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Major Article

Universal symptom monitoring to address presenteeism in healthcare workers

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Background: The scale of the COVID-19 pandemic has required rapid development of both governmental and institutional policies and protocols to minimize transmission. We describe our institution's implementation of a symptom monitoring program with this goal.

Methods: We developed a symptom monitoring tool based on our return-to-work guidelines using a Qualtrics survey tool. We implemented this for healthcare workers (HCWs) and provided individualized real time guidance and linkage to COVID-19 testing if indicated.

Results: During the period from April 2nd to April 17th, 2020, 9446 HCWs had enrolled in the symptom tracking survey, with 5,035 HCWs completing the survey daily at the end of this period. 1,318 HCWs had been identified as being symptomatic with an indication for SARS-CoV-2 testing and were directed to the hotline to have this ordered. Of these, 82% reported not currently staying home from work due to illness or quarantine when first reporting symptoms.

Discussion and Conclusions: A survey based symptom monitoring tool can be rapidly designed and implemented, and incorporated with a testing strategy. Our results show the potential for quick uptake, and effectiveness in identifying and addressing presenteeism. We report our large academic institution's experience as a model to be adapted for use in this and future pandemics.

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INTRODUCTION

The scale of the coronavirus disease 2019 (COVID-19) pandemic has required rapid development of both governmental and institutional policies and protocols to minimize transmission. While lessons drawn from past pandemics and emergency preparedness plans provide a framework, many specifics of implementation are developed in real time. This report describes the rationale, development and implementation of a symptom monitoring survey tool at a large academic medical center in Southern California. This tool was part of an effort to rapidly create a coordinated infrastructure to provide health care workers (HCWs) with consistent and centralized information, answers to common concerns regarding exposures, simple and expedited PCR testing if indicated, return to work guidance, and contact tracing of severe acute respiratory syndrome coronavirus-2 (SARS-

CoV-2)-positive cases. The purpose of this paper is to outline an effective strategy for rapid implementation of a symptom monitoring system early in a pandemic situation, and to present early data on its uptake and effectiveness. We aim to present a model that can be adapted by other institutions in response to ongoing and future pandemics.

RATIONALE FOR UNIVERSAL SYMPTOM MONITORING

The transmission of infectious diseases in hospitals can occur for many different reasons over the community, namely HCW to HCW interactions, HCW to patient interactions, and HCWs working while sick (presenteeism). Rates of presenteeism have been shown to be high among HCWs, including during previous pandemics.^{1,2} Symptom monitoring of HCWs is a proven method of addressing the unique challenges of hospital transmission and has been instrumental in controlling many emerging infectious diseases including H1N1, Ebola Virus, and seasonal influenza.³ Symptom monitoring can be classified as active or passive. Active monitoring requires a health institution to initiate contact with HCWs to monitor symptoms, usually at least once daily. Passive or self-monitoring means a HCW

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monitors themselves and only initiates contact with the institution to report positive symptoms.

In early March 2020, the CDC published guidelines encouraging active monitoring for all HCW with medium or high risk exposures, while allowing passive monitoring for low risk exposures or no known exposures.⁴ At our institution, after receiving a positive test result, the COVID-19 Health Care Worker Team was responsible for calling each positive HCW to perform contact tracing and investigate their symptom onset, nature of their symptoms, and if they worked while symptomatic. Despite data from Wuhan, China suggesting a high prevalence of fever (92%) and cough (75%) in infected individuals,⁵ there was a wider variability in initial symptoms that HCW endorsed, and a wide spectrum of severity. This is consistent with the reported mild symptoms at presentation of many healthcare workers.⁶ In that report, 64.6% of HCWs came to work after they initially developed symptoms.⁶ These factors underscored the need to rapidly develop a screening tool that included mild symptoms and immediately instructed symptomatic HCWs to stay home from work.

As community spread increased through the month of March 2020, the Los Angeles County Department of Public Health released updated guidelines encouraging active symptom monitoring for all HCW regardless of known exposure to SARS-CoV-2.⁷ Although active monitoring requires a significant amount of coordination, time, and labor, the screening tool was expanded to active monitoring of all HCWs in early April 2020 in order to combat presenteeism and slow the spread of hospital-acquired COVID-19. This was done in conjunction with temperature checks at the entrances to all facilities in the health system. While temperature checks are a valuable screening tool, early data from our own internal review suggested that fever was often not present in these HCWs, especially as an initial symptom.

Early in the course of the pandemic, there was a limited number of HCW exposures without proper personal protective equipment (PPE) to COVID-19 patients. The initial goal of the survey tool was to perform active symptom monitoring for these HCWs given their elevated risk.

As COVID-19 cases in the community and hospital system increased, the need for active monitoring of all HCW became more evident. The scope of the survey tool was expanded with the goals of: identifying HCWs with mild symptoms to prevent and gather data on 'presenteeism'; rapidly testing HCWs for SARS-CoV-2 soon after symptom onset to minimize hospital and community transmission; simplifying return to work guidance by providing daily recommendations specific to a HCW's symptoms, testing, and exposure history; funneling questions and testing requests to a contemporaneously developed hotline for efficient ordering, tracking, and follow-up of HCW SARS-CoV-2 PCR tests (Fig 1).

MATERIALS AND METHODS

We developed an electronic, smartphone-compatible survey tool using Qualtrics software. The survey tool consisted of an initial enrollment survey, which collected demographic data and job

descriptions, and daily surveys asking about symptoms (fever, cough, difficulty breathing, muscle aches, nasal congestion, loss of sense of taste or smell, diarrhea), SARS-CoV-2 exposures, and any prior SARS-CoV-2 testing. The list of symptoms was developed from a review of literature and internal data in collaboration with the hospital emerging infectious diseases team. The survey question logic was designed to require the least amount of information to provide specific recommendations. If testing was indicated, the HCW was referred to a hotline which was developed contemporaneously and which was staffed by modified-duty registered nurses who could order SARS-CoV-2 testing if indicated. If testing was already performed, follow-up questions were asked to determine if the HCW met the institutional return-to-work guidelines specific to their exposures, duration of symptoms, and test result. On completion of the survey, the HCW received the appropriate guidance on testing, return-to-work status, masking, home quarantine, and seeking care by Telehealth or at an emergency room.

Questions were designed to be yes/no or multiple choice for ease of use. The survey tool was mobile and desktop compatible. Daily e-mail and text reminders were sent to all enrolled HCWs. The survey was made available in English and Spanish.

The survey was initially distributed only to HCWs with a known work exposure to SARS-CoV-2. As the number of COVID-19 cases in the community and hospital system increased, and HCW-to-HCW spread became more evident, it became clear that all HCWs had some degree of exposure. On April 3, 2020, the survey was further expanded to include all UCLA Health system employees. Functionality was added to provide a work clearance certificate which could speed entry into clinical sites in conjunction with the temperature screening.

While the survey was designed to be a self-service tool, limited data collection was performed to assist in adapting strategies to reduce viral transmission and respond to staffing needs. This included data on whether employees were working or not (and if they had an indication for quarantine), their job category, and number of employees with household and aerosol exposures to SARS-CoV-2. Data was anonymized and extracted from the secure Qualtrics survey database and exported to Microsoft Excel for analysis.

RESULTS

During the period from April 2 to April 17, 2020, 9,446 HCWs had enrolled in the symptom tracking survey, with 5,035 HCWs completing the survey daily at the end of this period. From April 2 to April 15, 2020, 1,318 HCWs had been identified as being symptomatic with an indication for SARS-CoV-2 testing and were directed to the hotline to have this ordered. Of these, 82% reported not currently staying home from work due to illness or quarantine when first reporting symptoms, consistent with the high rates of 'presenteeism' reported in HCWs. Qualitative data from hotline calls on HCWs rationale for working with symptoms suggest that mild severity of symptoms was the most common reason. This included symptomatic HCWs on units that had already seen clusters of infected HCWs.

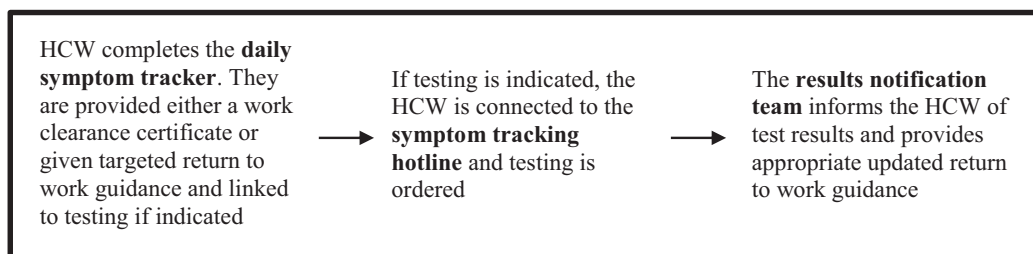


Fig 1. Workflow for the integration of a daily symptom tracker into a hospital's infection prevention strategy. The symptom tracking hotline and results notification team may be staffed by healthcare workers, occupational health, or a dedicated infection prevention team.

DISCUSSION

During a pandemic such as COVID-19, the role of occupational health expands and evolves rapidly. HCWs are essential to the response and at high potential risk of infection. Managing the competing demands of preventing transmission in the hospital from HCWs to patients and to other HCWs and of ensuring adequate staffing is crucial. It requires coordinated messaging of institutional guidelines including clear return-to-work policies, centralized information hubs for HCW, proactive messaging to avoid working with symptoms and active monitoring for HCWs with symptoms, as well as proactive communication on returning to work as soon as it is considered safe to do so. These systems need to be easily adaptable given the rapidly changing dynamics of a pandemic and production of new evidence causing frequent revisions to guidelines. A daily survey tool such as the one described provides a flexible and rapidly implementable method to prevent symptomatic HCWs from coming to work through utilization of work clearance certificates while efficiently linking them to testing and providing them with targeted guidance. In conjunction with other crucial elements of occupational health's role in a pandemic response, such as adequate PPE supply chains and testing capacity, this tool can help to keep HCWs protected and informed, at a time when they are critically needed. In addition, as businesses and organizations outside healthcare develop screening tools for their employees, similar principles can be applied. While employer facilitated linkage to efficient testing may be more difficult in these contexts, it is critical to the effectiveness of a self-reporting tool.

This report has limitations. The data presented here were extracted from a database created for the purpose of employee screening and infection control. The survey tool was designed

primarily for efficiency of use, not analysis, which precludes detailed analysis of variables such as baseline characteristics and COVID-19 testing results.

CONCLUSIONS

Healthcare institutions should have in place processes for rapid roll out of active symptom monitoring tools of employees when needed. During the COVID-19 pandemic, institutional messaging, individualized guidance, and rapid access to testing, is crucial to decrease rates of healthcare workers coming to work with symptoms.

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