Ultrasound in Women’s Health Care and Pregnancy
Introduction to Section 2

Point-of-Care Sonography in Women’s Health and Pregnancy

While this book was in press, several applicable publications and updated guidelines emerged, including an executive summary of a joint Eunice Kennedy Shriver National Institute of Child Health and Human Development, Society for Maternal-Fetal Medicine, American Institute of Ultrasound in Medicine, American College of Obstetricians and Gynecologists, American College of Radiology, Society for Pediatric Radiology, and Society of Radiologists in Ultrasound Fetal Imaging workshop. This document offered recommendations specific to fetal imaging. This summary outlined the indications for ultrasound and MRI in pregnancy, the recommended timing and intervals for fetal imaging, and the identification of research opportunities. Commentary regarding how these recommendations may differ slightly from content in the book is detailed on http://solution.lww.com.

As nurses, midwives, nurse practitioners, and physician assistants take on more responsibility in providing first-line care to women, the need to incorporate sophisticated technology as an adjunct to clinical assessment has become greater. These same clinicians are often the first to provide bedside assessment of maternal and fetal conditions. In the case of an advanced nurse practitioner (ANP), he or she may be the only clinician evaluating and treating a woman from adolescence through the postmenopausal years. As a result, gaining knowledge and acquiring skill with advanced technologies such as sonography has become paramount.

The point-of-care (POC) assessment and complementary treatments encompass many skills, but the focus of this section is on point-of-care sonography. Utilizing sonography in the diagnostic process provides immediate assessment and improves safety and quality of care. POC ultrasound is performed in direct response to a woman’s physical signs or symptoms, such as to evaluate vaginal bleeding in pregnancy. Nurses and advanced practice nurses have been recognized as the logical clinicians to incorporate ultrasound into clinical practice based on their basic knowledge of anatomy, physiology, obstetrics, and gynecology. Prior to adding sonography into clinical practice, however, it is necessary to enhance didactic and clinical knowledge encompassing practice-specific sonography content (e.g., gynecologic ultrasound for the assisted reproductive nurse specialist).

This section of the book on maternal and fetal assessment provides some of the educational foundations and resources for POC sonography. Competency must be established prior to performing POC ultrasound, as in any new clinical procedure or practice. Achieving clinical competency requires patience and practice, in conjunction with having an established system of consultation and collaboration.
Point-of-Care Sonography in Women’s Health Care: Indications and Guidelines

During the past decade, the use of sonography has become an integral tool in all aspects of health care, including emergency medicine, orthopedics, anesthesiology, critical care, urology, and trauma. Due to its diagnostic value in maternal/fetal assessment in pregnancy, as well as all aspects of women’s health care, it has become an essential device for most women’s health practices. Because of the ultrasound machine’s portability and ease of operation, sonography is available in all areas of the hospital, in clinics, and in private offices, as well as in remote areas such as military battle sites or rural communities. Sonography is now being offered as first-line “ultrasound first” assessment in the diagnosis and treatment of many health care issues. And because sonography has become such an integral part of health care, it is now being taught in many medical schools throughout the country beginning with the first year’s curriculum. As a result, the implementation of sonographic assessment has become a critical skill not only for specialized physicians, but also for all health care providers including nurses, midwives, advanced nurse practitioners (APN), and physician assistants (PA).

Specific to women’s health care and pregnancy, sonography is the imaging modality of choice for the evaluation of many signs and symptoms, such as determining the cause of vaginal bleeding in all trimesters, locating intrauterine devices, assessing for residual urine in the postpartum woman, and evaluating the endometrium in peri- and postmenopausal women. In many hospitals, labor room nurses are expected to have the minimum sonographic skills necessary to determine fetal presentation during labor when a physician or midwife is unavailable.

The majority of sonographic exams performed by nonsonographers are performed during a specific encounter in which the information obtained by ultrasound will immediately benefit the patient, thus avoiding delay in treatment. This type of assessment-specific ultrasound has been termed “point-of-care” (POC) and described by the American Institute of Ultrasound in Medicine in 2010 as ultrasound use during a specific encounter or procedure to:

- Enhance patient care,
- Diagnose critical conditions,
- Provide immediate care, and
- Improve safety and effectiveness of invasive procedures.

Thus, POC ultrasound may be practiced in a variety of settings and utilized by a diverse set of health care providers. For the purposes of this book, the phrase “point-of-care” sonogram will be used according to this definition but will also encompass those ultrasound examinations previously referred to as “limited ultrasound.”

The increasing use of ultrasound by health care professionals other than sonologists (physician sonographers), sonographers, perinatologists, or radiologists has justifiably generated concern by professional organizations. Improperly trained personnel using sonography may lead to increases in the incidence of misdiagnoses and medical errors. For example, there have been both official and unofficial reported cases of clinicians performing sonograms for fetal presentation during labor and missing the presence of a second twin, the absence of cardiac activity, or a placenta previa. In part to establish minimal educational criteria, several professional organizations, such as the American Congress of Obstetrics and Gynecologists (ACOG), the American College of Nurse Midwives (ACNM), and the Association of Women’s Health, Obstetric and Neonatal Nurses (AWHONN) have published guidelines or position statements for the education and training of their members who wish to incorporate sonography into clinical practice.

Additionally, before incorporating sonography into clinical practice, it is important to investigate the individual state’s Nurse Practice Act or appropriate state laws to determine the feasibility of adding...
sonography to current practice. Once this has been achieved, hospital policies and procedures may be developed to address the minimal educational content, methods for measuring clinical competency, and risk management concerns pertaining to the implementation of sonography into clinical practice.

The purpose of this chapter is to describe the various sonography practice guidelines pertinent to pregnancy and women’s health care. The guidelines begin with the indications for sonographic exams, along with the details of the “standard” exams performed by a sonographer or radiologist. This is followed by guidelines for the application of specific components of the standard sonogram that may be used during a POC assessment and performed by a nonsonographer.

### INDICATIONS FOR DIAGNOSTIC ULTRASOUND IN OBSTETRICS

In 1984, the National Institutes of Health formed a committee of obstetric and sonography experts to generate a list of indications for ultrasonography during pregnancy. These indications were updated by the American College of Radiology (ACR) and the American College of Obstetrics and Gynecology (ACOG), as shown in Box 8–1. Based on these guidelines, it should be noted that routine sonography for every pregnant woman is not an indication in itself.

#### PROFESSIONAL ORGANIZATION GUIDELINES

Traditionally, the vast majority of obstetric and gynecologic sonograms have been performed by sonographers, radiologists, and other physicians with specialized training in ultrasound. Professional organizations, such as the ACR and the American Institute of Ultrasound in Medicine (AIUM), published guidelines that set general recommendations for what should be included for each type of complete sonogram.

### The American Institute of Ultrasound in Medicine

The AIUM is a multidisciplinary professional organization whose membership includes physicians, sonographers, and others from all medical specialties.
AIUM Practice Guideline for the Performance of Obstetric Ultrasound Examinations

In 2007, the AIUM revised its obstetric guidelines in conjunction and collaboration with ACOG and the ACR. Personnel requirements and other aspects specific to the area of specialization (i.e., obstetrician vs. radiologist) are addressed by the individual professional organization. Additionally, this document stresses that fetal ultrasound should only be performed in response to a valid medical indication while utilizing the lowest possible exposure settings.

One of the major changes in this document from prior publications was the recategorization of the various types of sonograms, terms that were then adopted by other professional organizations. The new sonographic classifications include (1) the standard first-trimester ultrasound examination, (2) standard second/third trimester examinations (formerly referred to as the basic scan), (3) limited examination, and (4) specialized examinations (formerly referred to as the comprehensive or targeted scan). Because ACOG not only coauthored this guideline but also adopted this classification system for its own 2009 guideline, the details for each classification are described later, along with other content from the ACOG obstetric guideline.

The AIUM guideline also provides information pertaining to the anatomic landmarks needed for each specific fetal measurement and stands as an excellent document to use during the clinical practicum. Members of AIUM have access to an online enhanced version of this guideline that shows images of each anatomic landmark with proper cursor placement.

AIUM Practice Guideline for the Performance of the Ultrasound Examination of the Female Pelvis

As with obstetric ultrasound, AIUM recommends that scanning of the female pelvis should only be performed when there is an indication or a valid medical reason for the procedure. These indications may include pelvic pain, menstrual disorders, postmenopausal bleeding, abnormal pelvic examination, localization of an intrauterine device, and evaluation and monitoring of infertility treatments. Please refer to the guideline for a complete list of indications, as well as a description of the specific landmarks for measurement and evaluation. Further description of the sonographic evaluation of the female pelvis is detailed in Chapter 10.

AIUM Practice Guideline for the Performance of Ultrasonography in Reproductive Medicine

Ultrasound is an integral part of the evaluation and treatment of women with infertility issues. Whenever possible, AIUM recommends that a transvaginal approach be used for the evaluation of each organ and anatomic structure in the female pelvis. A comprehensive examination should first be performed to rule out pelvic pathology. If all necessary images cannot be obtained with the transvaginal approach, then the transabdominal scan should be done. Also, if there is any question of a pelvic mass, a transabdominal transducer can be used.

Under certain circumstances, a limited pelvic ultrasound may be performed based on a specific indication. Examples of a limited pelvic ultrasound include a folliculogram, which is used to monitor ovarian stimulation; and other procedures in reproductive medicine, such as an ultrasound-guided follicular puncture for egg retrieval with in-vitro fertilization and embryo transfer.

This document also delineates recommendations as to appropriate documentation. For example, when a limited folliculogram is performed, documentation should include (1) the number of ovarian follicles in each ovary and (2) endometrial thickness and endometrial morphologic appearance.

American Society for Reproductive Medicine

The American Society for Reproductive Medicine (ASRM) also provides guidelines for registered nurses (RNs) who have had specific training and supervision to perform ultrasound examinations in gynecologic and reproductive medicine. These guidelines do not stand alone; they are intended to be used in conjunction with other nursing guidelines, state laws, and institutional policy that address nursing practice in these areas of nursing. A limited ultrasound examination in gynecology and reproductive
medicine performed by nurses would include determining the number and size of developing follicles and the measurement of endometrial thickness and appearance.\textsuperscript{11,12}

\textbf{The American College of Obstetricians and Gynecologists}

In 2009, ACOG, in conjunction with AIUM, published a technical and educational bulletin pertinent to sonography performed by obstetricians and gynecologists.\textsuperscript{4} This publication updated all components and parameters for the obstetric ultrasound examination and included the three categories of ultrasound examinations established by AIUM in 2007\textsuperscript{9}: (1) the limited examination, (2) the standard examination in all trimesters, and (3) the specialized examination.

A \textit{limited ultrasound} is a less extensive examination that may be dictated by the clinical situation requiring investigation. Indications may include assessment of amniotic fluid, presence or absence of cardiac activity, confirmation of the fetal presenting part, interval growth, evaluation of the cervix, and placenta localization. Limited sonography may be performed by sonographers or specially trained personnel. A limited examination does not replace a standard examination.

A \textit{standard ultrasound examination} (formerly referred to as “basic,” “complete,” “formal,” or “level-one ultrasound”) generally is performed by sonographers or sonologists in the radiology or ultrasound department as a prescheduled, planned evaluation during all trimesters of pregnancy. The \textit{first-trimester standard sonogram} may be performed by either the transabdominal or transvaginal approach. If a transabdominal examination is not definitive, a transvaginal or transperineal scan should be performed. Although this differs from the AIUM guideline, the intent is the same: if all parameters cannot be visualized with one approach, then the alternate approach should be utilized. Per ACOG, the parameters for a first-trimester ultrasound examination include:

- Evaluation of the uterus, cervix, and adnexa for the presence of a gestational sac
- Documentation of the presence, size, and location of uterine and adnexal masses (such as leiomyomas)
- Assessment of the anterior and posterior cul-de-sac for presence or absence of fluid
- Localization of the sac
- Assessment for presence or absence of cardiac activity
- Assessment of fetal number
- Assessment for presence of a sac but the absence of a definite embryo or yolk sac (which may indicate a pseudogestational sac that may be consistent with an ectopic pregnancy; transvaginally, an embryo should be visible with a mean gestational sac diameter greater than or equal to 20 mm)
- Assessment of fetal anatomy according to gestational age
- Measurement of nuchal translucency at a specific gestational age and in conjunction with serum biochemistry in patients requesting individual risk assessment for aneuploidy

In the second and third trimesters, the standard obstetrical sonogram includes:

- Evaluation of the uterus, adnexal structures, and cervix (when appropriate)
- Evaluation of presentation
- Measurement of amniotic fluid volume
- Assessment of cardiac activity, including abnormal heart rate or rhythm
- Assessment of fetal number; with multiple gestation, the exam includes chorionicity, amnionicity, fetal sizes, estimation of fluid volume, and fetal genitalia
- Evaluation of placental location, appearance, and relationship to cervical os
- Assessment of fetal biometry for fetal gestational age and weight
- Performance of an anatomic survey; each component of the anatomic survey has been specified by the AIUM.\textsuperscript{9}

A \textit{specialized sonogram} (formerly referred to as “comprehensive” ultrasound) examination is recommended when an anatomic abnormality is suspected on the basic scan or based on prior maternal obstetric history. The specialized sonogram generally is interpreted or performed by a perinatologist (sonologist) or radiologist who examines the suspicious anatomic feature or abnormality. This category also includes fetal Doppler studies, biophysical profiles, amniotic fluid assessment, fetal echocardiography, or additional biometric measurements.

Overlap among the categories is inevitable. For instance, evaluation of amniotic fluid falls under all three categories. Also, more extensive studies, such as assessing interval fetal growth, was included in the comprehensive category but now falls under the limited ultrasound study. As a result of the creation
of these new categories, AWHONN opted to eliminate the descriptor "limited" from its clinical guideline to avoid confusion and miscommunication. Overlap also is noted between the descriptors “limited” ultrasound and “point-of-care” ultrasound; however, the meaning is similar. They both are defined as an ultrasound exam that is performed to gain specific information warranted by the clinical symptoms at the time of evaluation.

**Association of Women’s Health, Obstetric and Neonatal Nurses**

In 1993, AWHONN issued a specific educational and competency guideline for RNs performing what was then termed “limited sonography.” The document described the basic training, educational content, clinical practicum, and competencies needed by experienced OB/GYN nurses who wish to perform limited sonography. The document was updated in 1998 and 2004.

However, following AIUM’s 2007 and ACOG’s 2009 changes in terminology, the term “limited sonography” was no longer an accurate description for ultrasound exams performed by nurses. Because nurses were performing some components included in each of the new categories, AWHONN opted to update and expand its professional guideline in 2010. The new guideline, *Ultrasound Examinations Performed by Nurses in Obstetric, Gynecologic, and Reproductive Medicine Settings: Clinical Competencies and Education Guide* (3rd ed.), describes the appropriate clinical settings for nurses who perform ultrasound, as well as the recommended didactic component and clinical practice for all types of sonography.

The AWHONN didactic education recommendation is to obtain at least 8 hours of didactic content and instruction specific to the type of ultrasound the nurse will be performing. For example, the didactic focus would be on gynecologic ultrasound for the RN who is working in an infertility setting. There would be no need for such a specialized nurse to learn, for example, the components of a biophysical profile.

The clinical application of ultrasound is a separate educational experience that is performed under the direct supervision of an experienced sonographer, nurse, or physician who is trained in sonography. The precise number of scans a nurse needs to perform to be considered competent cannot be quantified because competency in ultrasound is an individual skill.

The educational competency and clinical practicum provide the basic skills needed for performing ultrasound examinations. Evaluation of learning can be by written examination, verbal exercises, one-on-one tutorials, image reviews, or case studies. Knowledge of hospital protocols and procedures and the appropriate lines of communication should also be validated.

Box 8–2 defines the components of obstetric and gynecologic ultrasound. Once the sonogram has been completed, the nurse documents the findings and reports them to the supervising physician or midwife.

**Box 8–2**

**Association of Women’s Health, Obstetric and Neonatal Nurses (AWHONN)**

**Components of Ultrasound Examinations (2010)**

<table>
<thead>
<tr>
<th>Obstetric Ultrasound Examination</th>
<th>Gynecologic Ultrasound</th>
<th>Reproductive Medicine Ultrasound Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determine intra- vs. extrauterine pregnancy</td>
<td>Measure endometrial thickness</td>
<td>Identify uterine position</td>
</tr>
<tr>
<td>Assess fetal number</td>
<td>Identify and locate IUD</td>
<td>Measure endometrial thickness</td>
</tr>
<tr>
<td>Measure yolk sac</td>
<td>Assess uterine size and position</td>
<td>Assess for adjunct ultrasound-guided procedures</td>
</tr>
<tr>
<td>Measure gestational sac</td>
<td>Locate and measure ovarian follicles</td>
<td>Locate placenta</td>
</tr>
<tr>
<td>Estimate fetal age (biometry)</td>
<td>Assess components of obstetric first-trimester ultrasound</td>
<td>Assess amniotic fluid volume</td>
</tr>
<tr>
<td>Estimate fetal weight (biometry)</td>
<td></td>
<td>Assess fetal well-being</td>
</tr>
<tr>
<td>Assess fetal cardiac activity</td>
<td></td>
<td>Assess for adjunct ultrasound-guided procedures</td>
</tr>
<tr>
<td>Assess fetal presentation</td>
<td></td>
<td>Measure cervical length</td>
</tr>
<tr>
<td>Locate placenta</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assess amniotic fluid volume</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assess fetal well-being</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assess for adjunct ultrasound-guided procedures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure cervical length</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data from Association of Women’s Health, Obstetric and Neonatal Nurses (AWHONN).
AIUM Training Guidelines for Physicians Who Evaluate and Interpret Diagnostic Abdominal, Obstetric, and/or Gynecologic Ultrasound Examinations

For the non–radiology-trained physician, AIUM has published recommendations pertaining to sonography education and training. Key points include:

- Completion of an approved residency program, fellowship, or postgraduate training that includes the equivalent of at least 3 months of diagnostic ultrasound training in the area(s) in which they practice, under the supervision of a qualified physician(s), during which the trainees will have evidence of being involved with the performance, evaluation, and interpretation of at least 300** sonograms.
- In the absence of formal fellowship or postgraduate training, documentation of clinical experience could be acceptable, providing the following could be demonstrated:
  1. Evidence of 100 American Medical Association (AMA) PRA Category 1 Credits™ dedicated to diagnostic ultrasound in the area(s) in which the physicians practice, and,
  2. Evidence of being involved with the performance, evaluation, and interpretation of the images of at least 300** sonograms within a 3-year period. It is expected that, in most circumstances, examinations will be performed under the supervision of a qualified physician(s). These sonograms should be in the specialty area(s) in which the physicians are practicing.

At this time, no research study has been able to conclusively determine how many scans in each category a clinician needs to perform in order to be considered clinically competent, and, therefore, no professional organization has set a specific number of sonograms necessary to demonstrate competency in POC sonography. However, AIUM has determined that at least 300 cases were needed to acquire sufficient experience and proficiency with sonography as a diagnostic modality and to gain a base understanding of normal and abnormal features. For those physicians utilizing ultrasound in subspecialty applications, the number of cases required by the AIUM is at least 500.

As for annual competency maintenance, the AIUM recommends a minimum of 170 diagnostic obstetric and 170 diagnostic gynecologic ultrasound examinations in order to maintain physician skills. Thirty hours of continuing education specific to OB/GYN every 3 years is also recommended.

American College of Nurse Midwives

In 2012, the ACNM published a position statement that it is within the scope of midwifery practice for midwives to incorporate obstetric and gynecologic sonography into clinical practice. However, when electing to perform ultrasound exams, midwives need to follow the Standards of Practice for Midwifery, which specifies the requirements for expanding midwifery practice beyond core educational competence. Midwives can obtain the necessary sonography education and skills through midwifery educational programs or on a continuing education basis. Once this is accomplished, the midwife should then be eligible for financial reimbursement for those ultrasound examinations performed. Additionally, state regulations, licensing, and facility credentialing should be satisfied.

The ACNM’s position statement also directs midwives to the education and training guidelines established by AWHONN, ACOG, and AIUM. Clinical competency can be established during the clinical practicum supervised by an experienced sonographer or other professional competent in the specific type of ultrasound examination being performed. Once again, as with other professional organizations, the recommendation for a minimum number of clinical education hours or number of performed examinations was not established due to individual learning needs; therefore, the determination of clinical competency is left to the discretion of the supervising sonographer.

According to this 2012 position statement, midwives need not be proficient in all aspects of ultrasound but may tailor education and training to the specific exams being performed. For example, if the midwifery clinical practice only requires the ability to perform biophysical profiles, the education and training may be limited to the specific procedure. However, should a competency or credentialing exam become available in the future, midwives may need to be proficient in a greater range of sonography skills.

As it stands at this time, the ACNM position statement delineates specific minimum didactic content that should be included regardless of the type of ultrasound to be performed (Box 8–3).

Additionally, a system for consultation, collaboration, and referral for abnormal findings must
be established and incorporated into midwifery guidelines. The ACNM also recommended that any midwife who plans to perform fetal anatomic examinations should consider becoming fully credentialed in OB/GYN sonography by the American Registry of Diagnostic Medical Sonographers (ARDMS) (see below). Performing a full fetal anatomic survey requires a greater depth of knowledge, education, and training than POC ultrasound and therefore requires credentialing equivalent to that skill level.

However, the vast majority of midwives will be performing POC imaging and not fetal anatomic surveys. The ACNM has recognized a need for midwifery ultrasound practice standardization and is working with established, nationally recognized credentialing organizations to develop an appropriate proficiency examination that may begin as early as 2015.

### American Registry of Diagnostic Medical Sonographers

The ARDMS is an independent, nonprofit organization that credentials qualified sonographers. It was established in 1975 for the sole purpose of administering certification examinations in all specialties of sonography. The ARDMS credentials include the Registered Diagnostic Medical Sonographer (RDMS), the Registered Diagnostic Cardiac Sonographer (RDCS), and the Registered Vascular Technologist (RVT). The obstetrics and gynecology specialty exam is included in the RDMS category.

There are several benefits to successfully completing the certifying examination, particularly for midwives and nurse practitioners. It provides verification of competency at a skill level beyond core competencies. It also increases scope of practice and allows for more thorough, timely assessments, particularly in the triage unit. In addition, some insurance companies will only reimburse for ultrasound examinations performed by a certified or registered sonographer.

The specific eligibility prerequisites for nurses, midwives, nurse practitioners, and other allied health professionals who wish to take the examination to become certified by the ARDMS are listed in Box 8–4. Once an individual has fulfilled the required prerequisites, all applicants must pass the physics and instrumentation examination, as well as the examination for the specialty area, such as OB/GYN. After successful completion of these two examinations, the allied health care provider then becomes RDMS certified. To maintain certification, all individuals must complete 30 hours of ARDMS-accepted continuing education in ultrasound every 3 years.

As of 2012, the ARDMS has been working in conjunction with other professional organizations to develop competency examinations for those who perform specific types of ultrasound examinations but do not meet the requirements for becoming a registered diagnostic medical sonographer. Because of this rapidly changing area of competency/proficiency examination, refer to the ARDMS website ardmso.org to determine testing availability for specific practitioners.

### Society of Diagnostic Medical Sonographers

The membership of the Society of Diagnostic Medical Sonographers (SDMS) is composed primarily of sonographers and other allied health professionals who perform diagnostic ultrasound. The SDMS issues guidelines and opinions on many aspects of...
sonography. A major function of the SDMS is educational, including local, regional, and national meetings providing ongoing continuing education. The SDMS has advocated for national licensing rather than licensing on a state-by-state basis, but it supports licensing of sonographers, nonetheless. Prior to 2009, individual states did not require licensing of sonographers. The first state to enact a law was New Mexico on April 6, 2009.

Clinical Competency in Sonography

Obtaining clinical competency in obstetric sonography is a challenge experienced by most nonsonographers for several reasons. To achieve clinical competency, one needs to be able to (1) scan under the supervision of a qualified and experience person, (2) have access to pregnant women as models, and (3) limit exposure time to the pregnant models. Most of these issues have been addressed by various professional organizations; however, obtaining sufficient clinical experience is still an obstacle for many clinicians.

Safety in Training and Research

Diagnostic ultrasound has been in use since the late 1950s. There are no confirmed adverse biological effects on patients resulting from this usage. No hazard has been identified that would preclude the prudent and conservative use of diagnostic ultrasound in education and research. Additionally, experience from normal diagnostic practice relevant to extended exposure times and altered exposure conditions is inconclusive. However, it is considered appropriate to make the recommendation that when examinations are carried out for purposes of training or research, the subject should be informed of the anticipated exposure conditions and how these compare with normal diagnostic practice.

Guidelines for Hands-On Scanning in Pregnant Subjects

Additionally, the AIUM has addressed the appropriate use of ultrasound in education with emphasis on safety for human models during AIUM-sponsored training sessions.

- Subject participation should require appropriate informed consent. The primary obstetrician providing prenatal care should be informed of patient participation.
- The subjects should be prescreened to attempt to avoid unexpected findings.
- There should be a plan to address unexpected findings should they be observed during the educational course.
- There should be no first-trimester examinations.
- Exposure time (i.e., duration of “hands-on” teaching session) should not exceed 1 hour per subject.

Competency and Cost

The didactic course content for learning ultrasound has been clearly established. It is recommended that midwives utilize the established guidelines of both ACOG and AIUM. Acquiring the clinical skills is a more daunting task because clinical sites are limited. In a study of family medicine residents, Dresang et al. found that clinical competency in performing fetal biometry and fetal anatomic surveys was achieved within 25–50 supervised scans. However, a minimum number of ultrasounds under supervision to achieve clinical competency has not been determined for nurses and/or midwives. Attaining clinical competence is learner dependent.
Whenever nurses, nurse practitioners, or midwives implement a new procedure into practice, the issue of training and cost needs to be addressed. In a study performed by Stringer et al. at the University of Pennsylvania Medical Center and School of Nursing, it was determined that nurses were able to acquire competency in limited ultrasound at a reasonable cost. In this study, the nurses completed 12 hours of didactic education and a clinical practicum consisting of 6–9 hours and approximately 15 ultrasound examinations resulting in a mean time of 7.5 hours. The cost per nurse was $1,037.55 (in 2003 dollars). This cost can be further reduced by utilizing home study programs for the 12 hours of recommended (at the time of the study) didactic education as compared with paying lecturers to present the information on an individual basis (12 hours at $41.28/hour) as in Stringer's study.

**DOCUMENTATION AND RETRIEVAL**

After an ultrasound examination has been completed, a record of the sonogram needs to become part of the maternal chart. The sonogram needs to be documented with appropriate still images or video or secured in an archival system in the event that the sonogram needs to be revaluated or compared at a later date. The permanent copy of the examination should be labeled, and the results should be documented in the patient’s medical record. For instance, if an ultrasound examination is done in the emergency room, the indication for the ultrasound examination, along with the findings and plan of management, should be documented. After consultation and/or discussion with a provider, further studies may be indicated. If the patient is not compliant or unable to be compliant with follow-up appointments, a method for follow-up and documentation specific to this issue should be established by institutional procedures and protocols as well.

**ULTRASOUND FOR NONDIAGNOSTIC PURPOSES**

The use of ultrasound for pure entertainment and/or psychosocial reasons is discouraged by many organizations including the U.S. Food and Drug Administration (FDA) and AIUM. The AIUM advocates for the responsible use of diagnostic ultrasound for medical benefits only. As stated in their document, “Prudent Use in Obstetrics,” the AIUM advocates “the responsible use of diagnostic ultrasound and strongly discourages the non-medical use of ultrasound for entertainment purposes. The use of ultrasound without a medical indication to view the fetus, obtain a picture of the fetus or determine the fetal gender is inappropriate and contrary to responsible medical practice. Ultrasound should be used by qualified health professionals to provide medical benefit to the patient.”

When the AIUM receives information that a practice, company, or individual is offering or promoting ultrasound for entertainment or nonmedical use, the AIUM first verifies the complaint, notifies the FDA, and then notifies the alleged offender that they have been reported to the FDA.

**Keepsake Fetal Imaging**

In the past, for many reasons, hospitals or practices have refused to give to the parents hard copies of the fetal images as a keepsake. One of the side effects of this rule was that “keepsake video imaging” companies began to spring up. For a fee, a two- or three-dimensional (2D/3D) sonogram would be performed and the parents could purchase videos, DVDs, or photographs of the fetus. One of the concerns of such easily available unregulated services is that any pregnant woman could have a nonmedically indicated sonogram in addition to her medically indicated sonogram, thus increasing the fetal ultrasound exposure time.

In response to this concern, the AIUM published a statement recognizing that fetal sonography may have an impact on parental–fetal bonding. And, for this reason, parents may desire to have a sonogram performed to acquire a permanent copy of the images. To support this belief and to diminish the number of nonmedically indicated sonograms, the AIUM (1) supports providing images or video clips to the parents during medically indicated ultrasound examinations and recommends (2) that these sonograms be performed by appropriately trained and credentialed medical professionals (physicians, registered sonographers, or sonography registry candidates) who have received specialized training in fetal imaging.
debated. Often the circumstances requiring a POC ultrasound make it difficult to obtain a written informed consent prior to performing the scan. Although it may be institution- or practice-dependent as to whether a written informed consent is needed, it may be beneficial, at a minimum, to verbally inform the woman why the POC sonogram is being performed and what structures or organs are to be imaged. It may be of equal importance to add that the POC ultrasound is a specific exam being performed to assess a specific complaint and will not include all fetal structures or assessment for anomalies.

CONCLUSION

Nurses, midwives, nurse practitioners, and PAs working in obstetrics, gynecology, and/or assisted reproductive technologies are incorporating ultrasound skills into their everyday practice. Many clinical situations encountered are ideal for the application of ultrasound.

These same clinicians possess the ideal assessment skills required for obstetric and gynecologic triage. Knowledge and skill in sonography can only serve to enhance the success of triage, expedite evaluation and diagnosis, and decrease patient anxiety, as well as decrease waiting time.

Sonography requires the acquisition of specific didactic information and the demonstration of clinical competence. Once the skills are acquired, continuing educational competence must go hand in hand with continued practice. A realistic concern among radiologists is that untrained personnel will utilize ultrasound. Dr. Roy Filly predicted in 1988 that ultrasound would become the new stethoscope. He said, “As we look at the proliferation of ultrasound instruments in the hands of untrained physicians, we can only come to the unfortunate realization that diagnostic sonography truly is the next stethoscope: poorly utilized by many but understood by few.”

Only proper training and education can prevent this from continuing.

REFERENCES

17. Society for Diagnostic Medical Sonographers (sdms.org).


