the first 9 months of the pandemic. Time exposed to source patient was significantly associated with infection. Our experience demonstrates the potential benefit of asymptomatic admission testing with expedited turnaround time to mitigate viral transmission between patients in double-occupancy rooms.

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Presentation Type:
Poster Presentation - Poster Presentation
Subject Category: COVID-19
Fitted containment efficiency of face masks for reducing emission of aerosols in the indoor environment
William Bennett; Steven Prince; Kirby Zeman and James Samet

Background: Face masks are a major tool for reducing the spread of COVID-19 has been the use of face masks because (1) they protect the wearer from aerosol laden virus in the environment and (2) they reduce aerosol emissions to the environment from infected individuals. Methods that quantify the fitted mask filtration efficiency for protection of the wearer are well established (eg, Sickbert-Bennett et al, *JAMA Intern Med* 2020;180:1607). In contrast, current methods for assessing face-mask containment efficiency are generally semiquantitative and rely on measurement of a very low concentration of aerosols emitted from a healthy or infected human, or the use of mannequins in which a high concentration of surrogate aerosols can be introduced inside the mask. **Methods:** Expanding on our standard methods used for fitted face-mask filtration efficiency, we designed a small-volume, low-ventilation chamber to accommodate a seated study participant. The study participant wore a ported face mask to allow introduction of a stream of 0.05 μm NaCl particles at a constant concentration (TSI 8026 particle generator) into the mask space. The ambient chamber concentration was continuously measured by a TSI 3775 condensation particle counter sampling 2 feet (~2 m) in front of the participant's head over a series of three 3-minute periods: (1) resting, (2) reading out loud, and (3) repeated forceful coughing (2 × 10 coughs) (~450 L/min peak flows). Figure 1 shows a raw data sample for the coughing procedure. Containment efficiency (%) for each mask and procedure were determined as 100 × (1 – the average of all 1 – second ambient concentration values between 30 and 180 seconds divided by the same for the "no mask" condition). **Results:** Table 1 shows the average % containment efficiency for 2 study days with each mask or procedure in an adult male. The 2-ear-loop masks (KN95 and procedure) tested during coughing had the greatest reduction in % containment efficiency compared to that during resting breathing, likely owing to a decreased mask fit with transient pressure increase inside the mask associated with the coughs. The N95 was least affected by the introduction of reading and/or coughing,
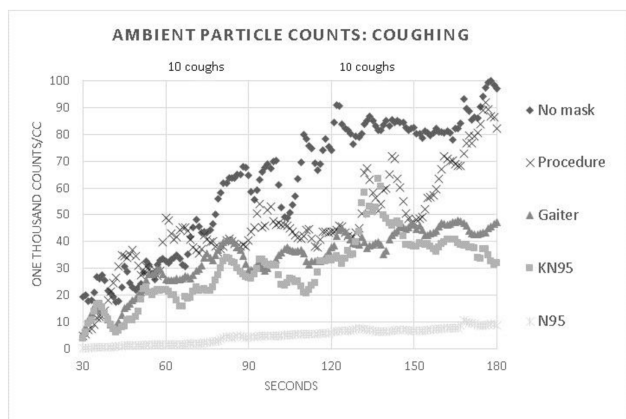

Fig. 1.

Table 1.

Masks	%CE		
	Resting	Reading	Coughing
N95	94.8	94.8	94.2
KN95	64.0	64.0	52.0
Procedure	46.6	41.6	29.9
Gaiter	39.0	45.1	47.6

maintaining near 95% containment efficiency throughout. **Conclusions:** Our preliminary data on fitted containment efficiency of masks under different conditions suggest that the fitted containment efficiency closely mimics their performance for personal protection. This information that may aid in providing optimum source control in indoor environments.

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Subject Category: COVID-19
SARS-CoV-2 breakthrough infections among hospitalized patients in southeastern Michigan
Sydney Fine; Kellee Necaise; Alexandra Hayward and Anurag Malani

Background: As of January 2022, more than 57 million cases of COVID-19 have been reported in the United States. Three primary COVID-19 vaccines are widely available: Pfizer (BNT162b2), Moderna (mRNA-1273), and Johnson & Johnson's-Janssen (JNJ-78436735). The vaccines are effective but do not prevent all infections. We investigated trends in type of vaccine receipt, demographic characteristics, and disease outcomes in COVID-19 breakthrough infections among hospitalized patients. **Methods:** A breakthrough case is defined as the detection of SARS-CoV-2 ≥14 days after completion of all doses of an FDA-authorized COVID-19 vaccine. An electronic medical record report in EPIC EHR software identified 85 fully vaccinated patients with a documented positive SARS-CoV-2 result between February and September 2021 at 2 hospitals in southeastern Michigan. Demographic information and hospitalization characteristics, including length of stay and oxygen requirements, were collected from the report. Patients were classified into disease severity categories: nonsevere, severe, or critical. A case was considered severe if the patient's oxygen saturation level (SpO_2) was ≤94% on room air or if the patient required supplemental oxygen. Illness was considered critical if the patient developed respiratory failure, including mechanical ventilation or extracorporeal membrane oxygenation. All other cases were classified as nonsevere. Cycle threshold (Ct) values, the number of PCR cycles required to reach a threshold of SARS-CoV-2 genomic material, were collected from the hospital microbiology lab. **Results:** We identified 85 breakthrough infections (Fig. 1). The average patient age was 69.9±15.7 years, and 44 (51.8%) were female. Severe disease was most common (n = 73, 85.9%) followed by nonsevere disease (n = 7, 8.24%), and 9 patients (10.6%) in this cohort died. Most patients received either the Moderna (n = 35, 41.2%) or Pfizer (n = 38, 44.7%) vaccines. Pfizer vaccine receipt was most common among patients with severe illness (n = 33 of 73, 45.2%), and Moderna vaccine receipt was most common among patients with critical illness (n = 4 of 5, 80.0%). Average time from last vaccination to positive test was longest among Moderna vaccine recipients (181.9±43.1 days) and shortest among J&J vaccine recipients (91.0±61.1 days). The average Ct value was 23.8±7.5 and ranged from 13.0 to 41.3. There were no appreciable differences in the average Ct value by vaccine manufacturer.
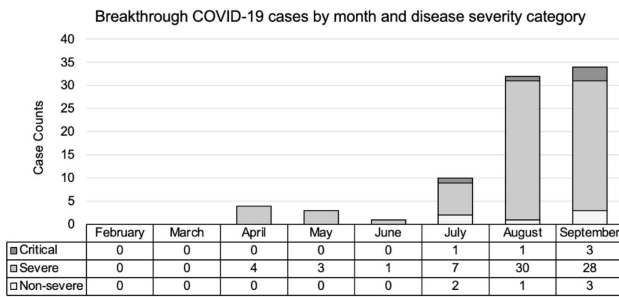
Breakthrough COVID-19 cases by month and disease severity category

	February	March	April	May	June	July	August	September
■ Critical	0	0	0	0	0	1	1	3
▨ Severe	0	0	4	3	1	7	30	28
□ Non-severe	0	0	0	0	0	2	1	3

Fig. 1.

Conclusions: Breakthrough infections among hospitalized patients were uncommon, but incidence increased with time after vaccine receipt in all vaccines. Further study is needed to examine differences and severity in breakthrough infections by vaccine type and in individuals who completed booster vaccines.

Presentation Type:
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Subject Category: COVID-19
COVID-19 postvaccination adverse events and vaccine hesitancy among hospital employees: Is there a link?

Anastasiia Weiland; Rangit Vallapureddy; Sarah Boaitey and Keyvan Ravakhah

Background: Vaccination against COVID-19 has demonstrated high efficacy in preventing illness severe enough to result in hospitalization. Despite these data, universal vaccine adoption by different population groups, including hospital employees, has been a challenging public health task. Vaccine-associated adverse events, the novelty of the vaccines, and the absence of long-term follow-up data have been reported as major contributors to COVID-19 vaccines mistrust. We sought to quantify postvaccination adverse events, to assess their correlation with unvaccinated status, and to evaluate other factors contributing to COVID-19 vaccination hesitancy. **Methods:** In a 240-bed community hospital located in a metropolitan area in the United States, we conducted a voluntary and anonymous online survey among contracted employees between September and November 2021. The study protocol was approved by the institutional review board at our facility. **Results:** Of all 185 responders, 143 (77%) were female, 95 (51%) were aged <51 years, and 146 were White (79%). Most (n = 100, 54%) reported no past medical history. Most common comorbidities included heart disease (n = 45, 24%), diabetes (n = 20, 11%), and chronic lung disease (n = 17, 9%). Among those surveyed, 178 were vaccinated either fully (n = 172, 93%) or partially (n = 6, 3%), and 7 (4%) were unvaccinated. Moderna was the most common vaccine received (n = 152, 85%). Those who received a 2-dose series reported experiencing more adverse events after the second dose than after the first dose (710 vs 451) of either Moderna or Pfizer vaccine. Adverse events included pain at the injection site (n = 257, 22%), fatigue (n = 178, 15%), chills (n = 133, 11%), muscle pain (n = 120, 10%), and headache (n = 117, 10%). Also, 2 responders reported omitting the second dose due to the severity of symptoms after the first dose of both Moderna and Pfizer vaccines. Concern for safety (n = 5, 71%) was the leading reason for vaccine refusal among unvaccinated followed by concern for efficacy (n = 3, 43%), lack of trust in government promoting vaccination (n = 3, 43%), religious reasons (n = 2, 28%), and immunity due to prior COVID-19 (n = 2, 28%). In addition, 3 responders reported intent to be vaccinated in the future. **Conclusions:** Most of the responders reported at least 1 adverse event related to COVID-19 vaccination. No severe adverse events were reported; however, a high prevalence of self-limited postvaccination adverse events might be misinterpreted as a concern for vaccine safety, as seen among surveyed unvaccinated individuals in our cohort. Targeted education is needed to limit knowledge gaps and address existing cognitive biases in COVID-19 vaccination among hospital employees.

Presentation Type:
Poster Presentation - Poster Presentation
Subject Category: COVID-19
Postacute sequelae of SARS-CoV-2 (PASC) in nursing home residents: A case–control study

Sophie Clark; Liza Marie Bautista; Karen Neeb; Ana Montoya; Kristen Gibson; Julia Mantey; Lillian Min and Lona Mody

Background: Postacute sequelae of SARS-CoV-2 (PASC) include fatigue, dyspnea, anxiety, and cognitive impairment. Few studies have explored the prevalence or presentation of PASC among nursing home (NH) residents. **Method:** A case–control study was conducted at 1 NH in Michigan in December 2021. Cases were defined as residents with SARS-CoV-2 infection between November 2, 2020, and October 8, 2021. Controls lived at the same NH during this interval and never tested positive for SARS CoV-2. Patient characteristics were compared between cases and controls using the Fisher exact test and Wilcoxon rank-sum test. Primary outcomes were functional decline, cognition, and adverse health outcomes. Outcomes were assessed by comparing measures on last observation to observations before COVID-19 diagnosis (cases) or to earliest observation (controls). Multivariable logistic regression assessed correlation between COVID-19 diagnosis and outcomes. **Results:** In total, 152 residents were identified for inclusion (147 included in final analyses, 76 cases, 71 controls); 5 were excluded due to insufficient data. We collected the following resident characteristics: 66% were aged ≥80 years; 73% were female; 95% were non-Hispanic white; 82% were long-stay residents; median of 3 comorbidities (IQR, 2–4). The mean number of follow-up observations was 2.60 (SD, 1.25). No significant differences in population characteristics were detected between cases and controls. Moreover, 106 patients (46 cases and 60 controls) had at least 1 follow-up visit and were thus included in the analyses to evaluate long-term outcomes. Among them, cases experienced significant declines in completing transfers (OR 5.65, p **Conclusions:** Nursing home residents with COVID-19 are more likely to enter hospice and have a higher mortality rate in the year following infection. Survivors experience significant functional decline in basic activities of daily living,

Table 1. Patient Demographic Characteristics

Characteristic	Total Population (N=147)	Cases (N=76)	Controls (N=71)	p-value
Number of visits (median, IQR)	3 (2-6)	3 (2-6)	4 (2-6)	0.563[a]
Number of post-baseline visits (median, IQR)	2 (0-4)	2 (0-3)	2 (1-4)	0.251[a]
Age				
35-69	14 (9.5%)	4 (5.3%)	10 (14.1%)	
70-79	36 (24.5%)	18 (23.7%)	18 (25.4%)	0.072[b]
80-89	53 (36.1%)	34 (44.7%)	19 (26.8%)	
Age >89	44 (29.9%)	20 (26.3%)	24 (33.8%)	
Sex				
Male	40 (27.2%)	22 (29.0%)	18 (25.4%)	0.712[b]
Female	107 (72.8%)	54 (71.1%)	53 (74.7%)	
Race				
Non-Hispanic white	139 (94.6%)	70 (92.1%)	69 (97.2%)	0.278[b]
Non-white or Unknown	8 (5.4%)	6 (7.9%)	2 (2.8%)	
Length of stay				
Short-stay	27 (18.4%)	14 (18.4%)	13 (18.3%)	1.00[b]
Long-stay	120 (81.6%)	62 (81.6%)	58 (81.7%)	
Comorbidities				
Dementia	80 (54.4%)	46 (60.5%)	34 (47.9%)	0.138[b]
Diabetes	44 (29.9%)	24 (31.6%)	20 (28.2%)	0.720[b]
CHF	49 (33.3%)	28 (36.8%)	21 (29.6%)	0.385[b]
COPD	38 (25.9%)	20 (26.3%)	18 (25.4%)	1.000[b]
Number of comorbidities (median, IQR)	3 (2-4)	3 (2-4)	3 (1-4)	0.068[a]

[a] Significance evaluated using Wilcoxon rank-sum test
[b] Significance evaluated using Fisher's exact test