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**58** WITHDRAWN



**59** **Forced Evolution: Emergency Medicine Match Advising During COVID-19**



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**Study Objectives:** The COVID-19 pandemic impacted advisors and students participating in the emergency medicine (EM) 2020-21 National Resident Matching Program cycle. Students were removed from clinical experiences, barred from away rotations, left struggling to obtain Standard Letters of Evaluation (SLOE), and forced to interview virtually and make rank lists without visiting programs. Advisors struggled to provide effective advice with constantly evolving institutional and national guidelines while living through and working in the public health crisis. The primary objective of this study was to analyze advising patterns of EM advisors for EM-bound students during the COVID-19 pandemic.

**Methods:** A 31-item survey with quantitative and qualitative questions was designed using an iterative process by a varied group of student advisors in the Council of Residency Directors (CORD) Advising Students Committee for EM (ASC-EM). This survey was distributed via the CORD list-serve during March 2021 to EM advisors (including program directors, assistant/associate program directors, clerkship directors and faculty advisors).

**Results:** We analyzed 97 unique responses. Despite the need to convert to virtual learning, a majority of advisors (73.3%) did not recommend taking an online virtual EM away rotation. The majority of EM bound students obtained one SLOE (75%). 20% of advisors reported that compared to prior years they recommended more students to dual apply. 31% of respondents reported being unsure how many interviews their lower-third candidates received, while only 17% were unsure how many their upper-third candidates received. Respondents providing qualitative responses on the challenges of advising reported significant stressors of the novel uncertainty of the process (43.2%), the challenges of decreased in-person time with advisees (27%), the stress of balancing personal and professional responsibilities (16.2%), and SLOE-related stress (13.5%). 100% of advisors reported that EM educational blogs such as EMRA (Emergency Medicine Residents' Association), SAEM (Society of Academic Emergency Medicine), and CORD guided how they advised students and all recommended students use those resources.

**Conclusion:** The pandemic created unique advising challenges. Despite uncertainty in how to guide students, advisors were able to provide largely cohesive recommendations aligned with national consensus recommendations from EM organizations. Students also seemed to adhere to these recommendations, particularly in terms of obtaining a single SLOE. Advisors reported variation on clarity about how many interviews their students had received, specifically knowing less about their less competitive students. Our survey raises some concern for significant stressors faced by advisors, but most respondents were able to draw on a unified larger EM community for support in their advising roles. This study highlights just one aspect of a unique year faced by our specialty.

**60** **Presence and Degree of Neutralizing Antibody Production Following Pfizer-BioNTech Vaccination**



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**Study Objectives:** While almost all adults vaccinated with the SARS-CoV-2 mRNA vaccine become positive for the IgG antibody (Ab) targeting the spike protein of SARS-CoV-2 within a week of their second dose, correlates of protection for SARS-CoV-2 are not fully understood. Therefore, the primary purpose of this study was to attempt to quantify the percentage of SARS-CoV-2 neutralizing antibodies (nAb) that develop after dose 2 vaccinations and also identify any factors that might affect the timing and degree of nAb production.

**Methods:** A fluorescence immunoassay analyzer was used to quantify the percent of SARS-CoV-2 antibodies capable of blocking the spike protein at its receptor

binding domain (RBD) for attachment to ACE-2 receptors. Seventy residents and staff of an assisted living facility ranging in age from 23 to 100 years were enrolled. Fingertick blood samples were measured at seven days and 21 days following the 2nd dose of the Pfizer-BioNTech mRNA vaccine. Based on prior research, nAb measurements <30% were considered to be inadequate protection and therefore delineated as nAb negative.

**Results:** Except for a 58 year old (yo) man taking daily prednisone for asthma and another 55 yo man with hypothyroidism (treated with levothyroxine), 100% of the 34 persons <70 were positive for neutralizing Ab (assays with >30% nAb) on day 7 after the 2nd vaccine dose. However, among the 37 patients older than 70 years, the percent of persons positive for nAb (>30%) on Day 7 diminished with age. Only half of those 71-80 yo, 33% of those 81-90 yo and 11% of those >90 yo were positive for nAb. Two weeks later, however, the percentages among those tested had increased to 83%, 71%, and 50% for those respective age groups. Also, one week after the second vaccine dose, the average neutralizing Ab% measurement (%nAb) among the various age groups under the age of 50 years ranged from 95 to 100% while age group averages were borderline or inadequate for those older than 70 years. Nevertheless, 21 days after the second dose, the average %nAb measurement had become 91% for those 61 to 70 years of age, 75% for those 71-80, and 55% for those 81-90. For the eight persons over 90 years of age, the average %nAb was 35% and half of those persons (n=4) had no detectable nAb, either at day 7 or day 21. No persons had significant declines in the %nAb measurements and the majority sustained or improved their %nAb between Day 7 and Day 21.

**Conclusions:** Escalating age and immunomodulating medications and conditions can impact the timing and degree of neutralizing Ab produced following SARS-CoV-2 mRNA vaccination. Most persons under the age of 90 years were considered to be "positive" for protective levels of nAb within three weeks following the 2nd dose of the SARS-CoV-2 mRNA vaccine. On-going investigations involve evaluations of the duration and sustained degree of positive nAb findings, as well as external validation of the tool used in this current research.

**61** **Academic Impact on Emergency Medicine Training Programs During COVID-19 Pandemic**



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**Background:** Rapid spread of the Novel Coronavirus Disease (COVID-19) resulted in a global pandemic. As front-line health care workers, this crisis significantly affected emergency medicine residents and their respective programs. We sought to explore the impact of COVID-19 on the education and training of emergency medicine residents across the United States and Puerto Rico.

**Methods:** A survey was sent out to Accreditation Council for Graduate Medical Education (ACGME) accredited United States and Puerto Rico emergency medicine residency programs (264 programs at the time) via email correspondence to the Program Directors and the Program Coordinators. The survey stratified program type (practice setting, length of training, institution type, moonlighting allowed) and impact of COVID-19 on residents (off-service rotations, weekly conferences, effect on research, and resident wellness initiatives). Comparison was made by United States and Puerto Rico regions divided by Northeast, South, Midwest, and West, as these closely correlated with the differences in areas of COVID-19 spread and saturation. REDCap was used as the platform for data capture.

**Results:** A total of 134 emergency medicine residency programs completed the survey. Northeast (44%), South (26%), Midwest (17%) and West (13%) programs by regions were reviewed. Overall, the majority of programs were in an urban setting (70%), and academic practice comprised 58%, followed by community at 40% (p=NS). The curriculum was a 3-year format for 71% of the programs (p=0.002). Overall half of the programs stated their institution was declared a site of pandemic emergency status by the ACGME, with 70% in Northeast and 39% of the Midwest, followed by the West and South regions (p=0.011). The impact of COVID-19 on off-service rotations for the emergency medicine residencies was not significant; Northeast had a high impact in 34% of the programs, moderate impact for Midwest (35%) and minimal impact in the South (34%) and West (29%) programs. Weekly lectures were switched to virtual format and smaller groups. Of note, clinical research for prospective studies was negatively impacted throughout all the regions (p=0.034), however retrospective studies were not affected. Additionally, 88% of programs reported changes since the start of COVID-19 to assure residents with new initiatives and activities such as improving wellness and reducing burnout and stress.

Conclusions: The COVID-19 pandemic impacted the training of emergency medicine residents in various aspects. Northeast programs were more affected compared to the other regions. Weekly didactic sessions largely transitioned to a virtual format and/or small group sessions. Off-service rotations overall were not significantly affected. Retrospective clinical research continued while there was a substantial disruption in prospective research projects. Finally, a positive outcome was the increased awareness to changes in improving resident well-being overall.

## 62 Network Analysis To Understand Regional Patient Flow

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Study Objectives: Consolidation of health care systems in the United States has created integrated enterprises with large geographical reach and complex interacting components. Specialty services vary among sites, and patients often need to travel between facilities for different aspects of care. Network science is an established method employed to investigate these complex systems, and can be used to identify bottlenecks, opportunities to increase value and patient-centeredness in health care. The COVID-19 pandemic changed care demand patterns unexpectedly. We wanted to investigate if network analysis would allow us to better understand these changes and challenges - where our patients receive hospital-based care, what services they used and how far they travelled. We focused this analysis on a multispecialty, tertiary care academic center emergency department (“AC\_ED”), with 70,000 patient visits annually.

Methods: We extracted patient location information from electronic health records, including originating location and level of care, to create a network representation of all care pathways that passed through our ED. The volume of transfers between nodes and the distance travelled were encoded as weighted/colored edge attributes, with edges between nodes in closer proximity being darker. Nodes include: communities within our service area, EDs, and academic center units, and an outcome of mortality. They are sized/colored by betweenness centrality, reflecting the importance of the node in the integrity of the network.

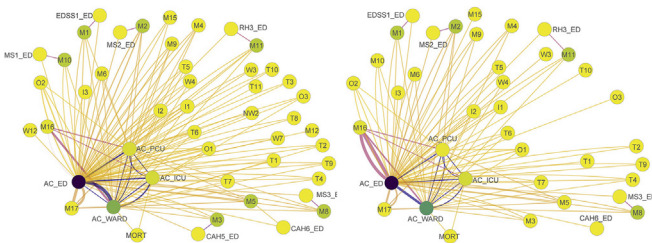
Results: The figure shows the overall network structure was similar for pre- and post-pandemic onset with some changes in details. AC\_ED receives patients from many home locations and referring hospitals. A large proportion of visits come from the local area reflected by M16 and M12. There are many patients who travel far to access emergency care at AC\_ED, bypassing local EDs though the average distance travelled to access care reduced from 114 to 85 miles. During the pandemic there was more traffic to the AC\_ED from the local area (M16), fewer connections to surrounding hospitals and disproportionately reduced visits from distant areas (O and OT). Low ED volumes and restricted outpatient clinic availability during the pandemic time frame likely affected this. Inter-hospital transfer volumes declined overall, several sites transferred very few patients to AC\_ED post-pandemic start, and other sites increased their transfer rate (eg, CAH13).

Conclusions: Looking at hospital systems through the lens of network science can reveal changes in patterns of referrals, allows for identification of unexpected results by presenting data visually and can assist identifying crucial components of a health care system. Application of this methodology to other variables has the potential to identify new areas of improvement to increase value, outcomes and services to improve patient-oriented care.

Figure: Networks of care

Pre-pandemic onset

Post-pandemic onset



Key:  
Home locations: M, O, W, T, I  
Hospital size: MS, EDSS, AC, RH, CAH  
Hospital units: PCU, ICU, Ward, ED  
Mortality: Mort

## 63 The Impact of the COVID-19 Pandemic on Social Determinants of Health on Patients in a Rural Academic Emergency Department

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Background: Stay-at-home orders and social distancing recommendations, combined with COVID-19 concerns, have caused significant disruptions in daily life. Throughout the pandemic, vulnerable populations, commonly seen within the University of Iowa emergency department, have been more negatively affected by COVID-19.

Study Objectives: To assess how the social needs of the population cared for within the University of Iowa emergency department have changed in response to the COVID-19 pandemic.

Methods: The Center for Medicare and Medicaid and Services (CMS) social risk assessment was adapted, covering 13 specific domains, to assess changes to participants' social situations throughout the COVID-19 pandemic dated from January 2020 to February 2021. It was administered within the emergency department to individuals selected by a convenience sample who were stable enough to complete the form. Frequencies with percentages, fisher's exact test, logistic regression were used to analyze the categorical data. Dependent variables of interest were analyzed by age group, sex, and race.

Results: A total of 305 patients were approached and 207 (68%) responses were received. Of the included responses 7/177 (4%) identified as Hispanic or Latino, 15/175 (8.6%) as Black or African American, and 151/175 (86.3%) as white. The survey respondents indicated that 7.1% had worsened employment situation in comparison to before COVID-19. Moreover, 14.5% found it harder to pay for basics such as food, housing, medical care, and heating compared to prior to the pandemic, and 10.1% reported worsening lack of reliable transportation. Further, 26% stated that feelings of loneliness have worsened along with 30% reporting more stress, while 16.8% reported feelings of little interest or pleasure in doing things have improved along with 20.8% reported feeling down, depressed, or hopeless also improved in comparison to before the pandemic. Lastly, 2.5% stated their physical safety had worsened and 6.5% were experiencing worsening verbal abuse. The logistic regression showed that the odds ratio (95% CI) for increased financial difficulty for Non-Caucasians vs Caucasians is 10.5 (2.7 -40.3) and the odds ratio (95% CI) for increased financial difficulty for females vs males is 2.9 (1.1 - 7.7).

Conclusion: The COVID-19 pandemic led to overall greater financial instability and increased stress. Non-Caucasians and females were more likely to report that their financial situations worsened. Isolation, stress, and forms of abuse were also found to worsen. Nevertheless, symptoms of worsening depression were found to be improve among our study population. In light of these findings, it is important to understand how the pandemic affected numerous social determinants of health, especially for individuals who were already experiencing unmet social needs. With a better understanding of the health needs of our population, identifying strategies to improve overall wellness can be better achieved.

## 64 Progression of COVID-19 from Urban to Rural Areas in the Southwest: A Spatiotemporal Analysis of Prevalence Rates

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Background: COVID-19 emerged in the United States on January 20, 2020 and has rapidly proliferated across the nation affecting more than 15 million individuals. Case incidence rates vary at the local, county, and state levels and it is unclear if a difference exists in the incidence of new COVID-19 cases among urban or rural counties. Due to county population density and geographic progression of the virus over time, COVID-19 may demonstrate variable incidence rates among urban and rural population centers.

Study Objective: The present study examines whether temporal differences in the incidence rate of diagnosed cases of COVID-19 exist between urban and rural counties in the Southwest United States.

Methods: Daily COVID-19 cases from Arizona, California, Oklahoma, Texas, and Utah were retrospectively tabulated on a county basis using publicly accessible