

Central Line Audit Team: RNs Who Monitored Central Lines in COVID ICUs in An Acute Care Hospital in NYC

**Results:** Central line rounds performed after the intervention showed a great improvement in compliance with the central line maintenance bundle, from 13% during the first rounds performed in April, to 88% in May, less than a month after these rounds started. Since this intervention, the ICU CLABSI rate has decreased from a rate of 3.3 per 1,000 central line days in April and May to a current rate of 0.

**Conclusion:** The timely identification and root cause analysis of a problem must be followed by timely, intensive, and repeated interventions that are designed to attack the causes of problems at their source. After the crisis period is over, the interventions must be maintained to ensure that gains made can be sustained.

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#### 506. Variation in Occupational Activities and Infection Prevention Practices in Healthcare Personnel Based on Exposure to COVID-19 Units

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**Session:** P-17. COVID-19 Infection Prevention

**Background:** Healthcare personnel (HCP) may be at increased risk for COVID-19, but differences in risk by work activities are poorly defined. Centers for Disease Control and Prevention recommends cohorting hospitalized patients with COVID-19 to reduce in-hospital transmission of SARS-CoV-2, but it is unknown if occupational and non-occupational behaviors differ based on exposure to COVID-19 units.

**Methods:** We analyzed a subset of HCP from an ongoing CDC-funded SARS-CoV-2 serosurveillance study. HCP were recruited from four Atlanta hospitals of different sizes and patient populations. All HCP completed a baseline REDCap survey. We used logistic regression to compare occupational activities and infection prevention practices among HCP stratified by exposure to COVID-19 units: low (0% of shifts), medium (1–49% of shifts) or high (≥50% of shifts).

**Results:** Of 211 HCP enrolled (36% emergency department [ED] providers, 35% inpatient RNs, 17% inpatient MDs/APPs, 7% radiology technicians and 6% respiratory therapists [RTs]), the majority (79%) were female and the median age was 35 years. Nearly half of the inpatient MD/APPs (46%) and RNs (47%) and over two-thirds of the RTs (67%) worked primarily in the ICU. Aerosol generating procedures were common among RNs, MD/APPs, and RTs (26–58% performed ≥1), but rare among ED providers (0–13% performed ≥1). Compared to HCP with low exposure to COVID-19 units, those with medium or high exposure spent a similar proportion of shifts directly at the bedside and were about as likely to practice universal masking. Being able to consistently social distance from co-workers was rare (33%); HCP with high exposure to COVID-19 units were less likely to report social distancing in the workplace compared to those with low exposure; however, this was not significantly different (OR 0.6; 95% CI: 0.3, 1.1). Concerns about personal protective equipment in COVID-19 units were similar across levels of exposure (Table 1).

Table 1: Occupational activities and infection prevention behaviors of healthcare personnel stratified by level of exposure to COVID-19 units

Table 1: Occupational activities and infection prevention behaviors of healthcare personnel stratified by level of exposure to COVID-19 units

Variable <sup>1</sup>	Level of exposure to COVID-19 units <sup>2</sup>			Total (n = 211) (n (%))
	Low (n = 73) (n (%))	Medium (n = 41) (n (%)) OR (95% CI) <sup>3,4</sup>	High (n = 95) (n (%)) OR (95% CI) <sup>3,4</sup>	
<b>Occupation</b>				
Emergency room provider	35 (48)	18 (44)	24 (25)	77 (36)
Inpatient MD/APP	14 (19)	6 (15)	13 (14)	35 (17)
Inpatient RN	17 (23)	14 (34)	42 (44)	73 (35)
Respiratory therapist	3 (4)	1 (2)	8 (8)	12 (6)
Radiology technician	4 (5)	2 (5)	8 (8)	14 (7)
<b>Proportion of shifts spent directly at bedside</b>				
Low (≤ 50%)	25 (34)	16 (39)	30 (32)	71 (34)
High (> 50%)	48 (66)	25 (61)	65 (68)	138 (66)
<b>Able to consistently social distance from co-workers</b>	29 (40)	15 (37)	26 (27)	70 (33)
<b>Practicing universal masking nearly all the time at work</b>	58 (79)	31 (76)	71 (75)	160 (77)
<b>Had concerns about PPE use while in COVID-19 units<sup>5</sup></b>	0 (0)	8 (20)	25 (27)	33 (16)
<b>Goes shopping outside home</b>	65 (89)	36 (88)	79 (83)	181 (86)

<sup>1</sup> All questions about occupational activities refer to the last 2 weeks

<sup>2</sup> Low: no shifts spent in COVID-19 cohorting units; Medium: more than none but less than half of shifts spent in COVID-19 cohorting units; High: half or more of shifts spent in COVID-19 cohorting units; Information was missing for 2 participants

<sup>3</sup> Logistic regression was used to examine associations between level of exposure to COVID-19 cohorting units and variables; \* = significant associations

<sup>4</sup> The reference group is "Low" exposure to COVID-19 cohorting units for all variables except "Had concerns about PPE use while in COVID-19 units", for which the reference group is "Medium" exposure to COVID-19 cohorting units

<sup>5</sup> Only asked for participants who worked at least some shifts in COVID-19 units (n = 136); percentages calculated with denominators equal to only participants who were asked the question

Abbreviations: OR, odds ratio; CI, confidence interval; MD, doctor of medicine; APP, advanced practice provider; RN, registered nurse; IQR, interquartile range; PPE, personal protective equipment

**Conclusion:** The proportion of time spent in dedicated COVID-19 units did not appear to influence time HCP spend directly at the bedside or infection prevention practices (social distancing and universal masking) in the workplace. Risk for SARS-CoV-2 infection in HCP may depend more on factors acting at the individual level rather than those related to location of work.

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#### 507. Activation of Macrophages Enhances Susceptibility to SARS-CoV-2 Antibody-Dependent Enhancement and Promotes Damage to Downstream Epithelial Cells

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**Session:** P-18. COVID-19 Pathogenesis

**Background:** The distinct shift in peripheral monocyte activation and infiltration of these cells into the respiratory tract observed in severe cases of COVID-19 suggests that like SARS-CoV-1, the acute respiratory distress syndrome (ARDS) observed in SARS-CoV-2 infections may result from damage to the respiratory epithelia by improperly activated macrophages (MPs). In this study, we examined the ability of non-neutralizing antibodies to sensitize MPs to killing by SARS-CoV-2, as well as the impact of these cells on downstream epithelial cells.

**Methods:** Raw 264.7 cells were seeded into 96-well plates at a density of 1x10<sup>4</sup>/well and incubated overnight in the presence or absence of heat-inactivated LPS derived from either *E. coli* (EC) or *S. enteritidis* (Sal). Cells were then treated with non-neutralizing antibodies or vehicle control at the time of infection with SARS-CoV-2. Viability was assessed 48 hours post-infection by luminescence following the addition of CellTiter-Glo<sup>®</sup> (Promega).

**Results:** While no decrease in cell viability was observed with SARS-CoV-2 alone, the presence of non-neutralizing antibodies against either the nucleocapsid or spike protein of SARS-CoV-2 decreased cell survival to 35.98% and 53.67% of the cell control, respectively (p < 0.0001 and p = 0.0003). Activation of MPs with Sal-derived LPS sensitized MPs to viral killing, even in the absence of non-neutralizing antibody (20.12% viability, p < 0.0001). This was not observed in MPs activated by EC LPS. MP activation by both Sal and EC LPS further enhanced viral killing in the presence of anti-nucleocapsid, reducing cell viability to 12.21% (0.0001) and 6.46% (p < 0.0001). Finally, supernatants collected from naïve MPs subjected to ADE markedly increased the susceptibility of Vero E6 cells to SARS-CoV-2 nearly 9.8-fold (p < 0.0001).

**Conclusion:** Here we demonstrate that naïve MPs, normally resistant to infection by SARS-CoV-2, are rendered susceptible to viral killing by activation and the presence of non-neutralizing antibodies to SARS-CoV-2. Furthermore, MPs secrete an as yet, unknown factor that enhances the susceptibility of Vero E6 to SARS-CoV-2. Taken together, these data suggest that MPs play an important role in determining the severity of SARS-CoV-2 infection.

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#### 508. Biomarker elevation during COVID-19: Differences between ambulatory and hospitalized individuals

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