Results of a Shortened Quarantine Protocol on a Midwestern College Campus

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A shortened quarantine protocol after severe acute respiratory syndrome coronavirus 2 exposure was implemented on a college campus. We assessed data on exposures, symptoms, and tests in 1152 unvaccinated individuals released from quarantine on day 7. A shortened quarantine period for asymptomatic individuals testing negative can be implemented with low risk.

Keywords. COVID-19; quarantine; public health; college campus

Public health recommendations from the Centers for Disease Control and Prevention call for close contacts of individuals with confirmed severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection to quarantine for 14 days to limit the risk of further transmission [1]. The length of the required quarantine has economic, academic, social, and mental health implications [2]. In an effort to reduce the time students are excluded from the classroom and other campus commitments, a working group was convened to make recommendations to a midwestern university related to the quarantine of asymptomatic individuals who had been exposed to persons with coronavirus disease 2019 (COVID-19). Comprising physician and administrative leadership for campus health services (for employees and students) at the university and the local health department, the working group's original intent was to develop a protocol specifically for returning asymptomatic student-athletes to practice after an exposure to a confirmed case of SARS-CoV-2 infection (The resulting protocol was ultimately not adopted for this purpose, pursuant to guidance from the National Collegiate Athletic Association requiring all student-athletes identified with prolonged close contact with a known case of SARS-CoV-2 to remain in quarantine for a full 14 days from the date of last exposure, irrespective of any subsequent negative tests.)

Because the intent was to develop a protocol that was effective in identifying individuals at low risk, from both clinical and public health perspectives, for SARS-CoV-2 infection and transmission, the group determined that it was both equitable and practical to adopt the protocol for all students. The goal was to define a testing strategy for asymptomatic individuals for whom negative results suggested a sufficiently low risk of SARS-CoV-2 infection to support a shortened quarantine period. The median duration to the onset of symptoms is approximately 5 days after exposure [3], but the optimal time frame for testing asymptomatic individuals after an exposure has been less clear.

The consensus of the group was to implement a 2-test strategy, allowing the potential for early detection of infections (and an opportunity to identify and quarantine any additional close contacts), with a follow-up test in a time frame associated with a decreased likelihood of a false-negative result [4–6]. The day 4/7 quarantine release protocol (QRP), developed by the working group, allows individuals who have never been symptomatic to be released from quarantine after a negative result based on LabCorp's real-time reverse-transcription polymerase chain reaction (RT-PCR) (https://www.labcorp.com/coronavirus-disease-covid-19/providers) test on day 4, and a negative result of the Sofia SARS Antigen Fluorescent Immunoassay rapid antigen test on the Sofia 2 platform (https://www.quidel.com/immunoassays/rapid-sars-tests/sofia-sars-antigen-fia) on day 7. This article reports the outcomes of the QRP developed by the working group and implemented in the fall 2020 semester.

METHODS

The university maintained data on symptoms and exposures (as reported in the online Daily Health Check platform), as well as data regarding testing, contact tracing, isolation and quarantine, and symptom monitoring (for those in isolation and quarantine) for all students. Students who were identified as close contacts of persons with COVID-19 (within 6 ft for >15 minutes) were instructed to quarantine. University staff conducted daily telephone follow-up with individuals in quarantine to assess for symptoms or any physical or psychosocial needs. Individuals who became
symptomatic while in quarantine were referred for diagnostic testing and were no longer eligible for the QRP. Specimens were collected by nasal swab at the campus testing site from individuals who remained asymptomatic on day 4 after their most recent exposure to a confirmed COVID-19 case. Swab specimens were processed at a local commercial laboratory using LabCorp's RT-PCR test; results were typically returned within 36 hours.

Persons with a negative RT-PCR result who remained asymptomatic were tested again on day 7 with the Sofia SARS Antigen Fluorescent Immunoassay rapid antigen test. Those testing positive were placed in isolation, while those testing negative were released from quarantine and returned to their regular housing and normal activities, with ongoing follow-up. Individuals released under the QRP received a final call from university staff on day 8 to assess for symptoms and report any subsequent exposures to persons with COVID-19. QRP-released individuals were also included in the university’s sampling protocol for routine screening of the entire university community [7]. Administrative and clinical data were aggregated in a Snowflake database (www.snowflake.com), and analyses were performed using Snowflake and Tableau platforms (www.tableau.com). The data included in this analysis were restricted to students advised to quarantine during the study period. The analysis was reviewed by the university’s institutional review board and deemed to fall under a regulatory exception from institutional review board review as a public health surveillance activity.

RESULTS

From 1 September to 11 November 2020, a total of 1355 students were identified as close contacts of persons with COVID-19 and instructed to quarantine (Figure 1). Of these, 45 individuals (3.3%) became symptomatic while in quarantine or otherwise tested positive (eg, on required screening tests for athletes) and were thus ineligible for the QRP. Ultimately, 1310 students were eligible for the QRP; of these, 143 (10.9%) tested positive by RT-PCR on day 4 after exposure to a person with COVID-19. Of 1167 persons undergoing rapid antigen testing within a standard interval (eg, within 7 days of release), 15 (1.3%) tested positive. Of 1152 persons released from quarantine on day 7, 1048 (91%) were tested for any reason between their day 7 release and the end of the semester.

DISCUSSION

A shortened quarantine period, predicated on remaining asymptomatic and testing negative for SARS-CoV-2 at days 4 and 7 after last exposure, was successfully implemented with no evidence of additional transmission of SARS-CoV-2 attributed to individuals released on day 7 (that is, these individuals were not identified as probable sources of exposure based on contact tracing interviews). In this study, only 4 (0.3%) of 1152 persons tested positive within 14 days of their exposure without either identifying new exposures or experiencing symptoms after being released from quarantine on day 7 according to the QRP. Given that symptoms are likely to develop within a week of exposure [3] and modeling studies suggest a decreased risk of transmission after 7 days of quarantine with negative tests [2, 9], findings from the current study are consistent with these expectations. In addition, there was no evidence of clusters attributable to individuals released under the QRP based on the university’s contact tracing interviews.

This report is subject to several limitations. First, not all persons released from the QRP after a negative test result at day 7 were subject to follow-up testing; subsequent testing was conducted only based on development of symptoms, subsequent exposure, or being called for a routine screening test. Although mandatory screening tests were required of all students, the cadence of screening testing varied as testing capacity increased. Thus, not all students released from quarantine were called for screening within a standard interval (eg, within 7 days of release). However, all eligible students (ie, those with a laboratory-confirmed diagnosis within the preceding 90 days or currently in quarantine) were subject to mandatory screening in the week before the end of the observation period for this report.

Second, symptoms were self-reported and may have gone unrecognized or underreported. Third, the combination and sequence of testing may warrant re-consideration. The original rationale for a high-sensitivity test on day 4 was to allow early identification of positive results to move additional close contacts into quarantine; in practice, this yielded relatively few additional close contacts. Instead the tangible benefit realized was the opportunity to start the clock earlier than day 7 for the 10-day isolation period recommended after a positive test result in asymptomatic individuals [10]. Furthermore, the majority of positive results were detected at day 4, though this may be a function of the lower sensitivity of the antigen test compared with RT-PCR, which may have missed detecting asymptomatic infections as part of day 7 testing.

Finally, these findings relate to a midwestern university campus with a residential community consisting predominantly of unvaccinated undergraduate students, and thus may
not be generalizable to the general population. While the university provided isolation and quarantine facilities and meal delivery, it is unclear how strictly or effectively further exposures were limited in this context. Adherence to quarantine expectations may also be challenging in a community context without such institutional supports. Finally, because molecular sequencing was not readily available to the campus community in the fall semester, transmission inference is based solely on exposure history and contact tracing interviews; moreover, because the predominant genomic variant was not identified on campus, it is unclear to what extent this shortened quarantine protocol can be applied generally for use in the setting of SARS-CoV-2 variants.

The duration of quarantine recommended after an exposure to a confirmed case of COVID-19 poses financial, academic, social, and mental health challenges, any of which can threaten adherence to quarantine guidance [2, 8]. This report provides evidence to suggest that, in the pre-vaccination era, releasing asymptomatic individuals from quarantine, based on negative test results at days 4 and 7 after exposure, carries

Figure 1. Results of the quarantine release protocol (QRP) (1 September to 11 November 2020). Abbreviations: COVID-19, coronavirus disease 2019; PCR, polymerase chain reaction.
a low risk of the individual either testing positive or infecting other individuals with SARS-CoV-2. Ensuring close follow-up, symptom monitoring, and access to care further enhance the ability to safely implement a shortened quarantine protocol, as does ongoing surveillance or screening testing. While widespread vaccination may reduce the need for complex quarantine protocols, a shortened quarantine could have significant impact for residential campuses, as well as other community settings and workplaces with low vaccination rates, and may contribute to enhanced adherence to quarantine guidance.

Notes

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