


## Research Brief

# Incidence of postprocedural coronavirus disease 2019 (COVID-19) at an urban academic medical center

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The coronavirus disease of 2019 (COVID-19) has created unprecedented challenges to health care. In the spring of 2020, elective procedures were postponed for various specialties to decrease potential exposures and allow resource reallocation.<sup>1</sup> As health systems resume elective procedures, we face a new challenge—patient fear. Two-fifths of US adults report avoiding or delaying medical care out of concern for COVID-19.<sup>2</sup> Although current literature suggests that rates of hospital-acquired COVID-19 are low, little is known about the risk to patients undergoing same day or hospital-based procedures.<sup>3,4</sup> In this study, we investigated the rate of postprocedural COVID-19, and we hypothesized that it would be low.

## Methods

We conducted a retrospective cohort study of all adult cases of same day or hospital-based procedures at the University of Miami Hospital and Clinics from April 1 to September 23, 2020, who were negative by severe acute respiratory coronavirus virus 2 (SARS-CoV-2) polymerase chain reaction (PCR) swab testing within 72 hours before the procedure, had contact with our health system 5–14 days after the procedure, and were either screened for COVID-19 symptoms or were tested for SARS-CoV-2 during this contact. This 5–14-day time frame was selected because the median time to symptom onset after exposure is 5 days and 99% of people who exhibit symptoms are symptomatic by 14 days.<sup>5</sup>

Cases were identified from the electronic health record and included all procedures that were completed during the study period. Case-specific data, results of all tests, and answers to symptom screens (intended to be performed at each health system contact) were also obtained from the electronic health record. Standard summary statistics were used to describe cohort characteristics and postprocedural symptom screening and testing outcomes. Among cases who were both screened and tested, we evaluated the accuracy of symptom screening for test positivity. Finally, for those cases who had symptoms on screening but were never tested within our system, we performed a qualitative chart review to understand the circumstances. This study was

approved by the University of Miami Institutional Review Board (no. 20200739).

## Results

The cohort consisted of 8,881 preprocedure COVID-19–negative cases, of whom 879 (9.9%) were both screened for symptoms and tested for SARS-CoV-2 within 5–14 days after the procedure. Moreover, 5,748 (64.7%) were screened but not tested and 131 (1.5%) were tested but not screened (Fig. 1 and Supplementary Table 1 online).

Overall, 82 postprocedure screens (1.2% of screens) revealed COVID-19–associated symptoms (including 48 cases who were tested and 34 who were not) and 13 tests (1.3% of tests) were positive. Furthermore, 91 (1.0% of all cases) had either symptoms or a test consistent with COVID-19. A positive symptom screen was only 40.0% sensitive but 94.9% specific for a positive SARS-CoV-2 test, with a negative predictive value of 99.3%.

Chart review of the 34 cases (0.4% of all cases) who screened positive for symptoms but were not tested revealed flaws in the screening process. Cases falsely screened positive by acknowledging prior SARS-CoV-2 testing (often preoperative, not symptom triggered) or, less frequently, reporting symptoms that were chronic (ie, not due to COVID-19).

## Discussion

We found a rate of postprocedure COVID-19 acquisition of <1.5%, even lower than the daily test positivity rate for Florida during the same period of 2.3%–19.6%.<sup>6</sup> Our health system has strict infection control practices: separate COVID-19 inpatient wards, individual rooms for all patients, droplet precautions even if SARS-CoV-2 swab negative, and adequate personal protective equipment. These practices likely minimized nosocomial SARS-CoV-2 transmission in addition to COVID-19 prevention education on discharge.

Our study was limited by its single-center design inclusive of a cohort heavily weighted toward ophthalmologic procedures, which may have affected the generalizability of our results. We also lacked access to test results performed outside our health system. Due to the inability to influence patient behavior in the initial 72 hours prior to and after the procedure, patients could potentially become infected in the community which may have influenced the results.

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**Cite this article:** Szewczyk JB, et al. (2021). Incidence of postprocedural coronavirus disease 2019 (COVID-19) at an urban academic medical center. *Infection Control & Hospital Epidemiology*, 42: 1279–1281. <https://doi.org/10.1017/ice.2021.191>

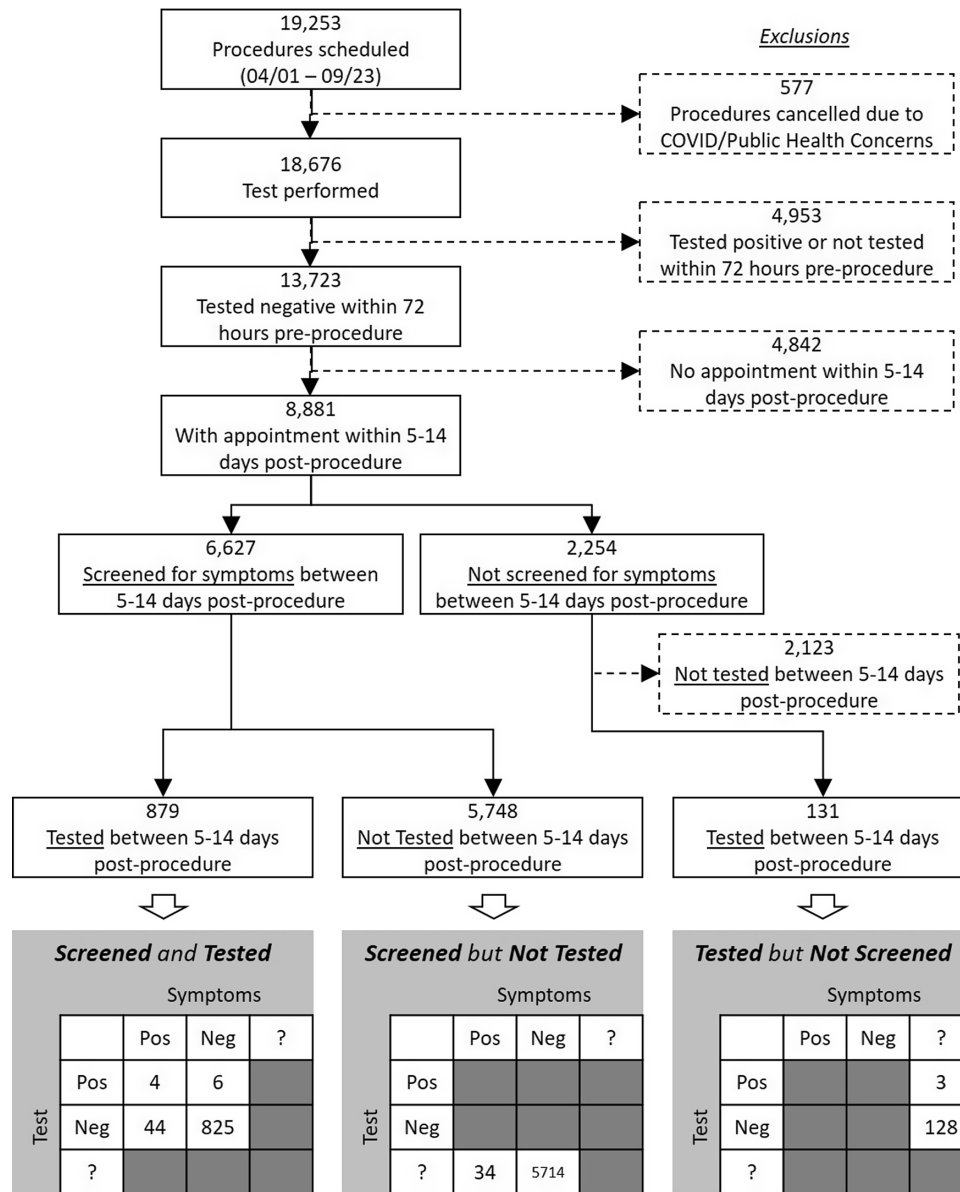


Fig. 1. Cohort flow diagram with symptom screen and testing results. Note. Neg, negative; Pos, positive; ?, unknown.

Moreover, variation in community incidence rates over the course of our study may have affected postprocedural COVID-19 acquisition. An attempt to compare test positivity rates over time between cases and the regional population would necessarily be confounded by differences (eg, access to healthcare) between cohorts. Finally, only 9.9% of cases were screened and tested. Our inability to include 90.1% of cases may have introduced bias because, despite demographic and clinical similarities between included and excluded cases, service lines performing included and excluded cases differed.

Our results suggest that the risk of acquiring postprocedural COVID-19 is low in the setting of strict infection control practices. Further delay of procedures due to fear of contracting COVID-19 may not be warranted.

**Supplementary material.** To view supplementary material for this article, please visit <https://doi.org/10.1017/ice.2021.191>

**Acknowledgments.** The University of Miami Hospital and Clinics had no role in any aspect of the work.

**Financial support.** The UHealth-DART Research Group is supported by the University of Miami Hospital and Clinics.


**Conflicts of interest.** All authors declare no conflicts of interest related to this article.

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## Effect of severe acute respiratory coronavirus virus 2 (SARS-CoV-2) mRNA vaccination in healthcare workers with high-risk coronavirus disease 2019 (COVID-19) exposure

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Healthcare providers (HCPs) have experienced significant burden of disease throughout the coronavirus disease 2019 (COVID-19) pandemic.<sup>1,2</sup> Infection prevention measures mitigated the significant initial work-related risk; however, many HCPs developed COVID-19 following exposure to severe acute respiratory coronavirus virus 2 (SARS-CoV-2)-infected individuals at home or in the community.<sup>2,3</sup> Healthcare systems have developed policies around SARS-CoV-2 testing, returning to work after infection, and high-risk exposures for their employees.<sup>4</sup> At Nebraska Medicine, employees were asked to report any COVID-19 symptoms or exposures to the Employee Health Department for instructions on testing, quarantine, and isolation. Due to the implementation of comprehensive hospital-based COVID-19 infection control policies and procedures, the major risk factor for employee quarantine at our institution was household contact with an infected family member. The emergency use authorization of 2 messenger RNA (mRNA) vaccines—the BNT162b2 vaccine (Pfizer-BioNTech) and the mRNA-1273 vaccine (Moderna)—were critical events in the response to the pandemic.<sup>5,6</sup> In clinical trials, both vaccines were shown to be very effective at preventing severe disease and hospitalization due to COVID-19; however, information regarding acquisition of infection with subsequent asymptomatic shedding of SARS-CoV-2 remain limited, particularly following known exposures to close contacts with COVID-19 cases.<sup>5,6</sup> Therefore, we describe the incidence of SARS-CoV-2 infection among vaccinated employees at our institution after a high-risk household exposure to a family member with COVID-19.

Since December 18, 2020, Nebraska Medicine, a tertiary-care academic medical center in Omaha, Nebraska, has fully vaccinated 12,160 employees with 1 of the 2 available mRNA vaccines. The availability of effective vaccines required adjustment of the return-to-work procedure after COVID-19 exposures. Employees with a household exposure to a close

contact with active COVID-19 infection and who were deemed essential and unable to work remotely were eligible to enroll in a screening program rather than completing a home quarantine period. Employees were eligible for the screening program if their exposure was >7 days after the second dose of SARS-CoV-2 vaccine and they remained asymptomatic. If these criteria were met, the employees underwent a nasopharyngeal swab (NP) for SARS-CoV-2 testing by PCR, and, if negative, they were allowed to return to work. The employee was then tested serially by NP swab every 5–7 days until at least 7 days from their last exposure to the SARS-CoV-2-positive household member during the period of viral shedding (typically 10 days). Employees were instructed to self-isolate from the positive individual in the home, if logistically feasible. Employees unable to do so were not excluded from the serial testing program, but their period of serial testing was extended until 7 days after the household contact was considered noninfectious.

As of March 30, 2021, 48 employees had been enrolled in the protocol. Of these, 5 were still actively undergoing serial testing, and 43 completed the protocol. Among them, 38 did not develop symptoms and were negative for SARS-CoV-2 on entry into protocol and on serial testing. Also, 13 employees had 1 test. Furthermore, 11 were able to physically distance away from the positive contact; 23 had 2 negative tests; and 2 had 3 or more negative tests. Moreover, 5 employees tested positive: 3 employees were positive in the protocol and 2 were positive on entry testing. These data currently represent a vaccine failure rate of 11.6% (5 of 43). We were not able to determine whether physical distancing in the household had any impact on transmission.

Of the 5 fully vaccinated employees who tested positive, all had asymptomatic or mild disease. None developed severe disease requiring hospitalization, which is consistent with previously published data about infections in individuals vaccinated with SARS-CoV-2 mRNA vaccines.<sup>5,6</sup> However, 3 developed mild symptoms with cough, fever, congestion, or headache, and 2 were asymptomatic (Table 1). None of the employees who tested positive were immunocompromised. They ranged in age from 23 to 29 years.

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**Cite this article:** Selby LM, *et al.* (2021). Effect of severe acute respiratory coronavirus virus 2 (SARS-CoV-2) mRNA vaccination in healthcare workers with high-risk coronavirus disease 2019 (COVID-19) exposure. *Infection Control & Hospital Epidemiology*, 42: 1281–1282. <https://doi.org/10.1017/ice.2021.193>