis with antibiotics. During treatment, she developed a palpable mass in the medial aspect of her left breast. A diagnostic mammogram was performed (Figure 1).

Given the palpable nature of the mass and suspicious features, an ultrasound was also obtained (Figure 2). The findings were assessed as BI-RADS® 4, suspicious, and ultrasound guided biopsy was recommended. Ultrasound guided biopsy yielded “suppurative neutrophilic and non-necrotizing inflammation involving ducts and lobules. The pattern of inflammation raises the possibility of idiopathic granulomatous mastitis.” Stains for acid-fast bacilli and fungus were negative.

Prednisone therapy almost completely resolved her symptoms. After tapering off prednisone due to side effects, she developed similar but milder erythema, pain and palpable lumps in the 4 o’clock region of her left breast. She was referred to rheumatology. High-dose prednisone as well as methotrexate was prescribed. Additionally, laboratory studies and a chest radiograph were performed to rule out other rheumatoid arthritis, systemic lupus erythematosus, sarcoidosis, and tuberculosis. All of these were negative. Given no other discernable cause for granulomatous disease, the diagnosis of idiopathic granulomatous mastitis was made. A left mammogram and ultrasound were also performed.
given recurrent but milder symptoms in the left breast in the 4 o’clock region (Figures 3, 4, and 5).

At the most recent follow up with rheumatology the patient was tapering steroids, tolerating methotrexate treatment, and completely asymptomatic.

**Teaching points:**

Idiopathic Granulomatous Mastitis (IGM) or Idiopathic Granulomatous Lobular Mastitis is a rare benign inflammatory breast disease that can mimic either of two more common breast diseases: breast carcinoma and infectious mastitis with abscess originally described in 1972 (1,2). While the incidence and prevalence is uncertain, in one recent review the incidence of granulomatous mastitis was less than 1% of all breast biopsies (3). Clinically, IGM usually presents as a unilateral ill-defined palpable mass and erythema, pain, and inflammation (2-4). Draining sinuses, sterile abscesses, lymphadenopathy, nipple discharge, and nipple retraction can also be present (2-4). It most often occurs in women of reproductive age (2-4,6).

IGM can cause diagnostic confusion with resulting patient anxiety, delay in diagnosis and inappropriate treatment including antibiotics, incision and drainage procedures, and occasionally extensive resection and mastectomy (4). The etiology is unknown and many triggers have been proposed including various infectious etiologies, hormonal or environmental exposures, and

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**Figure 2:** Targeted ultrasound at site of palpable concern at 8:30 o’clock, 8 cm from the nipple demonstrates a 2.3 cm irregular, shadowing hypoechoic mass (a) with internal vascularity (not shown). Tubular extensions from the mass, skin thickening and acoustic shadowing are present in the surrounding tissue (b).

**Figure 3:** Left full MLO and CC views 10 months after initial presentation. Two BB markers were placed at 4 o’clock region at the site of recurrent symptoms. Significant interval decrease in the global asymmetry (oval) and trabecular thickening with marker clip at 8 o’clock site of prior biopsy (arrow).
autoimmune processes (4). IGM can be self-limited but has a tendency to recur (2,6).

The mammographic appearance is not specific and IGM may be mammographically occult in a breast that is heterogeneously or extremely dense (3). A large focal asymmetry is the most common mammographic appearance but IGM can present as an irregular or oval lobulated mass. Diffusely increased breast density, as in this case, can occur but is less common. Skin thickening and axillary adenopathy can occasionally be present radiographically (3).

In one study of 54 patients, ultrasound evaluation demonstrated lesions in all patients (3). A large irregular hypoechoic mass with tubular extensions was the most common finding present in 60% of patients and a large lobulated or irregular mass without tubular extension was present in another third of the patients (3). Fewer than 10% of patients had only distortion and acoustic shadowing without discreet mass. Skin thickening was seen in about half of the patients and axillary adenopathy in just under a third (3).

Given the clinical and radiologic overlap with malignant and infectious etiologies, tissue sampling is required to make the diagnosis. As IGM can appear indistinguishable from inflammatory breast cancer, it may be tempting to assign it a BI-RADS® 5 final assessment. However, the BI-RADS® atlas states “the current rationale for using a
category 5 assessment is to identify lesions for which any non-malignant percutaneous tissue diagnosis is automatically considered discordant, resulting in the recommendation for repeat (usually surgical) biopsy” (5). In this case, where infectious and inflammatory diseases are also in the differential, a final assessment of BI-RADS® 5 would be inappropriate as it could potentially lead to unnecessary surgical biopsy. While unnecessary surgical biopsy is generally undesirable, it is particularly true in IGM as delayed healing, fistula formation, poor cosmesis, and disease recurrence are known complications of surgical treatment for IGM (2,4,6). The same can occur if IGM is misdiagnosed as infectious mastitis and treated with multiple incision and drainage procedures (2,6).

Core needle biopsy yielded the diagnosis in 96% of patients whereas FNA was inconclusive in nearly 80% of patients in the same study of 54 patients (3). IGM is a diagnosis of exclusion and once granulomatous mastitis is identified pathologically, infectious and other systemic causes of granulomatous diseases must be excluded.

Currently there is no consensus regarding optimal treatment with variable recommendations and conclusions in the literature (2-4,6). Historically, wide surgical excision and even mastectomy were considered standard. But given high rates of recurrence and surgical complications, a conservative approach with oral corticosteroid and/or methotrexate is increasingly favored by many (3,4,6). Less frequently, observation only has been suggested in mild cases with up to 50% of cases resolving spontaneously (6).

Below are two additional cases of IGM.

Case 2 (Figure 6)

A 32-year-old woman presented after multiple courses of antibiotics as well as incision and drainage procedures with ongoing symptoms of erythema, pain, and palpable lumps with draining fistulas at surgical sites.

Figure 6: Ultrasound shows a well circumscribed mass (a) with multiple tubular extensions (b) occasionally up to the skin (c).
Case 3 (Figures 7 and 8)

A 29-year-old woman developed left breast symptoms of erythema, pain, and palpable lump at 10:30 o’clock close to the nipple. Core needle biopsy was recommended after mammographic and sonographic evaluation. However, the patient had already arranged surgical consultation and was subsequently treated with antibiotics followed by drainage of a sterile abscess. After recurrent symptoms, the patient underwent core biopsy yielding “granulomatous inflammation with associated neutrophils and lymphocytes” with a negative infectious and systemic granulomatous disease workup by rheumatology. Subsequent treatment with prednisone, hydroxychloroquine, and methotrexate resulted in complete resolution of symptoms and imaging findings.

REFERENCES

The Sunday morning session at the 2015 edition of the RSNA Annual Meeting on Contrast Enhanced (CE) Mammography/CT included two digital breast tomosynthesis (DBT) papers. Dr. Norran H. Said, Ladies Health Alliance, Egypt, looked at both contrast-enhanced spectral mammography and DBT in 75 patients recalled after screening mammography and found both were useful in further evaluation and could potentially reduce unnecessary biopsies. Dr. Chen-Pin Chou, Machay Memorial Hospital, Taiwan, presented interesting data comparing CE-DBT and CE-MRI in architectural distortion lesions and found both performed well with 100% sensitivity for malignancy and similar specificity and accuracy rates.

On Monday morning, DBT was in the spotlight at Arie Crown Theater. The session was off and running with a keynote lecture by Liane Philpotts, MD, FSBI, Yale University, who discussed how DBT has gone beyond the screening environment and is dramatically changing the practice of breast imaging. Next, Emily Conant, MD, FSBI, University of Pennsylvania, showed that improvements in cancer detection, positive predictive values, and reductions in recall rates and interval cancers are sustainable over three years of DBT use. Dr. Per Skaane, University of Oslo, Norway, analyzed screen-detected and interval cancers before, during, and after DBT implementation and found increased cancer detection with DBT (9.7 per 1000) compared to 2D (6.2 per 1000) and a stable interval cancer rate (2.1 per 1000). But DBT does have limitations, and Dr. Miguel Pinochet, Universidad del Desarrollo, Santiago, Chile, emphasized that missed cancers are typically non-calcified, non-spiculated lesions in dense breasts. David Gur, ScD, University of Pittsburgh, assessed the impact of reading DBT on radiologist and exam performance with 2D mammography and found no change in 2D recall rates and cancer detection rates despite increased DBT experience. Dr. Jung Min Chang, Seoul National University Hospital, Korea, rounded out the session with a comparison of 2D+DBT and 2D+US in dense breasts, presenting evidence that 2D+DBT has higher specificity than 2D+US and that BI-RADS® 3 ultrasound lesions could be downgraded without a loss of sensitivity if DBT findings were benign.

DBT was an emerging technology showcased in the Tuesday morning session with several presentations on synthesized mammography and DBT in the diagnostic environment. Martin Jaffe, PhD, FSBI, Sunnybrook Health Sciences Centre, Toronto, Canada, kicked off the session with an in-depth overview of the technical variations of available DBT units. The next five presentations on
synthesized mammography (SM), compared SM+DBT to 2D and/or 2D+DBT and suggested SM+DBT may emerge as a replacement for 2D. In the screening environment, Dr. Eun Young Ko, University School of Medicine, Seoul, Korea, found no significant difference in sensitivity for detection of calcifications. Similar sensitivity and specificity, even with a dose reduction form of SM+DBT (which actually improved sensitivity) was shown by Dr. Tokiko Endo, Nagoya Medical Center, Japan. Samantha Zuckerman, MD, University of Pennsylvania, garnered the trainee research prize for her work showing decreased breast density, recall rates, and biopsy rates after conversion to SM. Melissa Durand, MD, Yale University, showed the majority of mammographic findings to be equally or better seen with SM+DBT. Dr. Manuela Durando, University of Turin, Italy, presented comparable performance outcomes to 2D in the diagnostic setting. Sarah Friedewald, MD, Northwestern University, gave a keynote address on recent landmark DBT papers and highlighted future avenues for research such as performance outcomes of 2nd and 3rd round screening and/or comparison to ultrasound or MRI, interval cancers, and whether a mortality benefit may be seen with DBT. Turning to the diagnostic environment, Reni Butler, MD, Yale University, shared that DBT continues to improve efficiency of the diagnostic workup, with a continual decline in additional views needed over a four year period of use. Madhavi Raghu, MD, Yale University, presented exciting results of a 40% increase in PPV3 for BI-RADS® 4 and 5 lesions with the use of DBT. Rosalind Candelaria, MD, University of Texas, MD Anderson Cancer Center, imparted interim results from a study comparing 2D+DBT and 2D+DBT+US in assessment of extent of disease of known malignancies. Regina Hooley, MD, FSBI, Yale University, cautioned that cancers missed on DBT tend to be invasive, in dense breasts, and may be retrospectively seen as subtle masses or architectural distortions. Liane Philpotts, MD, FSBI, showed false negatives and interval cancers with DBT are infrequent and smaller than those in a 2D false negative cohort.

A few more DBT papers were presented in the multi-modality screening session on Friday morning. Christin Reisenauer, MD, Moscow, ID, presented the positive effects of introducing DBT in a rural U.S. setting with significant impact on cancer detection and recall rates. Asif Iqbal, MBBS, London, UK, determined 2-view DBT is beneficial over 1-view DBT or 2-view FFDM for optimal cancer detection.

In addition to the scientific sessions, several refresher courses were offered during the week and many exceptional electronic exhibits presented on various aspects of DBT in breast imaging. This is a field full of active investigation that may shape how we all practice and improve the lives of our patients in the near and far future.
The volume of research related to breast MRI increases every year. A query of PubMed using the keywords “breast” and “MRI” yields a timeline of annually published articles that begins with a single citation in 1978 and finishes with 847 in 2015 alone. Some of the studies are only peripherally related to human breast cancer imaging but the pattern is clear. As with the published data, new research presented at the 2015 meeting of the Radiological Society of North America was impressive in both depth and breadth. It is impossible to describe it all, but the following summary captures some of the many highlights.

Beth Burnside, MD, MPH, University of Wisconsin, presented the results of an ambitious multi-center investigation of how the appearance of cancer on MRI may correlate with genetic profile and ultimately, prognosis. The team analyzed a dataset of 84 de-identified breast MRI examinations from The Cancer Imaging Archive at the National Cancer Institute. Using some established techniques, computer-extracted image-based tumor phenotypes (CEIPs), quantifying size, shape, morphology, enhancement texture, kinetic curve assessment, and enhancement variance kinetics were obtained from each exam. These CEIPs, along with clinical, histopathological, and genomic data from “The Cancer Genome Atlas” were compared with the results of the PAM50 gene assay. The results indicate a significant correlation between the prognosis for recurrence as estimated by genetic assays of the tumor and some CEIPs. Dr. Burnside concluded that quantitative MRI radiomics, a combination of radiologic and genomic information, could become a non-invasive method to estimate risk of breast cancer recurrence. Such information could impact decisions about treatment for individual patients.

The group from the University of Chicago presented two papers related to high temporal resolution breast MRI. The first study was described by Federico Pineda, BS, a RSNA Trainee Award recipient. Using a 3T magnet, the group designed a protocol of eight sequential post-contrast 3D acquisitions of both breasts lasting 6–10 seconds each with a spatial resolution of 1.5 x 1.5 x 3.0 mm. These were followed by higher spatial resolution acquisitions. The group investigated the enhancement of benign and malignant masses in the very early 3D sequences. Although the sample size was small, the results indicate significant differences in enhancement. Malignant findings, compared to benign findings, initiated enhancement faster (7 vs 25 seconds) and reached 90% of peak enhancement sooner (50 vs 191 seconds). Hiroyuki Abe, MD, presenting the second set of results from the same MRI protocol, described how the initial enhancement ratio and peak enhancement ratio were significantly higher for malignancies. The authors suggested that significant differences in enhancement between malignancies and other tissue may be happening earlier than traditionally believed and earlier than most protocols are currently designed to detect. They suggested that the ultra-fast technique, completed within 48–80 seconds after contrast injection, might be all the temporal data that is needed. A single high-resolution scan, rather than multiple sequential one to three minute scans, could subsequently provide all the necessary morphologic information. Patients would benefit by having shorter breast MRI examinations.
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Many programs around the world recommend that high-risk screening breast MRI be performed between days 7 and 10 of the menstrual cycle in pre-menopausal women to reduce the camouflaging effects of background parenchymal enhancement (BPE). Yolanda Bryce, MD, from Memorial Sloan-Kettering, presented a retrospective study that contradicts current practice. Analyzing 1,537 examinations from 2011 and 2012, the level of BPE was compared for each week of the menstrual cycle as well as the second week vs all other weeks pooled together. The team reported no significant difference in distribution of BPE, positive predictive value (PPV3) or cancer detection rate by week. The only difference was a higher utilization of BI-RADS® 3 assessments when comparing the second week to all others pooled together. The authors suggested that restricting the timing of high-risk screening MRI to the second week of the menstrual cycle may not be necessary.

Sabine M. Detering from the University of Bonn, Germany, described how a single additional T1 weighted coronal sequence was used to assess the axillary lymph nodes in patients with a new diagnosis of breast cancer. Using a 1.5T system in 287 patients, the radiologists rated the likelihood of metastases in axillary lymph nodes on a three-point scale and compared this to surgical staging. MRI was 86% sensitive to metastases in the level two and three nodes. The authors point out how, following the results of the ACOSOG Z001 trial, some women with positive sentinel lymph node biopsy do not proceed to axillary lymph node dissection. Incorporating this sequence into the standard staging MRI could identify those patients that may be under-staged or at risk for axillary recurrence.

Michelle Zhang, MD, a senior resident, presented research from the group at McGill University. The authors retrospectively evaluated 1,274 patients with breast cancer from 2007 through 2013 to study the impact of pre-operative MRI on surgical waiting time in a publicly funded health system. They used the dates of first positive biopsy, breast MRI, and first surgery to compare patients who had an MRI and those who did not. The results indicate an average increase of 11 days between the time of first biopsy and the time of surgery for patients having MRI.

This sampling represents only a smattering of the stellar research presented at RSNA in 2015. MRI continues to be a very fertile subject for research and we can expect to see new findings presented at the SBI meeting in Austin in April 2016.
Breast density was the subject of numerous presentations at the 2015 RSNA meeting. The Density and Risk Assessment scientific session, moderated by Jennifer A. Harvey, MD, FACS, FSBI, Emily F. Conant, MD, FSBI, and Martin J. Yaffe, PhD, FSBI, was dedicated to breast density related topics.

One of the nine scientific papers presented at that session was awarded a Trainee Research Prize. The recipient of this prize, Manisha Bahl, MD, MPH, from Duke University, discussed a study of over 900,000 mammograms from the National Mammography Database maintained by the ACR over a 20-month period to evaluate the impact of notification laws on radiology reporting practices nationally (1). Dr. Bahl and colleagues compared the percentage of reported mammograms as heterogeneously dense or dense 10 months before to 10 months after enactment of breast density notification laws in 13 states. They found an immediate decrease in the percentage of mammograms that were categorized as dense or heterogeneously dense in the two months following the enactment. However, Dr. Bahl stated that the downgraded density assessment was transient and not sustained over the long term with percentages of dense mammographic reports returning to pre-legislation levels by 10 months after law enactment.

The session opened with a study from the University of California, Davis performed under the direction of senior author, Karen K. Lindfors, MD, MPH, FSBI (2). As the presenter of this work, I was excited to share the results of our survey of 133 radiology technologists to evaluate technologist awareness of breast density notification legislation and any effects on their practice since the debut of this law in California. Not surprisingly, we found that mammography technologists are well aware of breast density notification laws and are being routinely questioned by patients regarding breast density. The surveyed technologists report being asked about breast density both as a risk factor as well as its role in decreasing the sensitivity of mammography during their patient encounters. Although, the majority of technologists refer patients to their primary care physicians, the survey respondents also report discussing additional imaging in patients with dense breasts. While our study did not evaluate the accuracy of information communicated to patients by technologists, it underscores the need for further investigation of the impact of breast density notification laws and the role of providers other than patients’ primary physicians in discussions regarding breast density.

Rasha M. Kamal, MD, from Cairo, presented data from over 117,000 women in the National Breast Cancer Screening Program in Egypt to assess the relationship between body mass index (BMI), mammographic breast density, and breast cancer (3). She showed that Egyptian women with BMI greater than 25 had a significantly increased risk of developing breast cancer compared to individuals with BMI <25 (odds ratio 1.4, 95% CI 1.036–1.905). She also reported finding no association between breast density and breast cancer in this population (odds ratio 0.95, 95% CI: 0.58–1.57). Dr. Kamal
went on to comment on the complex relationship of breast density, BMI, and breast cancer development given the inverse relationship of BMI and breast density.

Several innovative studies presented in this session confirmed that the risk of breast cancer imparted by breast density is quite nuanced and deserves further study. Michiel Kallenberg from Copenhagen, Denmark (4) and Aimilia Gastounioti, PhD, (5), each showed elegant experimentation demonstrating that masking of breast cancer may not only be related to current breast density classification used in practice, but may also be associated with breast tissue textural heterogeneity. Also addressing masking of breast cancer due to breast density, Stamatia V. Destounis, MD, FACR, FSBI, discussed the results of a comparative analysis of subjective radiologist density reporting according to ACR BI-RADS® 4th edition criteria and quantitative assessment of volumetric breast density (6). She suggested that quantitative volume density classification might capture potential masking effects due to breast density more precisely when compared to BI-RADS® categorization. In a second scientific presentation, Dr. Destounis showed data comparing breast density classification using subjective visual methods, automated breast density assessments, and continuous volumetric breast density measurements as predictors for development of interval cancers (7). She concluded that while higher density classification by all three methods was a strong predictor of interval cancers, volumetric breast density measurements were found to be stronger predictors of invasive interval cancers.

Many more presentations showcasing the gamut of breast density-related topics were covered in the poster sessions and could be found sprinkled throughout the breast imaging scientific programs. There was enough to feel excited, inspired, and completely overwhelmed as one can only experience by attending an annual RSNA meeting!

REFERENCES
