



Concise Communication

Rapid molecular severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) testing in hospital employees with mild, nonspecific respiratory symptoms facilitates expedient return to work

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Abstract

Nonspecific respiratory symptoms overlap with coronavirus disease 2019 (COVID-19). Prompt diagnosis of COVID-19 in hospital employees is crucial to prevent nosocomial transmission. Rapid molecular SARS-CoV-2 testing was performed for 115 symptomatic employees. The case positivity rate was 2.6%. Employees with negative tests returned to work after 80 (± 28) minutes.

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Individuals infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus that causes coronavirus disease 2019 (COVID-19), present with variable symptoms and severity. Individuals with COVID-19 may have nonspecific respiratory symptoms (like mild congestion and rhinorrhea), which are also common symptoms of seasonal allergies.

Prompt testing of symptomatic individuals for SARS-CoV-2 is warranted to distinguish COVID-19 from other etiologies and is crucial to prevent SARS-CoV-2 transmission among staff and to patients. Reverse-transcription polymerase chain reaction (RT-PCR) testing is commonly used due to its excellent test performance; however, test results require 1–2 days to return,¹ resulting in employee absences and increased strain on hospitals with critical staffing shortages.

The need to remain home with a pending test also exacerbates presenteeism (ie, attending work despite personal illness²) in health care. Presenteeism is associated with significant organizational cost due to productivity loss and spread of infections and is driven by multiple factors, including a desire to avoid burdening colleagues and loss of income.^{3,4} Thus, employees may avoid testing for mild symptoms they believe are not likely to be caused by COVID-19.

For these reasons, we believe that it is crucial to have a low-barrier model for accurate testing of hospital employees with nonspecific respiratory symptoms to rapidly rule out SARS-CoV-2 infection and minimize absences from work. We hypothesized that implementation of rapid molecular SARS-CoV-2 testing would (1)

facilitate detection of mild COVID-19, and (2) permit expedient return to work for employees with negative test results.

Methods

Harborview Medical Center (HMC) Employee Health Service (EHS) created an algorithm to identify symptomatic employees at low risk of COVID-19 based on symptom severity, vaccination status, and presence or absence of a high-risk COVID-19 exposure (Fig. 1). Employees were required to complete a symptom-attestation form at the start of their shift and to contact the EHS-staffed COVID-19 team by phone if symptomatic. Availability of rapid molecular testing was communicated via word of mouth to unit medical directors and managers. Fully vaccinated employees who self-identified new or worsened nonspecific respiratory symptoms and had no high-risk COVID-19 exposure were referred for rapid SARS-CoV-2 PCR testing at the on-site HMC EHS clinic. Individuals who were unvaccinated, had a high-risk COVID-19 exposure, or had high-risk symptoms for respiratory viral illness (ie, fever and cough) were directed to leave work and to undergo standard RT-PCR testing; they were excluded from this study.

Eligible employees underwent anterior nares swabbing by EHS staff or through self-collection as recommended by the Centers for Disease Control and Prevention.⁵ EHS staff submitted samples within 10 minutes of collection to the HMC microbiology laboratory, and testing was performed utilizing Cepheid Xpert Xpress multiplex real-time RT-PCR (Cepheid, Sunnyvale, CA), a platform that detects SARS-CoV-2 with an established positive percent agreement of 97.9% and negative percent agreement of 100.0% in nasopharyngeal specimens.^{6,7} It also detects influenza A, influenza B, and respiratory syncytial virus (RSV).^{6,7} Employees self-isolated while their tests were pending, and individuals with a negative test were permitted to return to work.

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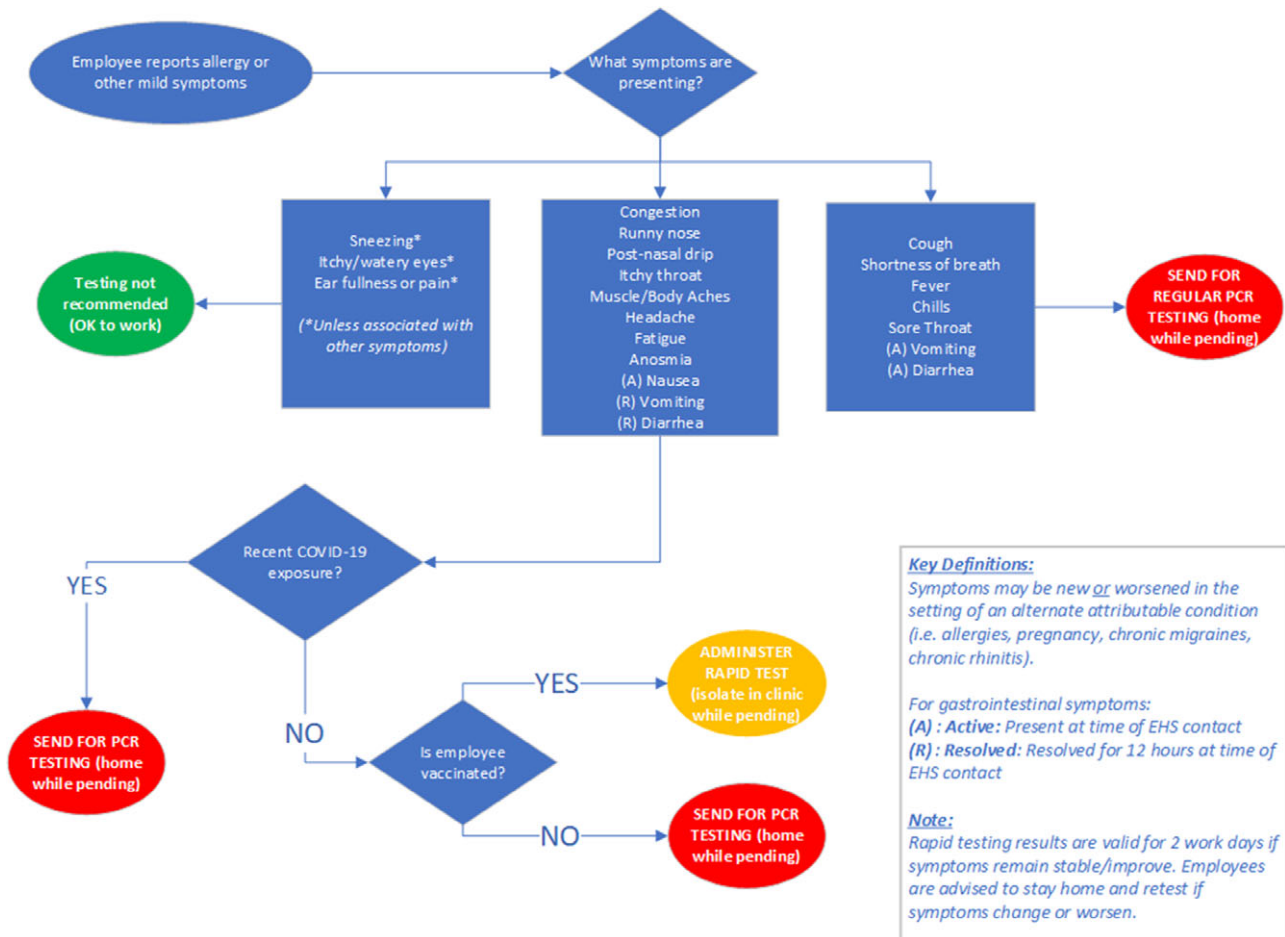


Fig. 1. EHS Algorithm for Determination of Employees Eligible for Rapid COVID-19 Testing.

The algorithm was implemented on May 5, 2021 (Fig. 1). All employees who underwent rapid molecular testing through October 15, 2021, were included in the intention-to-treat analysis. The primary outcome was the prevalence of SARS-CoV-2 infection among symptomatic employees with nonspecific respiratory symptoms. A secondary analysis was performed to evaluate the utilization and implementation of the algorithm.

Frontline healthcare workers (HCWs) were defined as employees with face-to-face patient contact. The UW Institutional Review Board approved the study and waived written informed consent.

Results

In total, 116 HMC employees underwent rapid molecular testing, comprising 7.5% of total SARS-CoV-2 testing for symptomatic HMC employees during the trial period. One individual entry was incomplete and was excluded. Overall, 15 employees had high-risk symptoms (ie, fever, cough, or sore throat) and did not meet criteria for testing through the algorithm; these individuals were included in the intention-to-treat analysis.

Among the 115 employees tested, 99 (86.1%) were frontline HCWs; the remainder were non-frontline staff. Frontline HCWs were subclassified as follows: 92 (80.0%) provided clinical care (ie, nurses, clinicians, therapists, social workers, etc) and 7 (6.1%) performed nonclinical care (ie, environmental services, nutrition services, etc).

The most reported symptoms were congestion or rhinorrhea (60.0%), headache (21.7%), and postnasal drip or itchy throat (18.3%) (Table 1). Also, 69 individuals (60.0%) reported multiple symptoms.

During the study period, 3 (2.6%) of 115 employees tested positive for SARS-CoV-2. The concurrent community incidence in Seattle's King County ranged from 19.9 to 195.2 cases per 100,000 population⁸. Among these 3 employees, 1 was a frontline HCW providing clinical care, 1 was a frontline HCW providing nonclinical care, and 1 was a nonfrontline staff member. Also, 2 (1.7%) of 115 employees tested positive for RSV.

Employees sought testing primarily on weekday mornings (Table 1). For those with negative test results, the return-to-work time was recorded for 90 employees (81.8%), and the mean time from test collection to return to work was 80 (± 28) minutes.

Discussion

Access to reliable SARS-CoV-2 testing for symptomatic hospital employees is crucial to prevent nosocomial spread to staff and patients. This access is relevant for hospital employees with nonspecific respiratory symptoms, who may minimize mild symptoms or delay testing. We implemented an algorithm to identify employees with nonspecific respiratory symptoms at low risk of COVID-19 and implemented rapid SARS-CoV-2 PCR testing. In doing so, we identified mild cases of COVID-19 among employees at work,

Table 1. Utilization and Implementation of the Rapid SARS-CoV-2 PCR Testing Algorithm for Nonspecific Respiratory Symptoms

Variable	No. (%)
Symptoms prompting testing^a	
Congestion and/or rhinorrhea	69 (60.0)
Headache	25 (21.7)
Postnasal drip or itchy throat	21 (18.3)
Itchy eyes or eye pain	14 (12.2)
Sore throat	10 (8.7)
Fatigue	9 (7.8)
Body aches	2 (1.7)
Chills or fever	2 (1.7)
Nausea or resolved vomiting or diarrhea	5 (4.3)
Ear symptoms	6 (5.2)
Cough	3 (2.6)
Other	4 (3.5)
Testing frequency by day of week	
Monday	22 (19.1)
Tuesday	23 (20.0)
Wednesday	22 (19.1)
Thursday	23 (20.0)
Friday	22 (19.1)
Saturday	1 (0.9)
Sunday	2 (1.7)
Testing time of day	
Before 7:00	1 (0.9)
7:00–8:59	45 (39.1)
9:00–10:59	31 (27.0)
11:00–12:59	16 (13.9)
13:00–14:59	11 (9.6)
15:00 or later	11 (9.6)

^aEmployees may have >1 symptom indication for testing, and % totals >100%.

thereby preventing subsequent exposures. Furthermore, individuals with negative tests returned to work promptly, resulting in fewer absences and decreased strain on understaffed hospital units.

Notably, our algorithm includes some nonrespiratory symptoms, such as nausea and resolved vomiting and diarrhea. These symptoms were incorporated into the algorithm to facilitate rapid assessment of SARS-CoV-2 in individuals whose clinical course and symptomatology were low risk for COVID-19. Only 5 employees (4.3%) sought testing for gastrointestinal symptoms, and none of them subsequently tested positive for SARS-CoV-2.

Our post hoc analysis demonstrated that our algorithm was disproportionately utilized by frontline HCWs providing clinical care relative to those providing nonclinical care. This finding may highlight a gap in our implementation, and it underscores the importance of ensuring broad, multidisciplinary communication about this resource to ensure equity in access and utilization.

In addition, our algorithm was utilized for 15 employees with high-risk symptoms (ie, cough and fever); all of these individuals had negative test results and were permitted to return to work

24 hours following symptom resolution (without antipyretics). These individuals were included in our intention-to-treat analysis to show “real-world” application of our algorithm.

Finally, our institution permits hospital employees to return to work immediately if their rapid molecular test is negative. Because the Cepheid Xpert Xpress multiplex platform was utilized in our study, we effectively assessed for SARS-CoV-2, influenza A/B and RSV infection. However, this approach does not represent exhaustive testing for respiratory viruses, and it is possible that employees with nonspecific respiratory symptoms caused by other viruses (ie, parainfluenza, rhinovirus) continued working. As a result, caution is required in applying our algorithm to hospitals serving large numbers of patients with immunocompromising conditions given the higher risk of employee-to-patient transmission. Ensuring strict adherence to the algorithm may also be important when other viral illnesses are more widespread.

This study had several limitations. It was observational in nature, and it was conducted at a single academic center without active transplant or oncology services. Thus, the generalizability of these findings to other institutions with different patient populations may be limited. In addition, we did not assess the health and comorbidities of employees who participated. Also, a return-to-work time was not documented for 18.2% of employees. Finally, implementation of this algorithm required both material and personnel costs. Although we anticipate these costs are small compared to the system-wide impact of employees who would have been absent while awaiting test results, cost nevertheless may be a barrier for small hospitals where rapid molecular testing is not available.

Our study was conducted prior to the identification and spread of the SARS-CoV-2 B.1.1.529 (Omicron) variant, and it is thus unclear whether our findings can be generalized to this variant. Notably, we performed exclusively anterior nares sampling, and it remains unclear whether this collection site will be optimal in the setting of SARS-CoV-2 infection with the Omicron variant. However, given that the rapid spread of the Omicron variant has been associated with extreme staffing shortages in hospital settings, the potential benefits of rapid PCR testing and earlier return-to-work are high, and further investigation is warranted.

In summary, protocols for rapid molecular SARS-CoV-2 testing of vaccinated hospital employees with nonspecific respiratory symptoms enable the diagnosis of mildly symptomatic COVID-19 cases, facilitating expedient return to work for employees with negative SARS-CoV-2 tests. It is unclear whether this approach will be useful when future SARS-CoV-2 variants emerge, when other viral respiratory infections are circulating widely, or when allergy symptoms are less prevalent. Future studies are needed to better define and validate the utility of this screening protocol using rapid molecular testing.

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