



Invited Commentary | Public Health

Reopening Colleges During the Coronavirus Disease 2019 (COVID-19) Pandemic—One Size Does Not Fit All

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In the midst of the deadliest pandemic since 1918, the question of how to reopen colleges safely after months of lockdown is of great concern. First and foremost, the strategy cannot be a one-size-fits-all approach. Rather, the best-prepared colleges will use a multifaceted approach that leverages a range of public health strategies best suited to each institution's resources, location, and culture. Containing coronavirus disease 2019 (COVID-19) requires testing; behavioral interventions to reduce the reproductive number (R_t), such as social distancing, masking, and contact tracing; and limiting the influx of new infections from outside campus.

In their modeling study, Paltiel and colleagues¹ conclude that to open safely, colleges need to test students every 2 days—a frequency that far exceeds the current guidelines from the US Centers for Disease Control and Prevention.² In a hypothetical cohort of 5000 students at a residential college in a base case scenario with 10 COVID-19 infections brought into the student population from outside each week, an R_t of 2.5, and test specificity of 98%, the authors estimated that testing every 2 days would maintain a controllable number of COVID-19 infections—a mean daily isolation census of 76 students (of whom 63% have false-positive test results) and 243 total infections during an 80-day semester. In the context of higher education institutions opening this fall, the findings are an important wake-up call. Are we planning for enough testing?

Paltiel and colleagues¹ conclude that frequent testing is necessary based on the assumptions in their model; however, the authors acknowledge that in colleges that can achieve adherence to behavioral guidelines, the R_t may be lower, perhaps approaching 1.0 to 1.5, as found in successful states³ and countries.⁴ In such circumstances, less frequent testing may be required. We applied the authors' model using assumptions that we think are realistic for Vassar College: 2500 students, 5 initially infected (given that we are requiring negative tests before students arrive), an R_t of 1.25 (given that we will have extensive social distancing, masking, and other measures), 1 new infection per week (given that we will limit student movement off campus and significantly reduce student interactions with faculty and employees), and test sensitivity of 80% and specificity of 99% (given that we plan to use a rapid polymerase chain reaction test with high accuracy). The results suggest that even if we only tested every 4 weeks, Vassar College could still maintain a controllable number of infections—a mean isolation census of 5 students (of whom 17% have false-positive test results), with a total of 79 student infections during the semester. Testing every 2 weeks yielded a mean isolation census of 6 students (of whom 31% have false-positive results), with a total of 50 infections during the semester.

Thus, before diverting resources from other interventions to testing every 2 days, we should consider a broader perspective. The best-prepared campuses will implement a set of interlocking strategies that together aim, first, to reduce the influx of COVID-19 from outside and, second, to limit its spread once on campus. Limiting spread on campus is possible through a combination of social distancing, masking, contact tracing and self-quarantining, amplified cleaning, equipping high-traffic areas with physical barriers, reducing density, using outdoor classrooms (weather permitting), using remote instruction for large lectures, implementing ventilation strategies, testing, and isolating students with new infections. Colleges can also affect the influx from outside. For example, colleges can require all students to produce evidence of a negative COVID-19 test prior to move-in, send students a travel personal protective equipment kit and instructions about how to travel safely,

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administer confirmation tests in the early days on campus, invest in robust contact tracing, and, most importantly, keep students on campus. To further limit the influx of COVID-19 onto campus, the density of employees can be reduced through telework programs (particularly helpful for faculty and employees in high-risk categories), and colleges can ensure that those who must enter and exit campus use social distancing, wear masks, and report symptoms daily so that, even if they are asymptomatic, they are unlikely to shed the virus in ways that cause infections on campus. Colleges can limit the number of visitors, restricting building access to students, faculty, and employees.

Although this approach requires sacrifice, community commitment, and monitoring, it may be more practical than testing every 2 days. Furthermore, this approach has an added benefit: if students occasionally lapse in adherence to social distancing or wearing masks, COVID-19 outbreaks are still unlikely because very few, if any, new infections would be coming onto campus from outside. Retaining strong community relations—through communicating openly, continued purchasing from local vendors, and supporting the local economy—is important as colleges seek to limit mutual exposure without compromising relationships with surrounding communities.

Importantly, not all colleges can pursue a strategy of keeping students on campus, considering that in some institutions, many students live off campus. Particularly in areas with escalating incidence of COVID-19, colleges can benefit from working with local officials to increase safety in the surrounding area. Colleges may work at this through research and advocacy to support public health ordinances including, but not limited to, mandatory masking and through their roles as anchor institutions to focus public attention on living safely with COVID-19.

The implications of the study by Paltiel and colleagues¹ are important. If a college is unable to reduce the influx of COVID-19 from outside and limit R_t on campus, far more testing is needed than current guidelines require. Paltiel et al¹ did the field a great service by making their model interactive and available online (a link to the interactive model is included in the eAppendix of the Supplement of their article). Adding a stochastic component to the model, as Gressman and Peck⁵ do, would also be helpful because recognizing the association of individual-level variability in R_t (such as the presence of superspreaders) with outcomes might further refine strategy choices. Nonetheless, colleges can use insights from the model by Paltiel et al¹ to inform actionable strategies that are suited to local conditions, again underscoring the fact that one size does not fit all.

In summary, the article by Paltiel and colleagues¹ is a valuable piece of research that answers an important question regarding the cost-effectiveness of COVID-19 testing under various assumptions. However, the conclusions underestimate the potential success of behavioral interventions coupled with public health efforts to reduce the influx of cases onto campus. Widespread access to rapid, inexpensive testing is a key ingredient of reopening colleges safely; nevertheless, the authors' findings¹ should be contextualized and their limitations recognized before they are translated into policy recommendations. A balanced approach is needed. Testing is important; however, successful colleges will be those that embrace inclusive leadership—collaborating with faculty, students, and employees as well as surrounding communities—to reduce the influx of new infections and to limit spread through the judicious use of social distancing, wearing masks, reducing density, augmenting cleaning and ventilation, and performing robust contact tracing.

ARTICLE INFORMATION

Published: July 31, 2020. doi:[10.1001/jamanetworkopen.2020.17838](https://doi.org/10.1001/jamanetworkopen.2020.17838)

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Conflict of Interest Disclosures: None reported.

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