Goals and Objectives of Training and Specialty Requirements
Pregnancy and Female Pelvic Ultrasound
January 2015

Introduction
We would expect the trainee, based on earlier training, to have basic knowledge of the following areas applicable to clinical ultrasound - embryology, teratology, genetics, the physiology and pathophysiology of pregnancy.

Upon completion of the complete US/PND rotation, residents would be expected to understand the full range of diagnostic possibilities of ultrasound. The training requirements are intended to ensure that the resident develops appropriate skills to be able to identify normal pelvic, pregnancy and fetal anatomy, pregnancy and fetal abnormalities, and female pelvic pathology.

Goals for resident learning are as follows. The over-arching goals are italicised.

MEDICAL EXPERT

Demonstrates knowledge of the basics of ultrasound physics, machine operation, normal pregnancy, fetal, and pelvic anatomy.
Achieves a basic understanding of ultrasound as a screening and diagnostic tool with respect gynecological pelvic pathology.

- location of IUCD Evaluation of early pregnancy
    - ultrasound features of normal early pregnancy, including multiple pregnancy
    - development of fetal anatomy in early pregnancy : sonoembryology
    - fetal biometry : crown rump length, nuchal translucency
    - ultrasound features of early pregnancy failure including hydatidiform mole
    - ultrasound and biochemical investigation of ectopic pregnancy
    - tumours in early pregnancy (e.g. hydatidiform mole)
    - normal appearance of the cervix

- Normal fetal anatomy at 18 -20 weeks
    - shape of the skull; nuchal skin fold
    - facial profile : eyes, nose (nasal bone), lips
    - brain : cerebral cortex and cerebral ventricles, posterior fossa and cerebellum, cisterna magna
    - spine : both longitudinally and transversely
    - heart : rate and rhythm, four chamber view, including atrioventricular valves, inlets and outlets, aortic root and arch, pulmonary trunk and ductus arteriosus
    - lungs
    - shape of the trunk

    - abdomen : diaphragm, stomach, liver, kidneys and urinary bladder, abdominal wall and umbilicus
    - genitalia
    - limbs : femur, tibia and fibula, humerus, radius and ulna, feet and toes, hands and fingers - these include shape, echogenicity and movement
    - multiple pregnancy : monochorionic and dichorionic
    - assessment of amniotic fluid
    - estimation of amniotic fluid volume
    - examination of the placenta and cord
        - placental location and morphology
        - number of cord vessels

- Fetal biometry
    - measurements to assess fetal size (biparietal diameter, head circumference, abdominal circumference, femur length)
    - measurements to aid the diagnosis of fetal anomalies : V/H ratio, cisterna magna, transcerebellar diameter, intraorbital diameter, nuchal skin fold, nasal bone length, nuchal translucency
    - estimation of gestational age
        - interpretation and appreciation of limitation of ultrasonic and other investigations for gestational age assessment
        - Assessment of fetal growth
        - ultrasonic assessment of fetal growth : interpretation and appreciation of limitations of standard measurements singly or serially
        - fetal weight estimation

- Assessment of normal fetal behaviour
    - fetal body movements
    - fetal breathing movements
    - fetal eye movements
    - heart rate and rhythm
    - biophysical scoring systems : interpretation and appreciation of limitations

Female pelvis

- Normal female pelvic anatomy
    - uterus
        - uterine size, position, shape
        - length, anteroposterior and transverse
        - cyclical morphological changes in the endometrium
        - measurement of endometrial thickness
    - ovaries
        - size and volume
        - cyclical morphological changes
        - measurement of follicles and corpus luteum
        - assessment of peritoneal fluid

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    - tubes
        - hydrosalpinx, cancer of Fallopian tube
    - ovaries
        - cysts, benign and malignant, morphological scoring systems
        - endometriosis
        - screening of ovarian carcinoma
        - differential diagnosis of pelvic masses

- Gynecological pathology
    - uterus
        - Fibroids
        - Adenomyosis
        - endometrial hyperplasia
        - screening for endometrial cancer
        - polyps
- Doppler in gynecology
    - pathology : detection of angiogenesis in ovarian tumors; general indications in infertility; endometriosis

Achieves a basic understanding of ultrasound as a screening and diagnostic tool with respect to the pathology and pathophysiology of pregnancy complications, fetal anomalies and fetoplacental dysfunction

- Evaluation of fetal and uteroplacental blood flow
    - methodology appropriate to obstetric investigation
    - appreciation of problems in blood flow and velocity measurements and wave form analysis in normal and complicated pregnancies
    - clinical applications in the prediction of intrauterine growth retardation and pre-eclampsia
    - clinical applications in monitoring the small-for-dates fetus
        - incl. Differential Dx of IUGR
    - pregnancies complicated by rhesus isoimmunization, diabetes, postmaturity and fetal cardiac arrhythmias
    - multiple pregnancies
        - recognition and staging of twin to twin transfusion sequence

- Pregnancy Complications/Fetal Anomalies
    - Fetal malformations (esp. neural tube defects, chamber and outflow anomalies of the heart, facial clefts, skeletal dysplasias, renal, GI and hepatic abnormalities, cystic hygroma, thickened NT, small or absent nasal bones, choroids plexus cysts)

- Pregnancy complications (esp. oligo- and polyhydramnios, placental abnormalities, cord abnormalities, fibroids, ovarian cysts and thin lower uterine segments)

Will acquire the technical skills to operate an ultrasound machine and manipulate images on a digital PACS system.

- identify the fetus within the uterus, it orientation and presentation
- identify and document the fetal heart rate
- demonstrate placental location
- measure biparietal diameter, abdominal circumference and femur length
- measure transperineal or transvaginal cervical length (optional)
- retrieve images on a PACS system
- adjust images brightness, contrast, zoom
- PACS measurements

COMMUNICATOR

Establishes appropriate supportive relationships with patient and families and also with ultrasound technologists, radiologists, obstetricians, family physicians and other members of the health care team.

COLLABORATOR

Works effectively and respectfully with ultrasound technologists, radiologists, and referring health care providers – obstetricians, family physicians, midwives, nurses, nurse practitioners and others.

MANAGER

Demonstrates an awareness of how the ultrasound unit operates – reporting requirements, lines of accountability, data storage and retrieval (PACS).

HEALTH ADVOCATE

Not applicable.

SCHOLAR

- *Demonstrates a commitment to acquiring the knowledge required to understand key concepts in ultrasound, screening and diagnosis, fetal malformations and pelvic pathology*
- Becomes familiar with the epidemiology and differential diagnosis of the more common abnormalities of the fetus:
    - Structure
        - skeletal system
        - central nervous system
        - cardiovascular system
        - intra-thoracic disorders

        - renal system
        - abdominal wall and diaphragm
        - gastrointestinal system
        - markers for chromosomal abnormalities
    - Function
        - hydrops, dysrhythmias, polyhydramnios, oligohydramnios
    - Invasive diagnostic and therapeutic procedures
        - amniocentesis, chorionic villus sampling, cordocentesis

PROFESSIONAL

Demonstrates high quality care combined with integrity, honesty, compassion and respect

- Demonstrates a caring, compassionate and respectful attitude for patients, families and other members of the health care team.
- Can identify ethical issues as they arise in patient care