Ultrasound Curriculum Handbook

University of Alabama at Birmingham
Department of Obstetrics and Gynecology
Ultrasound Curriculum

COURSE GOAL: The Ultrasound Course will provide readings, lecture, demonstrations, and hands-on scanning opportunities to help residents develop the fundamental knowledge, theoretical background, and mastery of skills for 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 pathology.
2. To provide PGY 1 residents with opportunities to practice and develop basic obstetric and gynecological ultrasound proficiency.
3. To provide PGY 2 residents with opportunities to practice and develop obstetric ultrasound proficiency.
4. To provide PGY 3 residents with opportunities to practice and develop advanced obstetric ultrasound proficiency and knowledge.
5. To provide PGY 3 residents with opportunities to practice and develop advanced gynecological ultrasound proficiency and knowledge.
6. To provide PGY 4 residents with opportunities to supervise lower level residents as a means to reinforce their own proficiency and knowledge 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
3. Determine placental location
4. Determine presence of fetal cardiac activity
5. Determine fetal presentation
6. 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

Timeframe: During orientation, there will be a lecture on basic US skills with a post-test on BPP to measure understanding. Formal skills training will be provided during the IUP rotation on Wednesday mornings from 10 AM – 12 PM in OBCC. The IUP-1 is expected to attend training on three Wednesday mornings during the six-week rotation. There will also be opportunities throughout the year to practice biometry on the US simulator. Skills assessment will be performed throughout the year by 4th year residents, US technicians, and attendings in the OBCC, MEU, during US simulations, on L&D, and on HRO.

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 the ability to measure a crown rump length and a gestational sac
4. Identify a yolk sac and cul de sac
5. Identify and evaluate adnexa

**Timeframe:** The PGY1 on the REI rotation will perform endovaginal US most mornings while on the rotation. Skills assessment will be performed by the REI fellows and 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—cavum septum pellucidum, ventricles, cerebellum
   b. Spine
   c. 4-chamber heart
   d. Abdominal wall and umbilical cord
   e. Kidneys and bladder
   f. Abdominal viscera and appropriate situs
   g. Face
   h. Extremities

**Timeframe:** In the summer, there will be a lecture on basic fetal anatomy. The PGY2 on the OBCC rotation will receive formal skills training in obstetrical anatomy from US technicians on Thursday afternoons in OBCC. The OBCC-2 is expected to attend training on three Thursday afternoons during the six-week rotation. There will also be opportunities throughout the year to practice anatomy scans on L&D and using the US simulator. Skills assessment will be performed by US technicians and attendings in the OBCC, on L&D, and during US simulations.

**PGY 3**

A. At the conclusion of the *Advanced Obstetric Ultrasound Skills* section of this course the residents will be able to:

1. 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. Describe 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. Develop proficiency in basic counseling regarding prenatal screening options for aneuploidy and other genetic diseases.

**Timeframe:** In the fall, there will be a lecture on fetal anatomic abnormalities. The PGY3 on the Res/US rotation will meet the above objectives through US and observational opportunities in the First Trimester Clinic, Prenatal Genetics Clinic, Fetal Diagnosis Clinic, and OBCC. The Res/US-3 is expected to attend a variety of clinics (to total 2 days/week) per the schedule outlined below. Skills assessments will be performed by US technicians and attendings in the clinic setting. There will also be opportunities during the year to evaluate select fetal anomalies on the US simulator.

B. At the conclusion of this *Advanced Gynecological Ultrasound Skills* section of the course the residents will be able to:
   1. Demonstrate ability to measure uterine size
   2. Assess endometrial thickness
   3. Evaluate uterine contour and cervix
   4. Identify and evaluate the adnexa
   5. Identify the cul de sac
   6. Explain the use of Doppler for assessment of adnexal mass
   7. Demonstrate ability to identify, measure, and characterize an adnexal mass
   8. Demonstrate proficiency in performance of sonohysterography

**Timeframe:** The PGY3 on the REI rotation will perform endovaginal US most mornings while on the rotation. The Res/US-3 will perform endovaginal US in the GYN Continuity Clinic on Wednesday mornings and assist with SIS on Thursday afternoons. Skills assessment will be performed by the REI fellows, attendings and US technicians during those rotations.

**RESIDENTS:** All residents participate in this curriculum.

**COURSE LENGTH:** The curriculum runs throughout the year and varies for each PGY level due to the different timing of the rotations.

**PGY1:**
- Intern orientation – OB Basic US lecture; BPP post-test; practice on simulator
- IUP rotation – F&G and BPP training (three Wed AMs, 10AM – 12P in OBCC)
- REI rotation – GYN early pregnancy scans
- Yearlong – Simulated and real time practice performing F&G/BPP and determining placentation and presentation

**PGY2:**
- Summer lecture on basic fetal anatomy; practice on simulator
- OBCC rotation – OBCC anatomy scans (Thursday PM)

**PGY3:**
- Fall lecture on fetal anatomic abnormalities; practice on simulator
- Res/US rotation (2 days/week)
  - Tuesday PM x 2: First Trimester Clinic
  - Tuesday PM x 4: OBCC
  - Wednesday AM x 6: GYN Continuity Clinic
  - Wednesday PM x 2: Prenatal Genetics Clinic
  - Wednesday PM x 4: Fetal Diagnosis Clinic
  - Thursday PM x 6: SIS Clinic
- REI rotation

**COMPETENCY ASSESSMENT:** Though there will be a number of opportunities for informal feedback throughout the curriculum, formalized competency assessment will be achieved through completion of standardized assessment forms that are available on the resident website. The majority of the forms will
be printed and held in resident-specific binders at OBCC/GYNCC and will be completed by the US technicians in those clinics. The basic gynecologic US assessment will need to be printed from the website and taken to REI clinic to be completed there by faculty and fellows. The minimum number of formal assessments required for each PGY year are outlined below. Residents are also encouraged to seek feedback through MyTIP Report.

**PGY1:**
- Five BPPs (assessed in OBCC)
- Five F&Gs (assessed in OBCC)
- Ten basic GYN scans (assessed in REI clinic)

**PGY2:**
- Three full anatomy scans (assessed in OBCC)

**PGY3:**
- Five advanced GYN scans (assessed in GYN Continuity Clinic)

**COURSE METHODS:** The curriculum consists of a series of online materials and hands-on experience with all information regarding the course on the residency website. There will be an introductory lecture for the incoming residents on basics of ultrasound. Other didactic material will be based on online materials including AIUM PowerPoint lectures developed in conjunction with CREOG/APGO.

**Topic 1: Basic OB Ultrasound Skills** – in conjunction with PGY1 skills curriculum
- **Articles:** [AIUM Standard for Documentation of an Ultrasound Examination](#)
- **PowerPoint Lecture:** US Concepts and Coding 2012 Update (pdf)  
- **Book Chapter:** [Growth Doppler and Fetal Assessment](#) pages 31-35, Nyberg
- **AIUM Lecture Modules and Tests:** Pregnancy Dating: [Lecture Module / Test](#)

**Topic 2: Basic GYN Ultrasound Skills** – in conjunction with PGY1 REI rotation
- **Book Chapters:**
  - [Normal Anatomy of the Female Pelvis](#) (book chapter)
  - [Ovarian Sonography](#) (book chapter)
  - [Ultrasound of the Uterus](#) (book chapter)
- **AIUM Lecture Modules and Tests:**
  - Early Pregnancy US: [Lecture Module / Test](#)
  - Ectopic Pregnancy: [Lecture Module / Test](#)
  - US of Early 1st Trimester Bleeding: [Lecture Module / Test](#)

**Topic 3: OB Ultrasound Skills** – in conjunction with PGY2 OBCC and PGY3 US rotations
- **Video Module:** [Practice Guidelines of an Antepartum OB Ultrasound Exam](#)
- **Articles:** [AIUM Practice Guideline for the Performance of an Antepartum Obstetric Ultrasound Examination](#)
- **Book Chapter:** [Abnormalities of Amniotic Fluid](#) (Chapter 3, Nyberg)
- **AIUM Lecture Modules and Tests**
  - Abdomen: [Lecture Module / Test](#)
  - CNS and Spine: [Lecture Module / Test](#)
  - Heart: [Lecture Module / Test](#)
  - Placenta and umbilical cord: [Lecture Module / Test](#)
  - US of abnormal fetal weight: [Lecture Module / Test](#)

**Topic 4: Amniocentesis Lecture and Simulation** – in conjunction with PGY3 US rotation
- **PowerPoint Lecture:** [Amniocentesis Didactic](#)
Topic 5: Ultrasound Physics – in conjunction with PGY3 US rotation

- **PowerPoint Lecture:** Ultrasound Physics

Topic 6: Advanced GYN Ultrasound Skills – in conjunction with REI and PGY3 US rotations

- **Articles:**

- **Book Chapters:**
  - Color Doppler Sonography of Pelvic Masses
  - Sonographic Evaluation of Pelvic Masses
  - Sonographic Evaluation of Uterine Disorders

- **AIUM Lecture Modules and Tests:** Complete by January of PGY4 year
  - US Evaluation of the Adnexa: Lecture Module / Test
  - US Evaluation of Infertile Female: Lecture Module / Test
  - Sonographic Evaluation of Post-menopausal Bleeding: Lecture Module / Test
  - Benign Abnormalities of Female Pelvis: Lecture Module / Test
  - US of Normal Female Pelvis: Lecture Module / Test

Topic 7: Advanced OB Ultrasound Skills – in conjunction with PGY3 US rotation


- **AIUM Lecture Modules and Tests:**
  - US of uterine cervix: Lecture Module / Test
  - US of Genitourinary system: Lecture Module / Test
  - US of Spine: Lecture Module / Test
  - US of Twin Pregnancy: Lecture Module / Test
  - Cranial Anomalies: Lecture Module / Test
  - Abnormal Midtrimester Screen: Lecture Module / Test
  - Abdomen: Lecture Module / Test
  - CNS and Spine: Lecture Module / Test
  - Heart: Lecture Module / Test
  - Placenta and umbilical cord: Lecture Module / Test
  - US of abnormal fetal weight: Lecture Module / Test

Supplemental Materials for potential use as Advance Learning Materials:

**AIUM Videos**

- The Developing Fetus
  - Sonoembryology (Running time: 27:05)
  - The Early Anatomic Survey (Running time: 28:49)
  - The Genetic Sonogram (Running time: 44:04)
  - The Fetal Ventricle (Running time: 41:49)
  - The Fetal Spine (Running time: 32:28)
  - Prenatal Evaluation of the Fetal Face (Running time: 28:51)
  - Cardiac Exam (Running time: 38:18)
  - The Thorax (Running time: 42:17)
  - The Gastrointestinal Tract & Abdominal Wall Defects (Running time: 39:29)
  - Genitourinary-Obstructive (Running time: 41:31)
  - Genitourinary-Non-Obstructive (Running time: 38:41)
  - Lethal and Nonlethal Skeletal Conditions (Running time: 45:49)
  - Borderline Findings in the Fetus (Running time: 41:39)
  - Understanding Risks What I Tell Patients (Running time: 42:17)
- Diagnostic Ultrasound Principles and Instruments
  - Transducers (Running time: 00:53:21)
  - Instruments (Running time: 1:34:24)
  - Modern Technology & Risk and Safety (Running time: 1:28:33)
  - Ultrasound in Tissues (Running time: 00:48:06)
  - Doppler Ultrasound (Running time: 1:28:24)

**AIUM Lectures and Tests** (Full length lectures compared to some abbreviated above)

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**Other Video Modules:** 3D Ultrasound for Gynecology (Parts 1-3)

- Part 1 (Running time: 27:39)
- Part 2 (Running time: 33:16)
- Part 3 (Running time: 31:23)