

## Research Abstracts

## 1 3D-printed Larynx is A Cost Effective Substitute for Traditional Simulation Models to Teach EM Residents Cricothyrotomy

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**Learning Objectives:** to compare the cost-effective and real-like experience of surgical cricothyrotomy between a 3D printed and prepared model compared to the (standard) trauma man simulator.

**Methods:** In a prospective crossover study, we compared the lifelike experience and cost effectiveness of surgical cricothyrotomy between a novice 3 Dimension (3D) trachea model and the trauma man simulator. The 3D model was prepared using silk tape and pig skin over the 3D model to create a cricothyroid membrane and skin. 27 emergency medicine residents and one medical student were recruited for participation. Each participant was randomly assigned to start with either the 3D model or the trauma man and then performed the procedure on the other simulated device. Participants filled out a survey post completion. Elements of interest were questions inquiring which device was most realistic and most useful. Cost analysis was based on the monetary value of each device for all participants. Pearson paired t-tests were used to compare the average realistic rating using STATA 15.1 (StataCorp LLC).

**Results:** The 3D model had a realist rating of 7.43 compared to 7.25 for the trauma man ( $p = 0.57$ ). The average cost per participant was \$0.50 for the 3D model compared to \$100 for the trauma man ( $p < 0.001$ ) with a total cost of \$14 and \$2,800 for each device, respectively.

**Conclusion:** Our study shows that the 3D tracheal model provides equivalent lifelike experience similar to the trauma man and is more cost-effective. It was associated with a cost reduction 99.5% (2800-14)/2800) compared to the trauma man utilization.

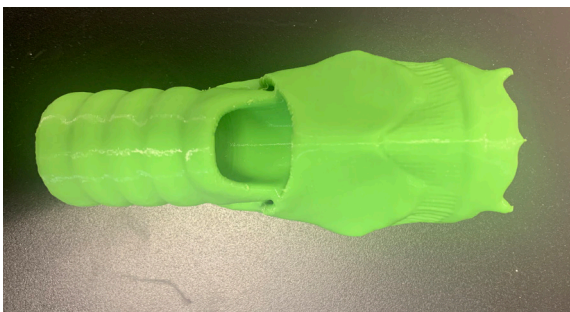


Figure 1.

## 2 A Geospatial Analysis of Gender Mobility in the Emergency Medicine Residency Match

Laura Hopson, MD; Meghan Mitchell, MD; Michelle Romeo, MD; Caroline Kayko, MLIS; Jeremy Branzetti, MD; Mike Gisondi, MD; Linda Regan, MD, MEHP

**Learning Objectives:** We compared movement between medical school and residency by gender. Our hypothesis was that women move a shorter distance than men.

**Background:** Women are underrepresented in EM leadership. Some evidence suggests geographic mobility improves career advancement.

**Objectives:** We compared movement between medical school and residency by gender. Our hypothesis was that women move a shorter distance than men.

**Methods:** We collected National Residency Matching Program (NRMP) lists of ranked applicants from 7 EM residency programs from the 2020 Main Residency Match. We added the gender expressed in interviews and left the Association of American Medical Colleges (AAMC) number as the unique identifier. Applicant data for matched osteopathic and allopathic seniors in the continental United States was included. We obtained street addresses for medical schools from an AAMC database and residency program addresses from the ACGME website. We performed geospatial analysis using ArcGIS pro and compared results by gender. NRMP approved the data use and our IRB granted exempt status.

**Results:** 881 of 944 unique applicants met inclusion criteria (830/1713 (48.5%) matched allopaths; 37% of all matched seniors); 420 (48%) were female. There was no significant difference between genders for distance moved ( $p=0.31$ ). Women moved a mean 619 miles (SD=698, median 341, range 0-2679); men a mean 641 miles (SD=717, median 315, range 0-2671). Further analysis of applicants travelling less than 50 miles (49 women, 51 men) showed no significant frequency differences.

**Discussion:** Women and men travel similar distances for EM residency with the majority staying within geographic proximity to their medical school. This suggests that professional mobility at this stage is not a constraint for the majority of women. Our study findings are limited by lack of knowledge of factors informing relocation decisions such as location of family and couples matching.

**Conclusion:** Gender does not appear to affect decisions to relocate for residency training. This finding may have implications for resident selection.

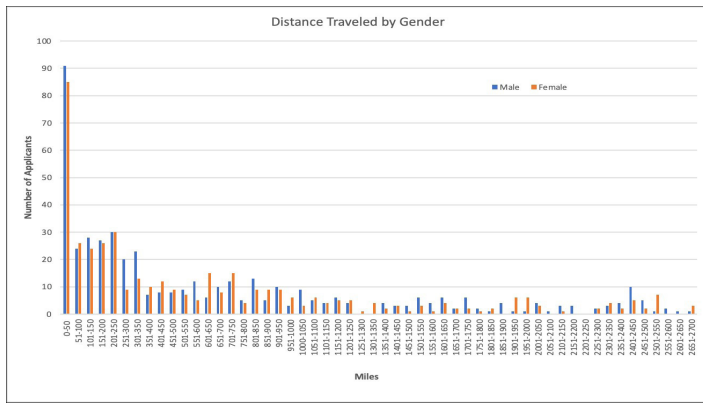


Figure 1.

### 3 A Mixed-Methods Needs Assessment to Identify Pharmacology Education Gaps Among Emergency Medicine Residents

Ashley Rider, MD; Brian Dang, PharmD; Kimberly Schertzer, MD; Holly Caretta-Weyer, MD, MHPE; Mike Gisondi, MD

**Learning Objectives:** The objective of this study was to perform a targeted needs assessment in order to develop a patient-safety focused pharmacology curriculum for EM residents.

**Background:** Medication errors threaten patient safety and half of all errors are related to physician orders. Emergency medicine (EM) residents are expected to demonstrate competence in pharmacotherapy (Milestone PC5), yet it is unclear which curricular topics to emphasize.

**Objective:** The study aim was a targeted needs assessment to develop a patient-safety focused pharmacology curriculum for EM residents.

**Design:** A convergent mixed methods study incorporated data from a de-identified safety event database and survey responses of EM faculty and clinical pharmacists at a single-site university hospital with 24-hour EM pharmacists. We reviewed the database to quantify types and severity of medication errors over 5 years. We identified survey participants using purposive sampling and obtained consent. Anonymous surveys included categorical items that we analyzed with descriptive statistics and short answer questions that two coders examined using thematic analysis. We summarized all data sources to identify relevant curriculum gaps.

**Results:** Common safety threats in our database were wrong dose (43%) and computer entry errors (14%). Survey respondents included 21 physicians and 9 pharmacists. Commonly identified knowledge gaps were medication cost (63%), pregnancy class warnings (60%), antibiotic stewardship (53%), medication interactions (47%), and side effects (47%). Qualitative analysis identified the need to optimize computer order entry, improve understanding of antibiotics and critical medications, better use references to guide prescribing, and know when to involve

the pharmacist. Improved skills are needed when prescribing antibiotics, insulin, sedatives, narcotics, and epinephrine.

**Conclusion:** Pharmacology skills to emphasize in EM residency training include order entry, prescribing high-risk medications, antibiotic stewardship, utilization of references particularly for special populations, and consultation with the pharmacist.

Table 1. Responses to categorical survey questions.

Categorical survey questions	Most common topics reported (%reporting)
Top five knowledge gap topics	Cost of medications (63%) Medications in pregnancy and lactation (60%) Antibiotic selection and stewardship (53%) Medication interactions (47%) Familiarity with side effects (47%)
Associated with patient safety events	Pain management/opioids (43%) Insulin (37%) Sedation medications (33%)
Incorrectly ordered	Pain medications (40%) Antibiotics (30%) Insulin (27%)
Must-know side effects	EPS-inducing medications (23%) Ketamine (17%) Opioids (10%)
Dose should be memorized	RSI medications (60%) Epinephrine (43%) Vasopressors (27%) Sedation medications (27%)
Antibiotics incorrectly prescribed	Vancomycin (43%) Piperacillin-Tazobactam (30%) Trimethoprim/Sulfamethoxazole (27%) Cephalexin (27%)

### 4 A Qualitative Needs Assessment of COVID-19's Impact on EM Interns

Eric Lee, MD; Shivani Mody, DO; Arlene Chung, MD

**Learning Objectives:** To characterize the impact that COVID-19 has had on the well-being and educational experience of EM interns in 2020

**Background:** The COVID-19 pandemic posed an unprecedented challenge to our learners. EM interns this year began their training during a time of great need and with less clinical experience than those of prior years.

**Objectives:** To characterize the impact that COVID-19 has had on the well-being and educational experience of EM interns in 2020.

**Methods:** We conducted a 60-minute semi-structured focus group with 18 interns at a single residency program in July 2020. A recording of the interview was transcribed and de-identified. Using qualitative methods, initial coding was performed independently using an inductive and iterative process by two study authors with experience in qualitative methodology. Once