Review 2: "Reopening universities during the COVID-19 pandemic: A testing strategy to minimize active cases and delay outbreaks"

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RR:C19 Evidence Scale rating by reviewer:

- **Potentially informative.** The main claims made are not strongly justified by the methods and data, but may yield some insight. The results and conclusions of the study may resemble those from the hypothetical ideal study, but there is substantial room for doubt. Decision-makers should consider this evidence only with a thorough understanding of its weaknesses, alongside other evidence and theory. Decision-makers should not consider this actionable, unless the weaknesses are clearly understood and there is other theory and evidence to further support it.

Review:

As the COVID-19 pandemic has progressed, it has become increasingly important to balance mitigation of disease spread with restoring socio-economic functioning. The paper focuses on the question of how to safely reopen universities amidst the pandemic. Some existing studies have explored periodic testing during a semester in universities to limit disease spread, however this study focuses on blanket testing before the start of the semester with a goal to limit the initial contagion size. The rationale of the study is well suited to the needs of the hour.

A useful insight given by the study is the differential efficacy of initial screening at different prevailing reproduction numbers. As the R_0 increases, the effect of initial screening on the timing and size of the peak is largely attenuated. The authors rightly note, *"..even with pre-semester screening, highly effective mitigation strategies are needed to avoid a large surge in cases."* The authors have accounted for pre-existing immunity in a fraction of the population as the epidemic has already been underway for some time. The authors have also accounted for underdetection of cases.

Limitations of the study:

-It is an implicit (sometimes explicit) rule of any modelling study to provide the equations and code behind the model to allow for independent verification of simulations. Although the paper uses a simplistic SIR compartmental model, this requirement should not be left unchecked. The authors mention under data/code: *"Code for transmission models will be made available on github."*

-There are more pertinent issues, such as the assumption of infectious period equal to 3 days, as compared to a widely established infectious period of around 7-10 days from

previous studies [1,2]. This will largely underestimate transmission in the simulations, leading to falsely controlled epidemics and aberrant results.

-The simulations account for imported students who already have been tested, but the authors suggest testing within a week of arrival on campus. Thus, the accuracy of the predictions may suffer as they don't account for the pre-testing spread. Enforcement of a complete quarantine until required negative tests will make the simulations a valid model of the scenario.

Some useful additions:

-The authors assume a single initial infected proportion of 5%, a sensitivity analysis for this assumption would be appropriate since the infected pool size is dependent on the stage of the local epidemic. A sensitivity analysis for varying

-We recommend exploring other testing strategies like point-of-care tests upon arrival, which are cheaper and easily administered but less sensitive than NATs. This can be easily done with the existing methodology and would provide an enlightening comparison, as well as serve the purpose of a sensitivity analyses for the test operating characteristics.

-In addition to assuming various levels of mitigation strategies by varying the reproduction number, simulating periodic intra-semester testing (possibly by rapid POC tests) in addition to the entry screening would be interesting, and could provide a viable comprehensive plan to keep the outbreak under control for the entire semester.

The authors conclude, *"Detection of SARS-COV-2 prior to campus arrival is necessary to avoid a large outbreak of hundreds to thousands of active infections at the onset of the fall semester. This is achievable through pre-semester screening via NAT testing of the entire student population prior to campus arrival.... Our team has therefore recommended that each student be tested (via NAT) at least once within one week of returning to campus."* However, as discussed above, the methods and assumptions of the analysis are not robust enough to reliably conclude this. **We believe that entry screening in universities may be a viable and effective method of mitigation, but unfortunately this study does not lend definitive support to the same. As such, we do not recommend this preprint for publication in its current form. Given the importance and relevance of the question under study, further analysis is imperative.**

References:

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2. He X, Lau EHY, Wu P, *et al.* Temporal dynamics in viral shedding and transmissibility of COVID-19. *Nat Med* 2020; : 1-4.