

## Chapter 1 – Ultrasound Guidelines, Education, and Professional Responsibility

1. An advanced practitioner (AP) wishes to add sonography to their clinical practice. Which is the first action the AP should take before adding this service?
  - A. Ask the hospital to establish policies and procedures for sonography.
  - B. Identify the legal and risk management issues for sonography practice.
  - C. Explore the state's nurse practice act or state laws related to sonography.
  - D. Ensure a means to verify clinical competency is available for sonographers.

Answer: C

Rationales:

- A. Policies and procedures in a hospital system are developed after analyzing the feasibility of providing the service.
  - B. Legal and risk management issues are completed after analyzing the feasibility of providing a service.
  - C. The nurse practice act and applicable state laws provide the parameters for legal practice in a state and, as a service is developed, must be followed.
  - D. Clinical competency is established after understanding legal parameters within the state. The clinical competency is based on state practice acts or laws.
2. What impact do the 2018 American Institute of Ultrasound in Medicine (AIUM) practice parameter revisions have on the advanced practitioner's (AP) role?
    - A. An AP is authorized to use the AIUM guidelines to implement ultrasound testing.
    - B. An AP is provided with medical indications for ultrasound in the pregnant patient.
    - C. The AP is accepted as one who is conducting point of care (POC) ultrasound exams.
    - D. The AP is allowed to order ultrasound examination as part of the patient assessment.

Answer: C

Rationales:

- A. The guidelines are available for all practitioners who perform obstetric ultrasound examinations.
  - B. Medical indications have been part of the AIUM guidelines before the 2018 revisions.
  - C. The most significant practice parameter revisions of 2018 recognize the AP as one who may perform ultrasound as part of the POC or serial examinations.
  - D. The AP had the ability to order an ultrasound prior to the 2018 revised parameters.
3. After the physical assessment of the pregnant woman, late in the third trimester of pregnancy, the advanced practitioner (AP) questions the fetal presentation. Which

American College of Obstetricians and Gynecologists (ACOG) category of ultrasound examination should the AP use to verify the fetal presentation?

- A. Limited examination
- B. Standard examination
- C. Specialized examination
- D. Comprehensive examination

Answer: A

Rationales:

- A. The limited ultrasound examination is limited in its scope and typically assesses a specific aspect of the pregnancy. The limited examination would be used to assess fetal presentation.
- B. The standard ultrasound examination is usually a planned assessment that includes multiple parameters of the pregnancy.
- C. The specialized ultrasound examination is used for more complex issues such as evaluation of fetal anomalies. These ultrasound examinations require interpretation by a trained perinatologist.
- D. ACOG does not recognize a comprehensive category of ultrasound examination. The specialized category was previously known as comprehensive.

4. Which of the following is unique to the American College of Nurse-Midwives (ACNM) position on ultrasound practice?

- A. Practitioners can obtain education specific to their clinical practice needs.
- B. Practitioners are not given a specified number of clinical education hours.
- C. Practitioners' clinical practicum is completed with a competent ultrasound professional.
- D. Practitioners are deemed competent in ultrasound practice by their supervising professional.

Answer: A

Rationales:

- A. Due to the nature of nurse-midwifery practice, the ACNM indicates nurse-midwives can be trained for the specific ultrasound skills they will need in their practice environment.
- B. Other professional organizations also do not specify the number of clinical education hours needed to be clinically proficient.
- C. Other professional organizations indicate clinical training is completed with a competent ultrasound professional.
- D. Other professional organizations utilize the supervising professional to determine competence of the practitioner.

5. The advanced practitioner (AP) decides to pursue clinical competency in obstetric sonography post-graduation. Which of the following is most likely to present as a challenge to the practitioner?
- A. The ability to obtain clinical experience under a competent professional.
  - B. The impact of financial barriers to sonography education beyond graduation.
  - C. The ability to get adequate practice experience while reducing exposure to patients.
  - D. The impact of available didactic courses to meet educational needs for sonography.

Answer: C

Rationales:

- A. The availability of competent professionals through which experience can be gained is no longer the greatest obstacle as more professionals become certified.
  - B. Financial barriers are more common in the advanced practitioner education curriculum rather than post-graduation work to obtain certification.
  - C. Getting adequate experience requires the use of live pregnant models, which would expose the woman and fetus to the ultrasound. Pregnant patients need informed when the ultrasound is for purposes of training or research.
  - D. Didactic courses are available to meet educational needs and have fewer challenges than the actual practice of performing the ultrasound. Many formats/options for didactic education are available to the student.
6. The advanced practitioner (AP) is attending a training session for ultrasound certification using live patients. Which of the following should the AP expect prior to initiating any ultrasound on the live patient? Select all that apply.
- A. The patients are chosen from a group consisting of patients in the first trimester of pregnancy.
  - B. The patient has been screened to prevent unexpected findings during the training.
  - C. The patient's primary obstetrician has been notified of the patient's participation.
  - D. The trainer has determined the minimum number of ultrasounds to demonstrate competency.
  - E. The training organization has predetermined actions that will be taken for incidental findings

Answer: B, C, E

Rationales:

- A. Patients who are in the first trimester of pregnancy should not be used for training sessions due to possible risk of exposure to the fetus.
- B. The patients need to be screened prior to the training ultrasound to prevent unexpected findings during the training session.
- C. The patient's primary obstetrician needs to be informed prior to participation in ultrasound for training purposes.

- D. There is no minimum number of ultrasounds indicated to determine competency; it depends on the learner's individual needs.
  - E. The training organization must determine what actions will be taken if incidental findings are noted on the ultrasound examination.
7. The advanced practitioner is preparing to perform a medically indicated ultrasound of the fetus. The parents ask for a keepsake picture to be taken during the ultrasound. Which is the best response?
- A. Provide a keepsake image to the parents after the ultrasound.
  - B. Obtain informed consent for the keepsake image to be provided.
  - C. Inform the parents that keepsake images are not appropriate practice.
  - D. Encourage parents to seek a company that provides keepsake images.

Answer: A

Rationales:

- A. The AIUM supports providing keepsake images during a medically indicated ultrasound; it may impact parent-fetal bonding.
  - B. Informed consent is not needed for the keepsake images as part of the medical ultrasound. The need for informed consent for the ultrasound is debated.
  - C. Keepsake images provided as part of a medically indicated ultrasound are appropriate and may impact parent-fetal bonding.
  - D. Companies that provide ultrasound imaging for keepsake purposes are unregulated and should not be encouraged. Rather, they may be reported to the FDA.
8. The nurse-midwife is considering ways to reduce liability concerns as ultrasound is added as a point of care (POC) tool in the clinic setting. Which of the following would be appropriate to include? Select all that apply.
- A. Ensure routine maintenance is performed on the equipment.
  - B. Adhere to professional organization guidelines for ultrasound testing.
  - C. Confirm appropriate training of the individual who performs ultrasounds.
  - D. Ask a physician to oversee the practice of ultrasound testing in the clinic.
  - E. Inform patients that an ultrasound may not show all essential information.

Answer: A, B, C

Rationales:

- A. Routine maintenance is important to ensure properly working equipment. Some litigation is related to improperly maintained equipment.
- B. Professional organizations provide guidelines that assist in preventing litigation related to the use of ultrasound.
- C. Appropriate training is one area that litigation has occurred related to ultrasound examinations.

- D. A nurse practitioner can practice ultrasound testing independently after appropriate training.
  - E. Litigation is not avoided by informing patients that not all essential information may be shown on the ultrasound.
9. Litigation is not avoided by informing patients that not all essential information may be shown on the ultrasound.
- A. The practitioner can charge a higher fee for conducting ultrasound examinations.
  - B. The patient is receiving the same level of care as that of a perinatologist sonologist.
  - C. The practitioner is protected from legal liability due to missing conditions on exam.
  - D. The patient can be assured the practitioner has skills beyond the basic competencies.

Answer: D

Rationales:

- A. The certification may address insurance reimbursement issues, however, does not impact the fee which is charged.
  - B. Certification can be obtained related to the practitioner's area of specialty such as midwifery. The certification does not provide the same level of care as a perinatologist sonologist.
  - C. Certification does not protect the practitioner from legal liability.
  - D. Certification indicates a practitioner has skills beyond basic competencies of ultrasound examination.
10. The practitioner has completed an ultrasound examination. Which aspects should be documented in the patient record? Select all that apply.
- A. Findings of the ultrasound examination.
  - B. Still images from the ultrasound examination.
  - C. The indication for the ultrasound examination.
  - D. The patient's questions about the ultrasound examination.
  - E. The patient's ability to be compliant with follow-up visits.

Answer: A, B, C, E

Rationales:

- A. Findings of the ultrasound examination are required to be documented.
- B. Still images and any videos become a permanent part of the patient record.
- C. The indication for the ultrasound examination is documented in the permanent record.
- D. The patient's questions about the ultrasound examination are not required to be documented.
- E. The patient's ability to be compliant and plans for follow-up must be documented.



## Chapter 2 – Image Acquisition

1. The practitioner is attempting to visualize a deep structure. Which is the best choice to improve the ability to view the deep structure?
  - A. Use a lower transducer frequency.
  - B. Use a spectral doppler ultrasound.
  - C. Use a higher transducer frequency.
  - D. Use a color flow doppler ultrasound.

Answer: A

Rationales:

- A. A lower transducer frequency will allow for greater depth of transmission, improving the ability to view the structure.
  - B. A spectral doppler ultrasound displays the spectrum of flow on the x- and y-axis.
  - C. A higher transducer frequency will improve the resolution of images; however, it does not penetrate deeply to view the deeper structures.
  - D. The color flow doppler ultrasound is a form of pulsed-wave Doppler, where the echoes are assigned a color. This improves visualization of motion, such as that of blood flow.
2. The color flow doppler ultrasound is a form of pulsed-wave Doppler, where the echoes are assigned a color. This improves visualization of motion, such as that of blood flow.
    - A. A-mode
    - B. B-mode
    - C. M-mode
    - D. TM-mode

Answer: B

Rationales:

- A. A-mode displays amplitude.
  - B. B-mode, also known as brightness mode, displays images in small and large dots.
  - C. M-mode measures distance over time and is primarily used for fetal cardiac imaging.
  - D. M-mode is sometimes referred to as TM-mode.
3. M-mode is sometimes referred to as TM-mode.
    - A. The linear transducer probe.
    - B. The sector transducer probe.
    - C. The curved linear transducer probe.
    - D. The transvaginal (TV) transducer probe

Answer: D

Rationales:

- A. The linear transducer probe is used in obstetric imaging but is not the best for detecting ectopic pregnancies, especially in the early weeks.
  - B. The sector transducer probe is used in obstetric imaging but is not the best for detecting ectopic pregnancies, especially in the early weeks.
  - C. The curved linear probe is used in obstetric imaging but is not the best for detecting ectopic pregnancies, especially in the early weeks.
  - D. The transvaginal transducer probe assists to more accurately diagnose ectopic pregnancy as early as 4 weeks.
4. The practitioner is developing policies and procedures for ultrasound equipment maintenance. When determining the best means to clean and disinfect the transducers, which of the following should the practitioner do?
- A. Perform an Internet search for policies and procedures from other clinics.
  - B. Refer to the AUIM (American Institute of Ultrasound in Medicine) instructions.
  - C. Review the material safety data sheets (MSDS) for disinfectants available in the clinic.
  - D. Research the CDC (Centers for Disease Control and Prevention) infection control advice.

Answer: B

Rationales:

- A. The policies and procedures of other clinics may or may not provide the most recent or accurate recommendations.
  - B. The AUIM provides detailed instructions for cleaning and disinfecting probes and provide official guidelines for practitioners
  - C. MSDS sheets provide information about the health effects and hazards for controlled products found in the workplace.
  - D. The CDC is the national health protection agency that has recommendations for infection control; however, it is not the best source for equipment maintenance.
5. Which scan plane divides the body into anterior and posterior segments?
- A. The sagittal plane.
  - B. The median plane.
  - C. The transverse plane.
  - D. The longitudinal plane.

Answer: B

Rationales:

- A. The sagittal plane divides the body into right and left sides. It is sometimes referred to the longitudinal plane.



- B. The median plane divides the body into anterior and posterior segments.
  - C. The transverse plane refers to the placement of the transducer to the anatomy and divides the body into superior and inferior parts.
  - D. The longitudinal plane divides the body into right and left sides and is sometimes called the sagittal plane.
6. The ultrasound student is instructed to manipulate the transducer by rocking. Which action should the student complete?
- A. Place pressure on the probe to compress the body part.
  - B. Change just the angle of the ultrasound in the long axis.
  - C. Move the transducer in the long axis to the desired area.
  - D. Shift the transducer either clockwise or counterclockwise

Answer: B

Rationales:

- A. Placing pressure is called pressure or compression.
  - B. Rocking means to change just the angle of insonation in the long axis.
  - C. Moving the transducer in the long axis is called sliding.
  - D. Moving the transducer in the long axis is called sliding.
7. The practitioner is doing an obstetric ultrasound exam on a woman who is approximately 24 weeks pregnant, weighs approximately 325 pounds (147 kg), and demonstrates abdominal obesity. Which technique is the best approach to improve visualization of the desired structures?
- A. Scan using a lateral approach over the lower abdomen.
  - B. Use a rocking motion over the uterus until it is in view.
  - C. Place as much pressure as needed over the central abdomen.
  - D. Move the transducer in a clockwise motion until view is clear.

Answer: A

Rationales:

- A. The lateral approach allows the practitioner to decrease the depth needed.
  - B. Using a rocking motion changes the angle but does not improve the ability to see through *adipose* tissue.
  - C. Placing additional pressure can assist to view structures, however, still requires viewing deep tissues under the adipose tissue. This is not the best way to work around the adipose tissue.
  - D. Moving the transducer in a clockwise or counterclockwise motion does not address the depth of tissue with which this patient presents.
8. When considering the thermal effects of ultrasound examination, which situation places the greatest thermal effects on the fetus during an obstetric ultrasound examination?

- A. The woman demonstrates an obese abdomen.
- B. The woman demonstrates a thin abdominal wall.
- C. The practitioner is using the B-mode for examination.
- D. The practitioner is viewing the fetal cardiac blood flow.

Answer: B

Rationales:

- A. The adipose tissue of an obese woman often absorbs the thermal energy, preventing transmission to the fetus.
- B. The woman with a thin abdominal wall does not have the tissue to absorb the energy, leading to more thermal transmission to the fetus.
- C. The energy is moving and being distributed over a large area in B-mode, reducing the thermal effects on a fetus.
- D. Viewing the blood flow would use color flow Doppler. This method uses moving energy distributed over a larger area, reducing the thermal effects on a fetus.

9. Which action demonstrates the ALARA (as low as reasonably achievable) principle is being used by the practitioner?
- A. The highest power tolerated by the patient is used.
  - B. The thermal index is displayed on the output screen.
  - C. The practitioner works quickly to acquire the images needed.
  - D. The pulsed Doppler is the first approach used for examination.

Answer: C

Rationales:

- A. Higher power increases ultrasound exposure rather than reducing.
- B. The thermal index display simply informs the practitioner of the thermal index; it doesn't impact the exposure.
- C. When the practitioner works as quickly as possible to get the images, the exposure to ultrasound is kept as low as possible.
- D. The pulsed Doppler creates the greatest energy and should only be used when necessary to reduce exposure.

10. The practitioner notes the image quality on the ultrasound exam is poor with several artifacts. Which is the first action the practitioner should take to address these image quality issues?
- A. Ensure adequate coupling gel has been applied.
  - B. Send the machine for repair by the manufacturer
  - C. Check the clinic's preventative maintenance records.
  - D. Change to a different transducer and compare images.

Answer: A

Rationales:

- A. Coupling gel eliminates most artifacts and is the simplest approach for initial trouble shooting.
- B. Sending the machine for repair should be done after initial attempts to improve images fail and other issues are ruled out.
- C. Checking the maintenance records will not inform the practitioner of the reasons for poor images. Basic techniques to improve the image by manipulating the transducer, for example, should be employed.
- D. Changing the transducer is not the initial approach. Instead, using simpler techniques to improve the image should be employed first.