environment section. **Conclusions:** Human factors–based analysis of video recordings of actual ED work identified a variety of work system factors that impede appropriate or correct use of PPE by HCWs. Future efforts to improve appropriate PPE use should focus on eliminating or mitigating the effects of these work system factors.

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Presentation Type:
Poster Presentation - Top Poster Award
Subject Category: COVID-19

Work system barriers to & resilience strategies for COVID-19 PPE use in the emergency department: A qualitative interview study

Oluseyi Daodu; Ayse Gurses; Patience Osei; Esosa Nosakhare; Shawna Perry; Marium Sultan; Nivedha Prabhu; Susan Peterson; Emma MacIntyre; Khue Vo; Lauren Yuan, Lauren Benishek and Jessica Li

Background: Emergency departments (EDs) are complex, sociotechnical, high-paced, safety-critical work systems that have been disproportionately affected by the COVID-19 pandemic. Despite training, consistent compliance with recommended PPE use during COVID-19 pandemic has been challenging. Healthcare workers (HCWs) have had adapt to overcome these challenges to ensure their own safety and patient safety. We sought to identify barriers in the work system that impede the recommended COVID-19 PPE use in EDs. **Methods:** We conducted semistructured, in-depth interviews over ZoomTM from August 2020–May 2021 with 45 HCWs from the ED (ie, physicians, nurses, ancillary support staff, etc) affiliated with a large, tertiary-care, academic medical center. These audio-recorded interviews were transcribed and analyzed using a hybrid (inductive and deductive) qualitative coding approach in NVivo software. The deductive portion was guided by the SEIPS work system model, a well-known human-factors conceptual framework. **Results:** We identified multiple work-system factors in the ED that impede compliance with the recommended COVID-19 PPE use. In addition, ED HCWs have reported making a variety of adaptations or developing strategies to overcome these barriers. Some of these adaptations were made to the PPE physically (eg, trimming portions of PPE), and others were related to the tasks and/or processes associated with PPE, such as filming their own training video demonstrating PPE donning and doffing techniques, and environment services staff checking a patient's status with nurses prior to entering the patient's room when there was no COVID-19 signage on the door. **Conclusions:** Consistent compliance with COVID-19 PPE use in ED clinical practice is challenging and can be negatively affected by a variety of work system factors. Resilience strategies developed by HCWs can provide critical information with regards to HCW needs and potential directions for innovation. Future efforts should focus on not only changing individual HCW behavior through training but also on improving the PPE and ED work system design.

Funding: US CDC

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Poster Presentation - Top Poster Award
Subject Category: COVID-19

Analysis of Universal admission laboratory screening for SARS-CoV-2 asymptomatic infection across a large health system

Jennifer Cihlar; Bryan Harris; Patty Wright; Romney Humphries; Kelly (Caroline); Brandi Cherry and Thomas Talbot

Background: Admission laboratory screening for asymptomatic COVID-19 has been utilized to mitigate healthcare-associated SARS-CoV-2 transmission. A better understanding of the impact of such testing across a variety of patient populations is needed. **Methods:** Beginning April 2020, every patient admitted within an academic healthcare system underwent SARS-CoV-2 PCR testing upon admission. Between April 20, 2020 through June 14, 2021, results were analyzed in asymptomatic patients across 4 inpatient facilities: a tertiary-care adult hospital, a free-standing pediatric hospital, a community-based hospital, and a behavioral health hospital. Positivity rates and the number needed to test (NNT) to identify 1 asymptomatic infected patient were calculated overall, by hospital type, by patient vaccination status, and by CDC-defined levels of community transmission. Weekly community incidence rates of COVID-19 for the system's metropolitan service area (8 central Tennessee counties) were obtained from Tennessee Department of Health records. Weekly COVID-19 incidence rates per 100,000 people were calculated using US Census Bureau data. Using a national survey of hospital epidemiologists, a clinically meaningful NNT was identified (ie, 1 positive patient per 100 patients tested). A crude admission testing cost (covering testing supplies, reagents, and lab personnel costs) was obtained from operational data ($50 per test) to assess testing utility. **Results:** In total, 51,187 tests were collected during the study period with a positivity rate of 1.8%. No periods of low transmission were observed (Table 1). During high transmission periods, the NNT met the clinically relevant threshold in all populations. In addition, the NNT approached or met the 1:100 threshold for most locations during periods of less transmission, suggesting continued benefit even as infection rates decline. In all transmission periods, the NNT for non–fully vaccinated patients met the clinically meaningful threshold, in contrast to testing of fully vaccinated patients (Table 2). **Discussion:** Implementing an asymptomatic patient admission testing program can provide clinically relevant

Table 1. Admission Testing for SARS-Cov-2 Infection in Hospitalized Patients at a Large Health System, Overall and by Specific Patient Populations Tested

		All Transmission Periods (n=60 weeks)	Moderate Transmission Periods (n=7 weeks)	Substantial Transmission Periods (n=13 weeks)	High Transmission Periods (n= 40 weeks)
All Hospitals Combined	Total # Tests Collected	51,187	5,173	10,978	35,036
	# Positive (%)	946 (1.8%)	52 (1.0%)	99 (0.9%)	795 (2.3%)
	NNT	54	99	111	44
	Total Test Costs	$2,559,350	$258,650	$548,900	$1,751,800
	Cost to Detect 1 Positive Patient	$2,700	$4,950	$5,550	$2,200
Tertiary Care Adult Hospital	Total # Tests Collected	35,962	3,740	7,888	24,334
	# Positives (%)	684 (1.9%)	36 (1.0%)	79 (1.0%)	569 (2.3%)
	NNT	53	104	100	43
	Total Test Costs	$1,798,100	$187,000	$394,400	$1,216,700
	Cost to Detect 1 Positive Patient	$2,650	$5,200	$5,000	$2,150
Pediatric Hospital	Total # Tests Collected	7,892	692	1,654	5,546
	# Positives (%)	113 (1.4%)	9 (1.3%)	10 (0.6%)	94 (1.7%)
	NNT	70	77	165	59
	Total Test Costs	$394,600	$34,600	$82,700	$277,300
	Cost to Detect 1 Positive Patient	$3,500	$3,850	$8,250	$2,950
Behavioral Health Hospital	Total # Tests Collected	2,505	239	466	1,800
	# Positives (%)	23 (0.9%)	2 (0.8%)	0	21 (1.2%)
	NNT	109	120	n/a	86
	Total Test Costs	$125,250	$11,950	$23,300	$90,000
	Cost to Detect 1 Positive Patient	$5,450	$6,000	n/a	$4,300
Community Hospital	Total # Tests Collected	4,828	502	970	3,356
	# Positives (%)	126 (2.6%)	5 (1.0%)	10 (1.0%)	111 (3.3%)
	NNT	38	100	97	30
	Total Test Costs	$241,400	$25,100	$48,500	$167,800
	Cost to Detect 1 Positive Patient	$1,900	$5,000	$4,850	$1,500

NNT: number needed to test to identify 1 positive patient

Table 2. Admission Testing for SARS-Cov-2 Infection in Hospitalized Patients at a Large Health System, by Patient Vaccination Status

		All Transmission Periods (n=19 weeks)*	Moderate Transmission Period (n=4 weeks)	Substantial Transmission Period (n=3 weeks)	High Transmission Period (n= 12 weeks)
Fully Vaccinated	Total # Tests Collected	2,387	958	587	842
	# Positives (%)	17 (0.7%)	5 (0.5%)	4 (0.7%)	8 (1.0%)
	NNT	140	192	147	105
	Total Test Costs	$119,350	$47,900	$29,350	$42,100
	Cost to Detect 1 Positive Patient	$7,000	$9,600	$7,350	$5,250
Not Fully Vaccinated	Total # Tests Collected	16,628	3,220	2,663	10,745
	# Positives (%)	315 (1.9%)	45 (1.4%)	39 (1.5%)	231 (2.1%)
	NNT	53	72	68	47
	Total Test Costs	$831,400	$161,000	$133,150	$537,250
	Cost to Detect 1 Positive Patient	$2,650	$3,600	$3,400	$2,350

*Data from study period following vaccine availability and subsequent time to develop immunity (February 1, 2021 through June 14, 2021); Fully vaccinated = receipt of 2 doses of mRNA COVID-19 vaccine or 1 dose of adenoviral vector vaccine; NNT: number needed to test to identify 1 positive patient

value based on the NNT, even during lower periods of transmission and in different patient populations. Limiting admission testing to non–fully vaccinated patients during periods of lower transmission may be a strategy to address cost and resource concerns around this practice. Further investigations into the impact of booster vaccination and newer SARS-CoV-2 variants on admission testing programs are also necessary. Although the impact of such testing on healthcare-associated COVID-19 among patients and healthcare workers could not be clearly determined, these data provide important information as facilities weigh the costs and benefits of such testing.

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Poster Presentation - Top Poster Award

Subject Category: COVID-19

Procalcitonin as marker for bacterial coinfection among adult COVID-19 patients in a tertiary-care hospital in the Philippines

Angelie Lorraine Pesebre; Cybele Lara Abad; Jan Jorge Francisco and Justin Allister Ong

Background: Antimicrobials are often given to patients with COVID-19 despite the absence of a bacterial coinfection. Procalcitonin (PCT), when elevated, often indicates the presence of a bacterial infection and is used to guide empiric antibiotic therapy. We sought to determine the utility of PCT and the optimal cutoff value of PCT among patients with COVID-19. **Methods:** We retrospectively reviewed all COVID-19 confirmed ca-ses hospitalized in our institution from March to December 2020. Of 729 cases, we included 403 (55.3%) who had baseline PCT and blood or respiratory tract specimens (eg, sputum, endotracheal aspirate) within 48 hours of admission. Participants were classified according to PCT levels and COVID-19 severity. A receiver operating characteristic (ROC) curve analysis was performed. The area under the curve (AUC) obtained was used to compute the possible optimal cutoff value using the Youden index. A χ^2 test was used to define association between groups according to the characteristics of variables. **Results:** Of a total cohort of 403, 245 (57%) were male, with an overall median age of 60 years (range, 22–94). Overall, 28 presented with mild COVID-19, 194 presented with moderate COVID-19, and 181 presented with severe or critical COVID-19. Moreover, 363 (90%) were given antibiotics. Of 28 with mild COVID-19, 22 (79%) received empiric antibiotics. The rate of bacterial coinfection was high at 28% (113 of 403). *Klebsiella pneumoniae* was the most commonly identified microorganism: 52 (19.5%) of 266 patients. Based on the ROC curve, the optimal cutoff for PCT was 4.72 ng/mL, with 97% specificity and only 6% sensitivity. Only 17 participants had

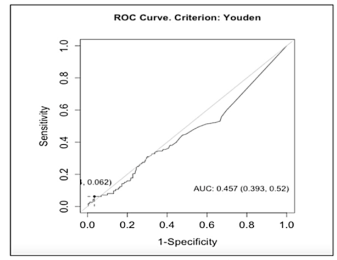

Figure 1. Receiver - Operator Characteristic(ROC) curve of procalcitonin and bacterial co-infection.
**ROC Curve that has an AUC of 0.5 suggests no discrimination. It means that the classifier is unable to distinguish between positive and negative disease (predicting the disease randomly).*
** An AUC between 0 and 0.5 means that the corresponding model has poor separability, and may actually perform worse than a random chance.*
** An AUC between 0.5 and 1 means there is a higher chance that the classifier is able to distinguish positive and negative disease.*
** An AUC=1 able to perfectly distinguish between all the positive and negative disease correctly*
** An AUC=0 means that the classifier predicts all positives as negative, and all negatives as positive.*

PCT > 4.72 ng/mL. Of these, 1 was mild, 5 were moderate COVID-19, 8 had severe COVID-19, and 3 had critical COVID-19; all received antibiotic therapy. **Conclusions:** In our cohort, the rate of bacterial coinfection was high. A PCT of >4.72 ng/mL increased the likelihood of a coinfection. However, PCT had poor sensitivity and may not detect the presence of bacterial coinfection, especially when used alone. Serial PCT monitoring, its use in conjunction with other markers, or as a prognostic tool, need to be explored further.

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Poster Presentation - Top Poster Award

Subject Category: COVID-19

Prioritizing SARS-CoV-2 testing in a highly immunosuppressed patient population

Jenna Shackelford; Michele Woolbert; Ninet Sinaii; Brooke Decker; Tara Palmore and Robin T Odom

Background: The NIH Clinical Center implemented multiple testing protocols to facilitate early detection and isolation of SARS-CoV-2 infected patients and rooming-in family members (RIFMs). Beginning in February 2020, all symptomatic patients were tested; in March 2020, all patients were tested prior to aerosol-generating procedures (AGPs); and in May 2020, all patients and RIFMs were tested on admission. We sought to determine the value of SARS-CoV-2 testing practices in our hospital. **Methods:** Respiratory specimens collected March 2020 through June 2021 tested for SARS-CoV-2 by RT-PCR were reviewed, and corresponding patient clinical and demographic variables were collected. Repeated tests from SARS-CoV-2–positive persons were excluded from the data. Results associated with multiple testing indications were assigned the highest priority reason based on a predetermined hierarchy. Data were analyzed using the χ^2 test and logistic regression. **Results:** Of 12,706 results from 5,704 patients, primary testing reasons were pre-AGP (n = 5,387, 43.0%), admission (n = 2,733; 21.8%), and symptomatic testing (n = 2,701; 21.6%). Overall, 159 tests (1.25%) were positive for SARS-CoV-2. Asymptomatic patients tested on admission were 1.8 times more likely to be positive than outpatients tested for any reason (P = .003) and 4.2 times more likely than asymptomatic inpatients tested prior to AGP (P = .003). Within asymptomatic pre-AGP testing, there was no difference between inpatients (0.46%) and outpatients (0.65%). Hispanic patients were 1.9 times more likely to be positive. (p **Conclusions:** At a hospital with a geographically broad referral base, admissions COVID-19 testing was far more fruitful than pre-AGP testing of inpatients. Pre-AGP used the most testing resources yet had the lowest yield. Admissions testing remains beneficial regardless of community transmission rates, while testing prior to AGP could be pared back when community rates of COVID-19 are low and redeployed when community rates rise. **Conclusions:** Our findings