**Geisinger Internal Medicine & Pediatric Point-of-Care Ultrasound -** *Draft 5.13.2021*

**Geisinger Credentialing Requirements:**

Minimum of **150** total credentialing clinical ultrasound exams (see below).

Minimum of 10% must identify abnormal pathology.

Credentialing images obtained under either direct or indirect supervision (minimum 50% direct).

Up to 25% of images can be done during simulation or cadaver training.

Good professional standing in respective field.

Formal request submitted in writing to obtain CUS privileges.

20 hours of dedicated CME instruction.

Written confirmation with letter from supervising credentialed staff.  
Additional 5 hours of CME per credentialing cycle and ongoing clinical ultrasound QI and QA.

**Ultrasound Portfolio – INTERNAL MEDICINE**

Total Studies Logged & Reviewed = **185 studies** (50+25+25+25+6+40+6+8) with **690 images/videos** (250+150+100+100+6+60+12+12)

* Cardiac: **50 studies** (*250 images/videos*)
  + Parasternal long axis: 50
  + Parasternal short axis: 50
  + Apical 4-chamber: 50
  + Subcostal: 50
  + IVC (include measurement of collapsibility): 50
* E-FAST: **25 studies** (*150 images/videos*)
  + RUQ – Hepatorenal space & pleura (1 view)
  + LUQ – Splenorenal recess & pleura (1 view)
  + Retrovesicular space (2 views: transverse & sagittal)
  + Lung sliding (2 views: video clip + M-mode)
  + [Pericardium included in cardiac portfolio]
* Lower Extremity DVT: **25 studies** (*100 video clips*) [***Internal Medicine Only***]
  + Common femoral vein with compression
  + Saphenofemoral junction (SFJ) with compression
  + Femoral vein (AKA "superficial" femoral vein) with compression
  + Popliteal vein with compression
* Abdominal Aorta: **25 studies** (*100 images*) [***Internal Medicine Only***]
  + Aorta diameter (outer edge to outer edge) proximal longitudinal
  + Aorta diameter (outer edge to outer edge) proximal transverse
  + Aorta diameter (outer edge to outer edge) distal longitudinal
  + Aorta diameter (outer edge to outer edge) distal transverse
* Lung Pathology: **6 studies** (*6 video clips*)
  + B-lines: 2 studies (1 view)
  + Pleural effusion: 2 studies (1 view)
  + Consolidation: 2 studies (1 view)
* Other Limited Abdomen **40 studies** (60 *images/videos*)
  + Liver size: 10 studies (2 views)
  + Spleen size: 10 studies (1 view)
  + Right kidney: 10 studies (2 views: long & short axis)
  + Left kidney: 10 studies (2 views: long & short axis)
  + [Bladder included in E-FAST]
* Vascular: **6 studies** (*12 images/videos*)
  + Artery labeled, non-compressible, pulse wave doppler: 2 studies (2 views: video clip w compression, pulse-wave doppler image)
  + Vein labeled, compressible, pulse wave doppler: 2 studies (2 views: video clip w compression, pulse-wave doppler image)
  + Nerve labeled: 2 studies (2 views: short & long axis)
* Musculoskeletal & Soft-Tissue: **8 studies**, (*12 images/videos*)
  + Joint effusion: 2 studies (2 views: transverse, longitudinal)
  + Cobblestoning: 2 studies (1 video clip)
  + Abscess: 2 studies (1 video clip)
  + Lymph node: 2 studies (2 views: transverse, longitudinal)

**Ultrasound Portfolio – PEDIATRICS**

Total Studies Logged & Reviewed = **170 studies** (50+30+30+6+40+6+8) with **800 images/videos** (250+180+180+100+6+60+12+12)

* Cardiac: **50 studies** (*250 images/videos*)
  + Parasternal long axis: 50
  + Parasternal short axis: 50
  + Apical 4-chamber: 50
  + Subcostal: 50
  + IVC (include measurement of collapsibility): 50
* E-FAST: **30 studies** (*180 images/videos*)
  + RUQ – Hepatorenal space & pleura (1 view)
  + LUQ – Splenorenal recess & pleura (1 view)
  + Retrovesicular space (2 views: transverse & sagittal)
  + Lung sliding (2 views: video clip + M-mode)
  + [Pericardium included in cardiac portfolio]
* Lung – 6-Point Lung Protocol: **30 studies** (*180 videos*)
  + Anterior (mid-clavicular): 60 videos (2-views, transverse & sagittal)
    - Anterior Superior, Anterior Inferior (2 videos each from superior to inferior in both transverse & sagittal)
  + Lateral (mid-axillary): 60 videos (2-views, transverse & coronal)
    - Lateral Superior, Lateral Inferior (2 videos each from superior to inferior in both transverse & coronal)
  + Posterior (paraspinal): 60 videos (2-views, transverse & sagittal)
    - Posterior Superior, Posterior Inferior (2 videos each from superior to inferior in both transverse and sagittal)
* Lung Pathology: **6 studies** (*6 video clips*)
  + B-lines: 2 studies (1 view)
  + Pleural effusion: 2 studies (1 view)
  + Consolidation: 2 studies (1 view)
* Other Limited Abdomen **40 studies** (60 *images/videos*)
  + Liver size: 10 studies (2 views)
  + Spleen size: 10 studies (1 view)
  + Right kidney: 10 studies (2 views: long & short axis)
  + Left kidney: 10 studies (2 views: long & short axis)
  + [Bladder included in E-FAST]
* Vascular: **6 studies** (*12 images/videos*)
  + Artery labeled, non-compressible, pulse wave doppler: 2 studies (2 views: video clip w compression, pulse-wave doppler image)
  + Vein labeled, compressible, pulse wave doppler: 2 studies (2 views: video clip w compression, pulse-wave doppler image)
  + Nerve labeled: 2 studies (2 views: short & long axis)
* Musculoskeletal & Soft-Tissue: **8 studies**, (*12 images/videos*)
  + Joint effusion: 2 studies (2 views: transverse, longitudinal)
  + Cobblestoning: 2 studies (1 video clip)
  + Abscess: 2 studies (1 video clip)
  + Lymph node: 2 studies (2 views: transverse, longitudinal)

**Curriculum Outline – Basic Topics**

**Ultrasound Basics – Indications, Physics, Artifact, Knobology**

Clinical Ultrasound (POCUS) is focused ultrasound, not a comprehensive ultrasound study.

*What is the clinical question you are seeking to answer?*

**POCUS Components:**

Image Acquisition

Image Interpretation

Clinical Application

“I AIM”

Indication

Acquisition

Interpretation

Management [application]

**Cardiac**

*Clinical Questions*

Is there evidence of LV systolic dysfunction?

Is the left ventricle dilated?

Is there evidence of RV strain?

Is the right ventricle dilated?

Is there a pericardial effusion?

Is there evidence of pericardial tamponade?

What is the size and respiratory variability of the IVC?

1. Basic anatomy & views
   1. Parasternal long axis
   2. Parasternal short axis
   3. Apical 4-Chamber
   4. Subcostal 4-Chamber
   5. IVC
2. LV size & function
   * 1. LV size
     2. Qualitative assessment of LVEF: hyperdynamic, grossly normal, mild-moderately reduced, or severely reduced
     3. E-point septal separation
3. RV size & function
   * 1. RV size
     2. Qualitative assessment of RV function (RV vs LV size, D-sign)
4. Pericardial effusion
   * 1. Pericardial effusion vs left pleural effusion
     2. Tamponade physiology (systolic collapse RA, diastolic collapse of RV, dilated IVC with decreased collapsibility)
5. IVC & Volume Status/Fluid Tolerance
   * 1. Dilation, Collapsibility

**Lung**

*Clinical Questions*

Is there a pneumothorax?

Is there a pleural effusion?

Is the pleural effusion simple or complex?

Is there pulmonary edema or some other interstitial syndrome?

Is there a consolidation?

Is the consolidation consistent with pneumonia?

1. Pneumothorax
2. Pleural effusion
   * 1. Simple vs complex (septations, etc)
3. Lung interstitial syndromes
4. Lung consolidation
   * 1. Pneumonia vs atelectasis (dynamic vs static air bronchograms)

**Abdominal**

*Clinical Questions:*

Is there free fluid in the abdomen?

What is the size of the liver?

What is the size of the spleen?

What is the size of the kidneys?

Is there hydronephrosis?

What is the bladder volume?

1. FAST - RUQ
2. FAST - LUQ
3. FAST - Retrovesicular
4. Liver
   * 1. Hepatomegaly
     2. Cirrhosis
5. Spleen
6. Kidneys
   * 1. Kidney size
     2. Hydronephrosis
     3. Nephrolithiasis
7. Bladder volume

**Vascular**

*Clinical Questions:*

Is there an artery/vein/nerve?

Are there signs of a lower extremity DVT?

Is there an abdominal aortic aneurysm?

1. Vein vs artery vs nerve
2. Lower extremity DVT
3. Abdominal aortic aneurysm screening
   1. <3 cm normal
   2. 3-4.5 cm requires serial US at least annually
   3. >4.5 cm requires vascular surgery consult

**Musculoskeletal/Soft Tissue**

*Clinical Questions:*

Is there a joint effusion?

Is there evidence of cellulitis (cobblestoning)?

Is there a fluid collection that may be an abscess?

Is there an enlarged lymph node?

1. Joint effusions
2. Cellulitis
3. Abscess
4. Lymph node

**Procedural Ultrasound**

Separate credentialing process for providers who want to perform and bill for ultrasound-guided procedures.

Must already meet institutional requirements for each respective procedure and be in good professional standing in respective field.

Complete education sessions including simulation

Perform minimum of 10 total procedures of each type with direct supervision utilizing ultrasound guidance

Written confirmation with letters from supervising credentialed staff.

Ongoing clinical ultrasound QI and QA.

1. Vascular access
   1. Central venous catheter
   2. Arterial line
   3. Peripheral IV
2. Paracentesis
3. Thoracentesis
4. Arthrocentesis/joint injections
5. Lumbar puncture

**Documentation for Credentialing CUS**

* Performed on patients with an appropriate clinical indication
* Must discuss with patient and document that a credentialing focused clinical ultrasound is being performed in the EMR.
* Images saved for QI/QA with report written by provider performing POCUS
* “Credentialing focused clinical ultrasound performed by Dr. \_\_\_\_. The findings were \_\_\_. A follow up \_\_\_\_ was ordered.”

**References**

ACEP 2014. Emergency Ultrasound Imaging Criteria Compendium

ACEP. The Core Content of Clinical Ultrasonography Fellowship Training

AIUM Practice Parameter for the Performance of Point-of-Care Ultrasound Examinations. J Ultrasound Med. 2019 Apr;38(4):833-849. doi: 10.1002/jum.14972. PMID: 30895665.

Mathews BK, Zwank M. Hospital Medicine Point of Care Ultrasound Credentialing: An Example Protocol. J Hosp Med. 2017 Sep;12(9):767-772. doi: 10.12788/jhm.2809. PMID: 28914285.

Smalley CM, Fertel BS, Broderick E. Standardizing Point-of-Care Ultrasound Credentialing Across a Large Health Care System. Jt Comm J Qual Patient Saf. 2020 Aug;46(8):471-476. doi: 10.1016/j.jcjq.2020.03.009. Epub 2020 Mar 20. PMID: 32430248.

