Supplementary Table 1. FAQs by the EUSOBI Recommendations for Women's Information for each breast imaging method
Mammography[1]
Question 1. How painful is breast compression?
Question 2. When should the first mammogram be done? What time intervals for further examinations?
Question 3. What about screening mammography for women over 75?
Question 4. Can women with breast implants or breast reconstruction undergo mammography?
Question 5. Is X-ray radiation from mammography dangerous?
Breast MRI[2]
Question 1. Is MRI screening harmful?
Question 2. Should I bring my prior examinations and mammograms?
Question 3. When should MRI screening in high-risk women start? How often should MRI screening be repeated?
Question 4. Does preoperative MRI also detect additional cancers in women with very fatty breasts and in women over 60 or 70?
Question 5. Is there any special indication for breast MRI when partial breast irradiation is under consideration?
ULTRASOUND[3]
Question 1. Is breast US a harmless investigation?
Question 2. Can breast US be performed instead of mammography for breast cancer screening in the general female population, as it spares radiation?
Question 3. After a breast US examination, does the woman also need mammography?
Question 4. Can women consider breast US being free from any potential negative consequences?
Question 5. After receiving the result of a breast handheld US, can women try to get a reliable second opinion on the test?
[1]Sardanelli F, Helbich TH; European Society of Breast Imaging (EUSOBI). Mammography: EUSOBI recommendations for women's information. *Insights Imaging.* 2012;3(1):7-10. [Crossref] [2]Mann RM, Balleyguier C, Baltzer PA, et al. Breast MRI: EUSOBI recommendations for women's information. *Eur Radiol.* 2015;25(12):3669-3678. [Crossref] [3]Evans A, Trimboli RM, Athanasiou A, et al. Breast ultrasound: recommendations for information to women and referring physicians by the European Society of Breast Imaging. *Insights Imaging.* 2018;9(4):449-461. [Crossref] BI-RADS, Breast Imaging Reporting and Data Systems; EUSOBI, European Society of Breast Imaging; FAQs, frequently asked questions; MRI, magnetic resonance imaging; US, ultrasound.

Supplementary Table 2. Questions generated by GPT-5 thinking from the EUSOBI recommendations for women's information "Special Information Notes" for each breast imaging method
Mammography[1]
Question A. What should a patient do if they have symptoms before or during a scheduled screening mammography, and how should persistent symptoms be managed even after a negative result?
Question B. Why is it important to provide previous mammogram images and reports before undergoing a new breast imaging examination?
Question C. What measures can be taken to minimize discomfort during a mammography and improve the quality of the images?
Question D. What does it mean to be recalled after a screening mammogram, and how likely is it to result in a cancer diagnosis?
Question E. What should a patient do after receiving a BI-RADS 3, 4, or 5 result from a breast imaging examination?
Question F. What actions should you take if you notice new breast symptoms, even after a recent negative screening mammogram?
Question G. Does a suspicious mammographic finding mean a confirmed cancer?
Question H. If you are part of an organized screening program, when should you consult your radiologist regarding screening intervals or additional imaging tests?
Question I. Should I inform my radiologist or radiographer if I have breast implants before a mammography?
Breast MRI[2]
Question A. What should I do if I think I might be claustrophobic before my breast MRI appointment?
Question B. What should I do if I have an implantable device or metal implant before undergoing a breast MRI?
Question C. What should I do if I have a history of allergies or conditions like asthma before having a breast MRI?
Question D. What should I do before a breast MRI if I have kidney problems or other health conditions that might affect my renal function?
Question E. If I am premenopausal, how should I schedule my breast MRI in relation to my menstrual cycle, and what should I do if the appointment doesn't fall within the recommended timeframe?
Question F. What should I do about MRI scheduling if I have irregular menstrual cycles or had a hysterectomy before the age of 50?
Question G. Why is it important for me to remain still during the MRI examination?
Question H. What does it mean if a needle biopsy is recommended after an MRI detects a suspicious breast lesion?
Question I. What should I do if my MRI result is BI-RADS 4 or 5 but targeted US and mammography are negative?
Question J. What should I do if my breast MRI result is BI-RADS 3, and does being at high risk affect the next steps?
Question K. If a needle biopsy is recommended based on a lump or imaging findings, should I still have the biopsy even if an MRI was done?
Question L. What should I do if I have multiple cases of breast or ovarian cancer in my family, and could I be eligible for MRI screening?
Question M. If I received thoracic radiation therapy in the past, should I have regular breast screening with MRI and mammography?
Question N. If I have been newly diagnosed with breast cancer, should I consider having a preoperative MRI, and what are its potential benefits and risks?
Question O. Do I need a breast MRI to check my implants if I don't have any symptoms?
Question P. Do breast implants affect the accuracy of contrast-enhanced MRI in detecting new or recurrent breast cancer?
Question Q. Do I need to provide information about my breast implants before having an MRI, and what should I do if I don't have the details?
ULTRASOUND[3]
Question A. Who should perform my breast US, and does the radiologist's experience or the quality of the equipment affect the reliability of the results?
Question B. Why is it important for me to follow the radiologist's instructions and how can I help improve the quality of my breast US exam?
Question C. What should I know about automated breast US, and what happens if a suspicious finding is detected?
Question D. If both mammography and breast US are recommended, which exam should be done first, and can they be evaluated together?
Question E. Which imaging method is better at detecting calcifications? If calcifications are detected on my mammogram, why do I need a targeted US as well?
Question F. Should I tell my radiologist about my breast implants before the exam, and why?
Question G. What should I do if my US report suggests a possible abnormality like U3/BI-RADS 3 or higher findings?
[1]Sardanelli F, Helbich TH; European Society of Breast Imaging (EUSOBI). Mammography: EUSOBI recommendations for women's information. *Insights Imaging.* 2012;3(1):7-10. [Crossref] [2]Mann RM, Balleyguier C, Baltzer PA, et al. Breast MRI: EUSOBI recommendations for women's information. *Eur Radiol.* 2015;25(12):3669-3678. [Crossref] [3]Evans A, Trimboli RM, Athanasiou A, et al. Breast ultrasound: recommendations for information to women and referring physicians by the European Society of Breast Imaging. *Insights Imaging.* 2018;9(4):449-461. [Crossref] BI-RADS, Breast Imaging Reporting and Data Systems; EUSOBI, European Society of Breast Imaging; FAQs, frequently asked questions; GPT-5, Generative Pre-trained Transformer-5; MRI, magnetic resonance imaging; US, ultrasound.

Supplementary Table 3. Predefined text normalization protocol Outputs were normalized prior to readability and accuracy scoring according to the following predefined sequence
Non-prose formatting and markdowns: **Including bullet and numbered list markers, headings, emojis, markdown artifacts, and web links.**
Conversational scaffolding: Opening salutations and transitional setup phrases (e.g., "Sure, here is an explanation...", "I can help with that").
Disclaimers and footers: Standard model identity statements, legal disclaimers (e.g., "I am an AI, not a doctor...", "Please consult your physician"), and closing user-interface prompts (e.g., "Let me know if you need more information").
Punctuation and sentence standardization: Reconstruct remaining content into continuous plain prose sentences, ensuring standard sentence boundaries (periods, capitalization) without adding, deleting, or rephrasing any clinical words.

Supplementary Table 4. Normalized GPT-5 Thinking responses to EUSOBI FAQs and SINs–derived questions

FAQs[1-3]

Mammography

Question 1. How painful is breast compression?

Response 1. Breast compression during mammography can cause discomfort, and the degree of pain varies from person to person. Some women describe it as mild pressure or tightness, while others may feel moderate pain. The discomfort usually lasts only a few seconds while the X-ray images are being taken. Several factors can influence how painful it feels, such as breast size and density, the timing of the exam within the menstrual cycle, individual pain sensitivity, and the skill of the technologist performing the procedure. Although compression may be uncomfortable, it is necessary because it spreads out the breast tissue, reduces motion, lowers the radiation dose, and improves the clarity of the images—helping detect abnormalities more accurately. In summary, most women tolerate the compression well, some experience mild to moderate pain, but the discomfort is short-lived and serves an important role in ensuring accurate breast cancer screening.

Response 2. Breast compression during a mammogram is usually described as uncomfortable rather than truly painful. The breast is pressed between two flat plates for a few seconds to spread out the tissue, which helps the X-ray show details more clearly. Many women say it feels like strong pressure or squeezing. For some, it may feel only mildly uncomfortable, while others experience sharper discomfort, especially if their breasts are sensitive (for example, before a menstrual period). The compression lasts only a short time—typically less than 30 seconds per image—and once the pressure is released, the discomfort goes away immediately. In short, it's not usually very painful, but it can be briefly uncomfortable. If you're worried, you can schedule the exam when your breasts are least tender (often the week after your period) and let the technologist know, so they can adjust the compression as much as possible.

Question 2. When should the first mammogram be done? What time intervals for further examinations?

Response 1. The first screening mammogram is generally recommended at age 40 for women at average risk of breast cancer. After that, the standard interval is every 1 to 2 years, depending on national guidelines, personal risk factors, and physician recommendation. For women at high risk (such as those with BRCA mutations, a strong family history, or prior chest radiation), screening often begins earlier, usually at age 30, and may include annual mammography and MRI. In summary, for average risk, the first mammogram starts at age 40 and is repeated every 1–2 years. For high risk, screening begins earlier, around age 30, often annually, and is combined with MRI.

Response 2. The first mammogram is usually recommended at age 40 for women who are at average risk of breast cancer. After that, it is generally advised to repeat the exam once every 1 to 2 years, depending on personal risk factors and the guidance of your doctor. If a woman has a higher risk (for example, because of family history or certain genetic conditions), her doctor may recommend starting earlier—sometimes as early as age 30—and screening more often. In summary, for average risk, the first mammogram starts at age 40, then every 1–2 years. For high risk, may need to start earlier and have more frequent checks, based on the doctor's advice.

Question 3. What about screening mammography for women over 75?

Response 1. Screening mammography for women over 75 is a debated topic because evidence is limited compared to younger age groups. Guideline differences: The U.S. Preventive Services Task Force (USPSTF) states that there is *insufficient evidence* to assess the balance of benefits and harms of screening beyond age 74. Other organizations, such as the American Cancer Society and American College of Radiology, recommend that screening may continue beyond age 75 if a woman is in good health and expected to live at least 5–10 more years. Life expectancy and comorbidities: Women with significant health problems or limited life expectancy are less likely to benefit, since the potential survival advantage of early detection may not be realized. Potential harms: False positives, unnecessary biopsies, and overdiagnosis are more likely with advancing age. Individualized decision-making: For healthy women over 75 who want to continue screening and understand the risks and benefits, mammography can still be reasonable. In summary, there is no universal recommendation to stop at 75. Instead, the decision should be individualized, based on overall health, life expectancy, and patient preference.

Response 2. For women over 75, screening mammography is not automatically recommended for everyone. Most guidelines say that the benefit of continuing routine mammograms depends on the woman's overall health and life expectancy. If a woman is healthy and expected to live at least another 10 years, screening mammography may still help detect breast cancer early. If she has other serious health problems or limited life expectancy, the risks of screening (like anxiety, false alarms, and unnecessary procedures) may outweigh the benefits. In short, after age 75 the decision should be personalized. It's best for a woman to discuss with her doctor whether continuing mammograms makes sense for her situation.

Question 4. Can women with breast implants or breast reconstruction undergo mammography?

Response 1. Yes. Women with breast implants or breast reconstruction can undergo mammography, but the process requires some adjustments. Breast implants: Implants can obscure part of the breast tissue on standard mammograms. To improve visibility, special techniques called implant displacement (Eklund) views are used. In these, the implant is gently pushed back against the chest wall while the breast tissue is pulled forward and compressed, allowing better imaging of the breast tissue in front of the implant. Breast reconstruction: After mastectomy and reconstruction (with either implants or tissue flaps), routine screening mammography is usually not needed for the reconstructed breast, because there is little to no remaining breast tissue. However, if some natural breast tissue remains (for example, after a lumpectomy with implant placement), mammography may still be performed on that side. Safety: Mammography is safe for women with implants, though the compression may feel slightly more uncomfortable. Rupture from mammography is very rare. Additional imaging: Sometimes ultrasound or MRI may be recommended in women with implants or reconstruction, particularly if there are concerns about implant integrity or if mammography images are limited. In short, yes, mammography can be done in women with implants or reconstruction, but with special techniques and sometimes additional imaging.

Response 2. Yes, women with breast implants or breast reconstruction can undergo mammography. However, the procedure is done with some special adjustments. For women with implants: Mammography is still possible, but the radiology team uses additional views called *implant displacement views*. In these, the implant is gently pushed back toward the chest wall while the breast tissue is pulled forward and compressed. This allows more breast tissue to be visible on the images. Sometimes, not all of the tissue can be seen, but mammography remains the recommended screening tool. For women with breast reconstruction after mastectomy: The approach depends on the type of reconstruction. If the breast was removed and replaced with an implant, routine mammography is usually not needed because there is no remaining breast tissue at risk. Instead, follow-up is done through clinical exams and sometimes ultrasound or MRI if necessary. If reconstruction was done using the patient's own tissue (like a flap procedure), mammography might still be performed, especially if some natural breast tissue remains. In summary: Women with implants can and should have mammograms, with special techniques. Women with breast reconstruction may or may not need mammograms, depending on the surgery type, and their doctor will guide them on the right follow-up.

Question 5. Is X-ray radiation from mammography dangerous?

Response 1. No, X-ray radiation from mammography is not considered dangerous for most women. Mammography uses very low doses of X-rays—typically around 0.4 millisieverts (mSv) per exam, which is roughly the same amount of natural background radiation a person receives over about seven weeks. This dose is well below the levels known to increase cancer risk. For women over 40, the benefit of early breast cancer detection far outweighs the minimal radiation risk. Screening mammograms can save lives by finding cancers when they are small and more treatable. That said, like any medical test, mammography should be used appropriately—usually according to national screening guidelines (for example, every 1–2 years starting at age 40 or 50, depending on the country and individual risk factors). In summary: Mammography does use X-rays, but the radiation dose is very low and not considered harmful compared to the significant benefits of breast cancer screening.

Response 2. No, the X-ray radiation from mammography is not considered dangerous Mammography uses a very low dose of X-rays, carefully controlled to be just enough to create clear images of the breast. The amount of radiation is small—about the same as what you are naturally exposed to from the environment over a few months. Doctors and health organizations agree that the benefits of mammography in detecting breast cancer early far outweigh the small radiation risk. The machines are regularly checked for safety, and the doses are kept as low as possible. In short: the radiation from mammography is very low and safe, and the test is an important tool for protecting your health.

Breast MRI

Question 1. Is MRI screening harmful?

Response 1. MRI screening is generally considered safe and not harmful, because unlike X-rays or CT scans, it does not use ionizing radiation. Instead, MRI uses a strong magnetic field and radio waves to create detailed images of the body. That said, there are a few considerations. Magnetic field effects: Patients with certain metal implants (such as pacemakers, cochlear implants, or some aneurysm clips) may not be eligible for MRI because the magnetic field can interfere with or move these devices. Contrast agents: In some MRI screenings, a contrast dye called gadolinium is used. For most people it is safe, but in very rare cases it may cause allergic reactions, and in patients with severe kidney disease, it can lead to complications. Claustrophobia and discomfort: Some patients may feel anxious or uncomfortable in the enclosed MRI scanner. Noise: The machine makes loud tapping or knocking sounds, which can be disturbing without ear protection. In summary, MRI screening itself is not harmful and does not expose patients to radiation. However, precautions are needed for people with implants, kidney problems, or anxiety in enclosed spaces.

Response 2. No, MRI screening is not harmful. MRI (Magnetic Resonance Imaging) does not use X-rays or any radiation. Instead, it uses strong magnets and radio waves to create detailed pictures of the inside of the body. This means there is no risk of radiation exposure.
For most people, MRI is completely safe. The main precautions are for people who have metal in their body (such as pacemakers, artificial joints, or certain implants), because the strong magnet may affect these devices. Before the scan, patients are always carefully checked for such conditions. Sometimes a contrast agent (called gadolinium) is used to make images clearer. This is usually safe, but in rare cases, people can have allergic reactions or kidney-related issues. Doctors will check if you are at risk before giving it. In summary: No radiation, safer than X-rays or CT. Main concern, safety around metal implants. Contrast dye, generally safe, but checked case by case.

Question 2. Should I bring my prior examinations and mammograms?

Response 1. Yes, you should bring your prior examinations and mammograms. Bringing your previous images helps the radiologist compare current findings with past studies. This comparison is important for detecting subtle changes, confirming stability of benign findings, and avoiding unnecessary additional tests or biopsies. It also provides valuable clinical context that improves diagnostic accuracy.

Response 2. Yes, it is very helpful to bring your previous examinations and mammograms with you. They allow the doctor to compare your current images with your past ones. This comparison makes it easier to notice even small changes, helps avoid repeating tests unnecessarily, and gives a clearer picture of your breast health over time. If possible, bring both the reports and the actual images (on CD, USB, or through online access), since doctors often need to look directly at the images, not just the written report.

Question 3. When should MRI screening in high-risk women start? How often should MRI screening be repeated?

Response 1. For women at high risk of breast cancer (such as carriers of a BRCA1/2 mutation, those with a strong family history, or prior chest irradiation before age 30), most international guidelines recommend the following: When to start: Screening breast MRI should generally begin at age 25–30 years, or earlier if the individual is a known mutation carrier with a relative diagnosed at a young age. In such cases, starting 5–10 years before the age of the youngest cancer diagnosis in the family is often advised. How often to repeat: MRI should be performed annually as part of high-risk surveillance. Some programs alternate MRI with mammography every 6 months to provide semi-annual imaging surveillance, particularly in women over 30. In summary: High-risk women should start MRI screening around age 25–30 (or earlier if family history suggests), and it should be repeated every year.

Response 2. For women at high risk of breast cancer (for example, because of a strong family history or carrying a gene like BRCA1 or BRCA2), most expert groups recommend the following: When to start: Screening breast MRI usually begins at age 25 to 30, depending on the woman's exact level of risk and family history. How often to repeat: MRI screening should be done once every year. In many cases, it is combined with yearly mammography, though the exact plan can vary depending on age and personal situation. High-risk women should start MRI screening in their mid- to late-20s and continue with yearly scans.

Question 4. Does preoperative MRI also detect additional cancers in women with very fatty breasts and in women over 60 or 70?

Response 1. Yes. Preoperative breast MRI can still detect additional cancers in women with very fatty breasts and in older women (over 60 or 70 years), although the added benefit is usually smaller than in younger women or those with dense breasts. In women with fatty breasts, mammography is already highly sensitive, so MRI may reveal fewer additional lesions. However, MRI can still identify occult multifocal, multicentric, or contralateral cancers that are not visible on mammography or ultrasound. In older women, MRI sensitivity remains high, but its impact on surgical management may be more limited, since breast cancers in this age group tend to be less extensive and more easily detected by conventional imaging. Therefore, while preoperative MRI can detect extra cancers in these patients, its routine use is less strongly recommended and should be individualized based on tumor features and clinical context.

Response 2. Yes, preoperative breast MRI can sometimes detect additional cancers that were not seen on mammography or ultrasound. However, this benefit depends on the type of breast tissue and the patient's age. In women with very fatty breasts, other imaging methods (like mammography) already work very well because fatty tissue makes cancers easier to see. So, MRI usually does not add much extra information in these women. In older women (over 60 or 70), breast tissue also tends to be more fatty, so the same applies — MRI may still find an occasional small cancer that other tests miss, but this is less common than in younger women with dense breasts. In short: MRI can detect extra cancers, but it's most helpful in women with dense breasts (where mammograms are less clear). For women with fatty breasts or those over 60–70, the added benefit of MRI is usually smaller.

Question 5. Is there any special indication for breast MRI when partial breast irradiation is under consideration?

Response 1. Yes — there *is* some support in the literature for using breast MRI (preoperatively) when partial breast irradiation (PBI), especially accelerated PBI or intraoperative radiotherapy (IORT), is being considered — though it is not universally mandated. Here is a more detailed breakdown: Rationale / potential indication for MRI in PBI setting: One of the key concerns when using PBI (versus whole breast irradiation) is that microscopic foci or additional tumor foci elsewhere in the same breast (multifocal or multicentric disease) might be missed, and PBI would not cover those. Because PBI irradiates only a limited volume (e.g. around the lumpectomy cavity), any occult disease outside that region would not receive radiation. Several retrospective studies have shown that in patients who were initially considered eligible for PBI (based on standard imaging), MRI detected additional lesions in a nontrivial fraction. For example, in one series of 79 patients eligible for accelerated PBI, MRI revealed additional tumor foci (other than the index lesion) in ~38%, and in 10% of cases, the additional cancer was in a different quadrant. The argument is that MRI might help improve patient selection by ruling out those who have occult multicentric disease (thus making them poor candidates for PBI). Some authors propose that MRI should be considered more strongly in candidates for IORT (a form of PBI done intraoperatively) because the radiation is delivered at the time of surgery and there is less opportunity for further imaging-based adjustment. One study ("Utility of Preoperative Breast MRI in Patient Selection for PBI") looked at how often MRI changed eligibility decisions by finding additional disease not seen on mammography/ultrasound. However, the current guidelines and consensus statements (e.g. ASTRO, ABS, GEC-ESTRO) for PBI do not universally require MRI for eligibility — many trials & protocols did not routinely include MRI as a staging tool for PBI in their inclusion criteria. Limitations, caveats, and practical considerations: MRI is more expensive, time consuming, and may yield false positives (leading to additional biopsies, patient anxiety). MRI is better at detecting invasive disease but less sensitive for certain in situ disease (e.g. microcalcifications, DCIS) because these are often better visualized on mammography. Some of the additional foci detected by MRI may be clinically insignificant (indolent) and their relevance to prognosis or recurrence risk is uncertain. The detection of additional lesions does not always lead to a change in management, especially if those lesions are small or in a location still covered by the intended radiation field. Because of these trade-offs, many centers reserve preoperative MRI in PBI candidates to selected cases — for example when conventional imaging suggests ambiguous findings, in dense breasts, in younger patients, or when there is higher suspicion of multifocal disease. Also, none of the major prospective randomized PBI trials built preoperative MRI into their eligibility criteria, so evidence is not yet definitive. Bottom line / suggested "indication": So, to directly answer your question: Yes, there is a rationale and some backing for doing a breast MRI before offering PBI in order to exclude occult additional disease and better assure the safety of limiting the treatment volume. But it is not universally accepted as a required step, and its use is somewhat discretionary depending on institutional practice, patient risk factors, and imaging findings.

Response 2. Yes — breast MRI can be useful in certain cases when partial breast irradiation (PBI) is being considered. MRI gives a much clearer picture of the breast tissue than mammography or ultrasound. It can help doctors see if there are any other small cancer areas in the same breast (called "multifocal" or "multicentric" disease) or in the opposite breast that might not have been visible on other tests. Since PBI targets only the area around the original tumor rather than the whole breast, it is very important to be sure that there are no additional hidden cancer spots elsewhere. If MRI shows that the cancer is truly limited to one small area, then PBI may be appropriate. In short: MRI is not required for everyone, but it is often recommended to confirm the cancer is confined to one region before proceeding with partial breast irradiation.

ULTRASOUND

Question 1. Is breast US a harmless investigation?

Response 1. Breast ultrasound (US) is generally considered a safe and harmless imaging technique. It uses high-frequency sound waves, not ionizing radiation, to produce images of breast tissue. Therefore, unlike mammography or CT, it does not expose patients to radiation. The procedure is noninvasive, painless, and well tolerated, making it suitable for all age groups, including pregnant and lactating women. There are no known long-term side effects or biological harms from diagnostic ultrasound when used appropriately. However, while breast US is harmless in terms of physical safety, it has some practical limitations: it is operator-dependent, and may lead to false positives or unnecessary biopsies in inexperienced hands. But these are diagnostic—not health—risks. In summary: Yes, breast ultrasound is a harmless investigation — it is safe, radiation-free, and noninvasive.

Response 2. Yes — breast ultrasound (US) is a harmless and safe test. It uses sound waves to create pictures of the breast and does not involve any radiation, unlike X-rays or CT scans. The procedure is non-invasive, meaning nothing enters your body, and it is painless for most people. During the scan, a small handheld device called a transducer is moved over the skin after applying a layer of gel. The sound waves bounce off the breast tissue and are turned into images on a screen. There are no known risks or side effects, and it can be safely repeated whenever needed — even during pregnancy or breastfeeding.

Question 2. Can breast US be performed instead of mammography for breast cancer screening in the general female population, as it spares radiation?

Response 1. While breast ultrasound (US) is a safe and radiation-free imaging method, it cannot replace mammography for breast cancer screening in the general female population. Mammography remains the standard screening tool because it can detect microcalcifications—tiny calcium deposits that are often the earliest sign of breast cancer—whereas ultrasound cannot. Mammography also provides a better overview of the entire breast structure and allows for population-based screening with proven mortality reduction. Breast US is mainly used as a supplemental test, particularly in women with dense breast tissue, where mammographic sensitivity is reduced. In these cases, combining mammography with ultrasound can improve cancer detection. However, for average-risk women, replacing mammography with ultrasound alone is not recommended, as it may lead to missed cancers and false-positive results.

Response 2. No — breast ultrasound (US) cannot replace mammography for breast cancer screening in the general female population. Ultrasound is very safe and involves no radiation, but it has some important limitations. It can detect many breast changes, especially in dense breasts, but it may miss small cancers that contain microcalcifications — tiny calcium deposits that are often the first sign of breast cancer. These are best seen on mammography. For this reason, mammography remains the standard screening test for women of average risk. Ultrasound may be used as an additional test, particularly in younger women or in those with dense breast tissue, but not as a substitute for mammography in the general population.

Question 3. After a breast US examination, does the woman also need mammography?

Response 1. Breast ultrasound (US) and mammography serve different purposes and complement each other rather than replace one another. After a breast US examination, a woman may still need a mammogram, depending on her age, risk factors, and the clinical findings. For women aged 40 and older, mammography remains the standard screening method because it can detect early signs of breast cancer—such as microcalcifications—that ultrasound cannot show. For younger women or those with dense breast tissue, ultrasound is often used as a supplementary test or as a diagnostic tool for a specific lump, but it is not a substitute for mammography in routine screenin. In summary, whether mammography is needed after breast ultrasound depends on the individual case, but both modalities are often used together for the most accurate assessment.

Response 2. Not always. Mammography and breast ultrasound (US) are different tests that look at the breast in different ways. Mammography uses low-dose X-rays and is the standard screening method for early detection of breast cancer in women over 40. Ultrasound uses sound waves instead of radiation and is usually added when something needs to be checked more closely — for example, if a lump is found or if the breast tissue is very dense on mammography. If a woman has already had an ultrasound, her doctor may still recommend a mammogram, especially for routine screening or to detect very small calcifications that ultrasound cannot see. In short: ultrasound does not replace mammography for screening — they are complementary tests that are often used together for a complete evaluation.

Question 4. Can women consider breast US being free from any potential negative consequences?

Response 1. No, women cannot consider breast ultrasound (US) completely free from potential negative consequences. Although breast US does not involve ionizing radiation and is generally regarded as a safe imaging method, it has some limitations and possible drawbacks: False-positive results: Ultrasound can sometimes detect benign findings that appear suspicious, leading to unnecessary biopsies, anxiety, and follow-up examinations. Operator dependence: The accuracy of breast US depends heavily on the skill and experience of the person performing the examination, which may cause variability in results. Limited screening value: In population-wide screening, US may miss some cancers—particularly microcalcifications that are well seen on mammography—so it cannot fully replace mammography in the general population. Incidental findings: Occasionally, ultrasound may reveal incidental or clinically insignificant lesions that can lead to overdiagnosis and overtreatment. In summary, while breast ultrasound is safe from a radiation standpoint, it is not entirely free from potential negative consequences related to diagnostic accuracy, false positives, and overdiagnosis.

Response 2. Breast ultrasound (US) is generally considered a very safe imaging method. It uses sound waves — not radiation — to create pictures of the breast, so there is no exposure to X-rays or harmful radiation. However, "safe" does not necessarily mean completely free from any possible negative consequences. Some women may experience mild discomfort from the pressure of the probe during the examination. More importantly, ultrasound has *limitations* — it can sometimes miss very small cancers or, on the other hand, suggest a suspicious area that later turns out to be harmless. Such false-positive results may lead to unnecessary anxiety, further tests, or even biopsy. In summary, while breast ultrasound itself does not harm the body and involves no radiation, it is not entirely free from potential indirect consequences related to diagnostic accuracy and follow-up procedures.

Question 5. After receiving the result of a breast handheld US, can women try to get a reliable second opinion on the test?

Response 1. Yes — women can try to get a second opinion after receiving the result of a handheld breast ultrasound, but the reliability of that second opinion depends on the available information. If the second physician has access only to the written report, the opinion will be limited to interpreting another radiologist's summary and wording, which may not fully reflect the actual imaging findings. However, if the original ultrasound images (cine clips and still frames) are provided — for example, in DICOM format on a CD, cloud link, or hospital PACS — another experienced breast radiologist can personally review the images and give a more independent and reliable second opinion. In short: Report only - limited reliability. Full image review by another expert - reliable second opinio. Therefore, women seeking a dependable second opinion should request a copy of their actual ultrasound images along with the report.

Response 2. Yes — women can get a reliable second opinion after a handheld breast ultrasound. However, the reliability of that second opinion depends on how it is done: Image review: The most accurate second opinion comes when another radiologist can review the original ultrasound images, not just the written report. This allows the second doctor to directly assess what was seen on the scan. Access to reports: If the actual images are not available, the second radiologist can still review the report and clinical information, but this may limit the accuracy of their opinion. Specialist centers: Seeking a second opinion at a center that specializes in breast imaging (with radiologists experienced in breast ultrasound and mammography) can improve reliability. Practical steps: Patients can request that their imaging center provide a copy of their ultrasound images on a CD or through a digital platform and take these to the second consultation. In short, yes—getting a second opinion is possible and can be very helpful, especially if the original results are unclear or if a biopsy or further test has been recommended.

Special Information Notes Derived-Questions[1,3,4]

Mammography

***Question A.* What should a patient do if they have symptoms before or during a scheduled screening mammography, and how should persistent symptoms be managed even after a negative result?**

Response 1. If a patient develops new breast symptoms before or during a scheduled screening mammography—such as a palpable lump, nipple discharge, skin changes, or focal pain—they should inform their healthcare provider or the radiology staff before the exam. In such cases, the screening appointment may need to be converted to a diagnostic evaluation, which typically includes targeted mammography views and possibly an ultrasound of the symptomatic area. If symptoms persist after a negative screening result, the patient should not ignore them. Instead, they should return to their clinician for further assessment, as a negative screening mammogram does not completely exclude breast disease. Additional diagnostic imaging, ultrasound, or even biopsy may be necessary to clarify the cause of persistent or worsening symptoms.

Response 2. If you notice any new breast symptoms—such as a lump, pain, nipple discharge, or skin changes—before your scheduled screening mammogram, it's important to contact your healthcare provider first rather than waiting for your appointment. The doctor may recommend a diagnostic mammogram or ultrasound instead of a routine screening. Diagnostic imaging is more detailed and focused on the area of concern. If symptoms appear during or right before the mammogram appointment, let the technologist or radiologist know immediately. They can adjust the exam to better evaluate your symptoms or arrange additional tests if needed. If your mammogram result is negative (normal) but your symptoms continue or worsen, you should not ignore them. A normal screening mammogram does not always rule out every breast problem. Return to your healthcare provider to discuss the next steps—this may include a repeat clinical examination, targeted imaging (such as breast ultrasound or MRI), or referral to a breast specialist to make sure nothing is missed. In short: Report new or ongoing symptoms before your screening. Mention any symptoms during your mammogram. If symptoms persist after a normal result, follow up promptly with your doctor for further evaluation.

***Question B.* Why is it important to provide previous mammogram images and reports before undergoing a new breast imaging examination?**

Response 1. Providing previous mammogram images and reports before undergoing a new breast imaging examination is very important for several reasons. Accurate Comparison: Breast tissue can have naturally dense or complex patterns that vary among individuals. By comparing new images with previous ones, radiologists can determine whether a finding—such as a mass, asymmetry, or calcification—is new, growing, or stable over time. This comparison is key to distinguishing benign, long-standing features from suspicious new changes. Early Detection of Subtle Changes: Small or early-stage abnormalities may be difficult to recognize without a baseline reference. Prior studies allow radiologists to detect even subtle interval changes, improving early diagnosis of breast cancer while minimizing unnecessary biopsies. Reduction of False Positives: Without prior exams, normal anatomical variations might be mistaken for new or suspicious findings, leading to additional imaging or invasive procedures. Having previous mammograms helps avoid such false alarms and reduces patient anxiety. Consistency in Interpretation: Reviewing prior reports provides insight into earlier interpretations, technical parameters, and any areas that required follow-up. This continuity helps ensure consistent and evidence-based assessment of breast health over time. In summary, previous mammograms and reports provide a critical reference that enhances diagnostic accuracy, improves early cancer detection, and reduces unnecessary interventions.

Response 2. It's important to bring your previous mammogram images and reports before a new breast imaging exam because they allow the radiologist to compare your current and past results. This comparison helps in several ways. Detecting changes: Small differences between exams can show whether a finding is new, stable, or has changed over time. Avoiding unnecessary worry or tests: Some spots or densities in the breast are harmless and have been present for years. If the radiologist can see this on your earlier images, you may not need extra imaging or biopsies. Ensuring accurate diagnosis: Having your past results provides a complete picture of your breast health, helping the doctor make a more confident and accurate interpretation. In short, bringing your previous mammograms improves accuracy, safety, and peace of mind during your breast imaging evaluation.

***Question C.* What measures can be taken to minimize discomfort during a mammography and improve the quality of the images?**

Response 1. To minimize discomfort during a mammography and to improve image quality, several simple measures can be taken. Schedule at the right time: If possible, plan the mammogram about a week after your menstrual period, when the breasts are usually less tender and less swollen. This helps reduce discomfort and allows for clearer images. Communicate with the technologist: Inform the technologist if you feel pain, have very sensitive breasts, or if there are any areas of concern. They can adjust the compression pressure or positioning to make the procedure more comfortable while still ensuring adequate imaging. Avoid caffeine and use of deodorant: Limiting caffeine for a few days before the exam may reduce breast tenderness in some women. Also, avoid applying deodorant, lotion, or powder on the chest or underarms before the mammogram, as these can appear as artifacts on the images. Proper positioning and compression: The technologist will position the breast correctly and apply firm but brief compression. Adequate compression is essential—it spreads out breast tissue, reduces motion, and enhances image sharpness, allowing small abnormalities to be seen more clearly. Relaxation techniques: Taking slow, deep breaths and staying as relaxed as possible can help minimize tension-related discomfort. Wearing a two-piece outfit can also make the process easier and quicker. Consistent imaging center and prior comparisons: Having your mammograms done at the same center whenever possible allows for easier comparison with prior studies, improving diagnostic accuracy and avoiding unnecessary repeat imaging. In summary, good communication, proper timing, and correct positioning help reduce discomfort and ensure high-quality mammographic images.

Response 2. To make a mammogram more comfortable and get the best possible images, several simple steps can help. Schedule wisely: Try to book your appointment one week after your period, when your breasts are usually less tender. Avoid caffeine for a few days before: Coffee, tea, and chocolate can sometimes make the breasts more sensitive. Wear a two-piece outfit: You'll only need to remove your top and bra. Don't use deodorant, lotion, or powder: These products can appear as spots on the images and affect quality. Communicate with the technologist: Let them know if you have any pain, anxiety, or prior breast surgery. They can adjust the compression or positioning to make it more comfortable. Relax and breathe steadily: Tensing your muscles can make compression feel worse. Staying calm helps reduce discomfort and produces clearer images. Take pain relief if needed: If you usually feel breast tenderness, taking a mild pain reliever (like ibuprofen or acetaminophen) about an hour before may help. In short: Good timing, preparation, and open communication with the technologist can significantly reduce discomfort and ensure high-quality mammogram results.

***Question D.* What does it mean to be recalled after a screening mammogram, and how likely is it to result in a cancer diagnosis?**

Response 1. Being *recalled* after a screening mammogram means that the radiologist saw something on the initial images that was unclear or required further evaluation. This does not necessarily mean cancer is suspected—it simply means that additional mammographic views or a breast ultrasound are needed to clarify the finding. Common reasons for recall include overlapping tissue, cysts, benign calcifications, or technical factors that limit image interpretation. In most cases, recalls result in benign outcomes. Statistically, only about 4–10% of women undergoing screening mammography are recalled, and fewer than 1 in 10 of those recalled (about 0.5–1% of all screened women) are ultimately diagnosed with breast cancer. Thus, while a recall can be anxiety-provoking, the vast majority of follow-up evaluations confirm that the finding is not malignant.

Response 2. Being recalled after a screening mammogram means that the radiologist saw something on your images that needs a closer look. It does not necessarily mean you have cancer. Sometimes, normal tissue, overlapping breast structures, or harmless cysts can look suspicious on the first mammogram, especially if it's your first screening and there are no previous images for comparison. When you're recalled, you'll usually be invited for additional imaging, such as magnified mammogram views or an ultrasound, to get a clearer picture. In most cases, these extra tests show that everything is normal. Only a small percentage of women who are recalled after screening are ultimately diagnosed with breast cancer. Typically, about 4 out of every 100 women (or around 1 in 25) who are called back after screening will have cancer; the rest will have benign (non-cancerous) findings. In summary: A recall means the radiologist wants more information — not that cancer is confirmed. Most recalls turn out to be false alarms. Only a minority (about 4%) of women called back after screening are found to have breast cancer.

***Question E.* What should a patient do after receiving a BI-RADS 3, 4, or 5 result from a breast imaging examination?**

Response 1. BI-RADS 3 (Probably Benign): A BI-RADS 3 result means the finding is *most likely non-cancerous* (less than 2% chance of malignancy). However, short-term follow-up imaging is recommended to ensure that the finding remains stable. Action: You should return for repeat imaging—usually in 6 months, and sometimes at 12 and 24 months—as advised by your radiologist. Goal: To confirm that the area does not change over time. If it remains stable, it can later be reclassified as benign (BI-RADS 2). BI-RADS 4 (Suspicious): This category indicates that the finding is suspicious for malignancy, with a 2–95% chance of cancer, depending on subcategory (4A, 4B, or 4C). Action: Your radiologist will recommend a biopsy to obtain a tissue sample for pathological examination. Goal: To determine whether the finding is benign or malignant and guide appropriate treatment. BI-RADS 5 (Highly Suggestive of Malignancy): A BI-RADS 5 result means there is a very high likelihood of breast cancer (greater than 95%). Action: An urgent biopsy should be performed to confirm the diagnosis and initiate a treatment plan as soon as possible. Goal: To establish a definitive diagnosis and proceed with multidisciplinary cancer care.

Response 2. If your imaging report shows a BI-RADS 3, 4, or 5, it helps to understand what these categories mean and what steps to take next. BI-RADS 3 – Probably Benign: This means the finding looks very likely to be non-cancerous (less than 2% chance of cancer). Your doctor will usually recommend a short-term follow-up with repeat imaging in about 6 months to be sure the area stays stable. It's important to keep this follow-up appointment, even if you feel fine. BI-RADS 4 – Suspicious Abnormality: This means the finding is not typical of cancer but has a higher chance (roughly 2%–95%) of being malignant. The next step is usually a biopsy, which takes a small tissue sample to confirm whether it's cancer or not. Your doctor or radiologist will explain the biopsy options and schedule it promptly. BI-RADS 5 – Highly Suggestive of Malignancy: This category means the imaging strongly suggests breast cancer (over 95% likelihood). A biopsy is urgently recommended to confirm the diagnosis, and if cancer is confirmed, your healthcare team will discuss treatment options with you right away. General Advice: Do not panic—BI-RADS results are part of a careful system to guide next steps. Follow your doctor's recommendations promptly for follow-up imaging or biopsy. Ask your healthcare provider to explain the results and next steps in simple terms if anything is unclear. Bring a family member or friend to appointments if that helps you feel supported.

***Question F.* What actions should you take if you notice new breast symptoms, even after a recent negative screening mammogram?**

Response 1. If you notice new breast symptoms—such as a lump, nipple discharge, skin changes, or persistent pain even after a recent negative screening mammogram, you should not ignore them. A negative screening result does not completely rule out the possibility of breast disease. Here's what to do: Contact your healthcare provider promptly. Report any new or concerning breast changes as soon as possible, even if your last mammogram was normal. Undergo further clinical evaluation. Your doctor may perform a clinical breast examination and, depending on the findings, recommend additional imaging such as diagnostic mammography, breast ultrasound, or breast MRI for further assessment. Follow recommended investigations and appointments. Early follow-up allows any potential problem to be identified and treated at an early stage, improving outcomes. Do not wait until your next scheduled screening. Screening programs are designed for people without symptoms; once symptoms appear, a diagnostic evaluation is required instead. In short: new breast symptoms always warrant medical attention, regardless of how recent or normal your last screening result was.

Response 2. If you notice new breast symptoms — such as a lump, pain, nipple discharge, or skin changes — even after a recent mammogram, you should not ignore them. A mammogram is a valuable screening tool, but no test is perfect. Some cancers may develop between screenings or may not be visible on imaging, especially in dense breast tissue. Here's what you should do: Contact your doctor promptly. Make an appointment with your primary care physician or gynecologist to discuss your new symptoms. Explain your symptoms clearly. Describe what you have noticed — when it started, whether it has changed, and if it is persistent or painful. Expect further evaluation. Your doctor may recommend a clinical breast exam and possibly additional imaging tests, such as a diagnostic mammogram, breast ultrasound, or sometimes MRI, to investigate the area more closely. Follow up on all test results. Ensure you understand your results and any next steps your doctor advises. In summary: do not wait until your next routine screening — always report new or unusual breast changes, even if your last mammogram was normal. Early evaluation is the safest approach.

***Question G.* Does a suspicious mammographic finding mean a confirmed cancer?**

Response 1. No — a suspicious finding on a mammogram does not necessarily mean cancer is confirmed. It simply means that something unusual was seen on the image that needs further evaluation. This could be due to many non-cancerous (benign) causes, such as cysts, overlapping tissue, or small calcium deposits. When a finding is labeled "suspicious," doctors usually recommend additional imaging tests (like magnified mammogram views or breast ultrasound) or sometimes a biopsy to determine the exact cause. In short, a suspicious mammogram means that cancer is possible but not yet proven — further testing is needed to know for sure.

Response 2. No, a suspicious finding on a mammogram does not mean a confirmed cancer. It means that something unusual was seen on the breast X-ray that needs further evaluation. This may include additional mammographic views, breast ultrasound, or sometimes a biopsy to check the tissue. Many suspicious findings turn out to be benign (non-cancerous), such as cysts, fibroadenomas, or post-surgical changes. In short, "suspicious" means more tests are needed to be certain — it does not automatically mean cancer.

***Question H.* If you are part of an organized screening program, when should you consult your radiologist regarding screening intervals or additional imaging tests?**

Response 1. If you are part of an organized screening program, you should consult your radiologist when there is any uncertainty or change in your recommended screening interval, or if you are advised to undergo additional imaging tests such as ultrasound, MRI, or short-term follow-up mammography. It is especially important to discuss with your radiologist if: You have new personal or family history of breast or other cancers that may affect your risk level. You have dense breast tissue or previous abnormal findings that could change your screening plan. You are pregnant, breastfeeding, or have new health conditions that may influence the safety or timing of imaging tests. Your radiologist can explain why extra imaging may be suggested and help determine the most appropriate interval and modality for your individual risk profile.

Response 2. If you are part of an organized screening program, you should consult your radiologist when: Your screening report shows any abnormal or unclear findings. This includes results suggesting a possible abnormality (for example, "U3" or "BI-RADS 3" or higher). Your personal or family risk factors change. For example, if you develop new symptoms, or if a close family member is diagnosed with cancer, your screening interval or imaging type may need adjustment. You are unsure about when your next screening is due. The recommended interval may differ depending on your age, risk level, and local screening guidelines. You receive advice for additional or follow-up imaging. The radiologist can explain why further tests (such as ultrasound, MRI, or additional mammographic views) are needed and what they involve. In summary, you should reach out to your radiologist whenever your screening results or personal situation change, or when you have questions about the timing or type of imaging that is best for you.

***Question I.* Should I inform my radiologist or radiographer if I have breast implants before a mammography?**

Response 1. Yes, you should definitely inform your radiologist or radiographer if you have breast implants before undergoing a mammogram. Breast implants can make it more difficult to visualize all the breast tissue on standard mammography images because the implant may obscure some areas. When the radiology team is aware of your implants, they can use special imaging techniques, such as implant displacement (Eklund) views, which gently push the implant back against the chest wall while pulling the breast tissue forward. This allows better imaging of the breast tissue and ensures a more accurate examination. Additionally, informing the staff helps them take extra precautions to avoid damaging the implants during compression and to properly interpret the images. In summary: Always tell your radiologist or radiographer about your breast implants before the mammogram so they can adjust the procedure for your safety and to achieve the best diagnostic quality.

Response 2. Yes — you should always inform your radiologist or radiographer if you have breast implants before a mammogram. Breast implants can make it more difficult to see some areas of breast tissue on standard mammography images. Knowing about your implants allows the radiology team to: Use special imaging techniques (called implant-displaced or Eklund views) to better visualize the breast tissue. Take extra care when positioning and compressing the breast to avoid damaging the implant. Ensure that the correct examination type and settings are chosen for your situation. You do not need to worry — mammography is safe for people with implants when the radiology team is informed in advance. Always mention your implants when scheduling the appointment and again when you arrive for your exam.

Breast MRI

***Question A.* What should I do if I think I might be claustrophobic before my breast MRI appointment?**

Response 1. If you think you might be claustrophobic before your breast MRI, it's important to tell your healthcare team in advance. MRI scans take place inside a narrow tube, and some people can feel anxious or confined. Your radiologist or technologist can help make the experience more comfortable by: Discussing your concerns ahead of time. Let the MRI team know about your claustrophobia when scheduling your appointment or upon arrival. Considering mild sedation. Your doctor may prescribe a mild sedative or anti-anxiety medication to help you relax during the scan. Exploring open or wide-bore MRI options. Some centers have scanners with a larger opening, which can feel less confining. Bringing support. In some facilities, you may be allowed to have a friend or family member present for reassurance. Using relaxation techniques. Deep breathing, closing your eyes, or listening to music (if offered) can help you stay calm. Always communicate your anxiety openly with the staff—they are experienced in helping patients who feel claustrophobic and can adjust the process to make it more comfortable and safe for you.

Response 2. If you think you might be claustrophobic before your breast MRI, it's important to let your doctor or the MRI staff know in advance. They can explain the procedure in detail and help you prepare. In many cases, mild relaxation medicine can be prescribed to help you feel calmer during the scan. You can also ask whether the exam can be done in a wider or open MRI scanner, which may feel less confining. During the scan, you'll be able to communicate with the technologist through a microphone, and they can stop the procedure at any time if you feel too uncomfortable. Taking a few slow, deep breaths before and during the scan, keeping your eyes closed, or listening to music (if available) can also help reduce anxiety. The key is to inform the staff early so they can make the experience as comfortable as possible for you.

***Question B.* What should I do if I have an implantable device or metal implant before undergoing a breast MRI?**

Response 1. If you have an implantable device or any kind of metal implant, you must tell your radiologist or MRI technologist before the breast MRI. MRI uses a powerful magnetic field, so metal objects in or on your body can interfere with the scan or pose a safety risk. Some implants—such as pacemakers, cochlear implants, certain aneurysm clips, or older metallic prostheses—may not be safe for MRI. Others, like most modern orthopedic implants or titanium clips, are usually MRI-compatible but still need to be checked. Your radiology team will review the type, model, and material of your implant to determine whether the MRI can be performed safely. In some cases, they may request documentation (like an implant card) or contact your physician. If MRI is not suitable, an alternative imaging method (such as CT or ultrasound) may be recommended.

Response 2. If you have any implantable device or metal implant, you should always tell your radiologist or MRI technologist before your breast MRI. This includes pacemakers, metal clips, joint replacements, cochlear implants, or any metal fragments in your body. MRI uses a strong magnetic field, which can interfere with or move certain metal objects. Your healthcare team will check whether your implant is MRI-safe, MRI-conditional, or unsafe. If it's not compatible, they may adjust the MRI settings, take special precautions, or use another imaging method such as ultrasound or CT. In short: always inform your radiology team about any metal or implanted device before your MRI to ensure your safety and the best possible imaging results.

***Question C.* What should I do if I have a history of allergies or conditions like asthma before having a breast MRI?**

Response 1. If you have a history of allergies or conditions such as asthma, it's important to inform your healthcare team before your breast MRI. Here's what you should do: Tell the MRI staff and radiologist about any allergies you have — especially to medications, contrast agents (such as gadolinium), latex, or adhesives used for ECG leads. Inform them about asthma or other respiratory conditions. This helps the team prepare in case you need special monitoring or medications during the procedure. Discuss prior reactions you may have had to contrast materials or other imaging tests. The radiologist may decide to perform the MRI without contrast or take extra precautions, such as prescribing premedication (antihistamines or corticosteroids). Bring your inhaler or allergy medication if you use them regularly, and let the staff know where they are in case of symptoms. Follow pre-scan instructions carefully, including fasting or medication guidance if contrast injection is planned. In short, providing complete information about your allergy and asthma history allows the medical team to ensure your safety and comfort during the breast MRI.

Response 2. If you have a history of allergies or conditions like asthma, it's very important to let your doctor and the MRI team know before your breast MRI. Some MRI exams use a contrast dye called *gadolinium*, which helps make the images clearer. Although reactions to this dye are rare, your care team needs to know about your allergy history to take precautions. Here's what you should do: Tell your doctor in advance about any allergies, especially to contrast agents, medications, food, or latex. Mention asthma or breathing problems, since these conditions may increase your risk of a mild allergic reaction. Bring a list of your medications, including inhalers or allergy medicines. Ask whether contrast will be used during your scan, and discuss possible alternatives if you've had reactions before. Follow pre-scan instructions carefully, such as taking prescribed medications or fasting, if advised. By sharing this information early, your healthcare team can prepare safely—for example, by giving preventive medication or monitoring you closely during the MRI.

***Question D.* What should I do before a breast MRI if I have kidney problems or other health conditions that might affect my renal function?**

Response 1. If you have kidney problems or any health condition that may affect your renal (kidney) function, you should inform your doctor and the radiology team before your breast MRI. This is important because some breast MRI exams use a contrast agent (gadolinium), which is removed from the body through the kidneys. Before the exam, your doctor will likely: Order a recent blood test to check your kidney function (usually serum creatinine or eGFR levels). Review your medical history, including any chronic kidney disease, diabetes, hypertension, or other relevant conditions. Decide whether contrast is safe or necessary. If your kidney function is reduced, the radiologist may perform the MRI without contrast or use an alternative imaging method. You should also: Bring a list of your medications, as some may affect kidney function. Stay well hydrated, unless your physician has advised fluid restriction. Follow any specific instructions your healthcare provider gives regarding fasting or medication adjustments before the scan. In short, always discuss your kidney health with your doctor before a breast MRI so that they can ensure the safest imaging plan for you.

Response 2. If you have kidney problems or any condition that could affect how your kidneys work, you should tell your doctor before having a breast MRI. This is very important because the MRI sometimes uses a special contrast dye (called gadolinium) that helps make the images clearer. Before the scan: Inform your doctor and MRI team about your kidney condition or any other serious health issues (such as diabetes, high blood pressure, or heart disease). You may need a blood test to check your kidney function (usually a test called eGFR) before the MRI. This helps your doctor decide whether it's safe to give you the contrast dye. Bring a list of your medications and recent test results if you have them. If your kidney function is reduced, your doctor may decide to do the MRI without contrast or use an alternative imaging method. In short, always discuss your medical history with your healthcare provider before the scan so they can ensure the procedure is safe and appropriate for you.

***Question E.* If I am premenopausal, how should I schedule my breast MRI in relation to my menstrual cycle, and what should I do if the appointment doesn't fall within the recommended timeframe?**

Response 1. For premenopausal women, the optimal time to schedule a breast MRI is during the second week of the menstrual cycle, typically between days 7 and 14, counting from the first day of menstruation. This timing minimizes background parenchymal enhancement (BPE), which can otherwise make interpretation difficult by obscuring lesions or mimicking enhancement patterns seen in pathology. Hormonal fluctuations in the luteal phase (after ovulation) increase vascularity and glandular activity, leading to higher BPE and potentially lower diagnostic accuracy. If your MRI appointment cannot be scheduled within this window, you should: Inform the imaging center about your menstrual cycle day so the radiologist can interpret the results accordingly. Proceed with the scan if rescheduling is not practical or if clinical urgency exists (e.g., known cancer, preoperative assessment, or follow-up of a suspicious finding). Avoid the week before menstruation if possible, since enhancement is typically maximal then and can reduce image clarity. In summary: Ideal timing: Cycle days 7–14 (follicular phase). If outside this window: Proceed only if clinically necessary, and document the cycle day to aid interpretation.

Response 2. If you are premenopausal, the timing of your breast MRI matters because your hormone levels can affect how your breast tissue looks on the scan. Best timing: The ideal time for a breast MRI is between day 7 and day 14 of your menstrual cycle (counting day 1 as the first day of your period). During this part of the cycle, your hormone levels are lower, and the breast tissue is less likely to appear dense or show background enhancement, which helps the radiologist see small abnormalities more clearly. If your appointment is outside this window: Don't worry — still go to your scheduled appointment unless your doctor advises otherwise. Inform the MRI center or your referring doctor about the exact date of your last period. They may decide whether to proceed or reschedule for optimal timing. In short, try to schedule your MRI for days 7–14 of your cycle, but if that isn't possible, don't cancel the exam — just let your healthcare provider know your cycle details so they can interpret the images accurately.

***Question F.* What should I do about MRI scheduling if I have irregular menstrual cycles or had a hysterectomy before the age of 50?**

Response 1. If your menstrual cycles are irregular or you have had a hysterectomy before age 50, you can still have an MRI safely — but scheduling may depend on the purpose of the exam: For most MRI exams (such as brain, spine, joints, or abdomen): The timing does not depend on your menstrual cycle. You can schedule the MRI at any convenient time. For breast MRI: The timing is important because the appearance of breast tissue changes with hormone levels. Normally, the best time is between days 7 and 14 of a regular cycle (counting from the first day of menstruation). If your cycles are irregular, let the radiology department know. They will usually recommend scheduling when you are not experiencing breast tenderness or hormonal symptoms, or they may time the MRI based on your most recent cycle information. If you had a hysterectomy but still have ovaries, your body still produces hormones, so you can mention whether you notice any monthly breast changes or symptoms to help choose the best timing. If you had a hysterectomy with removal of both ovaries (surgical menopause) or are already postmenopausal, the MRI can be performed at any time, since hormonal changes no longer affect the images. In all cases, the safest approach is to inform the radiology team about your menstrual history or surgery so they can schedule your scan at the most appropriate time for accurate results.

Response 2. If your menstrual cycles are irregular or you have had a hysterectomy before age 50, you should discuss MRI scheduling with your referring physician or radiologist. For breast MRI, timing is important because hormonal fluctuations can affect the appearance of breast tissue and contrast enhancement. Normally, MRI is performed between days 7 and 14 of a regular menstrual cycle (the follicular phase). If your cycles are irregular: The MRI can be scheduled when you are not experiencing menstrual-like symptoms (e.g., breast tenderness or swelling) to reduce background enhancement. Your radiologist may also advise timing based on hormonal therapy or recent bleeding patterns. If you have had a hysterectomy before age 50: The scheduling depends on whether your ovaries were removed. If both ovaries remain, you may still have cyclical hormonal changes, so timing may follow the same principle as above. If your ovaries were removed (surgical menopause), MRI can be scheduled at any convenient time, since hormonal variations are no longer a concern. In summary, for women with irregular cycles or those who underwent hysterectomy, MRI timing should be individualized based on hormonal status, symptoms, and clinical indication, in coordination with the radiology team.—

***Question G.* Why is it important for me to remain still during the MRI examination?**

Response 1. It is important for you to remain still during the MRI examination because even small movements can cause the images to become blurry or distorted. MRI works by capturing detailed pictures of your body using magnetic fields and radio waves, and the scanner records data in very fine slices. If you move during this process—such as by shifting, swallowing, or even breathing too deeply—the machine may need to repeat the scan or the results may not be accurate. Staying still ensures that the radiologist obtains clear, high-quality images, which are essential for an accurate diagnosis and to avoid having to repeat the examination.

Response 2. Remaining completely still during an MRI is very important because movement can blur the images. MRI works by using powerful magnets and radio waves to create detailed pictures of the inside of your body. Even small movements — such as swallowing, coughing, or shifting slightly — can cause the images to become blurry or unclear. When this happens, the radiologist may not be able to see important details, and parts of the scan might need to be repeated. Staying as still as possible helps ensure that the images are sharp and accurate, allowing your doctor to make the best diagnosis and plan the most appropriate treatment for you.

***Question H.* What does it mean if a needle biopsy is recommended after an MRI detects a suspicious breast lesion?**

Response 1. If an MRI detects a suspicious breast lesion and a needle biopsy is recommended, it means that the MRI has shown an area in the breast that looks abnormal enough to raise concern for possible cancer or another significant condition, but imaging alone cannot make a definite diagnosis. A needle biopsy allows doctors to remove a small sample of tissue from that suspicious area, usually under imaging guidance (such as MRI, ultrasound, or mammography). The sample is then examined under a microscope by a pathologist to determine whether the cells are benign (non-cancerous) or malignant (cancerous). In summary, this recommendation does not mean that cancer is confirmed—it means that the MRI has found a finding that requires tissue confirmation to determine its nature.

Response 2. If your MRI shows a *suspicious breast lesion* and your doctor recommends a needle biopsy, it means the imaging has found an area that looks unusual and needs to be checked more closely to see if it is cancer or not. An MRI can detect very small or subtle changes in breast tissue, but it cannot confirm whether those changes are *benign (noncancerous)* or *malignant (cancerous)*. A needle biopsy allows the doctor to remove a small sample of tissue from the suspicious area using a thin needle, usually guided by imaging. This tissue is then examined under a microscope by a pathologist. In short, a recommended needle biopsy does not necessarily mean cancer is present—it simply means that the MRI showed something that cannot be confidently identified without laboratory testing. The goal is to make a definite diagnosis and guide any further treatment if needed.

***Question I.* What should I do if my MRI result is BI-RADS 4 or 5 but targeted US and mammography are negative?**

Response 1. If your MRI shows a BI-RADS 4 or 5 lesion (meaning suspicious or highly suggestive of malignancy), but targeted ultrasound (US) and mammography are negative, here's what it means and what you should do next: Understand what this situation means: MRI is the most sensitive breast imaging method, and sometimes it can detect lesions that are not visible on ultrasound or mammography — especially in women with dense breast tissue or when the lesion is very small or deep. A BI-RADS 4 or 5 category still indicates that the finding needs a tissue diagnosis because the probability of cancer is not negligible. Next diagnostic steps: If no correlate is found on targeted US or mammography, the next step is usually an MRI-guided biopsy of the suspicious area. This allows radiologists to obtain a sample directly from the lesion detected on MRI, ensuring accurate diagnosis. If MRI-guided biopsy is not available or technically not possible, your doctor might: Refer you to a specialized breast imaging center with MRI-guided biopsy capability, or recommend a short-term follow-up MRI (usually within 3–6 months) to see if the lesion persists or changes. Why this is important: Even though other imaging tests are negative, a BI-RADS 4 or 5 MRI lesion should not be ignored. Relying solely on ultrasound or mammography could miss a small but significant cancer. The biopsy result will clarify whether it is benign or malignant and guide your next treatment steps. What you should do: Discuss the MRI report with your breast radiologist or referring physician. Ask if MRI-guided biopsy can be arranged. Ensure that all your previous imaging studies are reviewed together (sometimes a subtle correlate is later recognized). If biopsy is not immediately possible, make sure a clear follow-up plan is documented.

Response 2. If your MRI result is BI-RADS 4 or 5, it means that something suspicious was seen on MRI that may require further evaluation, usually with a biopsy. If targeted ultrasound and mammography are negative, it means that the area of concern seen on MRI could not be found on those tests. This situation happens sometimes because MRI is more sensitive and can show findings that are not visible on other imaging methods. Here's what you should do: Don't panic, but follow up carefully. BI-RADS 4 and 5 results are not always cancer, but they do mean that a definite diagnosis is needed. MRI-guided biopsy is usually recommended. When ultrasound and mammography can't locate the finding, a biopsy can be done directly under MRI guidance to take a small tissue sample from the suspicious area. Discuss with your radiologist or breast specialist. They will explain whether MRI-guided biopsy is possible at your hospital or if you should be referred to another center that offers it. If biopsy cannot be performed immediately, your doctor may suggest short-term MRI follow-up (usually in 3–6 months) to see if there are any changes. Bring all prior images and reports to your appointment. Sometimes comparing with older studies helps clarify whether the MRI finding is new or stable. In summary: A BI-RADS 4 or 5 MRI result needs a tissue diagnosis, even if other imaging is negative. The next step is usually an MRI-guided biopsy or specialist consultation to plan how to evaluate the finding safely and accurately.

***Question J.* What should I do if my breast MRI result is BI-RADS 3, and does being at high risk affect the next steps?**

Response 1. A BI-RADS 3 result on a breast MRI means that your radiologist found a small area or feature that looks "probably benign," meaning it's very likely not cancer. Statistically, less than 2% of BI-RADS 3 findings turn out to be cancer. Here's what it usually means for you: No immediate biopsy is needed. Your doctor will likely recommend short-term follow-up imaging (often another MRI, mammogram, or ultrasound) in about 6 months to make sure the area doesn't change over time. If it stays the same or becomes clearly benign, the report will eventually be downgraded to BI-RADS 2 (benign) or BI-RADS 1 (normal). If you are at high risk: Being at high risk—for example, if you have a strong family history of breast cancer, a genetic mutation (like BRCA1 or BRCA2), or a personal history of chest radiation—can affect the follow-up plan: Your doctor may choose closer or more frequent imaging follow-up, such as repeating the MRI sooner. In some cases, if the area looks even slightly suspicious and your risk is high, your doctor may suggest a biopsy earlier rather than waiting for follow-up imaging. In summary: A BI-RADS 3 result is reassuring—it usually means the finding is not cancer, but it needs to be watched closely. Your individual risk level helps your care team decide how soon to recheck it or whether additional steps are needed.

Response 2. A BI-RADS 3 result on breast MRI means the finding is "probably benign" — the likelihood of cancer is less than 2%. This category is used when a lesion shows features that are not entirely typical of a benign finding but also not suspicious enough to warrant immediate biopsy. What to do next: The standard management for BI-RADS 3 is short-interval follow-up imaging, not biopsy. Usually, your radiologist will recommend a repeat MRI in 6 months, followed by another at 12 and 24 months if the finding remains stable. The purpose is to ensure the area doesn't change over time. If the lesion remains unchanged, it is reclassified as benign (BI-RADS 2) after about two years of stability. If you are at high risk: If you are at high risk for breast cancer (for example, due to strong family history, genetic mutation, or prior chest radiation), this may affect the next steps in two ways: Closer surveillance: Your radiologist or breast specialist may choose shorter follow-up intervals or recommend additional imaging such as mammography or ultrasound, depending on the lesion's characteristics. Lower threshold for biopsy: In some high-risk cases, the radiologist may suggest biopsy rather than surveillance, even if the finding is technically BI-RADS 3, to provide more certainty. Summary: BI-RADS 3 = probably benign (<2% risk). Usual step: follow-up MRI in 6 months. If high risk: follow-up may be sooner, or biopsy may be considered to rule out malignancy early. Always discuss your personal risk profile and next steps with your breast specialist or radiologist.

***Question K.* If a needle biopsy is recommended based on a lump or imaging findings, should I still have the biopsy even if an MRI was done?**

Response 1. Yes — if a needle biopsy has been recommended based on a lump or imaging findings, you should still have the biopsy even if an MRI has already been performed. MRI is a highly sensitive imaging test, but it cannot definitively determine whether a lesion is benign or malignant. A biopsy is the only way to obtain tissue for microscopic examination, which provides a precise diagnosis. MRI findings may support or refine the suspicion level, but they do not replace histopathological confirmation. In short, if your doctor recommends a biopsy, it means that tissue sampling is necessary to reach a definitive diagnosis, regardless of prior imaging such as MRI.

Response 2. Yes — you should still have the needle biopsy if it was recommended, even if you already had an MRI. MRI is a powerful imaging tool that can show whether a lump looks suspicious, but it cannot confirm whether the tissue is benign or cancerous. Only a biopsy can provide a definite diagnosis by examining the cells under a microscope. In other words, MRI helps guide the decision, but the biopsy gives the final answer. Skipping the biopsy could delay an accurate diagnosis and the right treatment. Your doctor's recommendation for a biopsy means that the imaging findings — even with MRI — were significant enough to require tissue confirmation.

***Question L.* What should I do if I have multiple cases of breast or ovarian cancer in my family, and could I be eligible for MRI screening?**

Response 1. If you have several relatives diagnosed with breast or ovarian cancer, it's important to discuss this with your doctor or a genetic counselor. Multiple cases in the same family may suggest a hereditary cancer syndrome, such as mutations in the BRCA1, BRCA2, or other related genes (like PALB2, TP53, or CHEK2). If your family history meets certain criteria—such as: Two or more close relatives (mother, sister, daughter, or grandmother) with breast or ovarian cancer, cancer diagnosed at a young age (before 50), a male relative with breast cancer, or ovarian, pancreatic, or prostate cancers in the family you may be eligible for genetic testing. If a genetic mutation is found, or if your family history places you in a high-risk category, most international guidelines (such as those from the American Cancer Society and European Society of Breast Imaging) recommend annual breast MRI screening, often in addition to mammography. In short: Step 1: See your doctor or a genetic counselor to review your family history. Step 2: Consider genetic testing for BRCA or related mutations. Step 3: If you are found to be high-risk, yearly MRI screening may be advised, typically starting at age 25–30.

Response 2. If you have several relatives who have had breast or ovarian cancer, it's important to tell your doctor about your family history. They may refer you to a genetic counselor to check whether you could have an inherited risk, such as a BRCA1 or BRCA2 gene mutation. If your family history shows that you are at higher risk, you might be eligible for additional screening beyond routine mammography. In many countries, women at high risk are offered annual breast MRI scans, sometimes starting at a younger age than the general population. Here's what you can do: Gather family information – note which relatives had breast or ovarian cancer and their ages at diagnosis. Talk to your doctor – share this history and ask whether you meet the criteria for genetic testing. Consider genetic counseling and testing – if a mutation is found, your doctor can tailor a screening plan for you. Follow your doctor's screening advice – this may include regular MRI and/or mammography, depending on your personal risk level. Even if you do not have a confirmed gene mutation, your doctor may still recommend closer monitoring if your family history is strong.

***Question M.* If I received thoracic radiation therapy in the past, should I have regular breast screening with MRI and mammography?**

Response 1. If you received radiation therapy to the chest (thoracic radiation) in the past—especially between the ages of 10 and 30—you may have a higher risk of developing breast cancer later in life. Because of this increased risk, regular breast screening is strongly recommended, even if you have no symptoms. Most international guidelines (such as those from the American Cancer Society and the European Society of Breast Imaging) advise the following: Start breast cancer screening earlier than average, typically 8 years after radiation therapy, but not before age 25. Use both MRI and mammography each year. MRI is more sensitive for detecting early cancers in women with radiation-related risk. Mammography complements MRI by detecting some cancers MRI might miss, such as those with microcalcifications. Your doctor can help tailor the schedule to your specific situation, considering your age, the radiation dose, and any other risk factors. In summary: Yes — if you have a history of thoracic radiation, you should undergo annual breast screening with both MRI and mammography starting 8 years after treatment (or from age 25, whichever comes later).

Response 2. If you received radiation therapy to your chest (thoracic area) in the past — especially at a young age — you have a higher risk of developing breast cancer later in life. Because of this, doctors usually recommend regular breast screening with both mammography and breast MRI. Breast MRI is more sensitive and can detect early changes that may not be visible on a mammogram, especially in younger women or those with dense breast tissue. Mammography remains important because it can identify certain types of calcifications and structural changes that MRI may miss. Typically, women who had chest radiation (for example, for lymphoma or other cancers) between ages 10 and 30 are advised to begin annual breast MRI and mammography 8 years after radiation treatment, or at age 25 — whichever comes later. If this applies to you, you should talk to your doctor or a breast specialist to set up a personalized screening plan. Regular follow-up helps detect any problems early, when they are most treatable.

***Question N.* If I have been newly diagnosed with breast cancer, should I consider having a preoperative MRI, and what are its potential benefits and risks?**

Response 1. Preoperative breast MRI can be a valuable tool for some women newly diagnosed with breast cancer, but its role depends on individual circumstances such as tumor type, breast density, and planned treatment. Potential Benefits: More Accurate Assessment of Tumor Extent: MRI is more sensitive than mammography or ultrasound in detecting additional areas of cancer in the same or opposite breast. This can help determine the true size and multifocality of the tumor, which may influence surgical planning (e.g., choosing between lumpectomy and mastectomy). Detection of Occult Lesions: In women with dense breasts or invasive lobular carcinoma, MRI can reveal lesions that are not visible on conventional imaging. Better Surgical Planning: By identifying the full extent of disease, MRI can help reduce the likelihood of positive margins and the need for reoperation after breast-conserving surgery. Assessment of Response to Neoadjuvant Therapy: If chemotherapy is planned before surgery, MRI can serve as a sensitive method for monitoring tumor response. Potential Risks and Limitations: False Positives: MRI can sometimes detect findings that appear suspicious but turn out to be benign, leading to unnecessary biopsies or anxiety. Overestimation of Disease Extent: MRI may overestimate the tumor size or suggest multifocal disease that later proves to be false, potentially resulting in more extensive surgery than necessary. Cost and Accessibility: MRI is more expensive and less widely available than mammography or ultrasound, and it requires intravenous contrast injection. No Proven Survival Benefit in All Patients: While MRI can improve local staging accuracy, studies have not shown a consistent improvement in long-term outcomes such as survival for all patients. In summary: A preoperative breast MRI can be very helpful for selected patients—especially those with dense breasts, lobular histology, or unclear findings on mammography/ultrasound. However, it is not routinely required for every newly diagnosed case. The decision should be individualized after discussion with the multidisciplinary team, weighing the potential benefits of better surgical planning against the risks of false positives and overtreatment.

Response 2. If you have recently been diagnosed with breast cancer, your doctor may discuss whether to have a preoperative breast MRI before surgery. Potential Benefits: More detailed imaging: MRI can show the breast tissue in greater detail than mammography or ultrasound. This may help detect additional cancer areas in the same breast or in the opposite breast that were not seen on other imaging tests. Better surgical planning: By showing the exact size and extent of the tumor, MRI can sometimes help your surgeon plan the most appropriate type of surgery — for example, whether breast-conserving surgery (lumpectomy) is suitable or if a mastectomy might be needed. Assessment of treatment response: If chemotherapy is planned before surgery, MRI is also useful to evaluate how well the tumor responds to treatment. Possible Risks or Limitations: False positives: MRI is very sensitive, which means it can sometimes show findings that look suspicious but turn out not to be cancer. This may lead to unnecessary biopsies or anxiety. Cost and availability: MRI is more expensive and not always available in all centers. Contrast injection: The test usually requires an intravenous contrast agent (gadolinium). Although side effects are rare, there is a small risk of allergic reaction or kidney-related complications in patients with poor kidney function. Not always needed: For many patients, mammography and ultrasound already provide enough information for surgery. In such cases, MRI may not change the treatment plan. Summary: Preoperative MRI can be very helpful for some patients—especially those with dense breasts, invasive lobular cancer, or when there is uncertainty about tumor extent—but it is not necessary for everyone. It is best to discuss the potential benefits and drawbacks with your breast surgeon and radiologist to decide whether MRI would meaningfully add value in your specific situation.

***Question O.* Do I need a breast MRI to check my implants if I don't have any symptoms?**

Response 1. If you have breast implants but no symptoms such as pain, swelling, changes in breast shape, or signs of rupture, you typically do not need routine MRI screening right away. For silicone implants, the U.S. Food and Drug Administration (FDA) recommends a breast MRI (or ultrasound) to check for "silent rupture" starting 5–6 years after implantation and then every 2–3 years thereafter, even if you feel fine. This is because silicone leaks can occur without obvious symptoms. If you have saline implants, MRI screening is not usually necessary unless there are symptoms, since saline leaks are visible through noticeable breast deflation. In summary: If silicone implants: consider MRI screening every few years as recommended. If saline implants: MRI is not needed unless symptoms develop. Always discuss your individual situation with your plastic surgeon or breast specialist, who can tailor the recommendation based on your implant type, age, and any prior imaging.

Response 2. If you have breast implants and no symptoms such as pain, changes in shape, or firmness, a breast MRI is not always needed right away. For most women with silicone implants, the U.S. Food and Drug Administration (FDA) recommends having an MRI or ultrasound to check for silent (hidden) ruptures starting 5–6 years after getting them, and then every 2–3 years after that. This is because silicone leaks may not cause symptoms but can still be seen on imaging. If your implants are saline, you usually don't need an MRI, because a leak is easy to notice — the breast will deflate as the saline is absorbed by the body. In summary: No symptoms: follow the FDA schedule for periodic MRI or ultrasound checks (especially for silicone implants). Any change or concern: see your doctor sooner — they may recommend an MRI earlier.

***Question P.* Do breast implants affect the accuracy of contrast-enhanced MRI in detecting new or recurrent breast cancer?**

Response 1. Breast implants can partially affect the accuracy of contrast-enhanced breast MRI in detecting new or recurrent breast cancer, but the impact is generally much smaller than in mammography or ultrasound. Image Quality and Artifact: Implants—especially silicone—may cause signal voids and field inhomogeneity artifacts that can obscure adjacent breast tissue. However, modern MRI techniques (such as fat suppression, implant-displacement sequences, and dedicated breast coils) minimize these artifacts, allowing most of the glandular tissue to be adequately evaluated. Diagnostic Performance: Contrast-enhanced MRI remains the most sensitive modality for detecting breast cancer even in women with implants. Reported sensitivities for MRI typically exceed 90%, compared with much lower sensitivity for mammography in the same population. MRI is particularly valuable for evaluating recurrence after breast-conserving surgery or reconstruction, where postoperative changes and implant capsules make other imaging less reliable. Limitations: Small enhancing lesions adjacent to the implant–capsule interface may be difficult to characterize. MRI may have slightly reduced specificity, leading to more benign biopsies. Patients with non-MRI-compatible implants (very rare today) cannot undergo MRI. Summary: While breast implants can introduce minor technical challenges, contrast-enhanced MRI remains the most accurate and reliable imaging technique for detecting new or recurrent breast cancer in patients with implants, provided that appropriate imaging protocols are used.

Response 2. Breast implants do not usually reduce the accuracy of contrast-enhanced MRI in finding new or recurrent breast cancer. In fact, MRI is the most reliable imaging method for evaluating breast tissue in women with implants. Unlike mammography or ultrasound, MRI uses magnetic fields and contrast material to show the inside of the breast in detail — even behind or around the implants. Radiologists can clearly see both the breast tissue and the implant surface. However, certain factors can slightly affect image quality, such as the type of implant (silicone or saline), its location (in front of or behind the chest muscle), and any scar tissue or rupture. These do not usually prevent cancer detection but may make interpretation a bit more complex for the radiologist. In summary: MRI remains highly accurate and sensitive for detecting breast cancer in women with implants. Small technical adjustments during the scan may be needed to get the best images. Patients should always inform the radiology team about their implants before the exam.

***Question Q.* Do I need to provide information about my breast implants before having an MRI, and what should I do if I don't have the details?**

Response 1. Yes, you should always inform the radiology team if you have breast implants before undergoing an MRI. The details about your implants — such as the manufacturer, model, and type (silicone or saline; textured or smooth; with or without magnetic components) — help ensure that the correct MRI protocol is used and that safety precautions are in place. If you do not have this information, tell the technologist or radiologist before the scan. They can often identify the implant type using previous imaging (such as mammograms or ultrasound) or adjust the MRI settings to safely accommodate the uncertainty. It's also helpful to bring any implant identification card or medical records you may have, even if incomplete.

Response 2. Yes — you should always tell the MRI team if you have breast implants, even if they are many years old. This information helps the radiology staff choose the safest and most accurate MRI settings for you. Different implant types (such as silicone or saline) and brands may have specific safety guidelines, and some older implants may not be compatible with strong magnetic fields. If you don't have the implant details — for example, if you no longer have the card or paperwork — let the staff know before your appointment. They can often find out what kind of implants you have by checking your medical records, previous imaging (like mammograms), or by performing a quick ultrasound before the MRI if needed. The key is to inform them in advance so they can plan the scan safely and effectively.

ULTRASOUND

***Question A.* Who should perform my breast US, and does the radiologist's experience or the quality of the equipment affect the reliability of the results?**

Response 1. Breast ultrasound should be performed by a qualified radiologist or sonographer who specializes in breast imaging. Ideally, the exam is interpreted by a breast radiologist — a doctor trained to detect subtle findings and to correlate ultrasound results with mammography or MRI when needed. Yes, both the radiologist's experience and the quality of the ultrasound equipment can significantly affect how reliable the results are. Experience matters: An experienced radiologist is better at distinguishing normal tissue variations from suspicious findings, reducing both false positives and missed cancers. Equipment quality matters: High-resolution ultrasound systems provide clearer, more detailed images, which are essential for accurately characterizing small lesions or guiding biopsies. For the most reliable results, it's best to have your breast ultrasound done in a specialized breast imaging center where skilled radiologists use modern, high-quality equipment and your imaging can be compared with your previous studies if available.

Response 2. Breast ultrasound should always be performed and interpreted by a radiologist, ideally one who has specific experience in breast imaging. Radiologists who specialize in breast exams are trained to recognize very small or subtle changes that might indicate a benign or malignant process, which improves the accuracy of the results. The quality of the ultrasound equipment also matters. High-resolution and up-to-date machines provide clearer images, allowing the radiologist to detect small lesions and evaluate their features more precisely. In short, both the radiologist's expertise and the technical quality of the equipment directly affect how reliable and informative your breast ultrasound will be. Choosing a specialized breast imaging center helps ensure the most accurate results.

***Question B.* Why is it important for me to follow the radiologist's instructions and how can I help improve the quality of my breast US exam?**

Response 1. It is important to follow the radiologist's instructions because they are designed to ensure the most accurate and complete breast ultrasound (US) examination possible. The radiologist and technologist may ask you to change position, raise your arm, hold your breath, or remain still at specific times. These directions help to obtain clear, motion-free images and allow better visualization of all areas of the breast, including deep or difficult-to-reach regions. Following instructions closely minimizes artifacts and avoids the need for repeated scans, improving diagnostic accuracy and efficiency. You can help improve the quality of your breast ultrasound by: Arriving prepared: Avoid applying lotions, powders, or deodorants on the day of the exam, as these can interfere with image quality. Wearing comfortable clothing: This allows easier access to the area being scanned. Relaxing and cooperating: Staying calm and following breathing or positioning instructions reduces movement and helps the radiologist capture precise images. Communicating clearly: Inform the technologist of any breast symptoms, prior surgeries, or recent imaging studies, since this information helps tailor the examination to your specific needs. By actively participating and following the radiologist's guidance, you contribute to obtaining the most accurate and useful results from your breast ultrasound exam.

Response 2. It's important to follow the radiologist's instructions during your breast ultrasound because they help ensure that the images are clear and complete. Small details—like how you position your arm, when to hold your breath, or how much pressure is applied—can affect how well the radiologist can see the breast tissue. Clear images make it easier to detect any abnormalities early and avoid the need for repeat scans. You can help improve the quality of your breast ultrasound by: Wearing a comfortable, two-piece outfit so you can easily remove clothing from the upper body. Avoiding lotions, powders, or deodorant on your breasts or underarms before the exam, since these can interfere with the ultrasound gel and image quality. Relaxing and staying still during the scan so the images don't blur. Following positioning or breathing instructions carefully, as they help the technologist or radiologist visualize the breast tissue more completely. Mentioning any areas of concern (like lumps or pain) before the exam starts, so the radiologist can focus on those regions. By cooperating closely and following these instructions, you play an active role in helping the radiologist get the most accurate and useful images possible.

***Question C.* What should I know about automated breast US, and what happens if a suspicious finding is detected?**

Response 1. Automated breast ultrasound (ABUS) is an advanced imaging technique used to examine the breast tissue, particularly useful in women with dense breasts where mammography alone may miss certain cancers. Unlike handheld ultrasound, ABUS uses a large transducer that automatically scans the entire breast in a systematic, standardized manner. This creates a 3D dataset that radiologists can review in multiple planes, improving consistency, reproducibility, and workflow efficiency. Key things to know about ABUS: It is painless and radiation-free, typically performed while the patient lies on her back. The scan takes about 15–20 minutes for both breasts. ABUS is usually performed as a supplemental test after a screening mammogram, not as a replacement. It helps detect small, invasive cancers that may be hidden in dense tissue. If a suspicious finding is detected: The radiologist will carefully review the abnormal area and may recommend targeted (handheld) ultrasound for further evaluation. If the finding remains suspicious, a biopsy will be advised to determine whether it is benign or malignant. Depending on the biopsy result, the patient may need additional imaging, surgical consultation, or treatment planning. In summary, ABUS enhances breast cancer detection, especially in dense breasts, and any suspicious finding is thoroughly investigated to ensure an accurate diagnosis and appropriate next steps.

Response 2. Automated breast ultrasound (ABUS) is an imaging test that uses sound waves to create detailed pictures of the breast. Unlike traditional hand-held ultrasound, ABUS scans the entire breast automatically with a large transducer, producing standardized, three-dimensional images. It is especially useful for women with dense breast tissue, where mammograms may miss small cancers because dense tissue and tumors both appear white on mammograms. During the exam, you'll lie on your back while a layer of gel is applied to the breast. A scanning pad is gently placed on top, and the system moves automatically to capture multiple images. The procedure is painless, radiation-free, and usually takes about 15 minutes per breast. If a suspicious finding is detected, the radiologist will review the images in detail and may recommend a targeted diagnostic ultrasound to take a closer look at the specific area. If that still appears abnormal, the next step is typically a core needle biopsy, a short procedure that removes a tiny tissue sample to check for cancer cells under a microscope. Most findings turn out to be benign (non-cancerous), but if cancer is confirmed, your care team will discuss further imaging, treatment options, and next steps right away.

***Question D.* If both mammography and breast US are recommended, which exam should be done first, and can they be evaluated together?**

Response 1. When both mammography and breast ultrasound are recommended, mammography should generally be performed first. This is because mammography provides a comprehensive overview of the breast architecture, detects microcalcifications (which ultrasound cannot), and helps guide the subsequent ultrasound examination to areas that may require targeted evaluation. After mammography, ultrasound can be performed immediately in the same session for complementary assessment—especially to further characterize any findings seen on mammography (e.g., distinguishing cystic vs. solid lesions) or to evaluate regions that may be difficult to assess mammographically due to dense breast tissue. In summary, mammography is usually done first, followed by ultrasound, and the results from both modalities are interpreted together to provide a more accurate and comprehensive diagnostic assessment.

Response 2. If both mammography and breast ultrasound are recommended, it is usually best to have mammography first. Mammography gives an overall view of both breasts and can show areas that might not be felt or seen on ultrasound. After the mammogram, the breast ultrasound is then performed to look more closely at any findings or dense areas seen on the mammogram. The two exams are often evaluated together by the radiologist. This combined approach allows the doctor to compare findings from both tests, improving accuracy and helping decide if further tests or follow-up are needed.

***Question E.* Which imaging method is better at detecting calcifications? If calcifications are detected on my mammogram, why do I need a targeted US as well?**

Response 1. Mammography is the best imaging method for detecting breast calcifications. It can visualize even very tiny calcium deposits—sometimes only a few tenths of a millimeter in size—because X-rays are highly sensitive to differences in tissue density and mineral content. These calcifications may appear as early signs of breast changes, including ductal carcinoma in situ (DCIS), even before a mass develops. If calcifications are detected on your mammogram, a targeted ultrasound (US) is often performed as a complementary study. Although ultrasound is less sensitive to calcifications themselves, it helps determine whether there is a corresponding mass, distortion, or cystic lesion in the same area. This information is essential for accurate characterization and for guiding possible biopsy procedures, since ultrasound allows real-time needle guidance. In summary: Mammography detects and characterizes calcifications. Ultrasound evaluates the surrounding tissue for an underlying lesion and guides further management.

Response 2. Mammography is the best imaging method for detecting calcifications in the breast. It uses low-dose X-rays that can show very tiny calcium deposits long before they form a lump or cause symptoms. These small white spots—called microcalcifications—are often too small to be seen on ultrasound or MRI, so mammography is the most sensitive test for finding them. However, if calcifications are seen on your mammogram, your doctor may recommend a targeted breast ultrasound as a follow-up. This is because ultrasound helps look for any associated soft tissue changes, such as a small mass or architectural distortion, that might not be visible on the mammogram. Ultrasound also helps the radiologist determine whether the area needs a biopsy and guides the procedure safely if one is required. In short: Mammography is best for detecting calcifications. Ultrasound is used afterward to check for any related abnormalities and to guide further evaluation or biopsy if needed.

***Question F.* Should I tell my radiologist about my breast implants before the exam, and why?**

Response 1. Yes, you should definitely tell your radiologist or technologist about your breast implants before the exam. Here's why: Imaging technique adjustment: Breast implants can obscure some breast tissue on mammography or ultrasound. Informing the radiologist allows them to use special imaging techniques, such as *implant displacement (Eklund) views*, to better visualize the surrounding breast tissue. Safety considerations: Some imaging methods or compression pressures might need modification to avoid damaging the implants or causing discomfort. Accurate interpretation: Knowing the type (saline or silicone), location (subglandular or subpectoral), and age of your implants helps the radiologist interpret the images correctly and recognize implant-related findings or complications. In short, sharing this information ensures both safe imaging and more accurate detection of abnormalities.

Response 2. Yes — you should definitely tell your radiologist if you have breast implants before your imaging exam. Breast implants can change how breast tissue looks on a mammogram, ultrasound, or MRI. Knowing about your implants helps the radiologist and technologists use the right imaging techniques to get clear and accurate pictures. For example, during a mammogram, special "implant-displacement" views are used to see as much breast tissue as possible. It's also important for your safety. Certain exams or procedures apply compression or pressure to the breast, so the staff need to handle your implants carefully to avoid any damage or discomfort. In short, telling your radiologist ensures your exam is both safe and effective, allowing them to give you the most accurate results.

***Question G.* What should I do if my US report suggests a possible abnormality like U3/BI-RADS 3 or higher findings?**

Response 1. If your ultrasound (US) report indicates a possible abnormality such as U3 or BI-RADS 3 or higher, you should follow up with your referring physician or a breast specialist to discuss the next steps. U3 / BI-RADS 3 (probably benign): This means the finding is likely benign (over 98% chance of being non-cancerous), but short-term follow-up imaging—usually in 6 months—is recommended to ensure stability. Your doctor will schedule this follow-up ultrasound or mammogram. U4 / BI-RADS 4 (suspicious) or U5 / BI-RADS 5 (highly suggestive of malignancy): These categories indicate a higher suspicion of cancer. In such cases, your doctor will typically recommend a biopsy to obtain a tissue sample for definitive diagnosis. In summary, do not ignore the report. Make an appointment with your doctor to review the findings, discuss the level of concern, and arrange any additional imaging or biopsy as advised.

Response 2. If your ultrasound (US) report mentions a possible abnormality such as U3 (on the UK Breast Imaging Reporting system) or BI-RADS 3 or higher (on the American system), it means that something slightly unusual was seen, but it doesn't necessarily mean cancer. Here's what you should do: Don't panic: Most findings in these categories are not cancer. For example, BI-RADS 3 (or U3) usually means the finding is *"probably benign"* — there's less than a 2% chance it's cancer. Follow your doctor's advice for next steps: Your radiologist or referring doctor will explain what to do next. Depending on the category: BI-RADS 3 / U3: Usually, a short-term follow-up scan (in about 6 months) is recommended to make sure the finding doesn't change. BI-RADS 4 or 5 / U4 or U5: These suggest a higher chance of cancer, and your doctor will likely recommend a biopsy to check the tissue. Ask questions, you can ask your doctor: What exactly was seen on my scan? What does this score (U3/BI-RADS 3 or 4) mean in my case? Do I need more imaging or a biopsy? When should I come back for follow-up? Keep your reports: Bring your ultrasound and any previous imaging (like mammograms) to your next appointment. Comparing images over time helps doctors make the right decision. Stay calm and follow up: The most important thing is to attend your follow-up or biopsy as advised. Many small or uncertain findings turn out to be harmless, but careful follow-up ensures that anything serious is caught early.

[1]Sardanelli F, Helbich TH; European Society of Breast Imaging (EUSOBI). Mammography: EUSOBI recommendations for women's information. *Insights Imaging.* 2012;3(1):7-10. [Crossref]
[2]Mann RM, Balleyguier C, Baltzer PA, et al. Breast MRI: EUSOBI recommendations for women's information. *Eur Radiol.* 2015;25(12):3669-3678. [Crossref]
[3]Evans A, Trimboli RM, Athanasiou A, et al. Breast ultrasound: recommendations for information to women and referring physicians by the European Society of Breast Imaging. *Insights Imaging.* 2018;9(4):449-461. [Crossref]
BI-RADS, Breast Imaging Reporting and Data Systems; EUSOBI, European Society of Breast Imaging; FAQs, frequently asked questions; GPT-5, Generative Pre-trained Transformer-5; MRI, magnetic resonance imaging; SINs, special information notes; US, ultrasound.

Supplementary Table 5. Per-item, per-rater accuracy Likert ratings (rater 1, rater 2, final score) for all 48 questions under both prompts

	Reviewer-1 PROMPT-1	Reviewer-1 PROMPT-2	Reviewer-2 PROMPT-1	Reviewer-2 PROMPT-2	Final Score PROMPT-1	Final Score PROMPT-1
FAQs						
Mammography						
1	5	5	5	4	5	4.5
2	4	5	5	5	4.5	5
3	5	5	5	4	5	4.5
4	5	5	5	5	5	5
5	5	4	5	4	5	4
MRI						
1	4	4	4	4	4	4
2	4	5	4	5	4	5
3	5	5	5	4	5	4.5
4	5	5	5	5	5	5
5	4	4	5	4	4.5	4
US						
1	5	4	5	4	5	4
2	4	4	4	4	4	4
3	4	5	5	5	4.5	5
4	4	4	4	4	4	4
5	3	3	2	2	2.5	2.5
SINs						
Mammography						
A	5	5	5	5	5	5
B	5	4	5	4	5	4
C	5	5	5	5	5	5
D	5	5	5	5	5	5
E	4	4	5	4	4.5	4
F	5	5	5	5	5	5
G	5	5	5	5	5	5
H	4	5	4	5	4	5
I	5	5	5	5	5	5
MRI						
A	3	3	3	3	3	3
B	5	5	5	5	5	5
C	4	4	4	4	4	4
D	5	5	5	5	5	5
E	5	5	5	5	5	5
F	5	4	5	4	5	4
G	5	5	5	5	5	5
H	4	4	4	4	4	4
I	4	4	4	4	4	4
J	5	5	5	5	5	5
K	5	5	5	5	5	5
L	5	4	5	4	5	4
M	5	5	4	4	4.5	4.5
N	5	5	5	5	5	5
O	5	5	5	5	5	5
P	3	4	3	4	3	4
Q	5	5	5	5	5	5
US						
A	4	4	3	4	3.5	4
B	5	5	5	5	5	5
C	5	5	4	5	4.5	5
D	4	4	4	5	4	4.5
E	4	5	4	4	4	4.5
F	4	5	4	5	4,5	5
G	4	4	4	4	4	4

FAQs, frequently asked questions; SINs, special information notes derived-questions, MRI, magnetic resonance imaging; US, ultrasound.

References

1. Sardanelli F, Helbich TH; European Society of Breast Imaging (EUSOBI). Mammography: EUSOBI recommendations for women's information. *Insights Imaging.* 2012;3(1):7-10. [Crossref]
2. Mann RM, Balleyguier C, Baltzer PA, et al. Breast MRI: EUSOBI recommendations for women's information. *Eur Radiol.* 2015;25(12):3669-3678. [Crossref]
3. Evans A, Trimboli RM, Athanasiou A, et al. Breast ultrasound: recommendations for information to women and referring physicians by the European Society of Breast Imaging. *Insights Imaging.* 2018;9(4):449-461. [Crossref]