

# **Ultrasound Course Handbook**

*University of Alabama at Birmingham  
Department of Obstetrics and Gynecology*

## Ultrasound Course

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**Course Goal:** The Ultrasound Course will provide an integrated approach of lecture, demonstrations, and hands-on scanning opportunities designed to help residents develop the fundamental knowledge, theoretical background, and mastery of skills of effective diagnostic ultrasound.

### Program Objectives:

1. To provide all residents with interactive didactic opportunities to increase their fundamental and theoretical knowledge base in using ultrasound in diagnosing obstetrical, gynecologic, and abdominal problems.
2. To provide PGY 1 residents with opportunities to practice and develop basic obstetric skills.
3. To provide PGY 2 residents with opportunities to practice and develop obstetric ultrasound proficiency.
4. To provide PGY 2 residents with opportunities to practice and develop basic gynecological ultrasound proficiency.
5. To provide PGY 2 and PGY 3 residents with opportunities to practice and develop proficiency in performance of ultrasound-guided amniocentesis.
6. To provide PGY 3 residents with opportunities to practice and develop advanced obstetric ultrasound proficiency.
7. To provide PGY 3 residents with opportunities to practice and develop advanced gynecological ultrasound proficiency.
8. To provide PGY 4 residents with opportunities to supervise lower level residents as a means to reinforce their own proficiency in all of above outlined *Program Objectives*.

### Educational Objectives:

#### PGY 1

- A. At the conclusion of the **Basic Obstetric Ultrasound Skills** section of this course the residents will be able to:
1. Demonstrate proficiency in obtaining fetal biometric measurements including the following: biparietal diameter, head circumference, abdominal circumference, femur length, humerus length
  2. Measure amniotic fluid volume/index
  3. Determine placental location
  4. Determine presence of fetal cardiac activity
  5. Determine fetal presentation

**Timeframe:** Clinics rotation two 1/2-day sessions per week with ultrasound tech at OBCC. In beginning of year, series of didactics followed by hands on sessions with attendings.

#### PGY 2

- A. At the conclusion of the **Obstetric Ultrasound Skills** section of this course the residents will be able to:
1. Demonstrate ability to obtain diagnostic views of the following structures to confirm the presence of normal fetal anatomy:
    - a. Intracranial anatomy—ventricles, cerebellum
    - b. Spine
    - c. 4-chamber heart
    - d. Abdominal wall and cord insertion

- e. Kidneys and bladder
  - f. Abdominal viscera and appropriate situs
  - g. Face
  - h. Extremities
2. Demonstrate proficiency in performing amniocentesis
    - a. Indications
    - b. Technique
  3. Demonstrate the ability to code ultrasounds for billing purposes

**Timeframe:** During post-partum rounder/OBCC rotation, ½ day per week spent with techs in OBCC. Residents will need to schedule some time in Comp Clinic.

**Note:** Although the residents should try to get this experience as a PGY2, because of other clinical commitments during the 2012-13 Academic Year, it may not be possible to complete all outlined objectives as a PGY2. Therefore, residents must then complete these objectives as PGY3 during the US Rotation.

- B. At the conclusion of this **Basic Gynecological Ultrasound Skills** section of the course the residents will be able to:
  1. Conduct and interpret views of early pregnancy scans
  2. Conduct and interpret views of an endovaginal ultrasound
  3. Demonstrate ability to measure: a) crown rump length and b) gestational sac
  4. Identify: a) yolk sac and b) cul de sac
  5. Identify and evaluate adnexa

In a non-gravid ultrasound:

6. Demonstrate ability to measure uterine size
7. Assess endometrial thickness
8. Evaluate uterine contour and cervix
9. Identify and evaluate adnexa
10. Identify cul de sac

**Timeframe:** During REI rotation. In addition some evaluation of the early pregnancy may occur at OBCC.

- C. At the conclusion of the **Amniocentesis Skills** section of the course the residents will be able to:
  - a. Explain the indications for amniocentesis
  - b. Explain the contraindications for amniocentesis
  - c. Synthesize information on indications, risks, and alternatives to perform appropriate informed consent
  - d. Accomplish the requisite technical steps in the performance of lung maturity amniocentesis

### PGY 3

- A. At the conclusion of the **Advanced Obstetric Ultrasound Skills** section of this course the residents will be able to:
  1. Both identify and describe the major findings associated with the following common anatomic defects:
    - a. Neural tube defects
      - i. Spina bifida
      - ii. Anencephaly
    - b. Ventral wall defects
    - c. Renal abnormalities
      - i. Renal pelvis dilation
      - ii. Renal dysplasia
    - d. Cleft lip
    - e. Club foot

- f. Some cardiac defects
    - i. Hypoplastic left heart
    - ii. AV canal
  - g. Bowel atresia/obstruction
2. Identify the components of a genetic sonogram and explain the significance of each:
    - a. Echogenic bowel
    - b. Nuchal fold measurement
    - c. Renal pelviectasis
    - d. Echogenic focus
    - e. Ventriculomegaly
    - f. 2 vessel cord
  3. Describe the components of and demonstrate the ability to perform a fetal Biophysical Profile (BPP)
    - a. Amniotic fluid assessment
    - b. Fetal breathing
    - c. Fetal movement
    - d. Fetal tone
  4. Demonstrate the ability to code ultrasounds for billing purposes

**Timeframe:** During Research/Ultrasound rotation, residents spend 1-2 half-days per week in anomalies/genetics clinic with faculty.

#### **PGY 3 - 4**

- A. At the conclusion of the **Advanced Gynecological Ultrasound Skills** section of this course, the residents will be able to:
  1. Explain the use of Doppler for assessment of adnexal mass
  2. Demonstrate ability to identify, measure, and characterize an adnexal mass
  3. Demonstrate proficiency in performance of sonohysterography

**Timeframe:** During PGY3 US Rotation, **PGY3 Ambulatory GYN Rotation, PGY 4 REI**

#### **Biophysical Profile:**

As we have moved to Biophysical Profile as our primary form of antenatal testing, it is important for the residents to become proficient in the performance and interpretation of the form of antenatal surveillance. As part of the Ultrasound Curriculum, focused assessment forms for BPP have previously been developed. These forms will be utilized to document resident proficiency in performing 10 examinations. Each resident should be supervised in the performance of the BPP by an MFM faculty or fellow and have the faculty sign the focused assessment.

First year residents may complete the focused assessments and collect the requisite number of supervised scans, however, an upper level resident or attending must be present and concur with the first year's interpretation of the BPP prior to patient disposition. PGY2s and above who have competently performed at least 10 supervised BPP and submitted their focused assessment form may perform and interpret the BPP independently. Once the resident has successfully performed 10 BPPs, the completed focus assessment sheets should be submitted to Nancy Atkins and this will become part of the resident's file. The residents will be responsible for policing themselves and should inform the faculty if they have not attained the 10 necessary BPP prior to performing unsupervised scans.

#### **ACGME Competencies Addressed by the Ultrasound Course:**

1. Patient Care
2. Medical Knowledge
3. Professionalism

## Course Outline

The curriculum includes classroom time composed of: 1) didactic lectures that are delivered annually or bi-annually, depending on the topic and 2) discussions of various topics after the viewing of the online AIUM material as outlined below. The discussion sessions are designed to enrich/extend the residents' learning. Residents will complete 7 pocket-sized focused assessments throughout 4 years.

Topic	Online Resources (Read and/or view prior to lecture/discussion)	PGY	Instructor
1. Intro to OB Ultrasound Skills*	<p><b><u>Articles:</u> AIUM Standard for Documentation of an Ultrasound Examination</b></p> <p><b><u>PowerPoint Lecture:</u> US Concepts and Coding 2012 Update</b></p> <p><b><u>Book Chapter:</u> Growth, Doppler and Fetal Assessment—pages 31-35 Nyberg</b></p> <p><b><u>AIUM Lecture Modules and Tests:</u> Pregnancy Dating</b></p>	PGY1	Biggio
2. Basic OB Ultrasound*	<p><b><u>Video Module:</u> Practice Guideline of an Antepartum Ob Ultrasound Exam</b></p> <p><b><u>Articles:</u> AIUM Practice Guideline for the Performance of an Antepartum Obstetric Ultrasound Examination</b></p> <p><b><u>PowerPoint Lecture:</u> Basic OB Imaging 2011 Update</b></p> <p><b><u>Book Chapter:</u> Abnormalities of Amniotic Fluid—Chapter 3 Nyberg</b></p> <p><b><u>AIUM Lecture Modules and Tests:</u> (should be completed by December of PGY2 year)</b></p> <ul style="list-style-type: none"> <li>• Abdomen</li> <li>• CNS and Spine</li> <li>• Heart</li> <li>• Placenta and umbilical cord</li> <li>• US of abnormal fetal weight</li> </ul>	All	Biggio

Topic	<b>Online Resources</b> <i>(Read and/or view prior to lecture/discussion)</i>	PGY	Instructor
3. Basic GYN Ultrasound Skills**	<p><b><u>Video Module:</u></b></p> <ul style="list-style-type: none"> <li>• <i>AIUM Guideline for the Performance of Ultrasound of Female Pelvis</i></li> <li>• <i>Developing Fetus: Failing Intrauterine Pregnancy</i></li> <li>• <i>Developing Fetus: Ectopic Pregnancy</i></li> </ul> <p><b><u>Articles:</u></b></p> <ul style="list-style-type: none"> <li>• <i>AIUM Practice Guideline for the Performance of the Ultrasound Examination of the Female Pelvis</i></li> <li>• <i>Can ultrasound replace dilation and curettage?</i></li> <li>• <i>Accuracy of transvaginal ultrasonography in diabetic or obese women with postmenopausal bleeding</i></li> <li>• <i>Endovaginal ultrasound to exclude endometrial cancer and other endometrial abnormalities</i></li> </ul> <p><b><u>Book Chapters:</u></b></p> <ul style="list-style-type: none"> <li>• <i>Normal anatomy of the female pelvis</i></li> <li>• <i>Ovarian sonography</i></li> <li>• <i>Ultrasound of the uterus</i></li> </ul> <p><b><u>AIUM Lecture Modules and Tests:</u> (should be completed by end of PGY2 year)</b></p> <ul style="list-style-type: none"> <li>• <i>Benign Abnormalities of Female Pelvis</i></li> <li>• <i>Early Pregnancy US</i></li> <li>• <i>Ectopic Pregnancy</i></li> <li>• <i>US of Normal Female Pelvis</i></li> <li>• <i>US of Early 1<sup>st</sup> Trimester Bleeding</i></li> </ul>	All	H. Greer
4. Amniocentesis: Lecture and Simulation	<p><b><u>PowerPoint Lecture:</u> Amniocentesis Didactic</b></p>	PGY 2	Owen & Biggio
5. Ultrasound Physics**	<p><b><u>PowerPoint Lecture:</u> Ultrasound Physics</b></p>	All	Biggio

Topic	<b>Online Resources</b> <i>(Read and/or view prior to lecture/discussion)</i>	PGY	Instructor
6. Advanced GYN Ultrasound Skills**	<p><b><u>Video Module: 3D Ultrasound for Gynecology—Parts 1 – 3</u></b></p> <p><b><u>Articles:</u></b></p> <ul style="list-style-type: none"> <li>• <b>Standard for the Performance of Saline Infusion Sonohysterography</b></li> <li>• <b>Transvaginal sonography combined with saline contrast SHG in evaluating the uterine cavity...</b></li> <li>• <b>Usefulness of Doppler Sonography in the Diagnosis of Ovarian Torsion</b></li> <li>• <b>Preoperative sonographic and clinical characteristics as predictors of ovarian torsion</b></li> </ul> <p><b><u>Book Chapters:</u></b></p> <ul style="list-style-type: none"> <li>• <b>Color Doppler Sonography of Pelvic Masses</b></li> <li>• <b>Sonographic Evaluation of Pelvic Masses</b></li> <li>• <b>Sonographic Evaluation of Uterine Disorders</b></li> </ul> <p><b><u>AIUM Lecture Modules and Tests: (should be completed by January of PGY4 year)</u></b></p> <ul style="list-style-type: none"> <li>• <b>US Evaluation of Adnexa</b></li> <li>• <b>US Evaluation of Infertile Female</b></li> <li>• <b>Sonographic Evaluation of Post-menopausal Bleeding</b></li> </ul>	All	H. Greer
7. Advanced OB Ultrasound Skills**	<p><b><u>Video Module: Doppler Ultrasound</u></b></p> <p><b><u>Article: Nuchal translucency and other first-trimester sonographic markers of chromosomal abnormalities</u></b></p> <p><b><u>AIUM Lecture Modules and Tests: (should be completed by end of PGY3 year)</u></b></p> <ul style="list-style-type: none"> <li>• <b>US of uterine cervix</b></li> <li>• <b>US of Genitourinary system</b></li> <li>• <b>US of Spine</b></li> <li>• <b>US of Twin Pregnancy</b></li> <li>• <b>Cranial Anomalies</b></li> <li>• <b>Abnormal Midtrimester Screen</b></li> </ul>	All	Biggio

\* Offered every year

\*\* Offered every 2 years

**2-Year Schedule:**

2012 - 2013	2013 - 2014
Topic 1 (Interns)	Topic 1 (Interns)
X	Topic 2 (All)
X	Topic 3 (All)
Topic 4 (PGY2)	Topic 4 (PGY2)
X	Topic 5 (All)
Topic 6 (All)	X
Topic 7 (All)	X

**Computer-Based Supplemental Resources:**

*(All resources are available through the Resident's Website)*

*Video Resources Available on Resident Website*

1. Diagnostic Ultrasound Principles and Instruments: Fundamentals and Advances
2. The Developing Fetus: First and Second Trimesters
3. Practice Guidelines for Performance of an Antepartum Obstetrical Ultrasound Examination: CD-ROM Companion
4. Practice Guidelines for Performance of an Ultrasound Examination of the female pelvis: CD-ROM Companion
5. Three Dimensional Ultrasound in Gynecology

**Resident Assessment:**

- Post-tests on select AIUM Lecture topics
- Focused assessments:
  - Residents will need to have an initial focused assessment performed by an attending
  - Residents will need to have 10 procedures observed for each outlined on the focused assessment

**Self-Study Material:****Articles:**

1. AIUM Practice Guideline for the Performance of the Ultrasound Examination of the Female Pelvis
2. AIUM Standard for the Performance of Saline Infusion Sonohysterography
3. AIUM Standard for Documentation of an Ultrasound Examination
4. AIUM Practice Guideline for the Performance of an Antepartum Obstetric Ultrasound Examination
5. Can ultrasound replace dilation and curettage? A longitudinal evaluation of postmenopausal bleeding and transvaginal sonographic measurement of the endometrium as predictors of endometrial cancer *Am J Obstet Gynecol.*2003;188(2):401-408.
6. Accuracy of transvaginal ultrasonography in diabetic or obese women with postmenopausal bleeding *Am J Obstet Gynecol.* 2004;104(3):571-578.
7. Endovaginal ultrasound to exclude endometrial cancer and other endometrial abnormalities *JAMA.*1998;280(17):1510-1517



8. Sonohysterography transvaginal sonography combined with saline contrast sonohysterography in evaluating the uterine cavity in premenopausal patients with abnormal uterine bleeding  
*Ultrasound Obstet Gynecol.*2001;18:54–61.
9. Usefulness of Doppler sonography in the diagnosis of ovarian torsion *Fertility and Sterility.*2000;73(5):1047-1050.
10. Preoperative sonographic and clinical characteristics as predictors of ovarian torsion *J Ultrasound Med.* 2008; 27:7–13.
11. Nuchal translucency and other first-trimester sonographic markers of chromosomal abnormalities  
*Am J Obstet Gynecol.*2004; 191: 45-67

**Modules:**

1. AIUM Guideline for the Performance of Ultrasound of Female Pelvis
2. Practice Guidelines of an Antepartum Ob Ultrasound Exam

# UAB Department of Ob/Gyn Residency

## Ultrasound Curriculum - Focused Assessment Competency

Resident: \_\_\_\_\_

Academic Year: \_\_\_\_\_

### PGY 1 -- BASIC OBSTETRICS ULTRASOUND SKILLS

**Residents: ALL PGY 1s must complete**

Residents are required to complete 10 procedures for each procedure listed below by the end of the Academic Year. Have the attending physician initial each procedure then indicate (with a "1" or "2") how well the procedure was performed using the following scale:

- 1 = performed / demonstrated, but needs more practice**
- 2 = performed / demonstrated correctly**

*Scores and Attending's or Tech's Initials*



Procedures	1	2	3	4	5	6	7	8	9	10
1. Measured biparietal diameter										
2. Measured head circumference										
3. Measured abdominal circumference										
4. Measured femur length										
5. Measured humerus length										
<b>6. Fetal biometric measuring proficiency was demonstrated in the above 5 procedures.</b>										
7. Measure amniotic fluid volume/index										
8. Determine placental location										
9. Determine presence of fetal cardiac activity										
10. Determine fetal presentation										

Resident's Signature \_\_\_\_\_

Program Director's Signature \_\_\_\_\_

# UAB Department of Ob/Gyn Residency

## Ultrasound Curriculum - Focused Assessment Competency

Resident: \_\_\_\_\_

Academic Year: \_\_\_\_\_

### PGY 2 -- OBSTETRICS ULTRASOUND SKILLS

#### Residents: ALL PGY 2s must complete

Residents are required to complete 10 procedures for each procedure listed below by the end of the Academic Year. Have the attending physician initial each procedure then indicate (with a "1" or "2") how well the procedure was performed using the following scale:

**1 = performed / demonstrated, but needs more practice**

**2 = performed / demonstrated correctly**

*Scores and Attending's or Tech's Initials*



Procedures	1	2	3	4	5	6	7	8	9	10
<b><i>Obtained diagnostic views of the following structures to confirm the presence of normal fetal anatomy of:</i></b>										
1. Intracranial anatomy—ventricles, cerebellum										
2. Spine										
3. 4-chamber heart										
4. Abdominal wall and cord insertion										
5. Kidneys and bladder										
6. Abdominal viscera and appropriate situs										
7. Face										
8. Extremities										
<b><i>Demonstrated proficiency in performing amniocentesis:</i></b>										
9. Indications										
10. Techniques										
<b>Demonstrated the ability to code ultrasounds for billing purposes</b>										

Resident's Signature \_\_\_\_\_

Program Director's Signature \_\_\_\_\_

# UAB Department of Ob/Gyn Residency

Ultrasound Curriculum - Focused Assessment Competency

Resident: \_\_\_\_\_

Academic Year: \_\_\_\_\_

## PGY 2 -- BASIC GYNECOLOGICAL ULTRASOUND SKILLS

### Residents: PGY 2s on REI Rotation

Residents are required to complete 10 procedures for each procedure listed below by the end of the Academic Year. Have the attending physician initial each procedure then indicate (with a "1" or "2") how well the procedure was performed using the following scale:

**1 = performed / demonstrated, but needs more practice**

**2 = performed / demonstrated correctly**

*Scores and Attending's or Tech's Initials*

Procedures	1	2	3	4	5	6	7	8	9	10
1. Conducted and interpreted views of early pregnancy scans										
2. Conducted and interpreted views of an endovaginal ultrasound										
3. Measured crown rump length										
4. Measured gestational sac										
5. Identified yolk sac										
6. Identified cul de sac										
7. Identified and evaluated adnexa										
<b><i>In a non-gravid ultrasound:</i></b>										
8. Measured uterine size										
9. Assessed endometrial thickness										
10. Evaluated uterine contour and cervix										
11. Identified and evaluate adnexa										
12. Identified cul de sac										

Resident's Signature \_\_\_\_\_

Program Director's Signature \_\_\_\_\_

# UAB Department of Ob/Gyn Residency

Ultrasound Curriculum - Focused Assessment Competency

Resident: \_\_\_\_\_

Academic Year: \_\_\_\_\_

## PGY 3 -- ADVANCED OBSTETRIC ULTRASOUND SKILLS

### Residents: PGY 3s

Residents are required to complete 5 procedures for each procedure listed below. Have the attending physician initial each procedure then indicate (with a "1" or "2") how well the procedure was performed using the following scale:

**1 = Explained/described, but needs more practice**

**2 = Explained / described correctly**

Scores and Attending's or Tech's Initials

Procedures	1	2	3	4	5
<b>Explained and described the major findings associated with the following common anatomic defects AND described the appropriate views used to exclude the presence of these anomalies:</b>					
1. Neural tube defects:					
a) Spina bifida					
b) Anencephaly					
2. Ventral wall defects					
3. Renal abnormalities:					
a) Renal pelvis dilation					
b) Renal dysplasia					
4. Cleft lip					
5. Club foot					
6. Cardiac defects:					
a) Hypoplastic left heart					
b) AV canal					
7. Bowel atresia/obstruction					
<b>Identified the components of a genetic sonogram and explain the significance of each:</b>					
8. Echogenic bowel					
9. Nuchal fold measurement					
10. Renal pelviectasis					
11. Echogenic focus					
12. Ventriculomegaly					
13. 2 vessel cord					
<b>Demonstrated the ability to code ultrasounds for billing purposes</b>					

Resident's Signature \_\_\_\_\_

Program Director's Signature \_\_\_\_\_

# UAB Department of Ob/Gyn Residency

## Ultrasound Curriculum - Focused Assessment Competency

Resident: \_\_\_\_\_

Academic Year: \_\_\_\_\_

### PGY 3 -- ADVANCED OBSTETRIC ULTRASOUND SKILLS (BBP)

#### Residents: ALL PGY 3s

Residents are required to complete 10 procedures for each procedure listed below. Have the attending physician initial each procedure then indicate (with a "1" or "2") how well the procedure was performed using the following scale:

**1 = performed / demonstrated, but needs more practice**

**2 = performed / demonstrated correctly**

*Scores and Attending's or Tech's Initials*

Procedures	1	2	3	4	5	6	7	8	9	10
<b>Demonstrate ability to perform and interpret fetal Biophysical Profile (BPP)</b>										
1. Amniotic fluid assessment										
2. Fetal breathing										
3. Fetal movement										
4. Fetal tone										

Resident's Signature \_\_\_\_\_

Program Director's Signature \_\_\_\_\_

**UAB Department of Ob/Gyn Residency**

Ultrasound Curriculum - Focused Assessment Competency

Resident: \_\_\_\_\_

Academic Year: \_\_\_\_\_

**PGY 2 & 3 -- AMNIOCENTESIS SKILLS**

**Residents: ALL PGY 3s**

Residents are required to complete 10 procedures for each procedure listed below. Have the attending physician initial each procedure then indicate (with a "1" or "2") how well the procedure was performed using the following scale:

**1 = performed / demonstrated, but needs more practice**

**2 = performed / demonstrated correctly**

*Scores and Attending's Initials*



Procedures	1	2	3	4	5	6	7	8	9	10
<b>Demonstrate ability to counsel for, prepare for, and perform amniocentesis</b>										
1. Informed consent										
2. Patient and equipment preparation										
3. Needle placement										
4. Specimen collection										

Resident's Signature \_\_\_\_\_

Program Director's Signature \_\_\_\_\_

# UAB Department of Ob/Gyn Residency

Ultrasound Curriculum - Focused Assessment Competency

Resident: \_\_\_\_\_

Academic Year: \_\_\_\_\_

## PGY 3 - 4 -- ADVANCED GYNECOLOGICAL ULTRASOUND SKILLS

### Residents: PGY 3 on US Rotation / PGY 4 on REI

Residents are required to complete 10 procedures for each procedure listed below. Have the attending physician initial each procedure then indicate (with a "1" or "2") how well the procedure was performed using the following scale:

**1 = performed / demonstrated, but needs more practice**

**2 = performed / demonstrated correctly**

*Scores and Attending's or Tech's Initials*

Procedures	1	2	3	4	5	6	7	8	9	10
1. Identified, measured, and characterized an adnexal mass										
<i>Comments:</i>										
2. Demonstrate proficiency in perform sonohysterography										
<i>Comments:</i>										
3. Explained the use of Doppler for assessment of adnexal mass	<i>One signature required</i> _____									
<i>Comments:</i>										

Resident's Signature \_\_\_\_\_

Program Director's Signature \_\_\_\_\_