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Breast Sonography Review

Breast A Q&A Review for the ARDMS Specialty Exam

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KATHRYN A. GILL

Breast Sonography Review

A REVIEW FOR THE REGISTRY EXAM

Breast Sonography Review

A REVIEW FOR THE ARDMS BREAST EXAM

2019

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Preface

THIS MOCK EXAM is a question/answer/reference review of breast sonography for those RDMS candidates who plan to take the ARDMS specialty examination in breast sonography. It is designed as an adjunct to your regular study and as a method to help you determine your strengths and weaknesses so that you can study more effectively. *Breast Sonography Review* covers everything on the current ARDMS exam content outline, which you will find in Part 11 of this book.

Facts about *Breast Sonography Review*:

- It covers the current ARDMS exam outline.
- It focuses exclusively on the Breast specialty exam to ensure thorough coverage of even the smallest subtopic on the exam. (For the Sonography Principles and Instrumentation exam, see *Ultrasound Physics Review for the SPI Exam* by Cindy Owen and James Zagzebski.)
- *Breast Sonography Review* contains nearly 300 questions, many of which are image-based or otherwise illustrated.
- Explanations are clear and conveniently referenced for fact-checking or further study.
- The exam includes Advanced Item Type (AIT) questions that simulate hands-on clinical experience. We have identified the questions in this book that help prepare you for SIC (Semi-Interactive Console) and Hotspot questions.

  SIC questions require the examinee to use a semi-interactive console to correct a problem with the image presented. *Breast Sonography Review* has similar questions that ask what is wrong with an image or how to correct a problem. SIC questions are currently used in the SPI exam. We have included some here to provide bonus Physics coverage.

  Hotspot question items require examinees to indicate the answer to a question by pointing at or marking directly on an image. In *Breast Sonography Review*, similar questions ask examinees to indicate the label on an image that corresponds to the correct answer. Hotspot questions appear on the Breast specialty exam.

- The ARDMS exam outline and contact information for the ARDMS appears in Part 11 at the end of the book.

Breast Sonography Review effectively simulates the content and the experience of taking the exam. Current ARDMS standards call for approximately 170 multiple-choice questions to be answered during a three-hour period. That is, you will have an average time of 1 minute to answer each question. Timing your practice sessions according to the number of questions you need to finish will help you prepare for the pressure experienced by RDMS candidates taking this exam. It also helps to ensure that your practice scores accurately reflect your strengths and weaknesses so that you study more efficiently and with greater purpose in the limited time you can devote to preparation.

ARDMS test results are reported as a "scaled" score that ranges from a minimum of 300 to a maximum of 700. A scaled score of 555 is the passing score (the "passpoint" or "cutoff score" for *all* ARDMS examinations. The scaled score is simply a conversion of the number of correct answers that also, in part, takes into account the difficulty of a particular question. Google or otherwise search for *Angoff scoring method* if you want to learn more about scaled scoring. Suffice it to say that it helps to ensure the fairness of the exams and that in the case of all ARDMS exams 555 is the minimum passing score.

We include below and strongly recommend that you read *Taking and Passing Your Exam*, by Don Ridgway, RVT, who offers useful tips and practical strategies for taking and passing the ARDMS examinations.

Finally, you have not only our best wishes for success, but also our admiration for taking this big and important step in your career.

Kathy Gill

Kathryn A. Gill, MS, RT, RDMS, FSDMS
Spanish Fort, Alabama

Taking and Passing Your Exam

by Don Ridgway, RVT*

Preparing for your Exam . . .

Study. And then study some more. Knowing your stuff is the most important factor in your success. Start early, set a regular study schedule, and stick to it. Make your schedule specific so you know exactly what to study on a particular day. Write it down. Establish realistic goals so that you don't build a mountain you can't climb.

As to *what* you study, don't just read aimlessly. Focus your efforts on what you need to know. Rely on a core group of dependable references, referring to others as necessary to firm up your understanding of specific topics. Let the ARDMS exam outlines guide you. And use different but complementary study methods—texts, flashcards, and mock exams—to exercise those neural pathways.

Ease down on studying the week before. Wind down, reduce stress, build confidence, and rest up. Don't cram! And no studying the night before. You had your chance. Watch a movie, relax, go to bed early, and sleep well.

Organize your things the night before. Lay out comfortable clothes (including a sweater or sweatshirt in case the testing center is cold), pencils, your ARDMS test-admission papers, car and house keys, glasses, prescriptions, directions to the test center, and any other personal items you might need. Be prepared!

The Day of Your Exam . . .

Eat lightly. You do not want to fall asleep during the exam. Go easy on the coffee or tea so your bladder doesn't distract you halfway through the exam.

Arrive early. Plan to arrive at the test center early, especially if you haven't been there before. Take directions, including the telephone number of the testing center in case you have to make contact en route. You don't need a wrong-offramp adventure.

*Don Ridgway is the author of *Introduction to Vascular Scanning: A Guide for the Complete Beginner* and editor of *Vascular Technology Review 2010*. Don teaches and practices at Grossmont College and Hospital in El Cajon, California.

Be confident. As you wait for the exam to begin, smile, lift both hands, wave them toward yourself, and say, “Bring it on.”

During the Exam . . .

Read each question twice before answering. Guess how easy it is to get one word wrong and misunderstand the whole question.

Try to answer the question before looking at the choices. Formulating an answer before peeking at the possibilities minimizes the distractibility of the incorrect answer choices, which in the test-making business are called—guess what!—*distractors*.

Knock off the easy ones first. First answer the questions you feel good about. Then go back for the more difficult items. Next, attack the really tough ones. Taking notes on long or tricky questions often can jog your memory or put the question in new light. For questions you just cannot answer with certainty, eliminate the obviously wrong answer choices and then guess.

Guessing. Passing the exam depends on the number of correct answers you make. Because unanswered questions are counted as *in*correct, it makes sense to guess when all else fails. The ARDMS itself advises that “it is to the candidate’s advantage to answer all possible questions.” Guessing alone improves your chances of scoring a point from 0 (for an unanswered question) to 25% (for randomly picking one of four possible answers). Eliminating answer choices you know or suspect are wrong further improves your odds of success. By using your knowledge and skill to eliminate two of the four answer choices before guessing, for example, you increase your odds of scoring a point to 50%.

Pace yourself; watch the time. Work methodically and quickly to answer those you know, and make your best guesses at the gnarly ones. Leave no question unanswered.

Don’t despair 50 minutes into the exam. At some point you may feel that things just aren’t going well. Take 10 seconds to breathe deeply—in for a count of five, out for a count of five. Relax. Recall that you need only about three out of four correct answers to pass. If you’ve prepared reasonably well, a passing score is attainable even if you feel sweat running down your back.

Taking the Exam on Computer . . .

Some candidates express concern about taking the registry exam on computer. Most folks find this to be pretty easy; some find it off-putting, at least in prospect. But the computerized exams are quite convenient: You can take the exam at your convenience (a far cry from the days of one exam per year), you know whether or not you passed before you leave the testing center (compare that to waiting weeks and even months, as used to be the case), and you can reschedule the exam after 90 days if you happen not to pass the first time (rather than waiting another six months to a year). Another good point: The illustrations are said to be clearer on computer than in the booklets at a Scantron-type exam.

Taking the test by computer is not complicated. The center even gives you a tutorial to be sure you know what you need to do. You sit in a carrel with a computer and answer the multiple-choice questions by pointing and clicking with a mouse. There is a clock on the display letting you know how much time is left. Use it to pace yourself. Scratch paper is available; make liberal use of it.

You can mark questions to return for answering later. A display shows which questions have not been answered so you can return to them. When you have finished, you click on “DONE,” and you find out immediately whether you passed.

It’s nothing to be afraid of. The principles are the same as those for any exam. Be methodical and keep breathing.

Summary . . .

Preparing for the exam:

- Study
- Use flashcards
- Join a study group
- Wind down a week before
- Don’t cram
- Relax!

The day of your exam:

- Eat lightly, arrive early, avoid coffee
- Arrive early
- Take a sweater
- Be confident!

During the exam:

- Read each question twice
- Answer the question before looking at the answer choices
- Answer the easy ones first
- Guess when necessary
- Don’t second-guess your first answers
- Pace yourself
- Don’t despair

Taking the exam on computer:

- Just point and click
- Take notes
- Mark and return to the hard questions
- Use the on-screen clock to pace yourself
- Be methodical
- Breathe!

Contents

PART 1

Breast Instrumentation/Technique

System setup
Transducers
Grayscale
Doppler
Physical examination
Mammographic correlation (location and features)
Annotation
Standoff pads
Scan planes
Compressibility
Echo-palpation
Artifacts
Positioning
Indications

1. Which artifact may cause structures to look deeper than they actually are?

   A. Side lobe
   B. Shadowing
   C. Refraction
   D. Propagation speed error
   E. Slice thickness

2. The optimum operating frequency for a broad-bandwidth transducer would be:

   A. 6 MHz
   B. 7 MHz
   C. 8 MHz
   D. 9 MHz
   E. 10 MHz

3. In breast sonography, which of the following is NOT significantly affected by the limited field of view when imaging superficial structures?

   A. Contrast resolution
   B. Spatial resolution
   C. Axial resolution
   D. Lateral resolution
   E. Temporal resolution

4. Which of the following affects the actual intensity of the sound utilized for imaging?

   A. TGC
   B. Output power
   C. Overall gain
   D. Dynamic range
   E. Harmonics

   AIT–SIC item.

5. The dynamic range of a display is the:

   A. Number of gray shades
   B. Depth of focal zone
   C. Intensity of sound utilized
   D. Image scale
   E. Output power

   AIT–SIC item.

6. Using color/power Doppler while a patient hums to better delineate a mass is called:

   A. Aliasing
   B. Spectral mirroring
   C. Ring-down
   D. Harmonics
   E. Fremitus

7. A standoff pad thicker than 1 cm is NOT recommended because it will:

   A. Make the skin line look thicker than normal.
   B. Affect the optimal placement of the fixed elevation plane focus.
   C. Compress the mammary layer and make it look fibrotic.
   D. Cause enhancement of echoes in the mammary zone.
   E. Cause decreased penetration and an inability to see the chest wall.

8. Which type of transducer does NOT allow the sonographer to vary the focusing capabilities?

A. Electronic linear array
B. Electronic convex array
C. Annular array
D. Mechanical sector
E. Electronic sector

9. When taking patient history for a breast sonogram, what information from a previous mammogram would NOT be considered relevant?

A. Symmetry of breasts
B. Location of a questionable lesion
C. Size of a questionable lesion
D. Date and results of a previous mammogram
E. Name of the radiographer

10. Image amplitude is affected by:

A. Power
B. Overall gain
C. Time gain compensation (TGC)
D. A and B
E. A, B, and C

AIT–SIC item.

11. High-frequency transducers used in breast imaging provide excellent resolution of breast tissues but limited:

A. Focusing options
B. Gain adjustment
C. Penetration
D. Gray scale
E. Scan lines

12. When using the 123-ABC method of annotation, “B” would indicate:

A. Mass is close to the nipple.
B. Mass is medium shade of gray
C. Mass is in the mammary zone.
D. Mass is benign.
E. Mass requires biopsy.

AIT–Hotspot item.

13. In the 123-ABC method of annotation, the numbers denote the:

A. Distance from nipple
B. Depth of the mass
C. Number of masses
D. Stage of cancer
E. Sequence of imaging

AIT–SIC item.

14. Which method of patient positioning is best for evaluating the medial aspect of the breast?

    A. Posterior oblique
    B. Lateral decubitus
    C. Upright
    D. Trendelenburg
    E. Supine

15. The two-handed technique is used to image:

    A. Both breasts at the same time
    B. An extremely large breast
    C. The main breast duct and nipple
    D. Multiple masses within the breast
    E. A palpable mass that is mobile

16. Which of the following transducers would be the best choice for breast imaging?

    A. 5 MHz phased array
    B. 3.5–5 MHz curved linear array
    C. 8 MHz annular array
    D. 10 MHz linear array
    E. 12 MHz mechanical sector

17. Selecting multiple focal zones will:

    A. Decrease frame rate
    B. Increase frame rate
    C. Decrease frequency
    D. Increase frequency
    E. Increase penetration

    AIT–SIC item.

18. When viewing a mammogram, one always sees the marker in the region toward the:

    A. Axilla
    B. Nipple
    C. Medial breast
    D. Top of the film
    E. Bottom of the film

    AIT–Hotspot item.

19. If a breast sonographic image is labeled *Rt. AR 2:00 1A*, the area described is:

    A. In the right axillary region, upper outer quadrant, just under the skin

B. Radial scan of the right breast, upper outer quadrant, mid breast
C. Radial scan of the right breast, upper inner quadrant, near the chest wall
D. Antiradial scan of the right breast, upper inner quadrant near the nipple, under the skin
E. Antiradial scan of the right breast, lower inner quadrant, under the skin, near the areola

AIT–Hotspot item.

20. When viewing a mammogram, a mass is marked near the CC marker in the right breast. This will indicate to the sonographer that the mass is located:

A. In the lower outer quadrant
B. In the medial breast
C. In the lateral breast
D. In the upper outer quadrant
E. Near the nipple

AIT–Hotspot item.

21. A transducer that can operate at multiple frequencies is said to have:

A. Broad bandwidth
B. Variable focus
C. Harmonics
D. Multiple transmit zones
E. Dynamic range

22. All of the following statements about high-frequency transducers are true EXCEPT:

A. Axial resolution is increased
B. Lateral resolution is increased
C. Sound travels faster
D. Sound penetration is decreased
E. Best for breast imaging

23. Decreasing depth will:

A. Increase the frequency of sound used
B. Decrease the sound intensity
C. Improve depth penetration
D. Increase the gray scale
E. Increase frame rate

AIT–SIC item.

24. Increasing the overall gain control will:

A. Increase penetration
B. Reduce penetration

C. Cause artifactual echoes
D. Increase gray scale
E. Reduce frame rate

AIT–SIC item.

25. Which of the following allows for better demonstration of small, tortuous vessels?

A. Power Doppler
B. Spectral Doppler
C. Color Flow Doppler
D. Continuous wave Doppler
E. Pulsed Doppler

26. Which of the following affect(s) the frame rate?

A. Number of focal zones
B. Size of image
C. Frequency
D. A and B
E. A and C

AIT–SIC item.

27. Ideally, the elevational focus for breast imaging should be fixed at:

A. 0.5 cm
B. 1.0 cm
C. 1.5 cm
D. 2.0 cm
E. 2.5 cm

AIT–SIC item.

28. An increase in the intensity of echoes beneath a structure is called:

A. Shadowing
B. Enhancement
C. Reverberation
D. Refraction
E. Reflection

29. Of the following, which would NOT be a good indication for performing a breast sonogram?

A. Evaluate a mass for microcalcifications
B. Evaluate a palpable mass
C. Evaluate a questionable area on mammography
D. Localize for cyst aspiration
E. Evaluate a male for gynecomastia

30. When setting the TGC (time gain compensation) control for breast imaging, the following tissue should demonstrate a medium level of gray.

    A. Skin
    B. Fat
    C. Parenchyma
    D. Ducts and vessels
    E. Muscle

    AIT–SIC item.

31. The lactiferous ducts are best seen when scanning:

    A. Radial
    B. Antiradial
    C. Sagittal
    D. Transverse
    E. Coronal

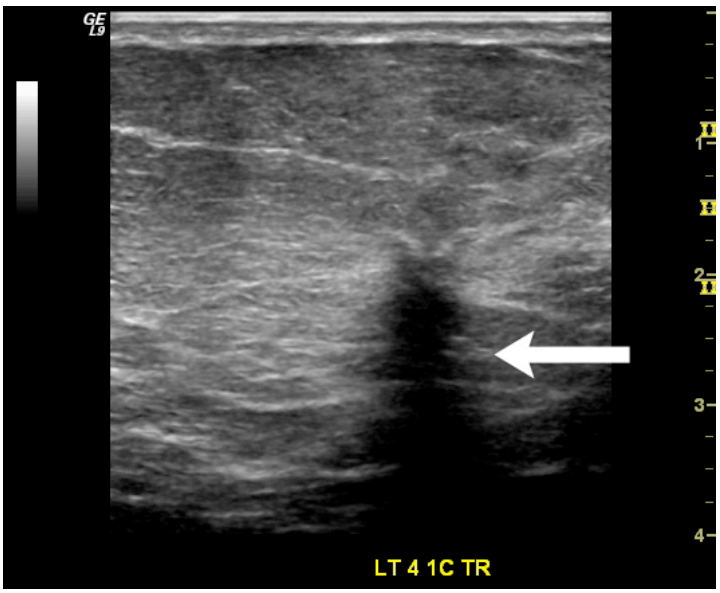
32. The orthogonal view from the longitudinal scan is:

    A. Radial
    B. Antiradial
    C. Transverse
    D. Sagittal
    E. Parallel

33. Adequate penetration of the breast is determined by imaging the:

    A. Lung
    B. Ribs
    C. Deep fascia
    D. Pectoral muscles
    E. Breast parenchyma

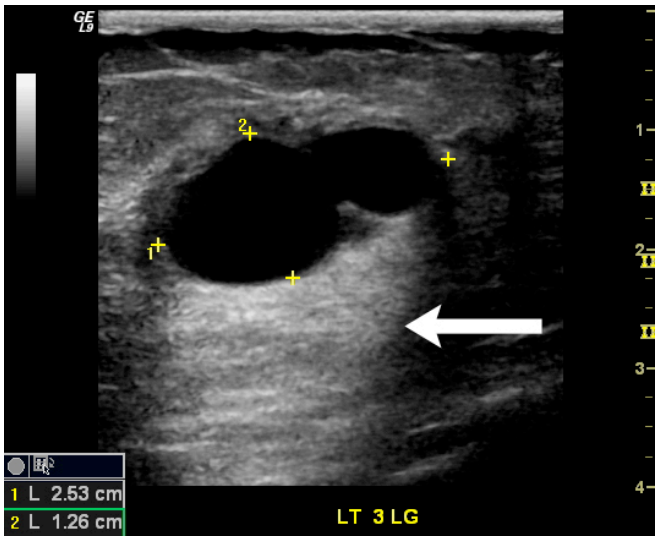
34. The arrow is pointing to what kind of artifact?



A. Enhancement
B. Through transmission
C. Critical angle refraction
D. Reverberation
E. Shadow

AIT–Hotspot item.

35. The arrow is pointing to what kind of artifact?



A. Enhancement
B. Ring down
C. Critical angle refraction
D. Reverberation
E. Shadow

AIT–Hotspot item.

36. If a mass is isoechoic with surrounding tissues, what maneuver would accentuate the mass to make it show up better?

    A. Add Doppler.
    B. Decrease overall gain.
    C. Apply harmonics.
    D. Try compression.
    E. Decrease frequency.

    AIT–Hotspot item.

37. Which of the following transducer features would NOT be good for breast imaging?

    A. Broad bandwidth
    B. High frequency
    C. Variable focusing
    D. Thin slice thickness
    E. Curved linear array format

38. Lateral resolution is best at the:

    A. Focal zone
    B. Fraunhofer zone
    C. Fresnel zone
    D. Transmit zone
    E. Near zone

39. Which technique would eliminate useful artifacts such as posterior enhancement and shadowing?

    A. Spatial compound imaging
    B. Harmonics imaging
    C. Extended field of view
    D. Dynamic range
    E. Beam focusing

    AIT–SIC item.

40. According to AIUM standards, all of the following information should be indicated on sonographic images of the breast EXCEPT:

    A. Patient's name/ ID #
    B. Patient's age
    C. Patient's social security number
    D. Facility name
    E. Date

41. Which of the following is considered an appropriate annotation method for breast imaging?

    A. Side/quadrant
    B. Clock-face
    C. 123-ABC

D. All of the above
E. None of the above

42. Which of the following statements would be FALSE when considering Doppler artifacts?

A. If the gain and filter settings are too low, it can cause noise.
B. If the filter setting is too high, it will inhibit the ability to detect low-velocity blood flow.
C. A PRF/velocity scale that is too low will cause aliasing.
D. If the Doppler angle is perpendicular to flow, no flow will be detected.
E. Spectral mirroring causes a duplication of the waveform on the opposite side of baseline.

AIT–SIC item.

43. Which statement is TRUE for propagation speed error?

A. If the propagation speed is slower than 1540 m/sec, posterior echoes will be displayed on the sonogram more anterior than they actually are.
B. If the propagation speed is slower than 1540 m/sec, posterior echoes will be displayed on the sonogram deeper than they actually are.
C. If the propagation speed is faster 1540 m/sec, reflectors will appear closer to the transducer than they actually are.
D. A and B
E. B and C

44. The brightness of echoes on an ultrasound image is affected by all of the following EXCEPT:

A. Overall gain
B. Power output
C. Transducer frequency
D. Dynamic range
E. TGC

AIT–SIC item.

45. Which one of the following steps would NOT be part of the examination preparation?

A. Obtain pertinent clinical information from the patient.
B. Explain the examination to the patient.
C. Present the informed consent to the patient for signature.
D. Review pertinent correlative imaging tests.
E. Know the indication for the exam.

46. The supine oblique position:

A. Evenly distributes the breast tissue

B. Allows better evaluation of the outer breast
C. Places the nipple in the center
D. Minimizes breast thickness for better penetration
E. All of the above

47. Echo palpation is used to:

A. Localize a mass
B. Determine if a mass is compressible or not
C. Determine if a mass is malignant or benign
D. A and B
E. All of the above

48. For general breast scanning, which patient position is considered best?

A. Supine oblique
B. Contralateral posterior oblique
C. Straight supine
D. Upright
E. A and B

49. Of the following, which would NOT be considered a method of annotating the sonographic image?

A. 123-ABC
B. Radial/antiradial
C. Side/quadrant
D. Clockface
E. All are acceptable.

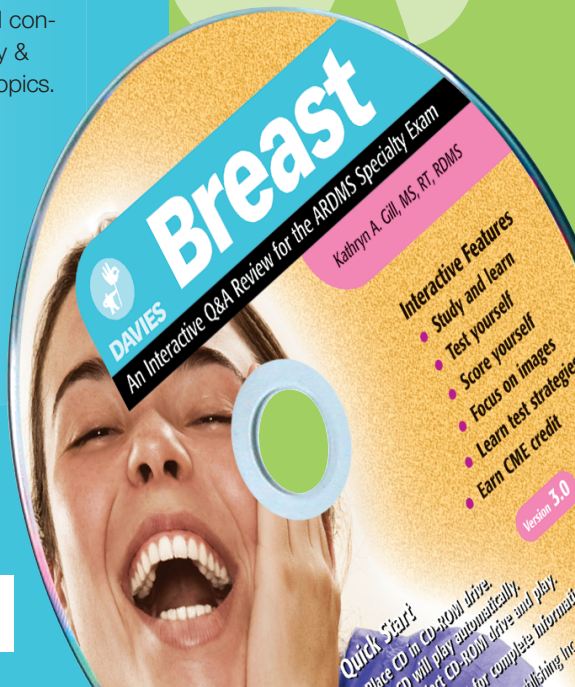
Breast Sonography Review

Test yourself before the ARDMS tests you! Kathryn Gill's *Breast Sonography Review* illuminates the facts and principles on which you will be tested, hones your test-taking skills, and reveals your strengths and weaknesses by exam topic. Based precisely on the breast specialty exam outline published by ARDMS, this review contains 340 registry-like questions (including CME activity questions) together with answers, clear explanations, and quick references for further study. Image-based cases and schematic illustrations prepare you to tackle images, anatomy, and pathology on the exam. Coverage includes breast instrumentation and technique, normal anatomy, benign versus malignant features, specific lesions (benign), specific lesions (malignant), and invasive procedures—all in the same proportion as the exam itself. *Breast Sonography Review* is very effective in combination with *Ultrasound Physics Review: SPI Edition,* by Cindy A. Owen, RT, RDMS, RVT, FSDMS, and James A. Zagzebski, PhD. Why are the Davies mock exams so popular and effective? Because they contain the same kinds of thought-provoking questions you will find on the exam! Approved for 6 hours of continuing medical education credit. Davies catalog #11052.

Ready to score? You can!

About the author . . .

Kathryn A. Gill, MS, RT, RDMS, FSDMS, has been practicing, teaching, and writing about ultrasonography for more than 20 years. She is Program Director of the Institute of Ultrasound Diagnostics in Spanish Fort, Alabama, and the author and editor of *Abdominal Ultrasound: A Practitioner's Guide, Ob/Gyn Sonography Review*, the *CD-ROM Mock Exams* for Ob/Gyn and Breast, and the forthcoming *Ultrasound in Obstetrics & Gynecology: A Practitioner's Guide*. Kathy became a fellow of SDMS in 1993 and a Senior Member of AIUM in 1996. She lives with her family in Alabama, where she teaches, practices, and writes.



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