Session: P-19. COVID-19 Infection Prevention

Background. At the onset of the COVID-19 pandemic, hospitals implemented infection control measures with limited data on predictors of nosocomial SARS-CoV-2 transmission. We aimed to quantify SARS-CoV-2 presence in an inpatient setting to understand nosocomial risk.

Methods. Patients admitted with confirmed SARS-CoV-2 infection at an urban academic hospital were enrolled. Demographic/clinical characteristics, a PCR nasal swab (NS), and air samples on filter media in the near- (< 6 ft) and far-field (>6 ft) of each patient for 3.5 hours were collected. PCR was used to detect SARS-CoV-2 on filter media. Associations between clinical characteristics and presence of SARS-CoV-2 in air samples used Fisher's exact and Wilcoxon rank sum tests.

Results. Of 52 subjects, 46% had no detectable virus by nasal swab on the day of sampling. Of 104 room air samples, 16% had detectable virus from 25% of rooms, including 10 near and 7 far field samples. Subjects with a positive room air sample had fewer days from symptom-onset compared with those with a negative air sample (median 6 vs. 8, p=0.24). Being on room air and having a nasal swab positive increased the odds of detecting virus in air samples but were not statistically significant.

Conclusion. A small number of air samples with detectable SARS-CoV-2 may suggest lower nosocomial risk than previously anticipated. Multiple subject and environmental factors may have contributed to this finding including patient source control masking, anti-viral therapies and HEPA filtration. The decreased association of virus in the air of those with more days of symptoms but with the need for supplemental oxygen may be related to what is now known about the COVID-19 inflammatory response after the infectious period.

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Table 1: Exposure risk classifications (adapted from CDC Interim U.S. Guidance for Risk Assessment and Work Restrictions for Healthcare Personnel with Potential Exposure to SARS-CoV-2).

| Type of Exposure | High Risk | Medium Risk | Low Risk |
|------------------|-----------|-------------|----------|
| Household Exposure | Always high risk | Exposed healthcare worker wearing a surgical face mask or respirator but no eye protection | Exposed healthcare worker wearing a surgical face mask and eye protection but no gown or gloves |
| Contact with unmasked COVID-19 positive patient, HCW, or visitor for >15 min and ≤6 ft away | Exposed healthcare worker wearing a surgical face mask or respirator but no eye protection | Exposed healthcare worker wearing a surgical face mask and eye protection but no gown or gloves |
| Contact with masked COVID-19 patient or HCW for >15 min and ≤6 ft at work | Exposed healthcare worker wearing a surgical face mask or respirator, or no PPE at all | Healthcare worker wearing all recommended PPE |
| Performed a high-risk aerosol-generating procedure on COVID-19 patient | Healthcare worker wearing a gown, gloves, and surgical face mask but no eye protection | Healthcare worker wearing a gown, gloves, eye protection, surgical face mask |

Figure 1. Number of reported exposures per number of healthcare workers in each job category, stratified by adjudicated exposure risk.
(12.5% vs. 4.2%, vs. 0.4%; p < 0.001). The rate of SYX infection following exposure to a fellow HCW (179/3,408; 5.6%) was higher than that following exposure to a patient (81/3,408; 2.4%; p < 0.001).

Conclusion. Conversion following exposure to COVID-19 in the healthcare setting with appropriate protective equipment was low. Incomplete testing of all exposed individuals was a limitation and our data may underestimate the true conversion rate. Our findings support our local practice of not quarantining HCWs following non-household exposures. Limiting contact tracing to only high or medium risk exposures may best utilize limited personnel resources.

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419. SARS-CoV-2 Environmental Surface Contamination of Healthcare Staff Common Areas
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Session: P-19. COVID-19 Infection Prevention

Background. There are limited data regarding SARS-CoV-2 (SC2) environmental contamination in staff areas of healthcare settings. We performed environmental sampling of staff areas in wards where coronavirus disease 19 (COVID-19) patients received care and compared findings to surfaces within COVID-19 patient rooms.

Methods. The study was conducted at the Hospital of the University of Pennsylvania (Philadelphia, PA) from 9/15/20-1/26/21. Sampling of 20cm² surfaces in staff common areas (breakroom high-touch surfaces comprising tables and microwave/refrigerator handles; bathroom surfaces comprising toilet, sink, and doorknob; and floors), nurse workstations (computer mice and floors), and COVID-19 patient rooms (high-touch surfaces comprising bedrail, computer mice/keyboards, and doorknobs; bathroom surfaces; and floors) was performed using flocked swabs one or more times per week. Specimens underwent RNA extraction and quantitative real-time polymerase chain reaction to detect the SC2 N1 region. Median comparisons were performed using Wilcoxon rank sum test. Trends in odds were evaluated using Score test.

Results. Proportions of surface specimens with detectable SC2 RNA are summarized in Table 1. Median copy numbers were lower among staff toilets compared to COVID-19 patient toilets (135.6 vs. 503.8 copies/specimen, p=0.02), lower among staff breakroom compared to patient room high-touch surfaces (104.3 vs. 220.3 copies/specimen, p=0.007), and similar between staff and patient room samples from sinks and floors. At nurse workstations, SC2 RNA was detected among 22/177 (12.4%) computer mouse and 147/178 (82.6%) floor samples. Odds of SC2 detection increased by study week among common area (p< 0.001) and nurse workstation samples (p< 0.001) (Figures 1 and 2).

Table 1. SARS-CoV-2 (SC2) RNA detection on staff common area and coronavirus disease 19 (COVID-19) patient room surfaces at the Hospital of the University of Pennsylvania, 9/15/20-1/26/21.

| Surface type         | Staff common area no. of specimens with detectable SC2 RNA total no. (%) | COVID-19 patient room no. of specimens with detectable SC2 RNA total no. (%) |
|----------------------|--------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| High-touch surface   | 26/440 (10.6%)                                                           | 286/760 (52.4%)                                                            |
| Bathroom             | 10/440 (9.8%)                                                            | 110/757 (14.6%)                                                            |
| Floor                | 120/1667 (7.5%)                                                          | 1244/2574 (48.7%)                                                          |

Conclusion. A low prevalence of detectable SC2 RNA was observed among staff area high-touch surfaces; however, the likelihood of detection increased over time. Environmental SC2 RNA detection may reflect primary contamination from infected healthcare workers or secondary contamination from contact with infected patients, though a direct relationship between surface SC2 RNA viral detection and transmission risk has not been established.

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420. Emergency Nurses’ Experiences over 1 Year of the COVID-19 Pandemic: A Qualitative Study
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