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
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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,

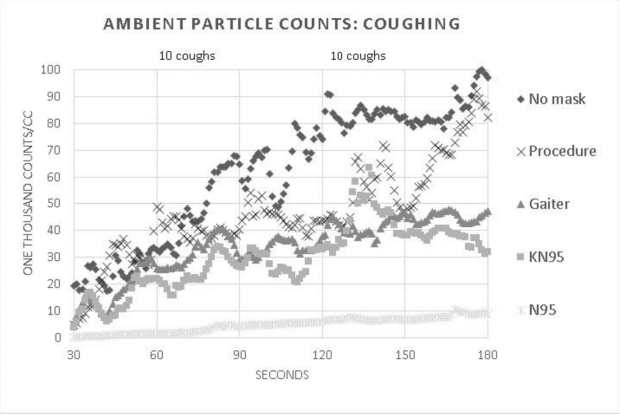

Fig. 1.

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
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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.