Goals and Objectives of Ultrasound Rotation:

I. The learner will understand and properly operate the ultrasound machine.

A. Introduction

1. Obtaining images: The learner will be able to perform basic machine functions (store images, enter patient information, enter indication for the examination)
2. Knobology – The learner will be able to choose correct probes for images and use the appropriate depth and gain
3. Maintenance – The learner will be able to store and clean the machine and probes appropriately

B. Core Applications

1. E-FAST examination
   a. The learner will be able to perform an E-FAST
   b. The learner will be able to explain the indication for E-FAST
   c. The learner will be able to interpret images and explain the clinical significance of abnormal findings
      i. Free Fluid in the Abdomen
      ii. Pneumothorax
      iii. Pericardial effusion

2. Soft Tissue
   a. The learner will be able to obtain adequate images of soft tissue
   b. The learner will be able to interpret images of abscess vs cellulitis vs necrotizing fasciitis
   c. The learner will be able to interpret images of foreign bodies
   d. The learner will be able to interpret images of lymph nodes
3. Focused Lung
   a. The learner will be able to obtain adequate images of the lung
   b. The learner will be able to interpret images of the lung
      i. Pneumonia
      ii. Pneumothorax
      iii. Pleural Effusion
      iv. Pulmonary Edema
4. Hydration (IVC and IVC:Ao Ratio)
   a. The learner will be able to obtain adequate images of IVC and IVC/Ao
   b. The learner will be able to interpret the images of IVC and IVC: Ao
      i. Dehydration
      ii. Cardiac insufficiency
5. Cardiac
   a. The learner will be able to obtain adequate images of the heart

i. Parasternal Long View
ii. Parasternal Short View
iii. Apical 4 Chamber
iv. Subxiphoid

b. The learner will be able to interpret cardiac standstill
c. The learner will be able to interpret pericardial effusion
d. The learner will be able to interpret cardiac function

6. Bladder Volume
    a. The learner will be able to obtain adequate images of the bladder
        i. Transverse
        ii. Longitudinal
    b. The learner will be able to measure bladder volume
    c. The learner will be able to determine if catheterization will be successful

C. Advanced Applications
1. Ocular
    a. The learner will be able to obtain adequate images of the eye
    b. The learner will be able to interpret images of the eye
        i. Retinal detachment
        ii. Papilledema
        iii. Vitreous hemorrhage
        iv. Hyphema
2. Limited Abdomen: Appendicitis
    a. The learner will be able to acquire and interpret images of acute appendicitis
    b. The learner will be able to describe ultrasound findings suggestive of acute appendicitis
3. Limited Abdomen: Intussusception
    a. The learner will be able to acquire and interpret images of intussusception and normal limited abdominal ultrasound
    b. The learner will be able to describe ultrasound findings suggestive of intussusception (i.e. size and appearance)
4. Focused Testicular
    a. The learner will be able to acquire and interpret images of the testicles
    b. The learner will be able to describe ultrasound findings of testicular torsion
    c. The learner will be able to describe ultrasound findings of testicular rupture
5. Pyloric stenosis
    a. The learner will be able to acquire and interpret images of the pylorus
    b. The learner will be able to describe ultrasound findings of pyloric stenosis

D. Procedural Applications

1. Peripheral IV
    a. The learner will be able to utilize ultrasound to place PIV
2. Central venous catheter (Optional)
    a. The learner will be able to utilize ultrasound to place femoral and internal jugular lines
3. Regional Anesthesia (Optional)
    a. The learner will be able to identify situations appropriate for regional anesthesia
    b. The learner will be able to perform an ultrasound guided forearm nerve block and a femoral nerve block

E. Further Ultrasounds (Optional)

1. Right Upper Quadrant
    a. The learner will be able to acquire and interpret images of the gallbladder
    b. The learner will be able to describe ultrasound findings of RUQ ultrasound
        i. Cholelithiasis
        ii. Cholecystitis
2. Renal/Bladder
    a. The learner will be able to acquire and interpret ultrasound findings of renal ultrasound
    b. The learner will be able to describe ultrasound findings of renal ultrasound
        i. Hydronephrosis
        ii. Hydroureter
    c. The learner will be able to measure bladder volume.

II. The learner will practice ultrasounds with the ultrasound techs

III. The learner will read text and view online lectures (through The Hospital for Sick Children in Toronto, Canada and The Ultrasound Podcast)

a. Text: Pediatric Emergency and Critical Care Ultrasound, Doniger, Stephanie. Cambridge University Press, 2013

b. Online Lectures are viewed here: http://www.p2sk.ca/shared-drive/
-Password is pocus1

c. Online Lectures are also viewed here:
http://www.ultrasoundpodcast.com

Expectations of Ultrasound Rotation:

I. 4 shifts (4 hours each, which can be combined) will be done with James Lee and/ or Danielle Paulin in the emergency department.

a. The first shift will be an introductory one-on-one shift (8 hours)
    i. Learn the machine (how to scan, how to save, how to use text)
    ii. Direct one on one teaching for each type of ultrasound

b. The other shifts will be 3-4 hours either before or after James Lee's shifts

II. 4 days will be spent with the ultrasound techs in radiology (cases go from 8-4 Monday-Friday)

a. Contact is Marshelle Vales: mvales@akronchildrens.org
b. Please contact her the month prior to your rotation to let her know to expect you.

III. Each required ultrasound will be directly monitored by either James Lee, Danielle Paulin, or an ultrasound technician. Each case will be logged on a paper form available in a folder located in the forms box in zone 1. QA will be done on all extra cases.

IV. Minimum ultrasounds required for the month:

1. 5 FAST
2. 5 Soft Tissue
3. 5 Lung
5. 5 IVC and IVC/Aorta
6. 5 Cardiac
7. 5 Bladder

***A total of 50 ultrasounds is required during the rotation. The above ultrasounds are 30, the other 20 can be any applications.**

*25 ultrasounds qualifies the learner as basic ultrasound competent (this is required by the time you graduate fellowship)

*150 ultrasounds are required for advanced ultrasound

1. 25 Cardiac
2. 25 FAST
3. 25 Lung
4. 25 Soft Tissue
5. 25 IVC
6. 25 Miscellaneous

V. Didactics – Honor Code

1. Read 9 Chapters of the textbook
    a. Physics and Knobology (Chapter 1)
    b. E-FAST (Chapter 4)
    c. Cardiac (Chapter 5)
    d. Pulmonary Ultrasound (Chapter 6)
    e. IVC, Aorta Assessment (Chapter 7)
    f. Renal, Bladder (Chapter 9)
    g. Pediatric Abdomen (Chapter 10)
    h. Vascular Access (Chapter 15)
    i. Soft Tissue Applications (Chapter 18)
2. Review the online lectures
    a. SickKids website: The website belongs to the Hospital for Sick Children in Toronto, Ontario, Canada. Dr. Jason Fischer and Dr. Charisse Kwan have been kind enough to permit our use of their online lectures. Please do not distribute this information to anyone

else. If you use any of the content for teaching purposes in the future, please make sure to credit them as appropriate.

b. Please watch the online lectures on SickKids website that correspond to the four weeks of the rotation. This will be located at the top of the page when you click on "Learning Materials" folder

Week 1 Introduction and Soft Tissue
Week 2 Skull and E-Fast
Week 3 Hydration and Cardiac
Week 4 Lung and Resuscitation

c. Ultrasound Podcast (Ultrasoundpodcast.com): These are entertaining podcasts

i. PIV:
Ultrasound guided Peripheral IV – Give this to your nurses! Teach your providers.

ii. Appendix:
Episode 02 – Appendix

iii. Intussusception
Appy, intussusception, and other peds US with @bretpnelson.

iv. Ocular
Episode 26 – Ocular US with Chris Fox

d. YouTube Videos to Watch

i. Cardiac
Introduction to Cardiac Ultrasound (atchiem)

VI. Further Practice

1. Each learner is encouraged to sign up and take the Ultrasound Class at Austen Bioinnovation. Sign up is through eregistrar.

VII. Tuesday Didactics

1. You will be required to still attend Tuesday didactics as scheduled.

Contact info:

a. Danielle Paulin, DO, MA
Director, Pediatric Emergency Ultrasound
Cell: 216.513.5431
Email: dpaulin06@gmail.com

b. James Lee, MD
Assistant Director, Pediatric Emergency Ultrasound
Cell: 216.534.1765
Email: lee.75@hotmail.com

Please email us the month before your rotation so that we can schedule your shifts.