

Saint Joseph Hospital Internal Medicine Residency Point of Care Ultrasound (POCUS) Program

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The Saint Joseph Hospital Internal Medicine program strives to keep its residents at the forefront of clinical medicine. The propagation of Point of Care Ultrasound (POCUS) in the field of internal medicine has increased exponentially. Residency programs across the country are trying to keep pace with this evolving technology, especially as evidence continues to accumulate in favor of its clinical utility. A successful POCUS program requires access to handheld ultrasound devices, qualified POCUS instructors and a robust quality assessment process. Saint Joseph Hospital Internal Medicine is one of a handful of programs that offers **each resident their own handheld Butterfly IQ+ system!** These state-of-the-art ultrasound devices allow for a wide array of imaging modalities including cardiovascular, pulmonary, abdominal, renal etc. These devices also excel at procedural ultrasonography with the latest in biplane technology for vascular access. For more information regarding the Butterfly IQ+ system please visit: www.butterflynetwork.com/.

Butterfly IQ+ system



Biplane Technology



****Saint Joseph Hospital has no conflicts of interest to disclose regarding this product and has no direct financial ties with the Butterfly company.***

Given the broad scope of POCUS applications, Saint Joe s has implemented a multifaceted longitudinal curriculum, including ultrasound electives that combine traditional didactic teaching with extensive hands-on training. Residents have frequent opportunities for supervised scanning with POCUS faculty, while also having their own Butterfly handheld ultrasound device to assess patients and practice independently. To further encourage utilizing POCUS techniques, we have introduced game theory into POCUS education, creating an engaging team and individual learning environment. All residents have a dedicated video portfolio where their best images will be stored along with feedback for EACH image. The portfolio will mimic the requirements needed to complete the POCUS certification for the American College of Physicians, as well as the Society of Hospital Medicine. In addition, our POCUS program uses a novel tool called Probe Watch that records a trainee s probe movement to give individualized recommendations regarding their probe motions.

Finally, Resident initiated POCUS research is strongly encouraged and supported. Current research projects include the identification of intercostal arteries for thoracentesis using POCUS and the ability of internal medicine residents to adequately categorize ejection fraction.

Meet the POCUS Faculty



Dr. Gerard Salame

Dr. Gerard Salame is a national expert in POCUS and is part of the national task force for ultrasound guided procedures sponsored by the Society of Hospital Medicine. He has been a POCUS educator for 12 years and guest speaker at multiple national venues including the Society of General Medicine, the Society of Hospital Medicine, the American Institute of Ultrasound in Medicine, among many others. He has dedicated his career to POCUS training and has infused game theory into various aspects of POCUS education. Since 2021, Dr. Salame has created a yearlong ultrasound competition that helped boost ultrasound image submission significantly each year. Dr Salame is working alongside VR companies to help create a novel POCUS VR educational tool that he hopes to integrate into the POCUS curriculum In addition, Dr. Salame believes in a multifaceted approach to POCUS training ensuring frequent and recurrent interactions with all residents throughout the year.

**Dr. Ken Lyn-Kew**

Recognized as the one of the nation's leading Pulmonary Critical Care experts, Dr. Lyn-Kew teaches critical care POCUS to residents during their ICU rotations with an emphasis on pulmonary ultrasound and ultrasound in shock. Dr. Lyn-Kew has taught POCUS nationally for the American College of Chest Physicians (ACCP) and has been honored as a Distinguished Chest Educator by the ACCP several years in a row. He has won the Residency "Teacher of the Year" award multiple times.

POCUS Curriculum

The 3-year longitudinal POCUS curriculum parallels the requirements for POCUS certification from both the American College of Physicians and the Society of Hospital Medicine. Given the breadth of POCUS applications there is a strong emphasis on repetition and hands-on practice. Curricular goals for each PGY level are delineated in the table below. These goals are not exclusive to each PGY level and overlap frequently. First year house staff will solidify the basic applications of cardiopulmonary, abdominal, vascular, and renal POCUS. In their second year more advanced imaging techniques and POCUS protocols will be introduced. Third year residents will continue to hone their skills and be offered guidance on how to become better POCUS educators.

All curricular content is maintained and accessible through a POCUS folder hosted online. The folder contains narrated lectures and presentations of all POCUS and POCUS ECG conferences.

PGY-Level Curricular Goals and Content/Expectations

Intern: Basic Applications and clinical integration of POCUS

- Cardiac: Basic Cardiac Views, Image optimization, Ejection Fraction Assessment, Chamber Quantification, Right Ventricle
- Pulmonary: Identification of lung Profiles, pneumothorax, pleural effusion
- Abdomen: Biliary tract, free fluid assessment
- Urinary tract: Renal ultrasound, identifying and staging hydronephrosis, bladder ultrasound and foley catheter assessment
- Vascular Ultrasound: DVT and IVC assessment, Peripheral artery disease identification

PGY2: Advanced Imaging Modalities and POCUS protocols

- Advanced Cardiac: Color Flow Doppler in valvulopathy, M Mode, HoCM, Regional ischemia
- Pulse Wave and continuous wave Doppler (*if residents complete advanced elective)
- Volume Assessment: Stroke volume and IVC

- Ultrasound in Shock: RUSH protocol Approach to the dyspneic patient: BLUE Protocol
Ultrasound in Renal Failure
- Advanced Pulmonary Ultrasound: Lung Pulse, ARDS, and Atelectasis...

PGY 3: Becoming a POCUS educator/instructor

- Identifying/anticipating errors in novice POCUS users
- Presenting case conference ultrasound images
- Diastology

Ultrasound Ward Rounds

The aim of ultrasound Ward Rounds is to show the direct implementation of POCUS on patient care. Two to four times a month POCUS experts will touch base with non-ICU medicine teams to identify one of their respective patients to undergo a supervised POCUS evaluation. The POCUS assessment can occur either during or after rounds to answer a specific clinical question (e.g., EF evaluation), visualize a known pathology (e.g., pleural effusion) or simply practice their image acquisition skills. All images are obtained by residents and will count towards their monthly ultrasound quota. To minimize the interruption to the team's workflow each assessment is limited to 7-10 minutes.

Ultrasound Admission Rounds

Once a week, Dr. Salame will meet with inpatient teams to scan any new admission the team has received in the last 24 hours. The aim is similar to the Ultrasound word rounds section.

VR Scanning

This novel approach to POCUS training involves the use of Oculus units using Deepscope software to practice image acquisition in POCUS. Residents will have access to these in the sim lab and will have scheduled training time with Dr Salame to focus on techniques in image optimization, identification image acquisition errors and how to correct them.

For more details please visit: <https://www.deepscope.co.uk/>

POCUS Certificate

We have created a pathway for POCUS certification to help residents keep tallies on all the images they have obtained as well as meeting quotas for certain pathologies. The certification process is given by our department (not by a governing body) but its requirements parallel that of the Certificate of Completion in POCUS Training required by CHEST, SHM, ACP. Videos obtained during their training can be used to help residents get certified on a national level.

Yearlong Ultrasound Competition

This exercise introduces game theory into POCUS education. At the beginning of the academic year residents are divided into 4 theme-based groups. Residents have the opportunity throughout the year to accumulate points for their respective groups (see table below for an example of the rules on point acquisition) and each month during POCUS conference the resident who contributed the most points to their team receives a small prize.

For the 2023-24 academic year, the house staff selected a Harry Potter themed competition. House staff will be divided among the 4 houses and compete for the Triwizard Cup.

Awards

- Pathology of the Month: For the Most Fascinating Pathology (150 Points)
- Image of the Month: For the Most Perfect Image (150 Points)
- Dobby Awards: Nominate someone who helped you acquire the images (100 Points)
- Quota: Awarded for each person who reaches their ward ultrasound quota of 1 Full echo + 1 non-cardiac image (50 points)
- Horcruxes: Find the 7 rarest images if you dare!!
- Prolific Award: The Wizard with the most submitted images (100 Points)
- Seeker Award: Awarded to those who can identify pathologies as well as the Grand Master (150 Points)
- Special Events: Events throughout the year (Points Vary)

Horcrux: 250 Points

The 7 most sought-after Images!! These are the rarest of them ALL and each brave witch or wizard who captures them will be awarded the full 250 points.

1. Large Pericardial Effusion (>2cm) or Cardiac Tamponade Physiology
2. Pneumothorax with Lung Point
3. Infective Endocarditis with Vegetation (on any valve)
4. Pneumonia with Dynamic Air bronchograms
5. Stage III or IV Hydronephrosis
6. Intra-Vascular Clot either venous/arterial or cardiac
7. Loculated Pleural Effusion

Ultrasound Elective

Basic level POCUS elective: Offered 6 times a year, this 5-day course offers intensive instruction of cardiopulmonary ultrasonography with two daily didactics and 4-5 hours of hands-on supervised and unsupervised training. (See example curriculum below) This elective is a requirement for ultrasound credentialing by the residency program.

Advanced POCUS Elective: Offered 1-2 times/year. This 5-day elective focuses on advanced imaging modalities such as pulse wave and continuous wave Doppler in vascular and cardiopulmonary ultrasonography.

During the POCUS electives we utilize a novel device aptly named the Probe Watch. This quarter size device attaches to the ultrasound probe and records the trainee's probe movement during image acquisition. This allows for personalized feedback of house staff's probe behavior" to assess their skill level in image acquisition.

Schedule

- Monday
 - 8-9:00am (didactic): Welcome/Intro Pretest Cardiac Basics
 - 9-11:30am: Un/Supervised Scanning
 - 11:30-1:00pm: Lunch/Conf
 - 1:30-2:00pm: Image Review
 - 2:00-4:00pm: Unsupervised Scanning Probe Tracker
- Tuesday
 - 8-9:00am (didactic): EF Assessment
 - 9-11:30am: Un/Supervised Scanning
 - 11:30-1:00pm: Lunch/Conf
 - 1:30-2:00pm: Image Review **RV/IVS Assessment**
 - 2:00-4:00pm: Probe Tracker Unsupervised Scanning
- Wednesday
 - 8-9:00am (didactic): Lung Intro
 - 9-11:30am: Un/Supervised Scanning
 - 11:30-1:00pm: Lunch/Conf
 - 1:30-2:00pm: Image Review **Cases**
 - 2:00-4:00pm: Probe Tracker Unsupervised Scanning
- Thursday
 - 8-9:00am (didactic): Ultrasound in Shock
 - 9-11:30am: Un/Supervised Scanning
 - 11:30-1:00pm: Lunch/Conf
 - 1:30-2:00pm: Image Review
 - 2:00-4:00pm: Probe Tracker Unsupervised Scanning
- Friday

- 8-9:00am (didactic): Volume Assessment Post-Test
- 9-11:30am: Un/Supervised Scanning
- 11:30-1:00pm: Lunch/Conf
- 1:30-2:00pm: Image Review
- 2:00-4:00pm: Probe Tracker Unsupervised Scanning

Monthly Conferences

POCUS conference: Twice a month an afternoon conference is dedicated to a specific POCUS topic. During this conference POCUS images obtained by residents are reviewed and the monthly POCUS winner is announced.

POCUS/ECG conference: Combining the expertise of our academic cardiologists, this case conference correlates ECG and Physical Exam findings with POCUS images obtained by house staff. Cases are selected from the general medicine teaching wards.

Mini-Workshops

Once a month 2-3 residents on local elective rotations will receive an afternoon of directed POCUS training on pre-screened patients. Images obtained will count towards their monthly quotas.

Special Events

Special events are a great way to accumulate massive points for your team! The last two academic years the department held a Jeopardy style POCUS competition and a zombie apocalypse POCUS escape room.

Video Portfolio

The portfolio consists of two parts:

- a) The Quality Assessment: Each image is scored using a view specific scoring system. The house staff's interpretation of the image is also compared to the reviewer's assessment of the image.
- b) Video Archive: All images are stored in an individual folder.

Residents can use this portfolio for fellowship, job or academic applications as well as the POCUS certification process for both the American College of Physicians and the Society of Hospital Medicine.

[See this example of a generic video portfolio.](#)

Ultrasound Credentialing

Monthly Quotas

In almost every rotation, residents will be required to meet a monthly POCUS quota that includes 2 full echocardiograms and 2 non-echo images, such as lung, renal, etc. All images obtained during educational activities such as ward ultrasound rounds, mini workshops, etc. count towards the quota tallies.

Credentialing

In addition to obtaining the required number of images for credentialing, in order to complete the credentialing process, residents must also complete the basic level POCUS elective and a final POCUS test. Once credentialed, residents will receive a certificate from the department of medicine and will no longer need to meet the monthly POCUS quotas.

[Learn more details regarding credentialing.](#)

POCUS Research

Resident-initiated POCUS research is strongly encouraged and supported by faculty. The unique POCUS academic environment at Saint Joseph Hospital is a fertile ground for innovative research that will help advance the careers of our trainees, especially those interested in fellowships or academic tracts.

Current projects:

- Pre-procedural evaluation of intercostal arteries using POCUS prior to thoracentesis
- The ability of a novel Probe tracking device to monitor the progress of trainees during a POCUS elective
- The ability of resident house staff to assess Left Ventricular Ejection Fraction using common POCUS measurements

Publications

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