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Supplement to

Western Journal of Emergency Medicine:

Integrating Emergency Care with Population Health

MEMC 2022

Jointly Organized by the American Academy of Emergency Medicine (AAEM), and the Mediterranean Academy of Emergency Medicine (MAEM)

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AMERICAN COLLEGE OF EMERGENCY PHYSICIANS

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The American College of Osteopathic Emergency Physicians

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CALIFORNIA CHAPTER DIVISION OF THE AMERICAN ACADEMY OF EMERGENCY MEDICINE

A Peer-Reviewed, International Professional Journal

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ACOEP stands with all emergency physicians and providers on the front line. We thank you for your tireless work and effort.

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Western Journal of *Emergency Medicine*:

Integrating Emergency Care with Population Health

Indexed in **MEDLINE, PubMed, and Clarivate Web of Science, Science Citation Index Expanded**

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MEMC 2022 - Jointly Organized by the American Academy of Emergency Medicine (AAEM) and the Mediterranean Academy of Emergency Medicine (MAEM)

XIth Mediterranean Emergency Medicine Congress, Malta 21-24 September, 2022

The XIth Mediterranean Emergency Medicine Congress (MEMC), jointly organized by the American Academy of Emergency Medicine (AAEM) and the Mediterranean Academy of Emergency Medicine (MAEM) will be held in Malta 21-24 September, 2022.

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. MEMC22 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 cover 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 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 will deliver 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 MEMC22 in Malta and invite you to explore all that this historic city and its surrounding areas have to offer. 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
University of California, Irvine
Editor-in-Chief, *Western Journal of Emergency Medicine*

The *Western Journal of Emergency Medicine: Integrating Emergency Care with Population Health* would like to thank the Mediterranean Academy of Emergency Medicine and the Academic Research and Educational Organization for helping to make this collaborative special issue possible.

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UC Irvine Health
School of Medicine

Department of Emergency Medicine

Position: Ultrasound Director

The Department of Emergency Medicine at the University of California, Irvine School of Medicine is seeking applicants for a faculty position in the Health Sciences Clinical Professor Series, at the Assistant, Associate, or Full Professor rank.

The University of California, Irvine Medical Center is a 472-bed tertiary care hospital with all residencies. The ED is a progressive 35-bed Level I Trauma Center with 50,000 patients, in urban Orange County. The ED has collegial relationships with all services and offers excellent salary and benefits with an incentive plan.

Criteria for the Health Sciences Clinical Professor Series:
The incumbent will be expected to teach residents and medical students; provide direct patient care; perform research and/or creative work; and public and University service. Candidates must have demonstrated capabilities for teaching and research or creative work suitable for this series.

Candidates must possess an M.D. or D.O. degree, board certification in Emergency Medicine, and be eligible for a California Medical License. Fellowship sub-specialization in Ultrasound is also required.

The successful candidate will be expected to engage in the following:

- Maintain function and peak performance of all 6 ultrasound trollies, 4 boom-mounted machines, and 8 handheld units
- Review all EM resident scans for competency and graduation requirements
- Optimize documentation templates
- Maintain Clinical Ultrasound Accreditation Program through ACEP
- Monitor credentialing progress for each new faculty and nurse practitioner
- Administer annual “bootcamp” for all new EM faculty, residents, and fellows
- Provide Chair with quarterly faculty ultrasound metrics
- Work with hospital IT to troubleshoot workflow and middleware issues
- Establish and maintain an active transesophageal echo program
- Oversee ultrasound quality assurance

Academic rank, step, and salary will be based upon the candidate’s training, qualifications, and experience.

Application Instructions - To be considered for the position, interested candidates should visit: https://recruit.ap.uci.edu/JPF07727, complete an online application profile and upload application materials electronically.

1 Implementation of Vertical Split Flow Model for Patient Throughput at a Community Hospital Emergency Department

Adrian A. Cotarelo; *Alex Hsieh*; Alexander W. Arena, MD; Anthony Oraha; Mary E. McLean; Norman Mok; Raffaele Milizia

Objectives: The objective of this study was to evaluate the impact of vertical split flow (VSF) implementation on emergency department (ED) patient length of stay (LOS) and throughput at a community hospital.

Background: Hospitals have implemented innovative strategies to address overcrowding by optimizing patient flow through the ED. Vertical split flow (VSF) refers to the concept of assigning patients to vertical chairs instead of horizontal beds based on patient acuity.

Methods: This was a retrospective cohort study of all emergency severity index (ESI) level 3 patients presenting to a community hospital ED over a three month period before and after VSF implementation between 2018 and 2019. A vertical area with 10 chairs was separated from the existing ED space and staffed by reassigned advanced practice providers. On arrival, ESI level 3 patients were assigned to the vertical area if they could maintain sitting position during treatment, did not require cardiac monitoring or airborne precautions, and presented no detectable risk of harm to self or others. Unpaired t-tests compared time intervals between cohorts with the primary outcome being ED LOS, as defined by the electronic medical record timestamps for patient arrival to disposition. Secondary outcomes examined throughput using time from patient arrival to bed placement and provider assignment.

Results: In total, 5,262 patient visits in the pre-intervention and 5,376 in the post-intervention group were included in the analysis. There were no significant demographic differences between the two groups. There was a significant reduction in mean overall LOS in minutes between the pre-intervention group (M=283, SD=1.9) and post-intervention group (M=251, SD=1.8), $t(10545)=12$, $p<0.001$. There was also a significant reduction in arrival-to-bed (M=9.2, 95%CI 7-11, $t(9268)=9.8$, $p<0.001$)) and provider assignment to disposition time (M=31.9, 95%CI 26-36, $t(10355)=12$, $p<0.001$)) in minutes with VSF implementation. There was no significant difference in time from arrival to provider assignment (M=0.64, 95%CI -1.2 to 2.4, $t(10237)=-0.64$, $p=0.525$), despite a small increase in bed to provider time.

Conclusion: Community hospital ED implementation of VSF for ESI level 3 patients was associated with significant reduction in overall length of stay and improved throughput. This model provides a solution to increase the number of beds in the ED and improve throughput for urgent acuity patients.

2 Efforts to Diversify Faculty Within Emergency Departments: A National Survey of Department Heads

Alexis Jones; Darian Harris; Evrim Oral; Jessica Fox; Lisa A. Moreno; Stacey Rhodes

Objectives:

1. To determine how diverse are emergency departmental faculty nationally
2. To determine what modalities emergency medicine department faculty are utilizing to achieve diversity within their departments
3. To determine how effective those modalities have been in achieving diversity in emergency medicine departments

Background: There has been a growing amount of evidence that clinician bias, racism, inequality, stereotyping, and discrimination has indeed contributed to health inequities. These variables have been proven to have negative effects on patient care and health outcomes. Countless studies have shown that diversifying the physician workforce can produce better patient outcomes and decrease the number of health disparities. Patients are more likely to communicate a higher level of care satisfaction when treated by health professionals who share the same racial, ethnic, or cultural background as them. Although many health centers, hospitals, and divisions are determined to promote diversity among their faculty and staff, minority representation has made very little progress. This study aims to determine how diverse are Emergency Medicine departments nationwide, how is diversity being promoted, and how effective are those methods.

Methods: This is a national convenience sampling of 263 Emergency Medicine department heads including medical directors, section chiefs, and department chairs. A REDCap based questionnaire was developed and distributed to the listserv. Participation was tracked and weekly follow-up reminders were sent to participants. Interim analysis was conducted on participants. All statistical analyses were carried out in SAS 9.4. Fisher's exact tests were used to assess the associations between variables.

Results: For the interim analysis, we look at the first 24 responses which consisted of 17 males (70.8%) and 7 (29.2%) females with aligning gender identity. Participants were white (91.7%), black (8.3%), and Hispanic/Latino (4.2%). Looking at suburban vs urban programs where 3 to 5, 6 to 10, and > 10 physicians of color were hired, suburban (0, 0, 0) vs urban (4, 3, 3) respectively; ($p= 0.0483$).

Conclusion: Upon assessing the first 24 respondents for this interim analysis, we can conclude that 66.7% of the participants classify as white males. While 66% of the leaders who were non-white hired 6 to 10 physicians of color, only 5% of white leaders hired 6 to 10 physicians of color. When

asked how successful their efforts were to diversify their staff, 3 respondents reported that their efforts were very successful and 20 reported either partially or not very successful. There was an association between the type of location (suburban vs urban) and the number of physicians of color hired when looking at programs that hired 3 or more physicians of color.

3 Emergency Nurses' Perceptions of Opioid Use Disorder and Its Treatment in the Emergency Department

Christiana K. Prucnal; Dawn Williamson; Elizabeth A. Samuels; Kristina Monteiro; Margaret Samuels-Kalow

Objectives: To describe the knowledge and attitudes of emergency nurses regarding caring for patients with opioid use disorder in the emergency department.

Background: Many eligible patients with opioid use disorder do not receive available emergency department services for treatment and harm mitigation. While prior study examined contributing provider factors, little is known of nursing factors. This study describes knowledge and attitudes of emergency nurses regarding patients with opioid use disorder and their evidence-based treatment services in the emergency department setting.

Methods: Anonymous email surveys with novel and previously validated questions based on The Theory of Planned Behavior Framework were distributed to emergency department nurses at a large, urban tertiary-care hospital. Chi-Square and independent samples t-tests were used in analyses.

Results: More than one third of nurses completed the questionnaire (39%, 85/218). Most showed willingness and confidence screening for substance use disorder (95% and 88% respectively). Higher confidence providing buprenorphine and take-home naloxone was significantly associated with having worked fewer years (8.33 v. 15.62 , p=0.01 and 7.38 v. 12.03, p=0.03 respectively). Confidence administering buprenorphine was significantly associated with receiving in-service training (p=0.03). Staff with knowledge of take-home naloxone, positive attitudes toward syringe service programs, and a belief in a biopsychosocial basis of addiction were significantly younger and had worked significantly fewer years than those not indicating these beliefs. Specific educational gaps were identified.

Conclusion: Emergency nurses display willingness to champion evidence-based care for patients with opioid use disorder. Younger age and having worked fewer years were significantly associated with positive attitudes towards recovery science, harm mitigation, and services knowledge. Having worked fewer years was significantly associated with greater confidence performing treatment and harm mitigation. In-service training was significantly associated with greater confidence administering buprenorphine. Further study should support generalizability and determine which staff development measures generate improved outcomes.

4 Effect of the COVID-19 Pandemic on ED Adult Psychiatric Visits

Barnet Eskin; *Crystal Bauman*; John R. Allegra

Objectives: Our goal was to determine whether the proportion of ED visits for specific psychiatric conditions, namely anxiety disorders, depression, self-harm/suicidal thoughts, bipolar disorder, and psychotic disorders, changed after the arrival of COVID-19.

Background: In March 2020, the COVID-19 pandemic reached the New York tri-state area, which, at the time, was one of the regions in the United States (US) that the virus most severely affected. ED visits dramatically declined, likely due to social isolation mandates and fear of exposure to the virus. Quarantining at home, fear of becoming sick, and job disruptions caused the level of stress in the population to increase. In a previous US study, the proportion of ED visits for some psychiatric conditions increased.

Methods: Design: Retrospective cohort. Setting: EDs of 28 hospitals within 150 miles of New York City. Hospitals were teaching and non-teaching in rural, suburban and urban areas. Total annual ED volumes were 12,000 to 122,000. Population: Consecutive ED patients = 21 years old from March 1 to November 30 in 2019 and 2020. Data analysis: We tallied the number of patients in 2019 and 2020 with anxiety disorders, depression, self-harm/suicidal thoughts, bipolar disorder, and psychotic disorders, identified using International Classification of Disease codes (version 10). We calculated the proportion of these visits to total ED visits in 2019 and 2020. We report the changes in these proportions from 2019 to 2020, along with 95% CIs.

Results: Total ED visits decreased 27%, from 844,017 in 2019 to 618,195 in 2020. In 2019 and 2020 combined, the number of patients were: 13,151 with anxiety disorders, 6884 with depression, 8886 with suicidal ideation/self-harm, 3252 with bipolar disorder, and 7129 with psychotic disorders. The changes [with 95% CIs] in the proportion of visits from 2019 to 2020 were: anxiety disorders -1% [-4,+3%], depression -5% [-10,-1%], self-harm/suicidal thoughts +23% [+18,+29%], bipolar disorder +14% [+6, +22%], and psychotic disorders +23% [+18,+29%].

Conclusion: The proportion of adult ED visits for self-harm/suicidal thoughts, bipolar disorder, and psychotic disorders increased following the arrival of COVID-19, whereas the proportions for anxiety and depression changed minimally. These results are somewhat different from the findings in the previously reported study. Our study highlights the need for continued surveillance of the impact of

COVID-19 on mental health.

5 Utilization of Telehealth Solutions for Patients with Opioid Use Disorder Using Buprenorphine: A Scoping Review

Aileen Guillen; Bharath Chakravarthy; Minal Reddy; Soheil Saadat

Objectives: A scoping review was conducted to examine the breadth of evidence related to telehealth innovations being utilized in the treatment of Opioid Use Disorder (OUD) with buprenorphine and its effect on patient outcomes and healthcare delivery.

Background: With the opioid epidemic worsening from year to year, there is a critical need to connect with this growing population and get them access to life-saving interventions. Buprenorphine is shown to be associated with lower overdose rates and a decrease in opioid-related acute care, but has historically been underutilized in treatment for OUD. Previous studies have determined that geographical barriers and lack of access to DEA-waivered providers are common obstacles towards starting MAT. Telehealth presents itself as a solution to this discrepancy and is becoming more feasible to integrate into clinical practice.

Methods: The authors systematically searched seven databases and websites for peer-reviewed and gray literature related to telehealth solutions for buprenorphine treatment published between 2008 and March 18, 2021. There were 69 articles which met inclusion criteria.

Results: According to the reviewed literature, incorporation of telehealth technology with Medication Assisted Treatment (MAT) for OUD is associated with higher patient satisfaction, comparable rates of retention, and an overall reduction in health care costs.

Conclusion: Utilization of synchronous videoconferencing has reportedly been effective in increasing access to and usage of buprenorphine by overcoming both geographical and logistical barriers. This has been made possible through the expansion of telehealth technologies and a substantial push towards relaxed federal guidelines, both of which were quickly escalated in response to the COVID-19 pandemic. Future research is needed to fully quantify the effect of these factors; however, the results appear promising thus far and should urge policymakers to consider making these temporary policy changes permanent.

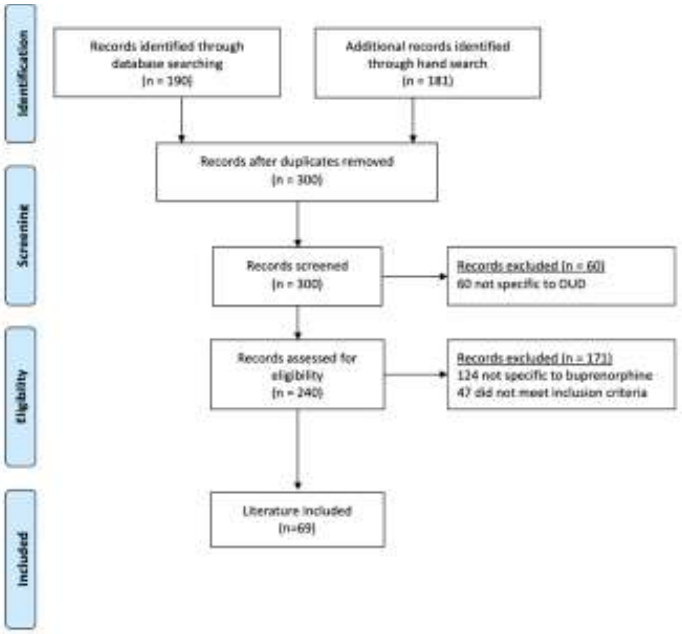


Figure 1. Prisma Flow Diagram.

6 Variation in Trauma Team Response Fees in United States Trauma Centers

Arianna Neeki; David Wong; Fanglong Dong; Jan Serrano; Louis P. Tran; Mason Chan; Michael M. Neeki; *Pamela R. A. Lux*

Objectives: Investigate the variation of the trauma team response fee (TTRF) among all levels of Trauma Centers (TC) Level I-IV, in different geographic regions in the U.S. (Midwest, West, South, Northeast U.S.).

Background: Investigate Hospital Medical Directors (HMD) and Trauma Medical Directors (TMD) knowledge of TTRF dollar amount in their institution.

Methods: Setting 525 American College of Surgeons verified trauma centers (TC) in the U.S. Level I-IV TCs. TC's in the continental U.S including Alaska and Hawaii. Data Collection Cross-sectional convenience sample. Online survey development cloud-based software, Survey Monkey. Responses from October 8, 2019 through March 11, 2020.

Results: True costs of TTRF's in the U.S remains elusive due to inadequate data. TTRF's were higher in level II TC's in the West compared to Level I's. No statistically significant difference in TTRF's despite geographical and cost of living differences. 41.3% of HMD are aware of dollar amount of TTRF's. 56.5% of TMD are aware of dollar amount of TTRF's.

Conclusion: Transparency in trauma costs is not common practice.Trauma Centers attempts to balance responsible financial billing and maintaining viability is an ongoing concern as trauma costs rise.Limited options are available to offset growing costs.Regulatory and public awareness of these increasing TTRF's has resulted in a push for transparency Federal and state financial support is needed to aid TC's to offset growing trauma care costs.Vigilant efforts are needed in patient advocacy to ensure all patients receive quality trauma care with justified associated charges.

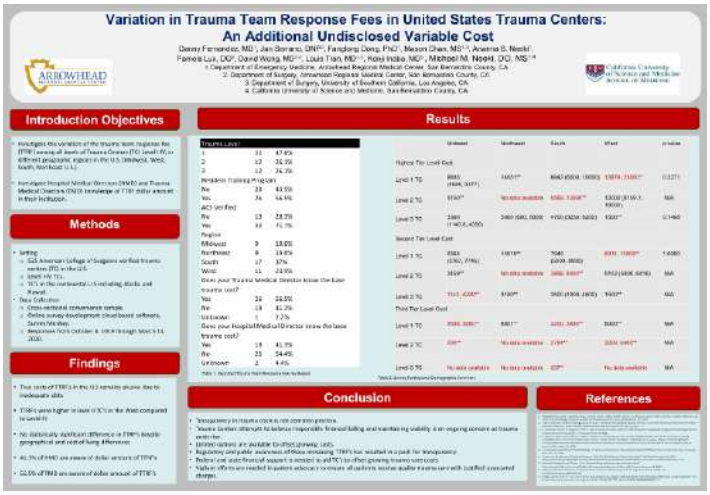


Figure 1. Variation in trauma yeam response fees in United States trauma centers: an additional undisclosed variable cost.

7 Analysis of Time-to-Disposition Intervals During Early and Late Parts of a Shift

Anne Grossestreuer; *Bryan Stenson*; David T. Chiu; Joshua W. Joseph,; Lakshman Balaji; Leon D. Sanchez; Peter S. Antkowiak

Objectives: To assess whether time-to-disposition is significantly different when a patient is seen by a provider during the early half or late half of a shift.

Background: Time-to-disposition is an important metric for emergency department throughput. We hypothesized that providers view the shift end as a key timepoint and attempt to leave as few dispositions as possible to the oncoming team, thereby making quicker decisions later in the shift. This study evaluates disposition distribution relative to when patients are assigned a provider during the course of a shift.

Methods: 50,802 cases were analyzed over the one-year study interval. 31,869 patients were seen in the early half of a shift (hours 1-4) and 18,933 were seen in the later half (hours 5+). We ran a linear mixed model that adjusted for age, gender, emergency severity index score, time of day, weekend arrivals, quarter of arrival and shift type.

Results: Median time-to-disposition for the early group was 3.25 hours (IQR 1.90-5.04), and 2.62 hours (IQR 1.51-4.31) for the late group. From our mixed model, we conclude that in the later parts of the shift, providers take on average 15.1% less time to make a disposition decision than in the earlier parts of the shift.

Conclusion: Patients seen during the latter half of a shift were more likely to have a shorter time-to-disposition than similar patients seen in the first half of a shift. This may be influenced by many factors, such as providers spending the early hours of a shift seeing new patients which generate new tasks and delay dispositions, and viewing the end of shift as a landmark with a goal to maximize dispositions prior to sign-out.

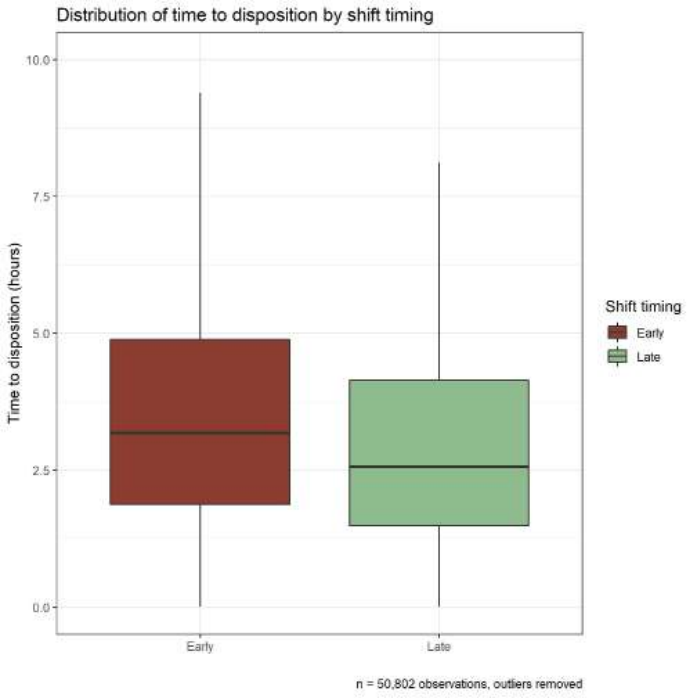


Figure 1. Distribution of time to disposition by shift timing.

Table 1. Descriptive Characteristics of the Data

Characteristic	Overall (n = 58, 802)	Early (n = 31, 869)	Late (n = 18, 933)	p-value
Age, years (median, IQR)	55.00 (35.00, 70.00)	55.00 (36.00, 70.00)	54.00 (33.00, 69.00)	<0.001
Male (n, %)	23,479 (49.2)	14,635 (45.9)	8,844 (46.7)	0.086
ESI (n %)				<0.001
1	2,823 (5.8)	1,550 (4.9)	1,273 (6.7)	
2	17,683 (34.8)	10,989 (34.5)	6,694 (35.4)	
3	26,951 (53.1)	17,264 (54.2)	9,687 (51.2)	
4	3,250 (6.4)	2,011 (6.3)	1,239 (6.5)	
5	95 (0.2)	55 (0.2)	40 (0.2)	
Time to disposition, hours (median, IQR)	2.99 (1.75, 4.81)	3.25 (1.98, 5.04)	2.62 (1.51, 4.31)	<0.001
Log of time to disposition (median, IQR)	1.10 (0.56, 1.57)	1.18 (0.64, 1.62)	0.96 (0.41, 1.46)	<0.001
Arrival (n, %)				<0.001
Daytime arrival	19,271 (37.9)	14,831 (46.5)	4,440 (23.5)	
Evening arrival	22,788 (44.9)	12,381 (38.8)	10,405 (55.0)	
Overnight arrival	8,745 (17.2)	4,657 (14.6)	4,088 (21.6)	
Weekend (n, %)	13,729 (27.0)	8,569 (26.9)	5,160 (27.3)	0.375
Quarter (n, %)				0.03
Q1	13,145 (25.9)	8,205 (25.7)	4,940 (26.1)	
Q2	12,574 (24.8)	7,796 (24.5)	4,778 (25.2)	
Q3	12,194 (24.0)	7,717 (24.2)	4,477 (23.6)	
Q4	12,889 (25.4)	8,151 (25.6)	4,738 (25.0)	
Type of Shift (n, %)				<0.001
Afternoon Shift A	10,942 (21.5)	6,218 (19.5)	4,724 (25.0)	
Afternoon Shift B	4,248 (8.4)	2,848 (8.9)	1,398 (7.4)	
Early Morning Shift	7,398 (14.6)	4,582 (14.4)	2,816 (14.9)	
Evening Shift	9,011 (17.7)	5,367 (16.9)	3,644 (19.1)	
Night Shift	10,824 (21.3)	6,842 (21.6)	3,982 (20.5)	
Regular Shift	8,381 (16.5)	5,882 (18.5)	2,499 (13.2)	

Table 1. Descriptive characteristics of the data.

Table 3. Adjusted Linear Mixed Model Coefficients

Adjusted: log(time to disposition) ~ Late_shift + age + gender + esicode + arrival + weekend + quarter + type_shift, clustered by attending ID

	Coefficient (exponentiated)	CI (exponentiated)	p-value
(Intercept)	1.068	1.063—1.066	<0.01
Late shift (hours 5+)	0.849	0.835—0.862	<0.01
Age	1.000	1.000—1.001	0.86
Gender: Male	0.911	0.898—0.924	<0.01
ESI level (reference level ESI1)			
ESI2	1.713	1.651—1.775	<0.01
ESI3	3.846	3.791—3.910	<0.01
ESI4	0.984	0.943—1.026	0.44
ESI5	0.710	0.600—0.820	<0.01
Arrival (reference level Daytime)			
Evening	0.955	0.938—0.955	<0.01
Overnight	0.944	0.932—0.977	<0.01
Weekend	0.997	0.978—1.015	0.73
Quarter (reference level Q1)			
Q2	0.971	0.952—0.991	<0.01
Q3	0.982	0.962—1.002	0.08
Q4	0.942	0.923—0.961	<0.01
Type of Shift (reference level Afternoon Shift A)			
Afternoon Shift B	0.870	0.844—0.897	<0.01
Early Morning Shift	1.055	1.035—1.069	<0.01
Evening Shift	0.890	0.867—0.912	<0.01
Night Shift	0.918	0.898—0.937	<0.01
Regular Shift	0.956	0.928—0.982	<0.01

Table 3. Adjusted linear mixed model coefficients.

8 Slack Intern Curriculum Supports Intern Preparedness and Bridges Curriculum Gaps due to COVID-19

Slack Intern Curriculum; Alisa Hayes; Daniel Axelson; Frosso Adamakos; Herman Lee; *Jonathan Chan*; Michaela Salvo; Moira Davenport; Tazeen Abbas; Thaddeus Schmitt

Objectives: Assess the effectiveness of social media implementation of an Accreditation Council for Graduate Medical Education (ACGME) milestone-based curriculum during the spring 2020 U.S. COVID-19 surge. The hypothesis is that pre-interns will report improvements in PP regarding multiple ACGME milestone topics.

Background: Transitioning to residency involves translation of academic knowledge into clinical acumen, and is complicated by variable medical school experiences. The COVID-19 pandemic presented a new challenge by displacing students from clinical rotations. Virtual educational modalities such as the Slack Intern Curriculum (SIC) have increased newly-matched "pre-intern" perceived preparedness (PP) for residency in prior years, but the SIC had never been implemented or evaluated in a pandemic with disrupted medical education.

Methods: The SIC was constructed using topics from 8 ACGME milestones in emergency medicine (EM), incorporated into 8 clinical scenarios. Residency recruitment occurred via national EM listservs; of 276 programs, 27 enrolled. Curricular implementation was on Slack workspaces. Cases included stimulus images and clinical questions. Ample discussion time, answers, and resources were provided. Trends in PP were calculated with descriptive statistics and the Wilcoxon Rank Sum test.

Results: Of 311 total pre-interns contacted, 289 (92.9%) completed a presurvey in April/May 2020, and 240 (77.2%) completed a post-survey in June/July 2020, for an 83.9% follow-through rate. Pre-interns reported statistically significant increases in PP both overall and regarding 14 of 21 milestones. See Table 1.

Conclusion: Amidst the educational disruption of the COVID-19 pandemic, pre-interns participating in the SIC reported statistically significant increases in PP. Limitations include absence of control or pre-pandemic data. Future directions include adapting the SIC to other specialties' ACGME milestones for generalizability across all fields.

Table 1: Wilcoxon Rank Sum Test summary data on perceived preparedness of United States emergency medicine-bound pre-interns. Pre-curriculum surveys were completed in April/May of 2020, and post-curriculum surveys were completed in June/July of 2020.

Milestone	Level	Pre-Survey		Post-Survey		Comparison	
		Med	Mean (SD)	Med	Mean (SD)	95% CI*	P value†
Emergency Stabilization	Recognizing Abnormal Vitals	4	4.343 (0.695)	4	4.271 (0.746)	(-0.1948, 0.0514)	.28
	Recognizing an Unstable Patient	4	3.948 (0.787)	4	4.071 (0.659)	(-0.00007, 0.24621)	.15
Diagnosis	**Forming a Diagnostic Plan**	4	**3.516 (0.838)**	4	**3.679 (0.738)**	**(0.0289, 0.2983)**	**.03**
	Forming a Differential Diagnosis	4	3.574 (0.851)	4	3.708 (0.807)	(-0.00003, 0.27593)	.07
Diagnostic Studies	Identifying Need for Diagnostic Tests	4	3.433 (0.797)	4	3.562 (0.757)	(-0.00141, 0.26303)	.07
	Identifying the Appropriate Tests	4	3.412 (0.799)	4	3.525 (0.781)	(-0.0222, 0.2487)	.09
	Interpreting Test Results	4	3.563 (0.915)	4	3.605 (0.832)	(-0.0919, 0.2568)	.52
Pharmacotherapy	Recognizing Pharmacology of Medications	3	3.059 (1.007)	3	3.142 (0.917)	(-0.0017, 0.24741)	.05
	Selecting Appropriate Medications	3	**2.865 (0.935)**	3	**3.108 (0.914)**	**(0.0058, 0.4008)**	**.002**
Disposition	**Recognizing need for Additional Resources**	3	**3.215 (0.966)**	4	**3.408 (0.919)**	**(0.0324, 0.3552)**	**.01**
	Recognizing need for Admission to Hospital	3	**3.118 (0.870)**	4	**3.425 (0.845)**	**(0.1598, 0.4539)**	**<.001**
	Recognizing Appropriate Level of Care for Admission	3	2.897 (0.892)	3	3.267 (0.944)	(0.2783, 0.5875)	<.001
General Approach to Procedures	Recognizing Relevant Anatomy for a Procedure	3	2.983 (1.029)	3	3.179 (0.979)	(0.0245, 0.3684)	.02
	Identifying Indications/Contraindications for Procedures	3	**2.879 (0.970)**	3	**3.167 (0.967)**	**(0.1247, 0.4539)**	**<.001**
	Identifying Appropriate Equipment for Procedures	3	2.668 (0.979)	3	3.062 (0.960)	(0.2285, 0.5608)	<.001
Airway Management	Identifying Pharmacology of RSI Medications	3	2.664 (0.997)	3	3.150 (1.003)	(0.3340, 0.6573)	<.001
	Confirming Endotracheal Tube Placement	4	3.502 (1.004)	4	3.867 (0.828)	(0.2085, 0.5214)	<.001
	Recognizing Upper Airway Anatomy	3	**3.076 (1.008)**	3	**3.283 (0.999)**	**(0.0303, 0.3841)**	**.03**
Other Diagnostic and Therapeutic Procedures	Recognizing Indications for Ultrasound	4	3.519 (0.902)	4	3.804 (0.807)	(0.1391, 0.4312)	<.001
	Optimizing US Images	3	2.661 (1.165)	3	2.950 (1.108)	(0.0945, 0.4837)	.003
	Interpreting US Images	3	2.799 (1.087)	3	3.154 (1.001)	(0.1763, 0.5334)	<.001
	Overall Perceived Preparedness for Residency	3	3.107 (0.861)	3	3.350 (0.855)	(0.0974, 0.3881)	<.001

Abbreviations: Med, median; SD, standard deviation; CI, confidence interval; RSI, rapid sequence intubation; US, ultrasound.
*Confidence interval values reflect shift in location (mean) around changes in the mean.
†Bold type indicates statistical significance.

Table 1. Wilcoxon Rank Sum Test summary data on perceived preparedness of United States emergency medicine-bound pre-interns. Pre-curriculum surveys were completed in April/May of 2020, and post-curriculum surveys were completed in June/July 2020.

9 Serious Medical Outcomes due to Single Substance Opioid Exposures

Aaron Frey; Christopher P. Holsteg; Kawai Tanabe; Moira Smith; Saumitra Rege; *Will Goodrich*

Objectives: The present study sought to evaluate the recent trends in the severe outcomes to single substance opioid exposures (SSO) reported to the U.S. poison centers (PCs).

Background: Misuse of prescription opioids continues to be a significant public health crisis globally. According to the Centers for Disease Control and Prevention (CDC), there were more than 72,000 overdose deaths in the United States (U.S.), with 49,068 involving an opioid.

Methods: The NPDS was queried for single substance opioid exposures that were reported to the U.S. PCs from 2011 to 2011. Cases with severe outcomes (SO) were defined as exposures that resulted in either a death or major clinical outcomes. We identified and descriptively assessed the relevant demographic and clinical characteristics. Poisson regression models were used to evaluate the trends in the number and rates (per 100,000 human exposures) of single substance opioid exposures resulting in SO. Percent changes from the first year of the study (2011) were reported with the corresponding 95% confidence intervals (95% CI). Logistic regression was utilized to study the risk markers of severe outcomes.

Results: Overall there were 308,202 single substance opioid-related cases reported to the U.S. PCs during the study period. The proportion of cases from ACH increased during the study period (32.9% vs 48.9%). Among cases with severe outcomes, ages between 20 and 29 years (27.9%) constituted the most common age group. Males accounted for 57.4% cases. Most exposures with SO occurred in a residence (83.7%). Hydrocodone (25.6%) was the most common opioid reported in cases followed by oxycodone (18.7%). Intentional abuse (48.4% vs 12.7%) and suspected suicides (24.7% vs 12.9%) were more common in exposures with SO compared to those without SO. Similarly, non-oral routes of administration were more common in exposures with SO (40.9% vs 8.1%). The rate of exposures with SO increased by 71.3% (95% CI: 63.4%, 79.9%, p<0.001). The risk of SO with single substance opioid-related exposures was the highest in cases between 50 and 59 years of age (Ref: 20 – 29 years) (AOR: 1.61, 95% CI: 1.52 – 1.71). Males were 16% more likely than females to have serious outcomes (AOR: 1.16, 95% CI: 1.12 – 1.20). The risk for severe outcomes with single substance opioid exposures was significantly elevated in hydrocodone (AOR: 2.43, 95% CI: 2.30 – 2.58), oxycodone (AOR: 1.64, 95% CI: 1.55 – 1.73) and tramadol (AOR: 1.80, 95% CI: 1.69 – 1.92) exposures. Other Important predictors of a single substance opioid-related SO were suspected suicides (Ref: Unintentional exposure) (AOR: 3.82, 95% CI: 3.67 – 4.09), non-oral routes of administration (Ref: Ingestion) (AOR: 2.94, 95% CI: 2.80 – 3.00) and exposure in the west census region of the U.S. (Ref: Northeast region) (AOR: 1.21, 95% CI: 1.16 – 1.28).

Conclusion: The number of single substance opioid exposures cases handled by the PCs decreased, but those with severe outcomes increased significantly. Hydrocodone and oxycodone were the most common opioid reported for the sample. Personalized evidence-based strategies, population level interventions, creation of protective environments, and better screening of patients are some key measure to limit this trend.

10 Patterns of SSRI Exposures Reported to the U.S. Poison Centers

Avery Michienzi; *Christopher P. Holstege*; Ryan Cole; Saumitra Rege

Objectives: We sought to characterize the SSRIs exposures reported to the U.S. National Poison Data System (NPDS).

Background: More than 20 million antidepressants were prescribed between October and December 2020, a significant increase compared to the same months in the prior year. In 2017, a selective serotonin reuptake inhibitors (SSRIs) was mentioned in 57,254 single-substance toxic exposures reported to United States poison centers (PCs).

Methods: The NPDS was queried for all human exposures to SSRIs reported to the U.S. Poison Centers (PCs) between 2015 and 2020. We descriptively assessed the demographic and clinical characteristics. Calls from acute care hospitals and hospital based EDs (ACH) were studied as a subgroup. Trends in SSRI exposures were analyzed using Poisson regression with percent changes being reported.

Results: There were 346,082 SSRI exposure calls made to the PCs from 2015 to 2020, with the number of calls increasing from 51,791 to 62,504 during the study period. Single substance exposures accounted for 45.5% of such SSRI exposures. Of the total SSRI calls, the proportion of calls from acute care hospitals and EDs decreased from 56.2% to 53.2% from 2015 to 2020. Multiple substance exposures accounted for 65.5% of the overall SSRI calls from acute care hospitals and EDs. Approximately 15% of the patients reporting SSRI exposures were admitted to the critical care unit (CCU), with 18.8% patients admitted to a psychiatric unit. Residence was the most common site of exposure (94.2%), and 63.9% of these cases were enroute to the hospital via EMS when the PC was notified. Among the patients, 66.7% were male, with individuals between ages 13 and 19 years (31%) predominantly reported SSRI exposures. Suspected suicides (58.5%) and therapeutic errors (18.6%) were commonly observed reasons for exposure, with the former accounting for 83% cases reported by ACH. Major effects were seen in 3.7% cases and the case fatality rate for SSRI was 0.3%. Sertraline was the most commonly observed SSRI (23.6%). The most frequently co-occurring substances associated with the cases were atypical antipsychotics (9.3%) and benzodiazepines (8%). Tachycardia (19.7%) and drowsiness/lethargy (15.6%) were commonly observed clinical effects. During the study

period, the frequency of SSRI exposures increased by 19.9% (95% CI: 16.2%, 22.7%; p<0.001), and the rate of SSRI exposures increased by 23.1% (95% CI: 15.2%, 29.2%; p<0.001).

Conclusion: There was a significant increase in the reports of SSRI exposures during the study with sertraline being the most commonly reported SSRI. Suspected suicides was the most common reason for exposure. Greater intervention and awareness initiatives are needed considering the severity of such overdoses.

11 Characterization of Oxycodone Misuse using National Survey Data.

Christopher P. Holstege; Kawai Tanabe; Moira Smith; Saumitra Rege; *Will Goodrich*

Objectives: The objective of the study is to characterize the risk markers of oxycodone misuse using the nationally representative National Survey of Drug Use and Health (NSDUH) data.

Background: Drug overdoses continues to be a public health crisis with 70,630 fatalities in 2019. Approximately two-thirds of these deaths (66%) involved a prescription or illicit opioid. Synthetic opioids accounted for 72.9% of opioid-involved overdose deaths in 2019.

Methods: The 2019 NSDUH public use cross-sectional data were analyzed. The respondents were classified into two groups, past year oxycodone misusers and non-misusers, based on the screening questions assessing past year misuse of oxycodone products. The prevalence of selected demographic, clinical factors and substance use and abuse, including prescription medications, was assessed descriptively for the two population groups using cross tabulated frequencies and chi-square tests. Logistic regression models using a backward selection process were used to identify predictors of oxycodone misuse adjusting for covariates. Adjusted odds ratios (OR) and corresponding 95% Confidence Intervals (CI) were calculated.

Results: Overall, the 2019 NSDUH survey comprised of 56,136 respondents, of which 4,359 respondents (7.7%) reported using oxycodone products over the last year. Furthermore, 770 respondents reported misuse, accounting for 17.6% of the total oxycodone users or 1.4% of the survey sample. The proportion of past year oxycodone misusers was higher in males (54.1% vs 44.6%, p<0.001), unmarried (69.6% vs 44.8%, p<0.001), and Hispanic (16.3% vs 13.4%, p<0.001). Suicide ideation was much more frequent in oxycodone misusers (19.8% vs 10.1%, p<0.001). The prevalence of use and misuse of other substances in the previous year was significantly higher in the oxycodone misusers. Previous year marijuana use (OR: 1.90, 95% CI: 1.41 – 2.57) was a significant predictor of oxycodone misuse while morphine users were 40% less likely to misuse oxycodone (OR: 0.60, 95% CI: 0.37 – 0.98). Similarly, hydrocodone use reduced the risk of oxycodone misuse by 64% (OR: 0.36, 95% CI: 0.26 – 0.50).Self-reports of obtaining the oxycodone from sources other than the doctors increased the risk of oxycodone misuse by 96% (OR: 1.96, 95% CI: 1.38 – 2.81). Hispanics (OR: 1.34, 95% CI: 1.02 – 1.55) had a significantly higher probability to misuse oxycodone. Oxycodone misuse was significantly more likely among misusers of other opioids including morphine (OR: 5.19, 95% CI: 1.62 – 15.12) and buprenorphine (OR: 2.42, 95% CI: 1.12 – 5.25). Previous year benzodiazepines misusers (OR: 2.44, 95% CI: 1.62 – 3.67), stimulant misusers (OR: 2.68, 95% CI: 1.71 – 4.21) increased the risk for oxycodone misuse in the past year. Males (OR: 1.60, 95% CI: 1.19 – 2.14) and individuals receiving medications for mental health treatment reported a higher risk of oxycodone misuse (OR: 1.46, 95% CI: 1.02 – 2.09).

Conclusion: The current study used data from a nationally representative sample and indicated a high prevalence of oxycodone misuse. Our study highlighted risk factors associated with misuse of oxycodone, including gender, use and misuse of other substances including other opioids appear to be important predictors of oxycodone misuse. Tailored interventions and risk-screening measures to optimize oxycodone prescribing might be key in limiting the misuse and diversion of tis pain medication.

12 Incorporating a Resident-Driven Mentorship Program into Emergency Medicine Clerkship Rotations

Arlene S. Chung; Daniel Novak; Eric Lee; Jeanette Kurbedin; Sabena Vaswani

Presenter: *Mahlaqa Butt*

Objectives: We launched an EM resident-driven mentorship program to help medical students excel in their clerkships, develop relationships, and navigate residency applications. We hypothesize that students will rate the mentoring positively and will report that it improved their performance.

Background: Mentorship is important for professional growth and success in medicine. There are few formal mentorship programs for medical students on audition rotations.

Methods: Students were assigned a self-selected EM resident mentor for their four-week clerkship at a single institution. Allopathic and osteopathic students were matched with residents from MD or DO schools, respectively. Mentors were instructed to review: patient presentations, differential diagnoses, clinical decision-

making tools, rotation advice, and the application and match process. Mentors were instructed to meet with their mentees and to check-in weekly. Following the rotation, students were sent an online anonymous survey consisting of 6 multiple choice and 3 free response questions. Simple descriptive statistics and qualitative methods were employed for data analysis. Initial coding was performed independently by two study authors and then reviewed by a third author with experience in qualitative methodology. Suggestions were merged via consensus into a final code set that was used for thematic analysis.

Results: Six audition rotations occurred over the study period. Of the 47 students, 74% (n=35) responded to our survey. 97% (n=34) of participants recommended continuing this program, 91% (n=32) rated this program helpful, and 64% (n=16) stated that this improved their success on the rotation. Preliminary qualitative analysis of students' responses revealed the themes in Figure 1.

Conclusion: Preliminary data suggests that students found having a mentor during their audition rotations was meaningful. We believe students can benefit from a resident-driven mentorship program during their auditions.

Figure 1:

Theme	Student Response
Clerkship Success	*"I met him the first week of the clerkship and he provided me with some useful information on how to tackle the rest of the rotation. He helped me understand what my role should be."*
Application Advice	*"Getting outside feedback from someone who has so recently experienced the same challenges and found their way through those hurdles was just what I needed."*
Enhanced Medical Knowledge	*"They can teach from a supervising role because they went through intern year and learned from their own mistakes."*
Team Camaraderie	*"It can be hard adjusting to a new environment and a friendly face definitely helped."*
Program Insights	*"The "mentor program was very good for general information and also to get a feel for the type of program..."*
Safe Space	*"It was helpful to have support from someone who truly wanted me to succeed and was willing to help me through the challenges I faced."*

Figure 1.

Figure 2:

Survey Question	% Yes	% No
Should we continue this program in the future?	97.1% (34/35)	2.9% (1/35)
Did you ever meet with your mentor?	88.6 (31/35)	11.4 (4/35)
Was this program helpful?	91.4% (32/35)	8.6% (3/35)
Do you feel this program helped improve your clerkship performance?	64% (16/25)	36% (9/25)
Did this program positively influence your perception of our program?	81.5% (22/27)	18.5% (5/27)
Will you try to keep in touch with your mentor?	88.6% (31/35)	11.4% (4/35)

Figure 2.

13 ICU admission Risk Factors of Latinx/ Hispanic COVID-19 patients at a US Mexico Border Hospital

Andrew LaFree; Christian A. Tomaszewski; Christopher Johln Coyne; Faith C. Quenzer

Presenter: *L.E. Gomez*

Objectives: To describe the association of demographics of sex, comorbidities, age with the risk of severe (Coronavirus Disease 2019) COVID-19 requiring intensive care unit level of care, and death in a primarily Latinx/Hispanic U.S.-Mexico border hospital operating at surge capacity.

Background: According to the CDC, the Latinx/ Hispanic population in the U.S. have been particularly affected by severe COVID-19 complications and high mortality rates. Border hospitals and their emergency departments (ED) are particularly vulnerable to widespread communicable respiratory infections and severe COVID-19 complications and poor outcomes such as surges of hospitalizations and death. Multiple factors such as inadequate healthcare infrastructure in border areas, access to preventative healthcare and subsequently higher prevalence of comorbidities that increase the risk for severe COVID-19 in the Latinx/Hispanic patient population overall. At the U.S.-Mexico border region, there is a paucity of research and data regarding how COVID-19 affects this predominantly Latinx/Hispanic community. Our study seeks to identify demographic, and clinical risk factors that make this specific community vulnerable to severe COVID-19 complications such as intensive care unit (ICU) utilization and death.

Methods: This is was a retrospective, observational chart review of 156 hospitalized COVID-19 patients during a surge at a border hospital. Adult patients (> 18 years) diagnosed with SARS-CoV-2 and met admission criteria from April 10, 2020 to May 30, 2020 were included. Excluded were pediatric patients (< 18 years of age), patients who did not consent for treatment, pregnant women, patients who did not meet the above inclusion criteria. Descriptive statistics of sex, age categories of 18-49, 50-64, and > 65 years or older, BMI, presence of at least one comorbidity (coronary artery disease, hypertension, diabetes, cancer/lymphoma, current

use of immunosuppressive drug therapy, chronic kidney disease/dialysis, or chronic respiratory disease), along with complications were done. Multivariate regression models were produced from the most significant variables and factors for ICU admission. The final, reduced regression model, a p-value <0.05 was considered statistically significant and confidence intervals were reported at a level 95%.

Results: Of the 156 hospitalized patients, 63.5% (99) were male, 132 (84.6%) admitted for respiratory failure, average age was 67.2 (+/-12.2). There were 71 (45.5%) patients who required intensive care. Those > 65 years old had a higher frequency of ICU admission. Seventy-nine percent (49) of the ICU patients had a BMI over 25. Most common comorbidities were diabetes, hypertension, and coronary artery disease/hyperlipidemia. The regression model showed that males had a 4.4 (95% CI 1.576, 12.308) odds of ICU admission (p=0.0047). Those who developed acute kidney injury (AKI) and BMI 25-29.9 were strong predictors of ICU admission (p<0.001 and p=0.0020, respectively). No single comorbidity was associated with ICU admission. However, those with at least one comorbidity, there was 1.984 increased odds (95% CI 1.313, 2.998) of an ICU admission. Of those admitted in the ICU, 72% (16) died.

Conclusion: The Latinx/Hispanic border populations have a high prevalence of comorbidities and potential complications that increase their risk for COVID-19 complications that lead to ICU admissions and death.

14 Effectiveness of face mask mandates in 4 suburban US communities during the SARS-CoV2 Omicron surge

Julie McCarthy; *Robert Partridge*; Stephen K. Epstein; Tiffany Zike; Timothy McDonald

Objectives: To evaluate the effectiveness of face mask mandates in four suburban communities in the metropolitan Boston area during the SARS-CoV2 Omicron surge.

Background: Face mask mandates have been implemented by local, state and national governments to limit the transmission of illness during the SARS-CoV2 pandemic.

Methods: A retrospective review of state reported, PCR positive cases of SARS-CoV2 and vaccination rates in four communities during the Omicron surge from 01/11/21-01/31/22. Data was analyzed using descriptive statistics.

Results: Two communities had a face mask mandate in place for all indoor public spaces throughout the study period, and two communities did not. Brookline (population 59,180, fully vaccinated rate per capita 62%) and Newton (population 88,593, vaccination rate 87%) implemented face mask mandates prior to the surge on 08/27/21 and 09/02/21, respectively, that remained in place through 02/18/22. Needham (population 31,248, vaccination rate 93%) and Framingham (population 72,308, vaccination rate 76%) issued mask recommendations but not a mask mandate. SARS-CoV2 percent positive rate per 100,000 population, reported weekly for each community is shown in Figure 1. Prior to Omicron, on 10/14/21 percent positive rates were 1% or less in all four communities. Percent positivity at the peak of Omicron was lower in Newton (13.18%) and Brookline (12.28%) than in Needham (14.92%) and Framingham (22.38%). Brookline had the lowest peak positivity rate and the lowest vaccination rate. Percent positivity also peaked and declined earlier in both communities with mask mandates.

Conclusion: In this study, suburban communities with mask mandates had a lower SARS-CoV2 peak percent positivity rate and an earlier peak than communities without mask mandates. Face mask requirements in indoor public spaces may reduce transmission of SARS-CoV2 during variant surges, and may be particularly effective in communities with lower vaccination rates.

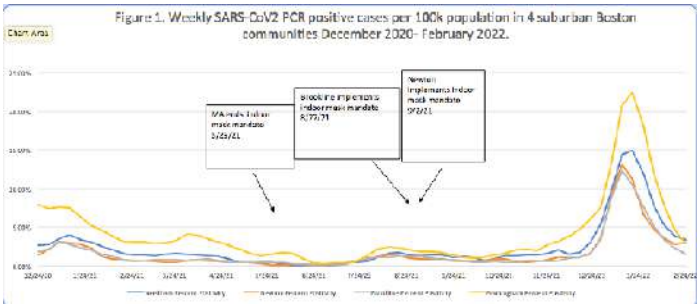


Figure 1. Weekly SARS-CoV2 PCR positive cases per 100k population in 4 suburban Boston communities December 2020-February 2022.

15 Proportion of Emergency Department Visits for Alcohol Abuse Increased After the Arrival of COVID-19

Barnet Eskin; Claire DeLong; *John R. Allegra*

Objectives: The goal of our study was to determine whether there was a change in the proportion of ED visits for alcohol abuse following the arrival of COVID-19.

Background: In March of 2020, COVID-19 arrived in the New York Metropolitan area. Total ED visits decreased markedly, likely because of fear of exposure to the virus as well as social isolation mandates. Concerns have been raised regarding the possible adverse effects that COVID-19 may have on increased abuse of alcohol. COVID-19 triggered bouts of anxiety, isolation from peers, and increased family tensions because of job disruptions and quarantining within families. A CDC study showed that despite decreased total ED visits, compared to 2019, the proportion of ED mental health related visits in 2020 increased. The goal of our study was to determine whether

there was a change in the proportion of ED visits for alcohol abuse following the arrival of COVID-19.

Methods: Design: Retrospective cohort. Setting: EDs of 27 hospitals within 150 miles of New York City. Hospitals were teaching and non-teaching in rural, suburban, and urban areas. Total annual ED volumes ranged from 12,000 to 122,000. Population: Consecutive patients seen by ED physicians. The database contained visits between March 1 and November 30 in 2019 and 2020. Data analysis: We identified patients with alcohol abuse using International Classification of Disease codes, version 10 (ICD-10). We tallied the number of ED visits for ICD-10 codes with at least 100 visits in the database. We calculated the proportion of these visits to total ED visits in 2019 and 2020. We report the relative change in this proportion from 2019 to 2020, along with the 95% CI.

Results: The database contained 1,161,080 visits in 2019 and 814,252 in 2020. Of these, 15,057 and 12,467 patients had a diagnosis of alcohol abuse in 2019 and 2020, respectively. For patients with alcohol abuse diagnoses in 2019 and 2020 the average ages were 46 and 47 years and females comprised 25% and 23%, respectively. The relative change in the proportion of visits for alcohol abuse from 2019 to 2020 had a statistically significant increase of 18% (95% CI: 15%-21%).

Conclusion: The proportion of ED visits for alcohol abuse increased following the arrival of COVID-19 in the New York metropolitan area. Our results are consistent with the CDC study showing the proportion of ED mental health related visits increased.

16 Cluster analysis of regional use patterns among critically ill emergency patients in Korea

Sung Min Lee; Tag Heo

Presenter: *Hyoung Youn Lee*

Objectives: The aim of this study was to analyze the inflow and outflow of critically ill emergency patients in Korea using National Emergency Department Information System (NEDIS) data for the last five years (2014-2018).

Background: In Korea, an imbalance across regions in emergency medical services has been creating a continuous barrier to ensuring access to such services for all residents. Korea's medical delivery system is not efficiently linked and a concentration of patients and medical resources in certain areas has continued due to the inefficiency of the competition between medical institutions from primary private clinics and tertiary hospitals.

Methods: Using the relevance index (RI) and the commitment index (CI) for analysis, the optimal number of clusters was determined and K-means cluster analysis was performed using the determined number of clusters in the cities, counties, and districts across the country. We classified regional types and expressed them as a geographic information system to examine changes over the five years. The difference between the RI and the CI clusters by year was analyzed by the non-parametric Mann-Whitney test.

Results: The total NEDIS data analyzed included 5,551,616 critically ill emergency patients. In the determination of the optimal number of clusters, the most appropriate number was two (Cluster 1, Cluster 2) for the years 2014-2018. Cluster 1 captured the patient outflow, low RI and high CI, and more than 100 regions by year. Cluster 2 captured patient inflow, high RI and low CI, and more than 80 regions by year. There were no significant differences in the RI and the CI each year based on the patient inflow of critically ill emergency patients. In an annual comparison of the CI, significant differences were noted between 2014 and 2017.

Conclusion: During the five-year period of 2014-2018, there were two regional types of critically ill emergency patients in Korea, and there was a significant difference between 2014 and 2017 in the CI in the patient outflow areas.

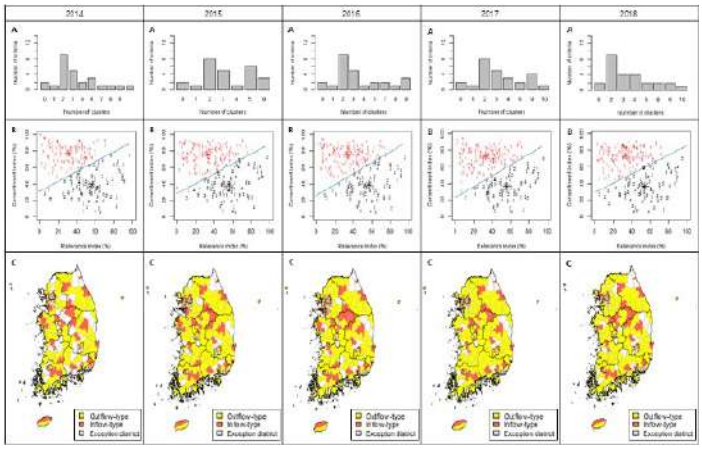


Figure 1.

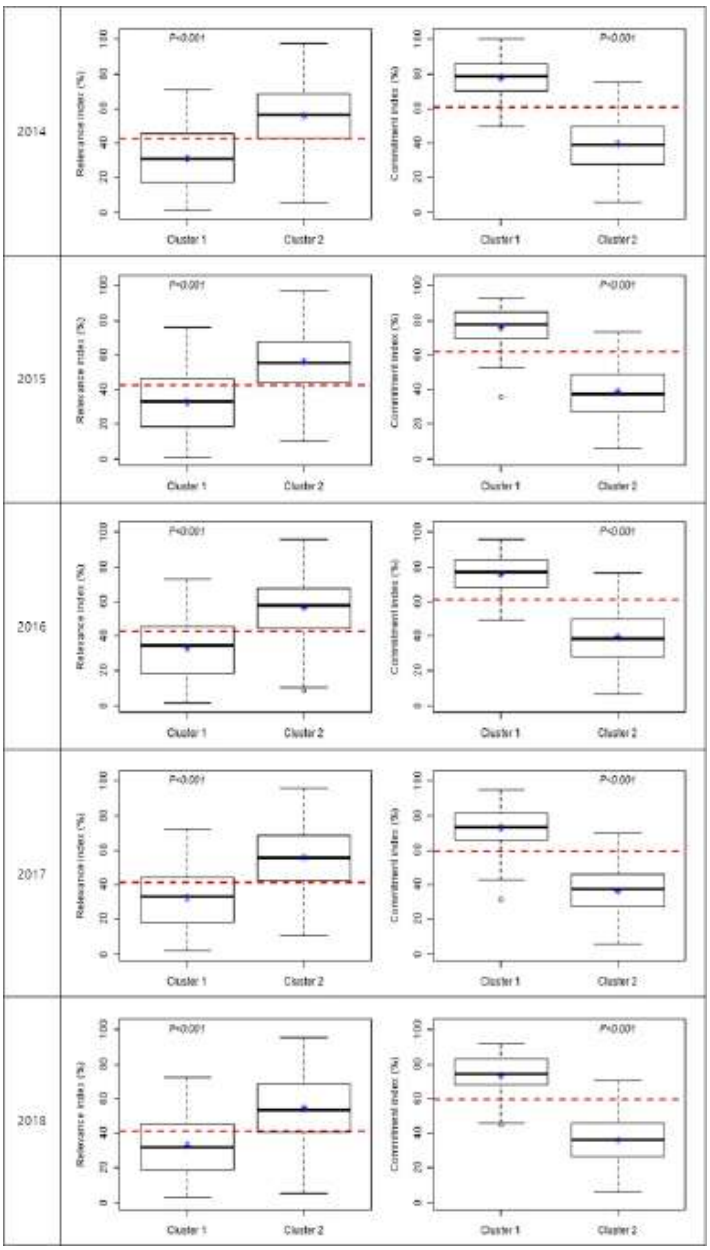


Figure 2.

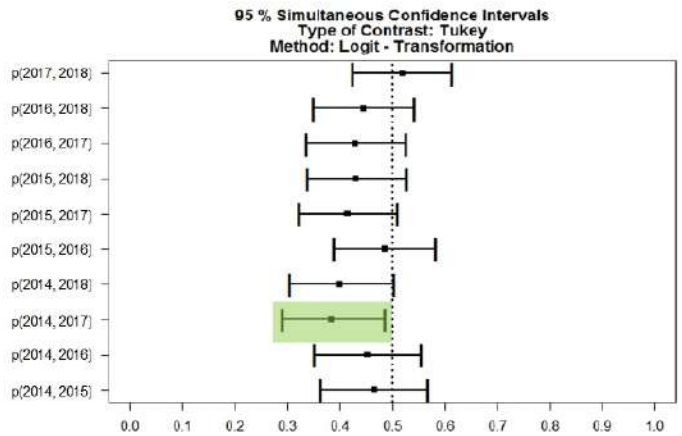


Figure 3.

17 Modeling Advanced Practice Provider Productivity in the Emergency Department

Bryan Stenson; David T. Chiu; Joshua W. Joseph; Leon D. Sanchez; Peter S. Antkowiak

Objectives: In this study, we examine APP productivity to determine if a similar pattern applies to that of residents and attendings, with the hypothesis that hourly productivity decreases after the first few hours of the shift.

Background: APP productivity follows a similar pattern to previously described behaviors in both residents and attendings. This further confirms the results of prior studies that productivity is a dynamic process that needs to be considered when adjusting staffing models. Additionally, this pattern by APPs at a community hospital provides additional validation of this model outside of academic institutions or training environments.

Methods: This is a retrospective cohort study from 7/1/21 through 6/30/21 at a single suburban community hospital in the northeast. APPs work ten hour shifts from 10AM to 8PM, nearly every day. APPs also provide coverage for approximately 5 shifts per month from 3PM to 11PM. Timestamps of initial patient contact are automatically logged by the electronic health record, and then analyzed to determine in which hour of the shift this occurred. A mixed linear model was performed with the hour as a categorical variable, and day of the week, month and year as covariates. Data was grouped by individual shifts.

Results: A total of 345 10-hour shifts were worked by five APPs over the one year studied. There were 64 additional afternoon shifts which were excluded due to the shorter length and lower frequency. Two APPs worked the vast majority of the shifts, and the other three provided per-diem coverage. A mean of 13.3 patients (SD 2.7) were seen per shift. In the first hour, APPs saw an average of 2.67 patients (95% CI 2.59-2.76). Each hour demonstrated a statistically significant decrease relative to the first hour ($p< 0.001$), with the highest magnitude over the second (-0.58 (95% CI -0.69 — -0.47)) and third (-0.98 (95% CI -1.09 — -0.86)) hours. This downward trend continued throughout the rest of the shift; however, the magnitude of this difference after the sixth hour was not significant. There was no effect by day of week, month or year.

Conclusion: APP productivity follows a similar pattern to previously described behaviors in both residents and attendings. This further confirms the results of prior studies that productivity is a dynamic process that needs to be considered when adjusting staffing models. Additionally, this pattern by APPs at a community hospital provides additional validation of this model outside of academic institutions or training environments.

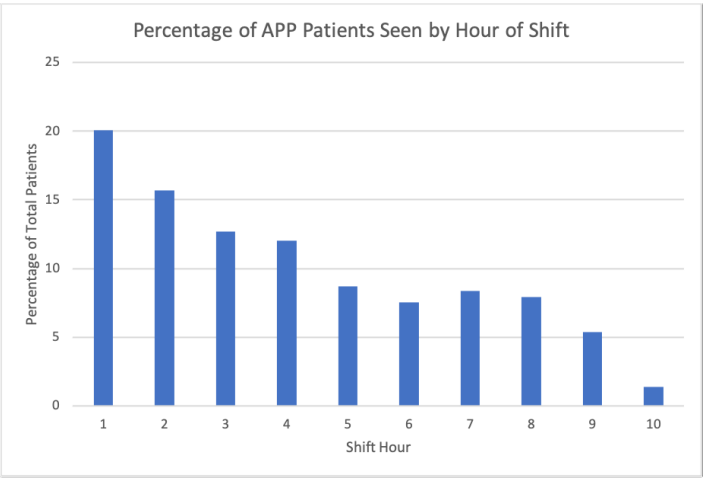


Figure 1. Percentage of APP patients seen by hour of shift

18 Impact of a Best Practice Alert on the Implementation of Expedited Partner Therapy

Andrew Gutting; Emily Ager; Fahmida Ahmed; Keith E. Kocher; *Rachel Solnick*; Roland C. Merchant; Zoe Curry

Objectives: The objective of this study was to determine if an ED-based electronic health record (EHR) Best Practice Alert (BPA) increased the ordering of expedited partner therapy (EPT) for sexually transmitted infections (STI) in adult patients.

Background: US EDs have reported increases in STI visits and positivity rates, mirroring record level increases in STI incidence in the general population. EPT is an evidence-based practice recommended by public health experts for treating sexual partners of STI patients. EDs typically evaluate patients for STIs without their sexual partner present, thereby providing opportunities for EPT. However, EPT is infrequently used in US EDs.

Methods: This pilot study was part of a quality improvement initiative conducted between August and October 2021 in an academic tertiary care ED located in the Midwest. An EPT BPA was randomly displayed in the EHR to clinicians when they empirically treated adult ED patients for STIs with antibiotics. Differences in proportions of EPT ordering were calculated for STI visits between BPA exposed vs. unexposed, ED clinician type, and testing-confirmed vs. not confirmed STI status.

Results: Of the 52 adult ED patients empirically treated for STIs during the study period, their mean age was 30 years old, 56% were female, 48% White and 40% Black, and 31% had Medicaid. Testing-confirmed STI prevalence was 27%. EPT was ordered less often during BPA unexposed (8%; 95% CI 1-25) than BPA exposed (42%; 95% CI 23-63) STI visits, for a mean difference of 35% (95% CI 13-56). EPT was ordered during 41% of STI visits involving residents, as compared to 7% of physician assistant visits (p=0.07). EPT was not ordered more often for testing-confirmed vs. not confirmed STI visits (21% vs. 26%; p=0.7).

Conclusion: Displaying an EHR BPA greatly increased EPT ordering for patients empirically treated for STIs, although not consistently across all clinician types. Because suspected cases of STIs may be less common in some EDs depending on the populations they serve, BPAs may be a useful tool to bolster the implementation of EPT practices.

19 Metal Detectors Improve Patients' Sense of Safety in the Emergency Department

Devon Fiorino; *Joshua Easter*; William Peter Kehr

Objectives: We aimed to assess the impact of metal detectors on patients' feelings of safety in the ED.

Background: National guidelines recommend hospitals attempt to prevent weapons from entering EDs. Metal detectors have been shown to reduce the number of weapons coming into EDs. However, there are concerns that they are unwelcoming to patients and might discourage them from seeking care. Less than one third of hospitals in the United States utilize metal detectors. The most recent ED based studies of patients' attitudes towards metal detectors were over 25 years ago, and patients' perceptions of safety likely have evolved during this time.

Methods: We surveyed a convenience sample of patients and their companions >18 years of age, who had undergone metal detection at the entrance of our suburban, academic ED from 2019-2021. Using tailored design, we developed survey questions with a consensus panel of physicians, nurses, and patients. We pilot tested the survey with cohorts of medical students and patients. Respondents anonymously reported their answers to questions on a 5 point Likert scale online in Qualtrics. Descriptive statistics were calculated, and chi square tests were utilized to compare groups.

Results: The survey response rate was 78%, with 303 patients completing the survey. Most (71%) non-respondents were due to clinical care needs preventing participation. Approximately two thirds of participants were patients (67%) and female (61%) with nearly all respondents in the ED for non-traumatic concerns (83%). Nearly one third of respondents (31%) had a colleague or family member that had been the victim of physical assault, 16% had previously witnessed physical violence in the ED, and 29% had a weapon in their home. An abundance (91%; 95% CI: 87 – 94%) of respondents reported that metal detectors improved their sense of safety in the ED. Slightly over half of respondents (52%; 95% CI: 46 – 58%) indicated the presence of metal detectors

made them more likely to visit an ED in the future. A small proportion (5%; 95% CI: 3 – 8%) indicated people should be allowed to bring weapons into the ED. Nearly one fifth of respondents reported metal detectors were somewhat or very inconvenient (19%; 95% CI: 15 – 24%) or somewhat or very much limited their privacy (21%; 95% CI: 16 – 26%). For respondents that reported a concern about privacy or inconvenience, over two thirds still favored having metal detectors (71%; 95% CI: 55 – 84%). There were no significant differences between respondents about metal detectors based on age, education, gender, race, prior exposure to violence, or personal ownership of weapons.

Conclusion: In this single center study, patients and their companions reported feeling safer with metal detectors in the ED, despite modest concerns about their impact on convenience and privacy. These results are similar to much smaller studies from 25 years ago.

20 The Role of Call-Back Systems in Older Patients Discharged from the Emergency Department

Cassandra Saucedo; Darius Martins; *Jennifer Roh*

Objectives: UC Irvine in partnership with CipherHealth has incorporated an automated call-back system utilizing a Geriatric Emergency Nurse Initiative Expert (GENIE) to follow-up with older patients. This study aimed to discover the most significant concerns older patients have after discharged from the ED, impact of a call-back system, impact of a dedicated GENIE in the follow-up process, and to highlight areas for further research.

Background: Emergency departments (ED) can be challenging to navigate for elderly patients. Geriatric visits to the ED are common and costly for both patients and health systems. Additionally, older patients are more likely to have a longer length of stay, increased complications and worse health outcomes. Over the past decade, there has been increasing efforts to incorporate geriatric specific care in emergency departments. The goal of these programs was to better communicate with older patients regarding their health and reduce recidivism.

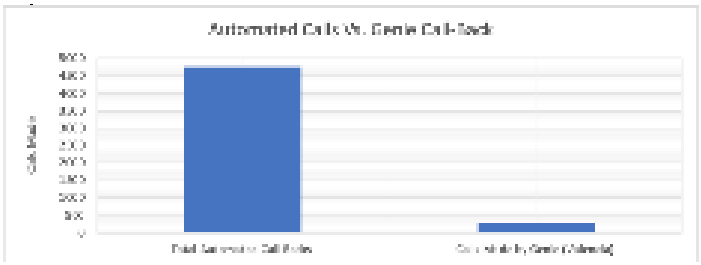
Methods: CipherHealth data regarding call-back rates and intervention details for UC Irvine Medical Center and UC Irvine Health were collected from June to November of 2021. Additionally, call-back data from the geriatric specialist nurse was collected during this time period and compared to the call-back rates of the automated CipherHealth system. Using the GENIE call-back data, we grouped call-backs into categories based on specific patient concerns. Finally, recidivism rates were obtained prior to the implementation of CipherHealth and geriatric nurse specialists and compared with those seen after.

Results: There were a total of 4,748 initial calls made with the Cipher Health system and 292 individual follow-up calls made by the GENIE. Of the calls made by the GENIE the most common issue was with follow-up appointments (99 recorded issues). The next most common issue was with discharge instructions (82 recorded issues), followed by general status issues (80 recorded issues), issues obtaining prescriptions (18 recorded issues), and medication questions (13 recorded issues). Additionally, the rate of recidivism for patients over the age of 65 prior to the implementation of the call-back system was 20.9 percent compared with 15.6 percent in the months following implementation of these systems.

Conclusion: Our data suggests that there are specific areas of intervention that many older patients have issues with post-discharge. These concerns centered around follow-up appointments and discharge paperwork, suggesting an avenue for future quality improvement. Additionally, the decrease in recidivism after implementation of the call-back systems are a promising sign. A future study would be needed to prove true causation however there are reasons for optimism.

Intervention	Calls Made
[illegible]	[illegible]
[illegible]	[illegible]

Table 1.



Graph 1. Automated calls vs. Genie call-back.

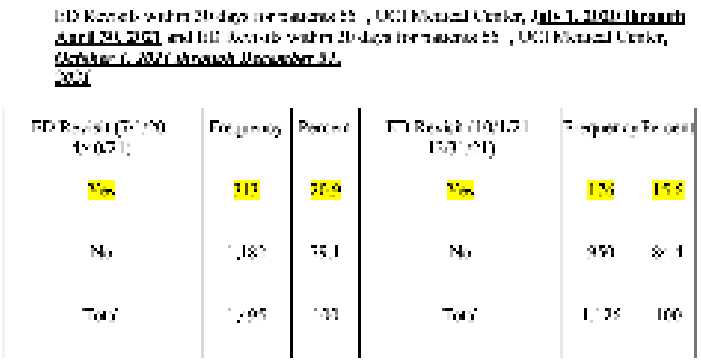


Table 2. Number of older adults with repeat ED visits and the percentage of all elder visits this represents.

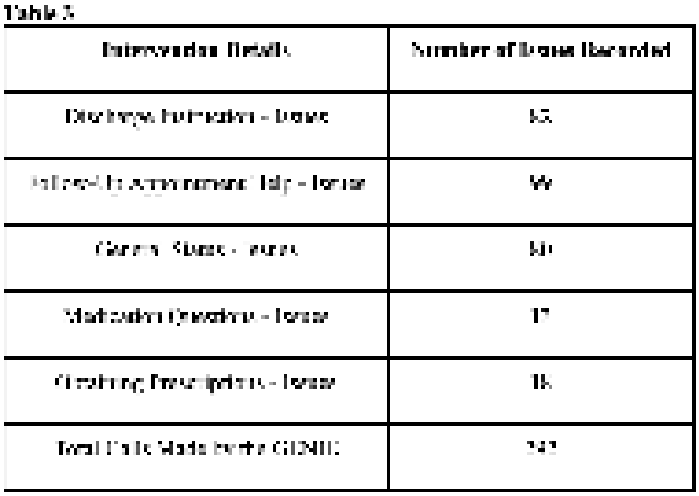
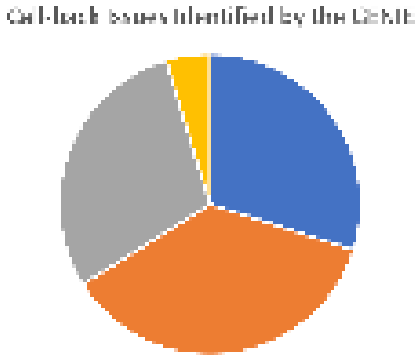


Table 3.



Graph 2.

21 Impact of Shared Visits with Midlevel Providers or Residents on Resource Use and Admission Rate

Bryan Stenson; David T. Chiu; Joshua W. Joseph; Leon D. Sanchez; Nathan McDonald; *Peter S. Antkowiak*; Terrance Lee

Objectives: To validate and expand upon prior data suggesting that visits shared with a midlevel or resident influence EP behavior as measured by resource use and propensity to admit a patient.

Background: Variability exists in Emergency Physicians' (EP) resource utilization as measured by ordering practices, propensity to admit patients, and whether a visit is shared with a resident or midlevel provider (nurse practitioner or physician assistant).

Methods: This is a retrospective study of routinely gathered operational data from two community, suburban hospitals within an academic emergency network. We analyzed 34 EPs with 141,433 patient visits from July 1, 2016 to June 30, 2019. We collected individual EP data on advanced imaging (CT, US, MRI), admission rates, and whether a visit was shared with a midlevel or resident for each patient encounter. To investigate whether there might be distinct groups of practice patterns relating these resources, we used a Gaussian Mixture Model (GMM), a classification method used to determine the likelihood of distinct subgroups within a larger population. The total number of groups and covariance structure were determined by Bayesian Information Criteria.

Results: Our GMM revealed three distinct groups of physicians based on their ordering practices. The largest group is characterized by a homogenous pattern of neither high or low resource utilization (n=19, 58% female, median years' experience: 9 [IQR 2-16]; rates of Advanced Imaging: 44%, Admission: 21%, Midlevel/Resident staffing 35% with a modest group of low-resource users (n=10, 0% female, median years' experience: 7 [IQR 5-11]; rates of Advanced Imaging: 31%, Admission: 17%, Midlevel/Resident staffing 32%), and far fewer members of a high-resource use group (n=5, 20% female, median years' experience: 15 [IQR 5-16]; rates of Advanced Imaging: 49%, Admission: 22%, Midlevel/Resident staffing 35%) [Figure 1]. This variation suggests that use of advanced imaging and propensity to admit may be influenced by whether a patient visit is shared with a midlevel or resident provider.

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.

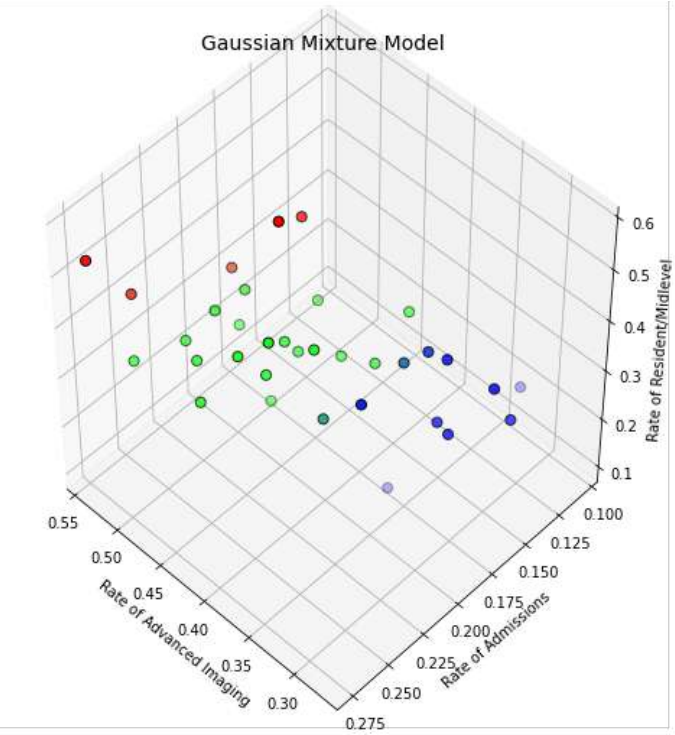


Figure 1. Gaussian mixture model

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.

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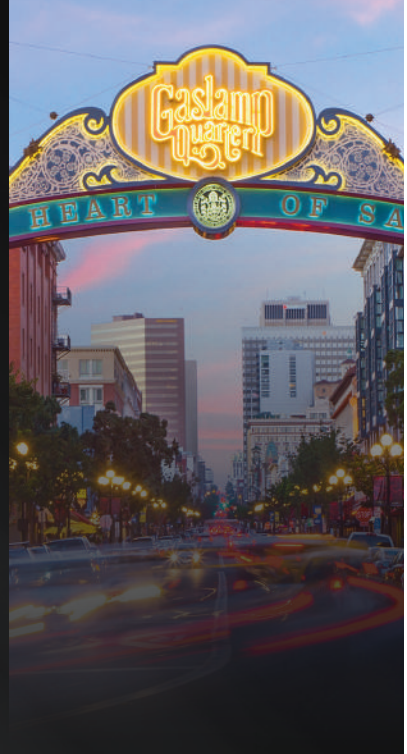

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