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Editorial

The Role of Testing in Reducing SARS-CoV-2 Transmission on College Campuses



As institutions of higher education (IHEs) across the nation opened for in-person, hybrid, or online classes for the fall 2020 term, they used various testing strategies in an effort to prevent or reduce transmission of SARS-CoV-2, the virus that causes COVID-19 [1]. Testing strategies range from testing only those presenting with symptoms to testing all students on arrival on campus (entry testing) to regularly testing three times a week. The U.S. Centers for Disease Control and Prevention (CDC) posted updated guidance on September 30 for testing in IHEs in response to recent outbreaks in the IHE setting. The guidance also provides information on rapid antigen viral tests and expanded considerations for transmission in off-campus settings [2].

As entry testing and repeat testing of students require considerable financial, time, and resource investments, understanding whether these strategies are both effective at reducing further spread and cost-effective is essential. Van Pelt et al. [3] conducted a decision tree modeling assessment of various strategies using reverse transcriptase polymerase chain reactions (RT-PCR) testing at one university. All approaches that included testing of asymptomatic individuals performed better than symptomatic testing alone. Modeling suggested that a single RT-PCR test, such as entry testing, is unlikely to identify enough infected individuals to interrupt transmission on campus. Retesting students who tested negative 7 days after the initial test considerably improves the proportion of infected individuals successfully identified by testing, with the highest proportion of true positives identified (87%) by universal, repeat RT-PCR testing. However, this approach also requires nearly double the number of tests and resources as other strategies, which has implications for sustainability.

RT-PCR is currently considered the gold standard for COVID-19 testing [2], but longer turnaround times and higher cost have led some IHEs to use alternatives, such as commercial rapid point-of-care antigen tests, or develop in-house tests to shorten

the process. Although some IHEs have studied the performance of antigen or in-house tests in comparison to RT-PCR, better understanding is needed of how well these tests identify infectious individuals, especially those without symptoms.

Studies on testing strategies at summer overnight camps support Van Pelt et al.'s findings [3]. A Georgia camp experienced an outbreak with high rates of transmission despite requiring entry testing of campers [4]. In contrast, four Maine camps required campers to undergo both entry and repeat testing after 7 days and did not experience any outbreaks [5]. Repeat testing identified asymptomatic, but SARS-CoV-2-positive, individuals who were then isolated and their close contacts were quarantined. However, testing was not the only difference between the two camps. For example, the Georgia camp did not require campers to wear masks, whereas the Maine camps did, and masks are an important component of mitigation strategies. Although IHEs share some characteristics with overnight camps, they are not closed systems and have older populations who engage in a wider range of behaviors that are not found in summer camps. Students, faculty, and staff typically mix freely with the community, and the level of transmission in the surrounding community should impact the campus testing strategy. The updated guidance for testing in IHEs [2] recommends considering initiation of an outbreak testing strategy when the rate of transmission in the community is at least 50 per 100,000 within the last 14 days. Of note, as of October 2, 2020, the prevalence of COVID-19 is higher than what was used in Van Pelt et al.'s modeling study (.022 vs. .0045). CDC's indicators for dynamic school decision-making [6] can be used to help guide decision-making for IHEs. The indicators are based on a combination of incidence, percent positivity of RT-PCR tests, and the ability to implement key mitigation strategies.

CDC recommends a risk-based approach to testing in IHEs with confirmed COVID-19 cases, considering the likelihood of exposure, application of mitigation measures, and the results

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of contact investigations. In the context of an outbreak, the new CDC guidance recommends a tiered approach to testing individuals who might have been exposed to a person with COVID-19 but might not be identified through case investigation and contact tracing [7]. This includes people who have any of the following in common with a person with COVID-19: in close contact in a classroom, share a dormitory room or bathroom or live together in other types of housing, use the same dining facility at roughly the same time, are involved with the same athletic team, and attended the same events or social gatherings where social distancing was not strictly followed.

Some IHEs are using symptom screener applications (apps), sometimes tied to access to campus or classrooms, in addition to or in place of testing. However, the apps rely on accurate self-reporting, which is of concern to some IHEs in cases when reporting honestly might limit access to a classroom or a job. IHEs are constantly innovating ways to improve identification of cases and close contacts. Some are using apps that determine proximity to other app users and provide notification when a user has been near someone who reports testing positive. Users can use this information when considering whether to be tested for COVID-19 [8]. Some IHEs are using wastewater surveillance to identify dormitories with likely cases, followed by targeted testing of those buildings [9].

Even with ongoing testing, IHEs have seen outbreaks among students [10]. Testing should be used in conjunction with mitigation strategies. Mitigation strategies promote behaviors that prevent spread, such as mask wearing and social distancing, maintain healthy environments and healthy operations, and include preparations for what to do when someone gets sick [11]. Additional factors, some outside the control of IHEs, such as large parties and Greek housing, have been linked with transmission on campus and in the surrounding community [12]. Still, regular testing has enabled some IHEs to identify and manage outbreaks with rapid isolation of those infected and quarantine of their close contacts [13]. A better understanding of optimal testing strategies can help IHEs best use testing alongside other mitigation strategies to keep their students and the broader community safe.

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