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MEMC 2023

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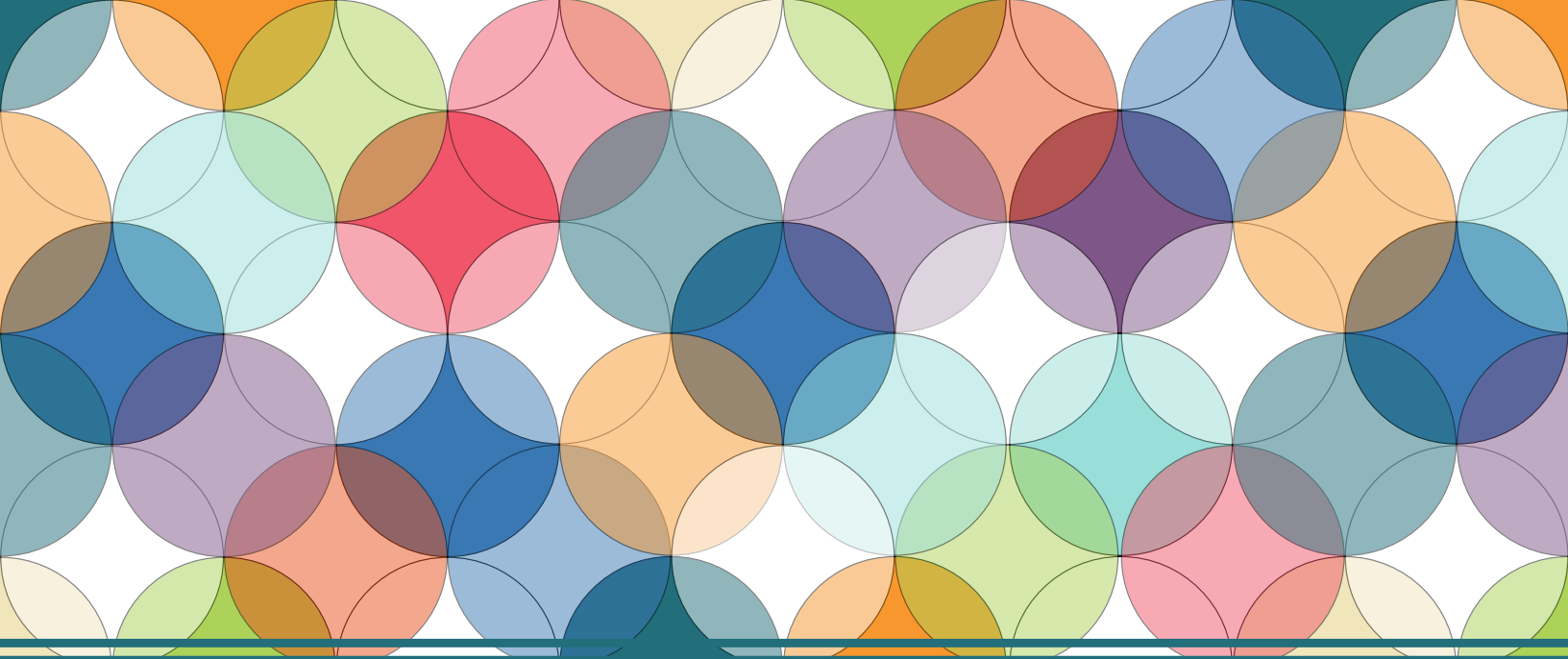
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MEMC 2023 - Jointly Organized by the American Academy of Emergency Medicine (AAEM) and the Mediterranean Academy of Emergency Medicine (MAEM)

XIIth Mediterranean Emergency Medicine Congress, Rhodes, Greece 7-11, September, 2023

The XIIth Mediterranean Emergency Medicine Congress (MEMC), jointly organized by the American Academy of Emergency Medicine (AAEM) and the Mediterranean Academy of Emergency Medicine (MAEM) was held in Rhodes, Greece on September 7-11, 2023.

We strive to grow the global development of our specialty around the Mediterranean basin, and indeed around the world. We endorse physician wellness, residency training, and quality, lifelong education in emergency medicine. All patients should have access to care by qualified emergency physicians and systems of care. MEMC23 is an opportunity to share the very best practices from high-resource countries with mature systems, countries that have recently achieved specialty status, and low- resource countries delivering care even in austere environments.

Our sessions covered aspects such as acute cardiac conditions, critical care, basic and advanced ultrasound, immigrant and refugee health, tactical and military medicine, trauma resuscitation, toxicology, prehospital care systems, and much more.

The Journal of Emergency Medicine (JEM) is sponsoring the oral abstract competition, and the Western Journal of Emergency Medicine (WestJEM) is sponsoring the research poster competition. The 50 abstracts with the highest scores by the Abstract Review Committee are being published. WestJEM is publishing here the top 25 population health related abstracts, and JEM is publishing the top 25 clinical abstracts. The primary authors of the top three scoring abstracts delivered ten-minute oral presentations during the opening ceremony.

Our curriculum for the Congress is impactful to both new and seasoned physicians, residents and medical students. as well as to nurses, researchers and scientists, prehospital providers, pharmacists, nutritionists, and anyone involved in the delivery of emergency care.

We are delighted to contribute to the MEMC23 in Rhodes and invite you to explore the abstracts from this historic meeting.. We welcome you, your families, and colleagues to the best international conference of the year!

Mark I. Langdorf, MD, MHPE, FACEP, FAAEM
Professor of Clinical Emergency Medicine
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1 (O-I4) Changes in Pediatric Emergency Department Visits After Arrival of COVID-19

Barnet Eskin, MD, PhD; Neena Joy, DO; John R. Allegra, MD, PhD

Objectives: Our goal was to examine the changes in pediatric ED visits after the arrival of COVID-19.

Background: Coronavirus 2019 (COVID-19) arrived in the New York metropolitan area in early March 2020. Shortly thereafter, total emergency department (ED) visits markedly decreased likely due to public health mandates and fear of contracting COVID-19. Our goal was to examine the changes in pediatric ED visits after the arrival of COVID-19.

Methods: Design: retrospective cohort. Setting: EDs of 8 hospitals within 150 miles of New York City. Hospitals were teaching and non-teaching in rural, suburban, and urban settings. Annual ED volumes ranged from 30,000-122,000. Population: Consecutive ED visits for patients ages 0-21 years, for the period from March 1–November 30 in 2019-2022, as COVID-19 emerged in early March 2020. Protocol: We tallied total pediatric ED visits for the time periods in each year. We calculated the percent changes from the base year, 2019, for each of the years 2020-2022 along with 95% confidence intervals (CI).

Results: The database contained a total of 332,504 visits: 110,210 in 2019, 55,270 in 2020, 71,570 in 2021, and 93,512 in 2022. Average age by year ranged from a low of 8.8 years in 2022 to a high of 10.5 years in 2020. The percentage of female patients ranged from a low of 47% in 2022 to a high of 49% in 2020. The percent changes in visits from 2019 were as follows: -49.9% (95% CI, -49.6, -50.2%); -35.1% (CI -34.8, -35.3%); and -15.2% (-14.9, -15.4%), for the years 2020, 2021 and 2022, respectively.

Conclusion: The number of pediatric ED visits changed after arrival of COVID-19. There was a marked decrease in 2020. This decrease was partially reversed in 2021 and 2022, although the visits did not reach their pre-pandemic levels. Since public health mandates have been relaxed, we speculate that failure to return to the pre-pandemic number of visits was likely due to preferential use of other sources of care, including doctor's offices, urgent care centers, and telemedicine.

2 (O-T2) Predicting High-risk Emergency Department Bounce-backs: A Natural Language Processing Approach to Provider Notes

Derick D. Jones, MD/MBA; Katie Sebald, PA; Pavan Thaker, MS; Moein Enayati, PhD

Objectives: Emergency department (ED) provider notes

can be used to predict high-risk ED bounce-backs using natural language processing machine-learning techniques.

Background: ED 72-hour return visits are a marker for high-risk patient visits and can be a surrogate marker for lapses in the quality of care at the index visit.¹ Published risk factors for bounce-backs resulting in hospitalization include age, public insurance, and end-stage renal disease among others.² While structured data from the medical record has been analyzed for factors associated with high-risk bounce-backs, there is a paucity of evidence analyzing the large volume of unstructured data that is contained in provider notes and that lend additional insight into the features associated with high-risk bounce-backs.

Methods: The authors analyzed patient encounters in the Mayo Clinic Midwest EDs from May 4, 2018– September 30, 2022. ED encounters were included if the repeat ED visit was within 72 hours and resulted in a disposition of admission, hospital observation, expired, send to the operating room, send to the catheterization lab, and transfer to another healthcare facility. ED encounters were excluded if the patient was not discharged on the index visit or experienced an irregular departure (eloped, left without being seen, left against medical advice). Notes from different provider types documenting on the same encounter were combined. Machine-learning methods used included text cleaning, TFIDF and count vectorization, creation of 1 to 3 n-grams, splitting data into test and training set, model fitting using support vector classifiers and logistic regression. Model explainability techniques include LIME (local interpretable model-agnostic explanations) and SHAP (Shapley additive explanations).

Results: A total of 397,125 patients among 639,693 encounters were eligible for inclusion. Of these, 10,094 (2.5%) resulted in a 72-hour bounce-back with a concerning disposition. Prediction accuracy on the concerning bounce-back cohort achieved 67% accuracy, precision of 68%, recall of 71%, and an area under the receiver operative curve (AUROC) of 71%. After applying SHAP, the top 10 text features associated with the concerning repeat visits include “return,” “discharged,” “significant,” “ed,” “pending,” “iv,” “mild,” “plan,” “discussed,” and “care.”

Conclusion: Natural language processing techniques applied to ED provider notes can be used to predict high-risk bounce-backs as surrogate markers for gaps in quality of care. Furthermore, NLP machine-learning explainability techniques give insight into the types of terminologies that are associated with high-risk bounce-backs. These features can be combined with previously studied risk factors for high-risk bounce-backs to increase prediction accuracy and generate comprehensive clinical phenotypes of ED patients at risk for these serious outcomes.

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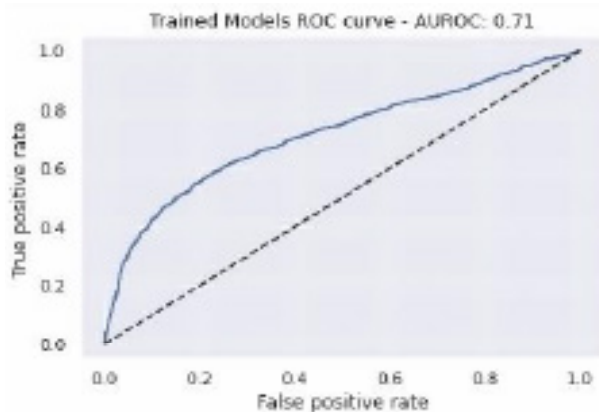


Figure 1. Area Under Receiver Operating Curve

3 (O-A1) Point-of-care Ocular Ultrasound vs Ophthalmoscopy for the Evaluation of Acute Visual Complaints in the Emergency Department

Ryan C. Gibbons, MD; Dillon Warr, MD; Thomas G. Costantino, MD

Oral Presenter: Ruth Lewis, MD

Objectives: The objective of this study was to compare the test characteristics of emergency physician (EP)-performed ophthalmoscopy with ocular point-of-care ultrasound (POCUS) using formal ophthalmologist evaluation as the gold standard.

Background: According to the 2017 National Hospital Ambulatory Medical Care Survey, visual complaints account for over 1% of all emergency department (ED) visits nationwide. Prior to the introduction of POCUS, EP-performed non-dilated ophthalmoscopic exam was considered standard of care. However, limited training and experience significantly limits the accuracy of this physical examination.

Methods: This was a single-center, prospective, observational study of a convenience sample of adult patients who presented to an urban, university hospital with >105,000 visits annually. Patients who presented with acute visual complaints were eligible to be enrolled between January 2017–May 2019. The treating physician, a PGY1-3 emergency medicine (EM) resident performed a visual inspection of the eye and the non-dilated fundoscopic examination. A separate PGY1-3 EM resident, blinded to the indication, performed the ocular POCUS using the Logiq e linear transducer (4-10 MHz) and a separate visual examination of the eye without the use of an ophthalmoscope. Each resident had performed >25 previous ocular ultrasounds per the American College of Emergency Physicians and Accreditation Council for Graduate Medical Education guidelines for EM POCUS training. Using a power analysis of 80%, our sample size calculation of 40 patients was based on previous data demonstrating a 50% difference in sensitivities between ocular POCUS and EP-performed ophthalmoscopy for diagnosing acute ocular pathology with an average prevalence of 30% in patients presenting with acute visual complaints. Data is presented as proportions with 95% confidence intervals (CI). Statistical analysis included Fisher exact and chi-square tests.

Results: 226 patients were enrolled, 104 of whom had a formal consultation and evaluation by a board-certified ophthalmologist within 24 hours of the patient’s ED visit. 87 patients were diagnosed with ocular pathology yielding a prevalence of 83.65% (95% CI 32.12-45.18). The following are the test characteristics for EP-performed ophthalmoscopy: sensitivity 16.49% (95% CI 9.73-25.4); specificity 100% (95% CI 59.04-100); and accuracy

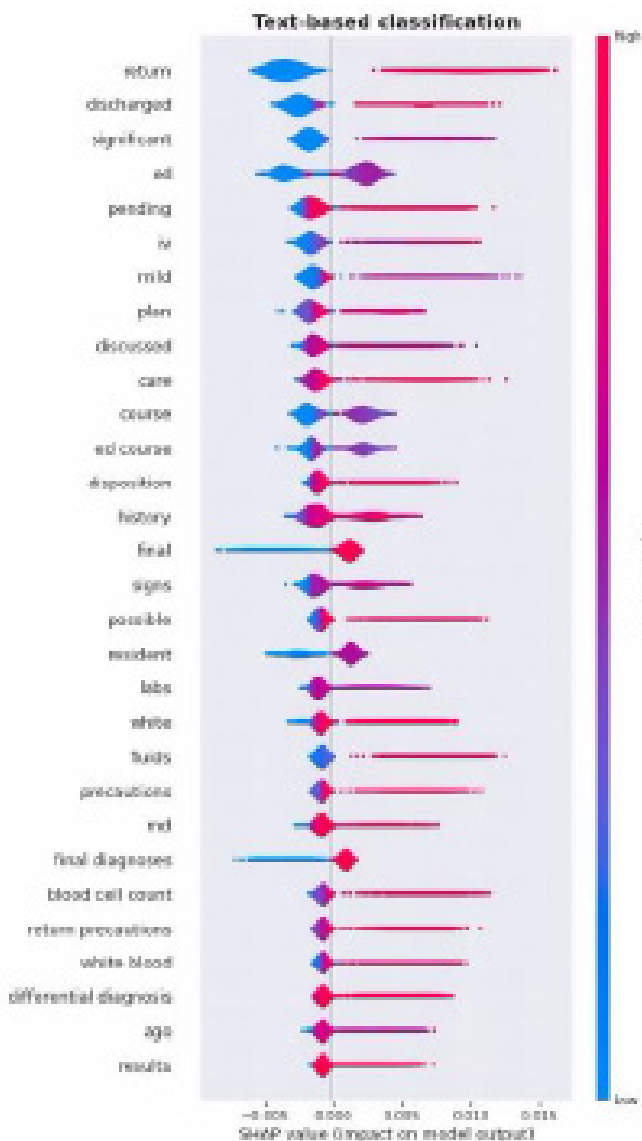


Figure 2. Shapley Additive exPlanations.

67.85% (95% CI 75.12-90.18). The following are the test characteristics for ocular POCUS: sensitivity 87.21% (95% CI 78.27-93.44); specificity 100% (95% CI 81.47-100); and accuracy 95.08% (95% CI 88.98-98.35).

Conclusion: Point-of-care ocular ultrasound was more sensitive and specific than EP-performed ophthalmoscopic examination for the diagnosis of acute ocular pathology in the emergency department.

4 (O-E1) Food Insecurity and Housing Instability Screening and Follow-up in a Pediatric Emergency Department

Kellie Bacon, MPH; Shelby K. Shelton, MPH, CCRC; Soheil Saadat, MD, PhD; Jason Douglas, PhD; Theodore Heyming, MD; Rammy Assaf, MD

Oral Presenter: Victor M. Cisneros, MD, MPH, CPH

Objectives: This pilot study examines the impact of screening and referral services for food insecurity (FI) and housing instability (HI) in a pediatric emergency department (PED) serving a large community.

Background: FI and HI disproportionately impact children within underserved communities. Pediatric EDs are uniquely positioned to address FI and HI in communities with inequitable access to food and housing resources. This study examines the impact of FI and HI screening and referral systems in a PED serving a large community.

Methods: From March 2021–February 2022, 1,981 PED patients participated in a 16-question cross-sectional survey addressing FI and HI and child/caregiver health status. All participants received passive referrals to food and housing resources. Research assistants contacted participants who screened positive for FI/HI at three and six weeks to readminister the survey. Summary statistics describe FI and HI outcomes.

Results: Of 218 patients (11.0% surveyed) who screened positive for FI/HI, 149 (68.3%) were contacted at three and six weeks. Of these 149, 60.5% were food insecure, and 77.2% were housing insecure at the index ED visit. After administration of passive referrals, 50.7% and 45.3% of baseline-positive patients reported FI at three and six weeks, respectively. Additionally, 47.3% and 42.7% reported HI at three and six weeks, respectively. Participants who self-reported good health had a lower rate of FI compared to those who reported poor health status.

Conclusion: While we observed encouraging FI reductions among PED patients, no significant change was noted in HI, and both generally persisted. FI was associated with lower overall health status compared to HI. EDs are ideal environments for detecting FI and HI; however, additional research is necessary to examine resource uptake among FI and HI patients.

5 (O-C2) The Association of Image Gain Intensity to the Accuracy of Point-of-care Ocular Ultrasound

Albert Lee, MD; Megan E. Guy, MD; Edmund Hsu, MD; Ryan Gibney, MD; Brenda Nash, RDMS; Nora Perez-Moreno, RDMS; Matthew Whited, MD; Jessa Baker, MD; Melissa Chang, MD; Nicole Finney, MD; Shreya Gupta, MD; Reem Sarsour, MD; Jonathan Rowland, MD

Oral Presenter: Soheil Saadat, MD, PhD

Objectives: To determine the effect on sensitivity, specificity, positive predictive value, and negative predictive value of detecting ocular pathology by stratifying gain settings on ocular point-of-care ultrasound (POCUS).

Background: POCUS plays a pivotal role in evaluating ocular complaints in the emergency department (ED). The rapid and non-invasive nature of ocular POCUS makes it a safe and informative imaging modality. Previous studies have investigated using ocular POCUS to diagnose posterior vitreous detachment (PVD), vitreous hemorrhage (VH), and retinal detachment (RD); however, little is known about the sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of detecting ocular pathology at stratified gain levels.

Methods: We performed a retrospective review of ED patients who received ocular POCUS examinations and ophthalmology consultations as part of their evaluation for eye complaints at our urban Level I trauma center ED from November 2017–January 2021; 383 of 706 exams qualified for the study. The primary analysis looked at the ability of emergency physicians to recognize any posterior chamber abnormality on ocular POCUS.

Results: The images were found to have an overall sensitivity of 81% (95% confidence interval [CI] 76-86%); specificity of 82% (95% CI 76-88%); PPV of 86% (95% CI 81-91%); and NPV of 77% (95% CI 70-83%). Images acquired with a gain of (25, 50] had a sensitivity of 71% (95% CI 61-80%), specificity of 95% (95% CI 85-99%); PPV of 96% (95% CI 88-99%); and NPV of 68% (95% CI 56-78%). Images acquired with a gain of (50, 75] had a sensitivity of 85% (95% CI 73-93%); specificity of 85% (95% CI 72-93%); PPV of 86% (95% CI 75-94%); and NPV of 83% (95% CI 70-92%). Images acquired with a gain of (75, 100] had a sensitivity of 91% (95% CI 82-97%); specificity of 67% (95% CI 53-79%); PPV of 78% (95% CI 68-86%); and NPV of 86% (95% CI 72-95%). Secondary analysis looked at each gain range further stratified by specific pathology (PVD, VH, and RD).

Conclusions: High (75, 100] gain on ocular POCUS has a high degree of sensitivity for detecting any posterior chamber abnormality, as compared to intermediate (50, 75] and low

(25, 50] gain levels. All gain levels are highly sensitive and specific for RD. Overall, we recommend incorporating the use of high gain for ocular POCUS to maximize sensitivity without sacrificing specificity. High gain is an effective screening tool for ocular pathologies in acute care settings and may be particularly valuable in resource-limited settings.

6 (O-F1) Remote Learner as Team Leader: A High-fidelity Telesimulation Experience for Global Emergency Medicine Trainees

Katelyn Latuska, MD; Rayal Jhagru, MD; Kristen Dettorre, MD, DTMH; Charles Lei, MD

Oral Presenter: Sean M. Boaglio, DO, MAS, DTMH

Objectives: Telesimulation is a feasible and effective education tool capable of connecting resource-limited training programs with experienced educators and high-fidelity simulators for remote, simulation-based education (SBE) to hone team leadership, communication, and clinical reasoning skills.

Background: Global medical training programs can face significant barriers to SBE, including high learner-to-instructor ratios and limited access to simulation equipment and available space. Telesimulation uses communication technology to connect distanced learners with simulation instructors for SBE. We developed a novel telesimulation modality that enables a remote learner to practice team leadership and communication skills through a high-fidelity, mannequin-based simulation experience.

Methods: Using six Zoom-enabled devices, a team of Vanderbilt University educators facilitated a telesimulation experience for 10 Guyanese emergency medicine resident learners. Each participant individually led the resuscitation of a critically ill simulated patient with aortic dissection. Over Zoom, learners could visualize three real-time audiovisual inputs: foot-of-bed patient view; clinical data; and vital sign monitor. Participants completed anonymous surveys rating aspects of the simulation experience on a five-point Likert scale.

Results: Participants rated the clinical scenario and simulated environment as highly realistic (mean 4.2, SD 0.63; mean 4.2, SD 0.79), finding the virtual format comparable to an in-person simulation (mean 3.8, SD 1.03). The teleconferencing platform was easy to use (mean 4.3, SD 0.67) and did not detract from their experience (mean 4.2, SD 0.79). Learners reported greater confidence in resuscitating critically ill patients (mean 4.2, SD 0.63) and managing aortic dissections (mean 4.7, SD 0.48). Learners wished to participate in more telesimulation sessions (mean 4.6, SD 0.52), describing telesimulation as a valuable educational experience (mean 4.5, SD 0.53) that will improve their team leadership and communication skills (mean 4.6, SD 0.52; mean 4.6, SD 0.52), as well as their performance in an actual

clinical environment (mean 4.7, SD 0.48).

Conclusion: Our novel telesimulation modality is a feasible and effective educational tool. Participants found the virtual platform comparable to in-person simulation, providing a realistic environment for training team leadership, communication, and clinical reasoning skills. Telesimulation may be broadly applicable to the global medical education community, connecting resource-limited training programs with experienced educators and simulators for remote simulation-based education.

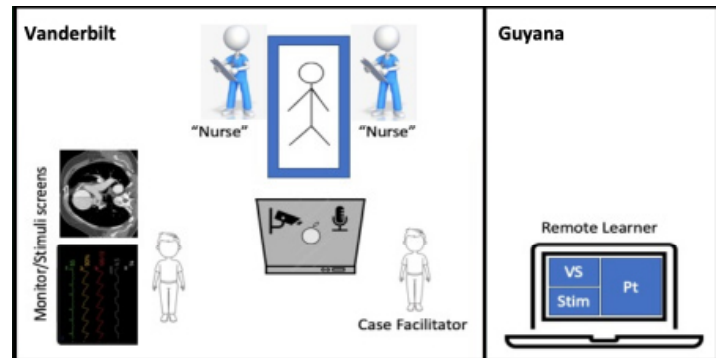


Figure 1. Schematic of telesimulation modality personnel and equipment layout

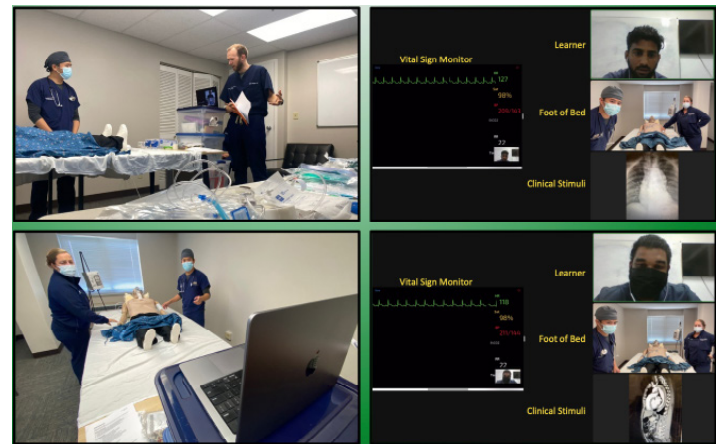


Figure 2. Education faculty facilitate mannequin-based telesimulation for remote Guyanese emergency medicine trainees (left). Remote learners individually lead the simulated resuscitation of a critically ill aortic dissection patient, with real time view of foot-of-bed, the vital sign monitor, and clinical stimuli (right)



Figure 3. Participants completed anonymous surveys rating aspects of the simulation experience on a five-point Likert scale (1 Strongly Disagree, 5 Strongly Agree), cohort mean scores for each queried element were calculated for analysis.

7 (O-I5) Factors Associated with Conversion to In-person Visit Among Patients Presenting for Pediatric Telehealth Encounters

Kirk Tomlinson, MD; Guillaume Stoffels, MA MS; Yvette C. Calderon, MD,MS

Oral Presenter: C. Anthony Lim, MD MS

Objectives: To identify patient- and illness-related factors associated with conversion to in-person visits among children presenting for pediatric telehealth encounters.

Background: Increases in telehealth utilization during the COVID-19 pandemic have been driven by limited availability of office visits due to infection prevention guidelines, parental hesitancy to enter healthcare facilities, and parity in reimbursement for providers. Due to increased demand and limited number of telehealth providers, it is important to determine which children may benefit the most from these encounters.

Methods: In this retrospective case-control study, patients 0-21 years old presenting for a telehealth encounter were evaluated. Children who had an in-person visit within seven days of the telehealth visit were identified as conversion cases and matched in a 1:3 ratio to controls by age in months up to 36 months and by year for those 4 and older. Patient demographics, past medical history, symptoms, and diagnoses were collected. A multivariable logistic regression model was developed including variables significantly associated with conversion on univariate analysis.

Results: From March–April 2020, there were 2,465 pediatric telehealth encounters. Of these, there were 67 (3%) conversions to in-person visits. 79% of these conversions originated from general pediatric telehealth encounters and the remaining from subspecialty telehealth visits. 69% of these conversions were to the ED and 31% in the clinic. Median days to in-person visit was 2 (1, 5). Median age was 25 months (1, 172), 66% were female, and 43% had a chronic medical condition. 55% were uninsured or on Medicaid, and the remaining were commercially insured. The most common symptoms reported included 42% respiratory, 22% fever, 19% pain, 18% vomiting/diarrhea, and 18% rash. After matching with controls based on age, a multivariable logistic regression model revealed that a history of cancer (OR 15.8, 95% CI 1.3-195.0), emesis (OR 4.6, 95% CI 1.1-18.9), pain (OR 4.5, 95% CI 1.5-13.3), non-COVID-19 related respiratory symptoms (OR 3.9, 95% CI 1.5-9.7), and telehealth visit with a specialist in allergy, endocrinology, gastroenterology, or pulmonary (OR 0.3, 95% CI 0.1-0.7) were associated with conversion, with an AUC of 0.82.

Conclusion: This introductory evaluation may suggest that certain patient- and illness-related factors are associated

with telehealth conversion to in-person encounters. To appropriately allocate telehealth and ambulatory resources, further study will determine whether some children will benefit if they are triaged directly to in-person visits.

8 (O-F6) A Mixed-methods Study of Barriers and Facilitators to Point-of-care Ultrasound Implementation for Emergency Department Providers at the Durham Veterans Affairs Healthcare System

Anna Tupetz, DPT, MScGH; Luna Ragsdale, MD, MPH; Padmaja Krishnan, MS-II; Raelynn Vigue, PGY-1; Carson E. Herman; Jaran White; Erica Peethumnongsin, MD, PhD; Catherine A. Staton, MD MSc; Alexander Gordee, MA; Maragatha Kuchibhatla, PhD; Stephanie Eucker, MD, PhD

Oral Presenter: Rebecca G. Theophanous, MD, MHSc

Objectives: Our primary objective was to identify the facilitators and barriers to optimize our program implementation using the Consolidated Framework for Implementation Research (CFIR) and test for impact at a single local emergency department (ED).

Background: Emergency ultrasound program leaders nationwide recognize that point-of-care ultrasound (POCUS) knowledge retention and utilization are difficult to achieve. Prior studies have identified a lack of provider training with a gap in POCUS knowledge and skills, lack of credentialed ultrasound users, and lack of quality assurance image review as significant barriers to POCUS use. A standardized approach to identifying and addressing barriers to sustainable POCUS implementation is needed to increase POCUS use, reduce radiology ultrasound, and potentially improve ED flow.

Methods: Our mixed-methods study implemented a co-designed, multifaceted intervention at the Durham Veterans Affairs ED from November 2021–October 2022 (12 months) to enhance POCUS usability and sustainability, including education, equipment knowledge, quality review process, and image archiving in the health record. Furthermore, 20/25 (80%) full-time ED providers participated in small- or large-group hands-on educational POCUS training sessions between February–May 2022. We conducted 14 semi-structured interviews to identify emergent themes and codes on ED POCUS use and performed team-based coding using inductive and then deductive analysis using NVivo. For our impact evaluation, we assessed POCUS program acceptability, effectiveness, and feasibility via provider pre/post-course questionnaires, interviews, and health record data (ED POCUS, radiology ultrasound orders, and ED length of stay (LOS)).

Results: Five POCUS themes emerged: convenience and

efficiency; ED environment (space and place); opinions on ED clinical POCUS use and education; and peer influences, feedback, and teaching. POCUS facilitators include machine availability, resident teaching, ED procedural POCUS, hands-on group training, colleagues' contagiousness and enthusiasm, and ultrasound faculty support and guidance. Additionally, ED and hospital leadership support and hospital-wide POCUS collaboration were cited as essential for success. POCUS barriers were time constraints, alternative radiology imaging availability, POCUS knowledge and skills comfort, and eliminating unnecessary and cumbersome steps for image acquisition and documentation/storage. Additional identified needs (image review, faculty credentialing, and an archiving system), require development locally to strengthen provider skills and reduce duplicated radiology studies. For feasibility and effectiveness, we found no significant change in ED LOS (6.7±7.5 hours, $P=0.0849$) and radiology ultrasounds ordered (355±361, $P=0.417$) but a significant increase in ED POCUS (72±267 scans, $P<0.001$), in the six months pre/post-intervention. The most frequently performed POCUS scans were cardiac, deep vein thrombosis (DVT), soft tissue, musculoskeletal, and biliary, and radiology studies were DVT, biliary, and scrotal ultrasound. From pre/post-intervention survey data, overall comfort with performing and teaching diagnostic and procedural POCUS changed minimally. All respondents agreed that POCUS is a useful clinical tool and that residents should learn POCUS, supporting acceptability.

Conclusion: We identified the barriers and facilitators to sustained POCUS training and implementation using the CFIR framework. Our POCUS program is acceptable, effective, and feasible based on survey responses, interviews, and health record data. Future work should address POCUS barriers and incorporate facilitators by tailoring POCUS education and clinical use toward individual providers at each site, using momentum from positive peer feedback, selecting an "ED clinical champion," and integrating ED and hospital leadership support, with the goal to extend our implementation evaluation into a standardized national scale intervention.

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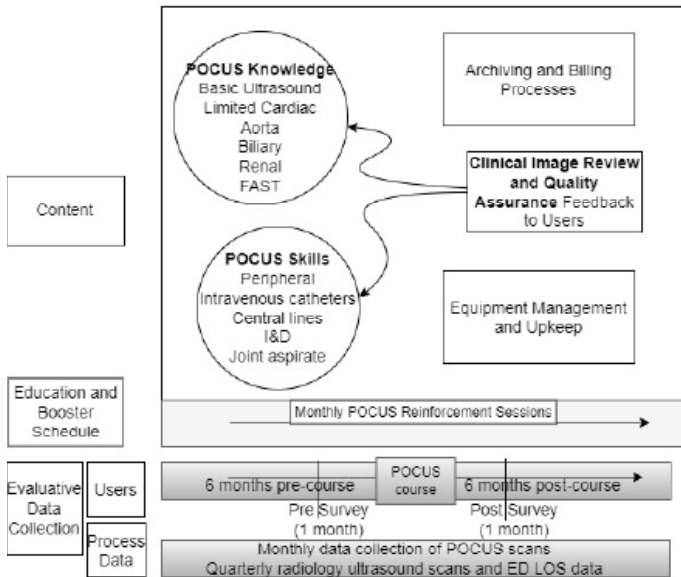


Figure 1. VA POCUS implementation plan-study timeline

Table 1. Identified themes and codes and respective barriers and facilitators as stratified by the Consolidated Framework for Implementation Research (CFIR)

| CFIR constructs: Individuals (number of participants) | |
|--|--|
| Themes: Convenience and efficiency, opinions on clinical POCUS use, opinions on POCUS education | |
| <ul style="list-style-type: none"> Barriers: <ul style="list-style-type: none"> Time constraints based on clinical volume (14/14) Comfort level with background POCUS knowledge and skills (14/14) Eliminating unnecessary and cumbersome steps for image acquisition and documentation/storage (11/14) Facilitators: <ul style="list-style-type: none"> Excellent image quality and ease of US machine use (14/14) Producing differentials and diagnoses; answering pointed clinical questions or progression of specific diseases (11/14) Provider clinical improvements and useful POCUS exams (10/14) Ensuring patient safety (7/14) Clinical standard of care (10/14) Patient-centered care improvements with increased efficiency and satisfaction (8/14) Hands-on POCUS group training rather than didactic learning (14/14) Both: <ul style="list-style-type: none"> US machine usability and familiarity (14/14) Ease of documentation (Barrier 4/14; Facilitator 8/14) Desire for more practice and repetition (13/14) Individuals' comfort with POCUS image acquisition and interpretation (Barriers 8/14; Facilitator 5/14) Different teaching and learning styles for POCUS education: preferred hands-on, small group training over classroom didactics (14/14); human models (5/14); simulation (6/14) | |
| CFIR constructs: Inner setting (Themes: ED environment and peer influences/feedback/teaching) | |
| <ul style="list-style-type: none"> Barriers: <ul style="list-style-type: none"> Availability of alternative radiology imaging modalities (11/14) Location and cleanliness at other sites (but not a problem at the Durham VA) (12/14) Facilitators: <ul style="list-style-type: none"> Availability of US machines and resources, cleanliness, and maintenance (14/14) US learners and resident teaching (14/14) POCUS use for ED procedures (14/14) Existence of a POCUS archiving system and faculty credentialing system (12/14; 14/14) | |

Table 2. Durham VA Healthcare System Emergency Department POCUS scans, pre/post-course

| Types of ED POCUS exams performed | Total n Durham VA Healthcare System Emergency Department POCUS exams | | | |
|-----------------------------------|---|--|--|--|
| | Pre-course POCUS scans (6 months) | Pre-course POCUS scans (6 months) | Post-course POCUS scans (6 months) | Post-course POCUS scans (6 months) |
| | 01 (October 1, 2021 - August 31, 2022) | 02 (February 1, 2022 - April 30, 2022) | 03 (May 1, 2022 - July 31, 2022) | 04 (August 1, 2022 - October 31, 2022) |
| 1 cardiac | 14 cardiac | 14 cardiac | 14 cardiac | 14 cardiac |
| 2 CVT | 2 CVT | 2 CVT | 2 CVT | 2 CVT |
| 3 renal | 3 renal | 3 renal | 3 renal | 3 renal |
| 14 biliary/renal | 14 biliary/renal | 14 biliary/renal | 14 biliary/renal | 14 biliary/renal |
| 2 biliary | 2 biliary | 2 biliary | 2 biliary | 2 biliary |
| 2 CVT | 2 CVT | 2 CVT | 2 CVT | 2 CVT |
| 1 lung | 1 lung | 1 lung | 1 lung | 1 lung |
| 2 soft tissue | 2 soft tissue | 2 soft tissue | 2 soft tissue | 2 soft tissue |
| 1 spine | 1 spine | 1 spine | 1 spine | 1 spine |
| 1 I&D | 1 I&D | 1 I&D | 1 I&D | 1 I&D |
| 1 vascular/vascular | 1 vascular/vascular | 1 vascular/vascular | 1 vascular/vascular | 1 vascular/vascular |
| 14 other | 14 other | 14 other | 14 other | 14 other |
| 1 ocular | 1 ocular | 1 ocular | 1 ocular | 1 ocular |
| 1 liver | 1 liver | 1 liver | 1 liver | 1 liver |
| 1 musculoskeletal | 1 musculoskeletal | 1 musculoskeletal | 1 musculoskeletal | 1 musculoskeletal |
| 1 vascular (POCUS) | 1 vascular (POCUS) | 1 vascular (POCUS) | 1 vascular (POCUS) | 1 vascular (POCUS) |
| Monthly ED POCUS exams performed | 01 US - November 2022 02 US - December 2022 03 US - January 2023 04 US - February 2023 05 US - March 2023 06 US - April 2023 | 07 US - May 2022 08 US - June 2022 09 US - July 2022 10 US - August 2022 11 US - Sept 2022 12 US - Oct 2022 | 01 US - May 2022 02 US - June 2022 03 US - July 2022 04 US - August 2022 05 US - Sept 2022 06 US - Oct 2022 | 07 US - May 2022 08 US - June 2022 09 US - July 2022 10 US - August 2022 11 US - Sept 2022 12 US - Oct 2022 |
| Total ED POCUS exams performed | 72 total POCUS exams in 6 months pre-course (Nov 1, 2021 to April 30, 2022) | 87 total POCUS exams in 6 months post-course (May 1, 2022 to Oct 31, 2022) | | |

9 (O-K4) Two-year Results from a New Model Pain Coach Educator Program and Integrative Discharge Toolkit for Pain Management in an Urban US Teaching Hospital and Emergency Department During COVID-19 Pandemic

Sophia Sheikh, MD; Katelyn Perl, BS; Magda Montague, MPH; Megan Curtis-Gonzalez, PhD; Victoria Bartow, MPH; Nolan Menze, BSH; Michelle Lott, BSH; Kendall Webb, MD; Ashley B. Norse, MD; Amy B. Crisp, PhD; Jennifer B. Fische, MD

Oral Presenter: Phyllis L. Hendry, MD

Objectives: To describe the two-year implementation pilot and descriptive analysis of a novel emergency department (ED) pain coach educator program including a customized integrative patient pain toolkit for use at home, including patient demographics, pain characteristics, coaching and toolkit topics, implementation challenges, and one-month patient feedback and toolkit utilization survey.

Background: Pain is the most common presenting ED complaint, yet most emergency care professionals receive minimal education about nonpharmacologic, integrative pain management options. It is faster to administer or prescribe medications than to provide patient education and nonpharmacologic, nonopioid modalities. The US and other countries are dealing with opioid epidemics resulting in a renewed focus on pain education and integrative alternatives. The COVID-19 pandemic escalated pain management challenges. To address this, we developed a novel ED pain coach educator program providing individual, customized education sessions and integrative pain management toolkits for acute and chronic pain, followed by a one-month feedback and utilization survey.

Methods: The project was implemented in an urban US safety-net, not-for-profit hospital system and registered with the affiliated university's Quality Improvement Project Registry. Data collection occurred from January 1, 2021–December 31, 2022 with enrollment initially starting in EDs

and trauma center followed by expansion to select inpatient services. Study inclusion criteria included patients ≥ 14 years with acute or chronic pain with preference given to high-risk or high-utilization patients. Patients were excluded if in extreme pain prior to initial assessment and treatment, incarcerated, violent, suicidal, or critically ill. A training program and curriculum was developed for inaugural pain educators. Toolkits were customized based on type of pain and interest with a choice of 7 integrative options and 17 educational brochures. Patients were identified through electronic health record (EHR) tracking systems, paging, rounding, shared service patient lists, or by healthcare professional verbal request. All data was stored and managed in REDCap. Beginning in November 2021, patients completed a 30-day post-session phone survey that included questions about frequency of home toolkit use and session feedback. Descriptive statistics, Area Deprivation Index (ADI), medical and pain diagnoses, education and toolkit items provided, challenges, and follow-up survey data were collected and analyzed.

Results: There were 1,492 sessions conducted over two years with 1,295 unique patients receiving pain coach education sessions and discharge toolkits. The average age was 47.8 years (SD 17.2). The majority were female (63.6%), Black (53.7%), and non-Hispanic/Latino (96.6%). Most (43.6%) had a high level of socioeconomic disadvantage (ADI score >85 , range 2-100). Sessions occurred in the ED (63.5%), in-patient (28.8%), out-patient (4.6%), and other (2.6%). Pain was reported as acute (55.3%), acute on chronic (28.1%), and chronic (16.6%), with patients often having multiple pain diagnoses (musculoskeletal, 73.4%; abdominal/pelvic pain, 13.8%; and low back pain, 12.8%). During customized educational sessions 89.7% of patients received a “4 flat tires analogy” stress ball, 87.9% hot/cold therapy, 86.9% aromatherapy inhaler/education, 56.6% pain journal with guided questions, 48.7%, virtual reality viewer, 33.4% therapeutic coloring, and 16.5% acupressure device. The top three challenges in conducting pain coaching sessions included medical condition such as nausea or lethargy, 14.5%; time constraints, 7.9%; or too much pain, 6.8% with 65.1% of sessions reporting no challenges. Of the 185 survey respondents, 169 remembered the session and were using toolkit items at home with 147 (86.9%) rating the session as helpful or very helpful and 135 (79.9%) using toolkit items daily or weekly.

Conclusion: Results from this novel ED-based pain coach education/toolkit program provide valuable insights and benefits for development of an international pain coach model. Most patients ranked the program as very helpful/helpful with continued use of integrative toolkit items at one month and qualitative statements of patient satisfaction and improved functionality. Appropriate timing of approach was a key issue. Multidisciplinary project champions and recognition were

important to project success along with rounding. All program materials including an implementation guide are available online. Future plans include assessing program outcomes such as readmission and return ED rates, decrease in opioid use, cost effectiveness, and functionality.

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10 (P78) Evaluation of Emergency Room Reattendance and Re-hospitalisation Reductions with Our Hospital-to-Home Programme

Chong Yau Ong, MBBS, MMED Family Medicine; Jieru Lai, MBBS

Poster Presenter: Jean MH Lee, MD, FRCSAE

Objectives: Many patients get readmitted post hospital discharge due to multiple factors. Home visits through hospital-to-home (H2H) programs are targeted at these at-risk patients with complex co-morbidities and high social care needs. We aimed to review the outcome of a H2H program with regard to reducing emergency department (ED) visits and readmissions.

Background: Upon discharge from inpatient wards, patients with high risk of re-hospitalisation are followed up by a health care team at home visits, with the purpose to identify patient care needs which range from medical to social needs, and they intervene to prevent an avoidable readmission back to the ED or hospital. We also aimed to optimise the well-being of the patient with our multi-disciplinary team approach.

Methods: A retrospective review of patients cared for under the program in a tertiary hospital in Singapore from September 2020–August 2021 was conducted. We studied the demographics of patients three months prior to enrolment into the H2H program and followed up with them for the period of enrolment. The enrolment consisted of two home visits

to the patient which could be conducted virtually if deemed suitable. Thereafter, the cohort was tracked for three more months after the last home visit and the visits to the ED and hospital admissions documented for them. During the home visits, other than following up on the medical issues, we would perform medical reconciliation, conduct Advance Care Planning conversations, and attend to social/financial needs by referring them to social workers or community partners where necessary.

Results: 284 patients had complete data and were included in the analysis. 90% of the patients were above age 60. The median length of enrolment in the program was five months (0-7 months). Compared to the three-month pre-enrolment period, there was a 47.5% reduction in ED re-attendances during the program enrolment period. The after-effect was also observed whereby there was a further 18% reduction in ED re-attendances at three months post-discharge from the program. Compared to the pre-enrolment period, enrolment in H2H studied three months later resulted in the highest number of ED re-attendance reductions among the groups with three ED visits (8 patients down from 46) and four and above ED visits (6 down from 30).

Conclusion: Home visits through a hospital-to-home program can reduce the number of ED re-attendances, and the benefit can still be observed after three months post-discharge from the program.

11 (O-G2) Laboratory Testing Is Indicated for Older but Not Younger Emergency Department Psychiatric Patients

John R. Allegra, MD, PhD; Marielle Daclan, MD

Oral Presenter: Barnet Eskin, MD, PhD

Objectives: To assess the value of laboratory testing for emergency department (ED) psychiatric patients of different ages by examining the fraction of those patients admitted medically instead of psychiatrically.

Background: Previous studies have shown that routine laboratory testing has low yield for identifying unsuspected medical conditions for most ED patients who present for psychiatric problems. About 20% of ED psychiatric patients are over 65 years old, and these patients are more likely to have chronic medical conditions than younger patients. These conditions may worsen during exacerbations of psychiatric illnesses and, in fact, may contribute to these exacerbations. We hypothesize that a larger proportion of elderly than younger patients presenting for psychiatric problems require medical admission, and that the reasons for such admission are exacerbations of chronic medical conditions.

Methods: Design: Retrospective cohort. Population: Consecutive ED patients presenting with psychiatric conditions in the years 2019-2021. Setting: Suburban ED with

an annual ED volume of 90,000 patients, an ED residency, and a separate area for psychiatric patients. This area has specialized psychiatric personnel, including psychiatric social workers and psychiatrists. ED healthcare providers initially evaluate the patients and then request psychiatric consultation. Protocol: A database of ED psychiatric patients is maintained by the hospital. We tallied the number of psychiatric visits and the number of these patients admitted for medical conditions. We calculated and plotted the percent admitted medically by decade of life. We also tallied admissions for specific conditions, namely drug-related diagnoses (including alcohol abuse) and dementia.

Results: The database contained 8018 patients. The median age was 30 years (interquartile range 19-51); 51% were female. Of these, 175 (2.2%) were admitted for medical conditions. The percent admitted medically varied markedly by decade of life, ranging from an average of <1% in the first four decades of life to 15% in the 10th decade. Drug-related diagnoses were found in patients admitted medically in the 3rd-8th decades of life and accounted for 46% of the medical admissions in the 4th-6th decades of life. Of medical admissions in the 8th-10th decades of life, 30% were for dementia.

Conclusion: We found a higher admission rate for medical conditions in elderly than younger psychiatric ED patients. Dementia was the most frequent chronic medical condition in elderly patients that was identified as the reason for medical admission. Our results confirm that the routine requirement for laboratory testing in younger psychiatric ED patients is unlikely to be useful.

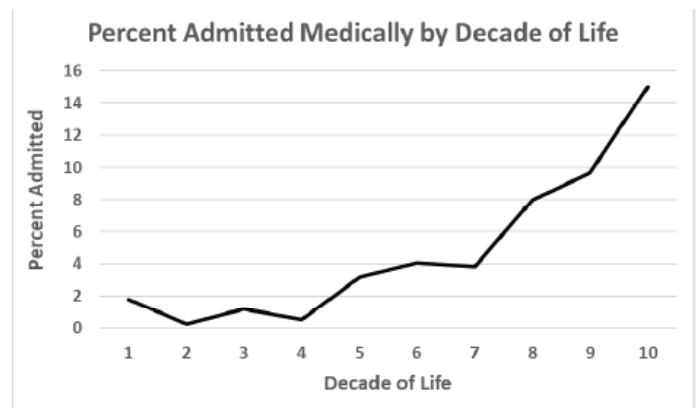


Figure 1. Percent Admitted Medically by Decade of Life

12 (O-D4) Impact of an Electronic Format on the Completion of Evaluations of Medical Students in the Emergency Department

Joshua Easter, MD, MSc

Objectives: To assess the effect of a novel electronic format on the frequency of evaluations completed by faculty and residents for medical students in the emergency

department (ED).

Background: Faculty and residents' assessments of medical students working in the ED play an integral role in helping students improve and in providing input for students' grades and standardized letters of evaluation for their residency applications. Despite the importance of these evaluations, students and clerkship directors often report that they do not receive sufficient evaluations to provide meaningful assessments. The aim of this study was to determine whether an electronic evaluation system would improve the frequency of submitted evaluations and the quantity of information submitted.

Methods: This was a prospective observational study at a single academic ED from 2019-2022 with an advanced clerkship elective for senior medical students in emergency medicine and an advanced elective in pediatric emergency medicine. Evaluations were performed utilizing a modified version of the National Clinical Assessment Tool for Medical Students in the Emergency Department. Prior to the intervention, residents and faculty were asked to complete paper evaluations on students after every shift in the ED and submit them to a locked box in the ED. In the beginning of academic year 2020, a new electronic evaluation format for the evaluation was provided as a Google Form. It was accessible by a hyperlink or QR code that was given to all students and posted in the ED. Descriptive and comparative statistics were calculated. A sensitivity analysis was performed to assess the impact of COVID-19 on results.

Results: Over the three-year period, 172 students rotated in the ED, and 718 evaluations were submitted. Students worked approximately 2,924 shifts and received submitted evaluations from 22% of these shifts. With the paper format students received a mean of 2.8 (SD 2.1) evaluations for their month-long rotation compared to 5.7 (SD 3.9) evaluations with the electronic format ($P < 0.001$). Resident evaluations increased more than attending evaluations following the implementation of an electronic format; a mean of 2.1 resident evaluations per student using the paper format and 4.1 evaluations using the electronic format ($P < 0.05$). Most electronic evaluations were accessed by the hyperlink (70%), followed by QR code (27%) and direct email (3%). The mean number of discrete comments included via free text on each evaluation increased from a median of 1 (IQR: 0-2) with the paper format to a median of 4 (IQR: 3-5) with the electronic format. A sensitivity analysis with exclusion of data from the 12 months at the height of the COVID-19 pandemic did not reveal any significant changes in the reported associations between the format of the evaluation and the frequency of submission.

Conclusion: An electronic format was associated with more frequent submission of ED shift evaluations of medical students and more content in the evaluations. As an observational study there are potentially unmeasured

confounders that may have impacted the results. In addition, while the number of evaluations increased, the quality of the evaluations was not assessed.

13 (O-F7) Augmented Reality for Empathy Training: Stepping into the Patient's Shoes

Aaron Frank, MS-3; Melissa Allison, MS-3; Clara Riggle, MS-3; Ronnie Rivera, MD; Ariana Nelson, MD

Oral Presenter: Alisa Wray, MD, MAEd

Objectives: The patient-physician relationship and satisfaction are highly reliant on effective physician communication.^{1,2} We proposed that by utilizing the Microsoft HoloLens augmented reality to record and watch medical student standardized patient (SP) encounters students would be more empathetic and imagine what it is like to be "in the patient's shoes."

Background: Although virtual reality has been widely adopted for training practical skills, virtual and augmented reality are minimally utilized to improve medical students' (MS) empathy skills.³ Medical students have limited options of reviewing their SP encounters and typically can only view footage from one camera angle. This limited point of view (POV) does not give a representation of eye contact, body language, or communication directly from the patient's POV. We initiated a pilot project utilizing Microsoft HoloLens augmented reality to give students an opportunity to view themselves from the patient's POV. The figurative "putting yourself in the patient's shoes" became literal with digital education.

Methods: To analyze the efficacy of augmented reality video, we designed a pilot study that evaluated students' self-perception of their performance immediately before and after watch-back sessions. Twenty MS1s and MS2s were randomly assigned into two groups: those who would review their video footage captured on the HoloLens, and those who would review their video footage captured from a standard camera. Students completed a 5-minute SP encounter, with all SPs wearing the HoloLens during the encounter. Students then completed the Consultation and Relational Empathy (CARE) validated survey, and additional questions evaluating body language, eye contact, and facial expressions. Students assigned to the HoloLens group then had the opportunity to wear the device and experience themselves delivering their 5-minute patient interview in an immersive, augmented-reality experience, from the patient's POV. The other group of students watched the third-person POV of their encounter. After completing the watch-back sessions, students repeated the CARE survey and additional questions, and provided feedback on the experience. Changes in CARE survey scores, evaluation of body language, eye contact, and facial

expressions. Each group then reviewed the alternative video and completed a final survey on their overall thoughts comparing HoloLens to the third-person POV camera.

Results: Each participant was able to view their encounter from the augmented reality and third-person perspective and completed a final survey: 84% (16/19) marked the HoloLens footage as “more informative” vs the third-person camera. Many of the students’ reviews of the experience included descriptions of evaluating body language and facial expression with patients and seeing their mannerisms from a new perspective. 15/19 participants noted in their free response that the HoloLens was better than the third-party perspective for facial expressions, eye contact, and seeing from the patient’s perspective. The third-person perspective was better for overall body language. One student stated that “It was great to see myself from the patient’s perspective (HoloLens) and see the importance of body language and facial expressions.” Other notable quotes regarding the HoloLens included “HoloLens helped me empathize better with the patient”; and “The HoloLens footage gave me a more detailed look into my facial expressions and how I was translating empathy through small acts of non-verbal communication (eyebrow raise, eye contact).” All 20 students stated that they felt the experience was valuable to their clinical practice, that they would participate in a study like this again and would recommend the session to a colleague.

Conclusion: This pilot study provided strong beneficial evidence to using augmented reality in medical communication training. The overwhelmingly positive reviews suggest that using augmented reality video feedback during SP encounters is an important supplement to traditional education and allows MSs to experience what it is like to be in a patient’s shoes.

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14 (O-E2) Buprenorphine Initiation for Opioid Use Disorder in the Emergency Department: Impact on Patient Outcomes in at a Community Hospital

Darien Lee, PharmD; Nileena Johnkuty, DO; Nikitha Ashok, DO; Jibril Ahiru; Balogun, MD; Greg Neyman, MD; Nicole Maguire, DO, FACEP; Andrew Vasallo, PharmD; Danielle Biggs, MD

Oral Presenter: Hrant Gevorgian, MD, MPH

Objectives: To investigate the impact of emergency department (ED)-initiated buprenorphine in comparison to current standard of care on various patient outcomes. The current standard of care will constitute the retrospective variable of the study while the ED-initiated buprenorphine protocol will constitute the prospective variable.

Background: Buprenorphine has been shown to be safe and effective in preventing withdrawal symptoms of opioid use disorder (OUD) and subsequent relapse into uncontrolled substance use. No standardized protocol currently exists for the treatment of OUD in the ED, and management has traditionally been at the discretion of the physician. This study examines the initiation of a department-based protocol based on a documented Clinical Opiate Withdrawal Scale (COWS) score of prescribing buprenorphine in the eligible population and following patient outcomes over a short-term interval (30 days from enrollment).

Methods: This is a single-center, cohort study set up with two phases: a retrospective phase that consisted of review of standard of care patients from October 2020–January 2021, and a prospective phase where an ED-initiated buprenorphine protocol was implemented from October 2021–January 2022. The inclusion criteria for the buprenorphine protocol included the following: patients ≥ 18 years of age who meet *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* criteria for OUD, patients seeking outpatient detoxification treatment with buprenorphine, and patients who were offered peer recovery program (PRP) services. Exclusion criteria included medical or psychiatric conditions requiring hospitalization; patients actively participating in methadone maintenance program; and history of allergic reactions to buprenorphine. The primary outcome evaluated was readmission to the ED for OUD within 30 days of initial discharge. The secondary outcomes included admission to

an outpatient treatment program through the facilitation of PRP, readmission to the ED for opioid-involved overdoses requiring naloxone administration, readmission to the ED for any reason, acceptance of PRP recovery specialist services, acceptance of PRP patient navigator services, and follow-up with the PRP.

Results: There were 85 total patients of similar race, gender, age, and drug of abuse enrolled in this study. The primary outcome of readmission to the ED for OUD within 30 days of initial discharge was 15% in the retrospective phase and 5% in the prospective phase, $P=0.17$. In the secondary outcomes, 9% of patients had admission to an outpatient treatment program vs 17% in the prospective phase, $P=0.32$. In the retrospective group 98% of patients accepted PRP services compared to 90%, $P=0.17$. In the retrospective group, 25% of patients accepted PRP patient navigator services vs 44%, $P=0.11$. The retrospective group included 13% of patients involved in an overdose requiring naloxone administration vs 0%, $P=0.03$. The retrospective group had 35% of patients with readmission to the ED for any reason vs 13% of patients, $P=0.18$. Additionally, 41% of patients in the retrospective group followed up with the PRP vs 44% in the prospective group with a $P=1.00$.

Conclusion: The ED-initiated buprenorphine protocol led to a reduction in readmissions for any reason, readmission for OUD, and overdoses requiring naloxone. There was an increase in admissions to an outpatient treatment program through PRP facilitation, and acceptance of PRP services. Limitations and low adherence rate may influence results. The next steps include continued enrollment, re-education on protocol, and monitoring long-term outcomes.

15 (O-D1) Simulation-based Assessment for the Emergency Medicine Milestones

Ashley Crimmins, MD

Oral Presenter: Afrah A. Ali, MBBS

Objectives: The purpose of this study is to identify the Accreditation Council for Graduate Medical Education (ACGME) milestones that are the most difficult to assess using traditional methodology and the most suitable milestones to be assessed using simulation.

Background: The ACGME recently revised the educational milestones for all accredited residencies programs. The Emergency Medicine (EM) Milestones 2.0 contains updated specialty-specific, competency-based behavioral anchors for the assessment of residents. Most programs use their current assessment methods to fulfill data points for these milestones subcompetencies rather than

devise new tools. This has resulted in subcompetencies that are difficult to assess using traditional methods. Simulation-based medical education (SBME) measures outcomes based on observational rating, while providing opportunities for formative and summative feedback that can be used as an alternative solution.

Methods: This is a survey-based study that was targeted toward EM residency programs with simulation fellowship affiliation. The web-based survey contained 12 key questions, which focused on demographics of the program, the educational role of the respondents, frequency and type of simulation used in the program, the most difficult to assess education milestones using traditional assessment methods and most suitable milestones for using simulation-based assessment. The survey was conducted using SurveyMonkey and was sent weekly for six weeks to the program director, associate and assistant program director, and simulation fellowship director who were listed on the program’s website. Descriptive statistics were used to analyze the data for demographic data as well as the total number of votes for each of the 22 EM milestones subcompetencies for each question. The outcome variables for each subcompetency included the number of votes for “most difficult to assess using traditional methodologies” and “best assessed using simulation.” These were counted from both simulation experts and program directors, for a total of five non-ranked votes per category.

Results: Thirty-eight of 115 respondents completed the survey (33% response rate). The milestone that was ranked most difficult to assess using traditional methodologies was Systems-based practice: Quality Improvement. The milestone identified by most respondents as most suitable for assessment using simulation was Patient care: Emergency Stabilization. There was no overlap between the two categories of milestone subcompetencies.

Conclusion: System-based practice and reflective practice and commitment to personal growth are difficult to assess using traditional methods. Non-traditional assessment methods as well as innovative use of simulation may be helpful in assessing these subcompetencies.

Table 1. Emergency Milestone Sub-competencies Most Suitable to Assess Using Simulation

| Rank | MOST SUITABLE for assessment using a simulation-based assessment tool | Percentage |
|------|---|------------|
| 1 | Emergency stabilization (PC1) | 84.38% |
| 2.5 | Performance of a focused history and physical exam (PC2) | 62.50% |
| 2.5 | General approach to procedures (PC8) | 62.50% |
| 4 | Interprofessional and Team Communication (ICS2) | 53.13% |
| 5 | Patient and Family-Centered Communication (ICS1) | 50.00% |

Abbreviations: ICS, interpersonal and communication skills; PC, patient care.

Table 2. Emergency Milestone Sub-competencies Most Difficult to Assess Using Traditional Non-Simulation Methods

| Rank | MOST DIFFICULT to assess using traditional NON-simulation | Percentage |
|------|---|------------|
| 1 | Quality Improvement (SBP2) | 71.88% |
| 2 | Physician Role in Health Care Systems (SBP4) | 62.50% |
| 3 | System Navigation for Patient-Centered Care (SBP3) | 50.00% |
| 4 | Reflective Practice and Commitment to Personal Growth (PLBI2) | 46.88% |
| 5 | Patient Safety (SBP1) | 43.75% |

Abbreviations: PBLI, practice-based learning and improvement; SBP, system-based practice.

16 (P82) Predictors of Prolonged Hospital Length of Stay After Traumatic Brain Injury

George Loo, DrPH; Eric Legome, MD

Poster Presenter: Shameeke Taylor, MD, MPH, MS

Objectives: The aim of this study was to identify factors associated with prolonged hospital length of stay (PLOS) following traumatic brain injury (TBI).

Background: For TBI survivors, recovery can be a long and arduous process with a significant number of days spent in the inpatient and rehabilitation settings.¹⁻⁶ Hospital length of stay (HLOS) after TBI is a crucial metric of injury severity, resource utilization and treatment-related costs.⁷⁻⁸ Risk factors for PLOS after TBI require further characterization as there is a dearth of literature on this important topic.⁵⁻⁶ Identification of the risk factors associated with PLOS in TBI patients may help health systems develop standards of care and facilitate early mobilization of resources, promote timely discharge and reduce healthcare costs.

Methods: De-identified patient data for individuals with diagnosed TBI who were evaluated by the trauma surgery service at a single US Level 2 academic trauma and tertiary referral center between January 2017–August 2022 were extracted from the hospital’s prospectively collected trauma registry. PLOS was defined as the 95th percentile of the in-hospital length of stay of the entire patient cohort. Patients with PLOS were compared with those without PLOS (normal HLOS). Clinical/injury factors, insurance status, and discharge disposition were analyzed. In addition, a logistic regression model was developed that examined PLOS (outcome variable) using intensive care unit (ICU) stay, Glasgow Coma Scale (GCS) score on hospital arrival, Injury Severity Score (ISS), hospital discharge disposition, use of a ventilator, in-hospital cardiac arrest, alcohol withdrawal, and unplanned intubation as predictor variables. Statistical analysis included descriptive statistics, chi square test, Wilcoxon rank-sum test and multivariate logistic regression modeling (OR; 95% CI).

Results: The threshold for PLOS was >24 days. In the cohort of 1343 patients, 77 had PLOS. PLOS was significantly associated with male gender (80% vs 64%; $P < .003$), longer mean ICU stays (16.4 vs 1.5 days; $P < .001$) higher mean ISS (18.6 vs 13.8; $P < .001$), lower mean GCS score (11.3 vs 13.7; $P < .001$) and greater mean complication burden (0.7 vs 0.1; $P < .001$). PLOS patients were more likely to have moderate/severe TBI (44% vs 14%; $P < .001$), were more likely to die in hospital (19% vs 7%; $P < .001$), be discharged to a facility (55% vs 29%; $P < .001$) and use Medicaid (36% vs 22%; $P < .005$). In terms of complications, PLOS was associated with higher rates of cardiac arrest (5% vs 0.5%; $P = 0.002$), unplanned intubations (13% vs 1%; $P < .001$), inpatient alcohol withdrawal (10% vs 2%; $P < .001$), ventilator-associated pneumonia (5% vs 0.1%; $P < .001$) and acute respiratory distress syndrome (3% vs 0.2%; $P < .02$). Both groups had similar mean ages, racial distributions, Medicare/commercial insurance use, and rates of orthopedic injuries, alcohol-related injuries, unplanned extubations, and operating room revisits. In the regression model, presence of an ICU stay (OR 2.5, CI 1.1-5.7) disposition to inpatient facility (OR 3.0 CI 1.6-5.9), ventilator use (OR 4.1, CI 2.0-8.4), unplanned intubation (OR 3.4, CI 1.1-10.5), and inpatient alcohol withdrawal (OR 3.5, CI 1.2-10.3) predicted PLOS.

Conclusion: Traumatic brain injury patients with prolonged length of stay were more likely to have severe injuries, in-hospital complications, and Medicaid insurance use and were less likely to be discharged to home. PLOS status was predicted by ICU stay, intubation, alcohol withdrawal and disposition to inpatient and post-acute care facilities. These findings have significant implications for quality improvement and resource utilization at acute care hospitals. Efforts to reduce in-hospital complications and expedite discharge to long-term facilities may reduce length of stay and accompanying costs in TBI patients. Further validation of these results is needed from larger, multicenter studies with diverse patient populations.

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17 (O-C7) De-escalating Techniques to Reduce Tension in the Emergency Department Among Staff

Mohamad Moussa, MD, FAAEM

Objectives: We hypothesized that some techniques utilized by emergency department (ED) staff would be less effective than other techniques at reducing tension.

Background: Due to the unique nature of the work environment in the ED, healthcare providers and staff in the ED often adapt unique strategies to respond to periods of increased tension that can regularly occur at work. This study aimed to identify the most effective techniques used by ED staff to rapidly de-escalate tension. Tension among staff may impair performance and team cohesion; therefore, it is important to understand which techniques will effectively decrease this tension and which will not.

Methods: An online survey was administered to staff from seven separate EDs. Of 634 potential participants, 163 responses were received, representing physicians, nurses, PAs, NPs, and clinical support staff. Participants indicated whether they had experienced a period of increased tension in the ED and chose which techniques they used to de-escalate this tension. For each technique selected, participants rated perceived effectiveness at de-escalating tension on a personal level and among their healthcare team, ranging from completely effective (5) to not at all effective (1). ANOVA was used to analyze for significant differences between technique effectiveness.

Results: Of 163 participants, 152 participants (93.3%) reported experiencing a period of increased tension while working in the ED, and these responses were further analyzed for techniques used in response to tension. “Withdrawing or becoming silent” in response to tension was shown to be significantly less effective than the other techniques at reducing tension on both a personal and team level ($P < 0.001$). There were no significant differences in the perceived effectiveness of other techniques used. Humor was the most commonly reported technique (84.2% reported) while motivational speech was the least commonly reported (13.82%).

Conclusion: Withdrawing oneself from the situation was shown to be least effective at de-escalating tension. Therefore, a proactive approach to resolving tension in the ED was

shown to be more efficacious, regardless of which proactive technique was used. This data, along with the relative levels of technique effectiveness, can inform an approach to resolving tension that can be utilized by medical staff in emergency departments across the country.

18 (O-B1) A Retrospective Cohort Study to Determine the Injury Prevalence of Cervical Spine Injuries in Elderly Patients Undergoing Full Trauma CT

Pedro Simoes, MD; Khalid Abdelsadig, MD

Oral Presenter: John S. Batchelor, MD

Objectives: The aim of the study was to determine the prevalence of cervical spine injuries and injury patterns in elderly patients (>65 years) with low energy injuries who underwent a pan trauma computed tomography (CT).

Background: Cervical spine injuries sustained from low energy injuries or falls are often relatively occult due to the absence of significant cervical spine symptoms or pre-existing arthritis. There is some debate as to the whether the pan CT should be undertaken in all elderly fallers. Recent evidence has shown that cervical spine fragility fractures are uncommon in the elderly fallers due to a higher bone density in this region.¹ In contrast osteoarthritis of the cervical spine is common and has been shown to be a risk fracture for cervical spine fractures.²

Methods: The Emergency Department at North Manchester General Hospital automatically undertakes a pan CT in elderly patients with one or more of the following: haemodynamic instability; evidence of chest wall tenderness; evidence of respiratory compromise; multi-level spinal pain; cervical spine tenderness plus evidence of torso injury or high impact injury. The CT reports and clinical notes were reviewed of all elderly patients (over 65 years of age) who had a full trauma CT (head, neck, chest, abdomen and pelvis) over a 12-month period (September 2020–September 2021). The number of patients with cervical spine fractures and their age were recorded. The type and location of cervical spine injuries was also recorded.

Results: Sixty-six elderly patients underwent a full trauma series over the 12-month period. High-impact injuries and haemodynamic instability account for a small number of patients because the ED at North Manchester General Hospital is a non-trauma centre. The mean age of the cohort was 83.2 years; 26% (of the patients (17) in the cohort were aged 90 years or over. 39% (26) of the patients were identified to have a least one injury detected on CT; 86% (57) were due to ground level falls. Three patients out of 66 were noted to have cervical spine fractures (4.5%). One patient was an isolated C2 fracture, one patient had a C2 fracture with an associated T4 fracture, and the third patient had a C5 fracture with an

associated T1 and occipital fracture.

Conclusion: The results of this study demonstrated that 4.5% of elderly patients sustained cervical spine injuries following low-level falls; 39% of the cohort had at least one significant injury identified by the pan CT. The results from this study justify a fairly liberal approach to the use of the pan trauma CT in elderly patients.

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19 (O-E6) Active Threat: Evaluating a Borderland's Emergency Department Staff's Preparedness

Jessica Vanschuyver, MS-IV; Erica Guerrero, PA

Oral Presenter: Neha Sehgal, DO

Objectives: The purpose of the study was to determine the fundamental knowledge of the current active threat policy and the effectiveness of training provided to the emergency department (ED) personnel at an urban borderland Level 1 Trauma Center in El Paso, TX, over the course of one year.

Background: The Department of Homeland Security defines an active shooter as “an individual actively engaged in killing or attempting to kill people in a confined and populated area; active shooters use firearms with no pattern or method to their victim selection.” In 2012 the *Annals of Emergency Medicine* published a study highlighting 154 hospital-related shootings from 2000–2011 in the United States. Furthermore, Texas was cited as one of five states that accounted for more than a third of the hospital-related shootings, with 53% of shooting events occurring in hospitals that had 100-399 beds.

Methods: This study took place at the University Medical Center (UMC) in El Paso, TX. UMC is an urban Level 1 trauma center that sees 70,000 patients annually in a 45-bed ED. A total of 193 surveys were collected from ED personnel, which included resident physicians, faculty physicians, advanced practice providers, bedside nurses, technicians, paramedics, and nursing management. The purpose of the study was to determine their knowledge of the current active threat policy and the effectiveness of the training provided. We initially collected pre-test surveys, then provided didactic training, and immediately collected post-test surveys. The didactic training took place in the form of a standardized PowerPoint lecture given at resident conference and staff meetings over three months. We then used *t*-tests and ANOVA to compare across pre- and post-test survey results. Seven months post education

an active-threat tabletop simulation was conducted to gauge ED personnel's retention during a simulated high-pressure scenario. Participants were informed that participation in the survey was anonymous and voluntary, all answers were kept confidential, and their participation in the survey had no bearing on their current and/or future employment.

Results: The following survey questions were statistically significant when comparing pre- and post-survey results. “In the event of an active threat, the current policy at UMC calls for you to take 1 of 3 actions in a specific order. What are those actions in the correct order?” 16% answered incorrectly on the pre-survey, while no one got it wrong on the post-survey, $P < 0.001$. “In the ED, where would you go to secure yourself if there was an active threat?” 36% answered incorrectly on the pre-survey, while 19% answered it incorrectly on the post-survey, $P = 0.034$. “If you see a situation that has the potential to be an active threat do you call 911 or UMC security?” 62% chose the incorrect answer on the pre-survey, while 22% chose the incorrect answer on the post survey, $P < 0.001$. “On a 10 point scale, please rate how confident you are that you would know how to protect yourself and your patients in the event of an active threat, with 0 being not confident at all and 10 being completely confident.” The mean pre-survey score was 5.32, while the post-survey score was 7.33, $P < 0.001$.

Conclusion: Our aim was to determine the fundamental knowledge of the current active threat policy and the effectiveness of training provided to the ED personnel at an urban borderland Level 1 trauma center in El Paso, TX. Training included a didactic presentation and an active-threat tabletop simulation seven months post education to gauge ED personnel's retention. Four survey questions indicated a statistically significant change, suggesting that even a brief didactic training can be effective. Responding to an active threat does not come naturally to most healthcare workers, which is why ED personnel warrant structured education and training.

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20 (O-D6) CP-"R" You Ready for Residency

Nora McNulty, MD; Noah Trump, MD; Sandeep K. Dhillon, MD

Oral Presenter: Amritpal Saini, MD

Objectives: The use of simulation to assess medical student competency of the AAMC Core Entrustable Professional Activity (EPA) 12: demonstrating competency in performing core procedures in providing basic patient care.

Background: EPAs are standards established by the AAMC, with the goal to identify competencies that medical students must meet prior to their initiation into residency. EPA 12 involves the demonstration of competencies in key patient care procedures, including cardiopulmonary resuscitation (CPR) and bag and valve mask ventilation. There is a paucity of studies on how to evaluate medical student competencies, especially in regard to EPA 12. This project evaluates the utility of high-fidelity simulation as a standardizable assessment tool for EPA 12 in medical student education via its use within a transition to residency program.

Methods: 62 fourth-year medical students received a lecture on Advanced Cardiac Life Support (ACLS) and then participated in a simulated case of a patient with multiple comorbidities who initially presented with chest pain and was found to have a ST-elevation myocardial infarction that deteriorated into ventricular fibrillation requiring ACLS management. Evaluators observed groups of students for performance of critical actions, such as performing the

technical skills of CPR and bag-mask ventilation (PC1) and communication with the patient's family (PC7, ICS6, P6, PPD7, PPD1). A post transition-to- residency course survey was conducted to assess student confidence.

Results: Upon review of the data, 69.6% of the participants performed CPR technical skills adequately after a standardized lecture. After a debrief and individualized procedural teaching, 82.8% of the participants felt comfortable performing CPR.

Conclusion: High-fidelity simulation is an effective tool to measure a student's ability within the EPA 12 framework. By utilizing checklists with critical actions, we were able to effectively quantify team performance during a resuscitation. By interpreting the results of this checklist in real time, we were able to tailor the procedural stations portion of the course to match the students' needs. This has a high relevance to transition-to-residency courses that are typically run prior to students starting their emergency medicine residencies. Future studies can be conducted to further evaluate learner readiness for residency using this modality.

EPA 12 Checklist

Procedures to be assessed in this simulation:

- Basic CPR
- Bag-mask ventilation

PC1: Demonstrate technical skills required for the procedure

- Demonstrates necessary preparation for performance of procedures
- Correctly performs procedure on multiple occasions over time

| | Yes | No |
|--|-----|----|
| CPR | | |
| Does the team identify that the patient requires initiation of CPR? | | |
| Does the team use 2 rescuer CPR? | | |
| Does the team use 15:2 compression to breath ratio? | | |
| Does the team switch roles every 2 minutes? | | |
| Does the team have depth of compression at least 1/2 of the depth of the chest or around 2 inches? | | |
| Does the team place the defibrillator pads on the patient? | | |
| Bag Valve Mask | | |
| Does the team apply jaw-thrust maneuver to open the airway? | | |

PC1: Understand and explain the anatomy, physiology, indications, contraindications, risks, benefits, alternatives, and potential complications of the procedure

- Demonstrates and applies working knowledge of essential anatomy, physiology, indications, contraindications, risks, benefits, and alternatives for each procedure
- Knows and takes steps to mitigate complications of procedures

| | Yes | No |
|--|-----|----|
|--|-----|----|

Figure 1. Checklist for Critical Actions to Assess EPA 12

21 (O-D2) Needs Assessment Tool for Global Emergency Medicine Residency Curriculum Modification

Zelda Luke-Blyden, MD; Kristen Dettorre, MD, DTMH; Charles Lei, MD

Oral Presenter: Sean M. Boaglio, DO, MAS, DTMH

Objectives: The purpose of this study is to design a curriculum modification needs assessment tool for global emergency medicine (EM) training programs. We sought to quantify program-wide confidence in the residents' ability to manage core clinical scenarios and perform key procedures to identify opportunities for improvement and innovation within the residency curriculum.

Background: In 2010, the Vanderbilt University Department of Emergency Medicine established the first EM residency program at the Georgetown Public Hospital Corporation (GPHC) in the Republic of Guyana. The program has since graduated 18 trainees and transformed emergency care in Guyana. Our goal was to conduct a needs assessment to identify opportunities for improvement and innovation in the GPHC EM residency curriculum. We sought to evaluate perceived instructional needs and quantify program-wide confidence in the residents' ability to manage core clinical scenarios and perform key procedures.

Methods: We developed a curricular needs assessment survey based on the 2019 American Board of Emergency Medicine Model of the Clinical Practice of EM. Participants anonymously rated their confidence in GPHC residents managing 62 clinical scenarios and performing 29 procedures on a 5-point Likert scale. Mean Likert scores were compared between resident and faculty cohorts to identify clinical

scenarios and procedures showing agreement in low confidence or disagreement in the level of confidence in the residents' ability.

Results: A total of 35 participants completed the assessment (9 GPHC residents, 15 GPHC faculty, and 11 Vanderbilt faculty) for a 97% response rate. Clinical scenarios with agreement of low confidence were shoulder dystocia, breech delivery, and adrenal insufficiency. Procedures with agreement of low confidence were cricothyrotomy, lateral canthotomy, and resuscitative hysterotomy. Clinical scenarios with disagreement in confidence were aortic dissection, postpartum hemorrhage, and trauma in pregnancy. Procedures with disagreement in confidence were neonatal resuscitation, pediatric resuscitation, and pediatric endotracheal intubation.

Conclusion: Our needs assessment identified areas of emphasis for curriculum development in the GPHC EM residency. Future directions include determining the optimal educational strategies for addressing the clinical scenarios and procedures identified as deserving particular attention. This needs assessment tool holds promise for curriculum evaluation for other global EM training programs.

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