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Authors

Chen, Angela

Hu, Kevin

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Conclusion: At two community EDs, three distinct subgroups of EP ordering practices exist based on advanced imaging use, propensity to admit a patient, and whether a visit was shared with a midlevel or resident. This data validates prior work showing that resource utilization and admission rates are related, while demonstrating that more nuanced patterns of EP ordering practices exist based on whether a visit is shared with a midlevel or resident provider. Further investigation is needed to understand the impact of EP characteristics and behavior on throughput and quality of care.

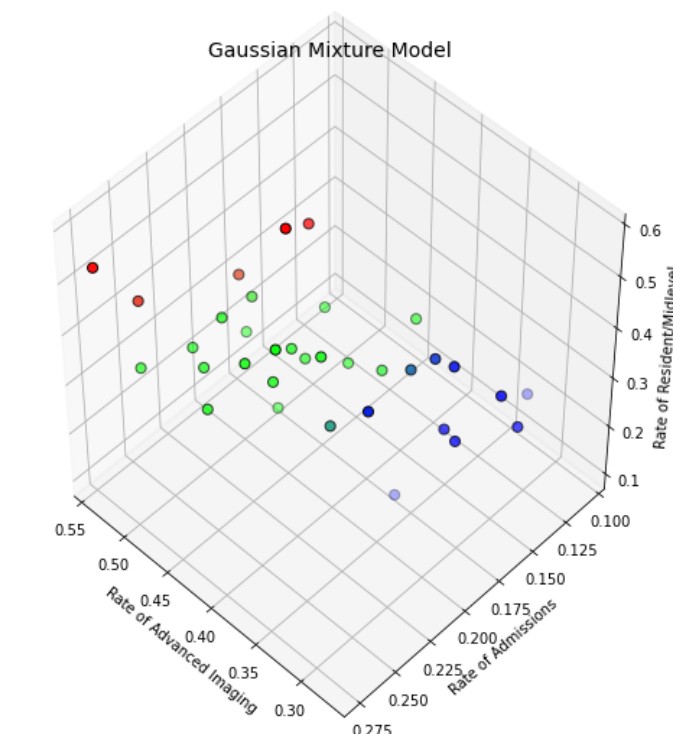


Figure 1. Gaussian mixture model

22 Variation of Emergency Medicine Resident Productivity During the COVID-19 Pandemic

Arjun Dhanik; Bryan Stenson; Daniel L. Shaw; David T. Chiu; Jake Hoyne; Joshua Kolikof; *Leon D. Sanchez*; Nathan McDonald; Peter S. Antkowiak

Objectives: The purpose of this study is to determine Emergency Medicine (EM) resident productivity (as measured by patients per hour) over the course of the COVID-19 pandemic compared to the prior training environment.

Background: The coronavirus disease 2019 (COVID-19) pandemic disrupted medical education throughout the United States. As a result, many EM residents began residency with atypical clinical experiences. In addition, Emergency Department (ED) patient volumes decreased during the early months of the pandemic.

Methods: This is a retrospective observational cohort

study conducted at an urban, academic medical center with an established EM residency program. Data was collected from electronic medical records between July 1, 2017 and October 31, 2021. EM residents completing full, consecutive years of residency were included in the sample. Classes prior to 2020 were defined as a control group. Due to the structure of the residency, only shifts at the academic medical center during first and second year of residency (PGY1 and PGY2) were included. Productivity was defined as total primary patient encounters divided by aggregate scheduled shift hours. To allow comparison of the most recent data, analysis was performed on the first four months (July-October) of each academic year. The data was analyzed using descriptive statistics, including standard deviation and t-tests.

Results: A total of 63 residents were included in this analysis of the first four months of each training year from 2017-2021. Prior to COVID-19, PGY1 residents evaluated 0.75 ± 0.23 patients per hour and PGY2 residents evaluated 1.46 ± 0.11 patients per hour ($p < 0.001$). Compared with the pre-COVID control group, PGY1 residents evaluated 0.64 ± 0.22 patients per hour in 2020 ($p = 0.15$) and 0.82 ± 0.21 patients per hour in 2021 ($p = 0.34$); PGY2 residents evaluated 1.44 ± 0.17 patients per hour ($p = 0.65$) in 2020 and 1.75 ± 0.17 patients per hour in 2021 ($p < 0.001$).

Conclusion: This analysis suggests that EM resident productivity at the medical center did not decrease significantly compared to prior years during the COVID-19 pandemic. While there was a trend towards fewer patients per hour in 2020, this did not reach statistical significance. These results may have applications to medical education and ED operations. The study is limited by single center, retrospective, and observational design.

23 Point-of-Care Ultrasound Interpretation of Cardiac Standstill in Children

Angela Chen; *Kevin Hu*

Objectives: This study seeks to determine the level of inter-observer agreement among Pediatric Emergency Medicine (PEM) physicians when interpreting POCUS for cardiac standstill in pediatric patients during cardiac arrest as well as highlight factors that may contribute to lack of agreement.

Background: Use of point-of-care ultrasound (POCUS) to diagnose cardiac standstill and guide continuation of cardiac resuscitation has gained widespread use in adult patients and is becoming more prevalent in pediatric patients. Previous studies have demonstrated moderate inter-observer agreement among physicians using POCUS to diagnose cardiac standstill during cardiac arrests in adult patients. There is limited data regarding POCUS interpretation of

cardiac standstill among pediatric patients during cardiac resuscitations.

Methods: A single, nation-wide, cross-sectional, convenience sample survey was administered to PEM attendings and fellows between Feb - Jun of 2021. PEM attendings with = 25 cardiac ultrasound scans were considered “proficient” based on POCUS competency set by the American College of Emergency Physicians. The survey contained 11 unique 6-second video clips of cardiac POCUS performed during pulseless arrests in pediatric patients and asked the respondents to determine which clips represented cardiac standstill. A description of each clip is found in Table 1. The level of inter-observer agreement was determined using Krippendorff’s alpha (K alpha) coefficient for PEM attendings with = 25 scans, PEM attendings with 1-24 scans, PEM attendings with 0 scans, PEM fellows with = 25 scans, and PEM fellows with 1-24 scans. K alpha = 0.800 is determined as good agreement and a K alpha = 0.667 is considered an unacceptable level of agreement.

Results: 263 PEM physicians completed the survey. Respondent demographics are found in Table 2. Agreement among subgroups is found in Table 3. PEM attendings with = 25 scans had moderate agreement (K alpha = 0.740). PEM fellows with = 25 scans had good agreement (K alpha = 0.811). PEM attendings with no prior ultrasound experience had lack of acceptable agreement (K alpha = 0.630). Highest divergence in responses included clips displaying minimal wall or valve motion as well as swirling blood in an otherwise static heart.

Conclusion: There is moderate inter-observer agreement interpreting pediatric cardiac standstill on POCUS during cardiac resuscitations among PEM attendings who are considered proficient. Minimal cardiac structural movements during POCUS may influence interpretation. Cardiac POCUS may be a useful tool to guide resuscitation efforts in pediatric patients.

Clip #	View	Wall Motion	Valve Motion	Swirling Blood	Additional Comments
1	Subxiphoid	None	None	Blood swirling in right ventricle	N/A
2	Parasternal long axis	Minimal ventricle wall contractions	Mitral valve opening	No	N/A
3	Parasternal long axis	Minimal ventricle wall contractions	Diminished mitral valve opening	No	N/A
4	Subxiphoid	None	None	Blood swirling in ventricles	N/A
5	Parasternal long axis	None	None	No	N/A
6	Parasternal long axis	None	None	No	The operator appears to slide the probe towards the end of the clip
7	Parasternal long axis	None	None	No	N/A
8	Parasternal long axis	Atrial and ventricular wall contractions	Mitral valve motion seen	No	Large pericardial effusion present
9	Subxiphoid	Minimal ventricular wall motion	Minimal tricuspid and mitral valve opening	Blood swirling in right atrium	N/A
10	Parasternal long axis	None	None	Blood swirling in left atrium, left ventricle, and right ventricle	There is an isolated twitch of the musculature towards the aortic outflow tract towards the end of the clip.
11	Subxiphoid	Minimal right and left ventricle wall contractions	Not well visualized	No	Significantly dilated atria

Table 1.

Respondents	Total (n)	Prior experience with POCUS in pulseless arrest (n)
PEM Attendings	205	130
0 scans	17	0
1-24 scans	78	38
≥25 scans	110	92
PEM Fellows	58	28
0 scans	0	0
1-24 scans	32	18
≥25 scans	26	12
Total Respondents	263	160

PEM = Pediatric Emergency Medicine
POCUS = Point-of-care Ultrasound

Table 2.

Respondents	Krippendorff's Alpha Coefficient	Level of agreement
PEM Attendings		
0 scans	0.630	Unacceptable
1-24 scans	0.728	Moderate
≥25 scans	0.740	Moderate
PEM Fellows		
1-24 scans	0.757	Moderate
≥25 scans	0.811	Good
All Respondents		
	0.735	Moderate

Table 3.

24 Utilization and Cost Savings of an Emergency Department Acetaminophen Route Pathway

David Arastehmanesh; *David T. Chiu*; Nadia Eshraghi

Objectives: To evaluate the cost savings of an acetaminophen route pathway in patients presenting to the emergency department.

Background: The use of intravenous acetaminophen (IVA) has been increasing since it was approved by the Food and Drug Administration in 2010. However, the cost of IVA is orders of magnitude more than the oral version

with significant cost variation based on hospital formulary. Despite the cost difference, multiple studies have shown that the IV version is not more effective than enteral forms. By implementing an Acetaminophen Route Pathway (ARP), we hypothesize a reduction in unnecessary use of IVA and significant cost savings.

Methods: A prospective, before-after controlled study was conducted. ED ARP was designed by expert/consensus opinion and rolled out with a discussion at faculty and resident staff meetings followed by reminder emails. The electronic medical record logged every instance of IVA administration 12 months before and after implementation of an ED ARP (with a 90 day washout period) along with total ED volumes. The absolute number of doses as well as per patient utilization of IVA were calculated. Fisher's exact test was used to assess for significance.

Results: During the pre ARP phase (03/01/18-02/28/19), a total of 54,533 presented to the ED with 2,703 doses of IVA given (4.96%). In the post ARP phase (06/01/19-05/31/20), a total of 48,278 presented to the ED with 582 doses of IVA given (1.21%). At \$689.29 per dose, this corresponds to a cost of \$1,863,151 (\$34.16 per ED patient registered) in the before group compared with \$401,166.80 (\$8.31 per ED patient registered) in the after group. This corresponds to more than \$1.2 million dollar in savings, when adjusted for the lower volume post ARP. Fisher's exact test was significant at $p < 0.001$, indicating that the decrease in IVA use and cost were significant.

Conclusion: A straight forward set of guidelines regarding when IVA should be used versus enteral versions was able to drastically reduce unnecessary pharmaceutical cost in the ED. While the magnitude of cost savings will vary based on the hospital, this is a simple implementation that will increase value without loss of effectiveness.