year EM residents, and a neonatal resuscitation rotation for seniors. A large group session included advanced pediatric EKG interpretation and recognition and management of tachydysrhythmias in children. High fidelity simulation cases included myocarditis, airway foreign body, and ductal-dependent congenital heart disease, with emphasis on resuscitation skills including difficult access, vasopressor and prostaglandin administration, the difficult airway, and needle cricothyrotomy.

Impact: This senior pediatric resuscitation boot camp was the most highly rated educational offering of the academic year, scoring 5 out of 5 points in content, relevance, and presentation by all 12 participants. Comments included: "a must for all residents," "so helpful, please let's do more of this," "fantastic," "thank you," "amazing sim session." All EM residencies should develop a similar pediatric emergency curriculum to ensure graduating residents are confident and competent to care for low-frequency, high-stakes, and high-anxiety pediatric emergencies.

8 A Redlining Primer: Structural Determinants of Health in Resident Orientation

Megan Healy, MD; Margaret Wolf, MD

Learning Objectives: Introduce incoming residents to the history of discriminatory housing and lending policies which directly contribute to current day health disparities in our highly segregated city.

Abstract:

Introduction/Background: It is essential for physicians to understand systemic racism in order to combat healthcare inequities. Many trainees have little exposure to historical issues like redlining that impact the health of the communities they serve. There is little guidance for which modalities are effective for teaching structural determinants of health. We created a redlining primer to introduce residents to discriminatory housing/lending policies which directly contribute to current day health disparities in our highly segregated city.

Educational Objectives:

-Introduce incoming trainees to the history of discriminatory housing/lending policies.

-Highlight the stark health disparities that are rooted in redlining, such as gun violence, lead levels, access to primary care and life expectancy.

Curricular Design: We created a session to introduce incoming house staff to discriminatory housing/lending policies and their impact on patients. The session included a lecture, followed by an interactive panel discussion with faculty experts in health equity research. The primer described the historical context of housing/lending policies in our city. We traced these practices to the resultant high levels of segregation and resultant disparities across important health markers that map along these divisions, including gun violence, lead levels, access to primary care and life expectancy.

Impact/Effectiveness: Sessions were held for all resident as part of their GME orientation, for a total of 206 participants. 42% of survey respondents reported they were unfamiliar with the concept of redlining prior to the session. 62% reported no prior dedicated teaching on this subject. The majority (96%) reported the topic was important/v. important to their clinical practice. 77% reported they were likely/v. likely to read more about this topic. 88% reported they would like to see structural topics like this covered more in their training.

9 Application of 3D Printed Anatomic Heart Models in Instruction of First-Time Learners of Bedside Echocardiography

Michael Vu, MD; Richard Gordon, MD

Learning Objectives:

- Improve first-time learners' understanding of echocardiographic anatomy
- Improve learners' echocardiographic image quality
- Reduce learners' time-to-acquisition of interpretable echocardiographic images

Abstract:

Introduction/Background: The ubiquity and utility of bedside transthoracic echocardiography (TTE) creates the need for a strong foundation in the anatomy. Since ultrasound is increasingly being integrated into undergraduate and graduate medical education, the opportunity to build a solid base in this area is critical.

3D printed anatomic heart models can help learners bridge the gap between 2D and 3D space with their ease of manipulation and open-source accessibility. This can potentially improve patient outcomes by enabling operators to make better-informed clinical decisions quickly at the bedside.

Educational Objectives:

1) Provide learners high-fidelity 3D cardiac models cut in cross sections representing each of the TTE views (parasternal long and short axis, apical four chamber, subxiphoid)

2) Improve learners' understanding of echocardiographic anatomy

Design: We obtained digital heart models from the NIH 3D print exchange (https://3dprint.nih.gov/) and cut them in cross sections for each of the TTE windows using modeling software. These files were then converted to physical models using a 3D printer.

Students participated in lectures followed by a hands-on scanning session using live volunteers where they practiced acquiring images. For each window, the appropriate 3D model was used to correlate the position of the patient's heart to the probe and to illustrate how the beam cuts the heart in cross-section.

Impact: The models were positively received. Students agreed that factors such as screen and probe indicator position

generated confusion when first trying to visualize the anatomy, and that being able to use the 3D models to correlate these significantly improved their understanding.

Our next steps for this project will be to formally integrate it into the ultrasound curriculum at our school and study its impact on learner-centered outcomes such as quality and time-to-acquisition of images that could be used to make clinical decisions.

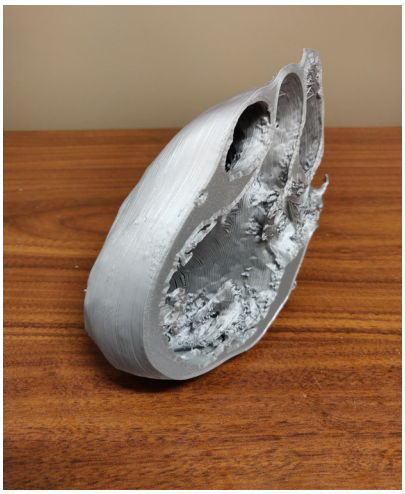

Figure 1.

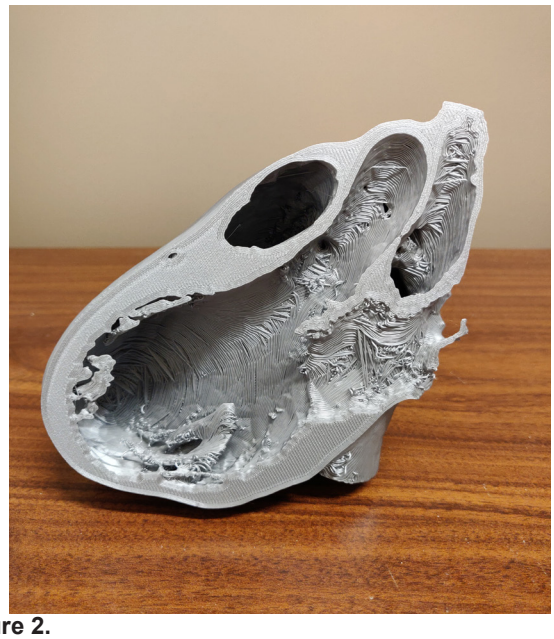

Figure 2.

10 Arterial Transduction: From the Kitchen to the Classroom

Matthew Szymaszek, DO; Scott Plasner, DO

Learning Objectives: To help residents become more self-sufficient and educated clinicians when it comes to placement, setup, and management of an arterial catheter.

To teach this seemingly simple procedure to completion while making it as realistic as possible without having to cannulate a patient or volunteer.

Abstract:

Introduction/Background: Arterial cannulation is a common emergency medicine and critical care procedure. Placement of the catheter is fairly straightforward and the technique is quite similar to most other vascular access procedures. But placing the catheter is only half of the procedure. We typically leave the ensuing tubing connections for transduction to our nursing colleagues, yet physicians are the ones asked to help troubleshoot when it is no longer functioning properly. Having the ability to practice and troubleshoot a simulated setup complete with waveform transduction would build confidence and proficiency.

Curricular Design: Most new residents quickly become proficient in vascular access techniques including arterial cannulation (A-line). However, tubing connections and setup are rarely the responsibility of the proceduralist. This A-line simulation was designed to teach this procedure from the start all the way through to waveform transduction and troubleshooting of the setup. Using simple cooking gelatin, a turkey baster, silicon caulking, a baking tin, and rubber tubing we were able to crudely simulate an artery, as well as generate a pulse wave through this closed system. The mechanical energy was then converted to electrical pulsations as reflected on the monitor. Steps included: cannulate the artery, get pulsatile flow up the catheter, connect the tubing and learn how to zero the line for accurate measurements, and finally generate a pressure waveform through the column of water within the tubing.

Impact/Effectiveness: This multiuse arterial simulator was perfect for resident procedure skill sessions and can be made in minutes for dollars. Now anyone can repeatedly simulate cannulating an artery, complete the ensuing steps to obtain a transducible pressure, and troubleshoot the A-line tubing setup and monitor connections. Modification to the consistency of the gelatin and trying other materials may make this even more life-like.

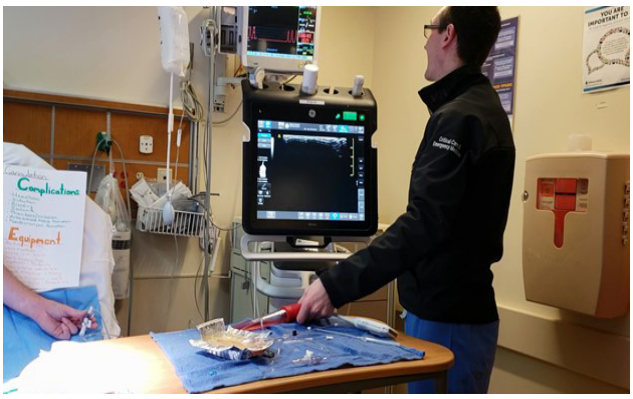

Figure.