

June 18, 2020

Proceedings of the National Academy of Sciences
500 Fifth Street, NW
NAS 340
Washington, DC 20001 USA

Dear Editorial Board of the Proceedings of the National Academy of Sciences,

We are writing with deep concerns about a paper recently published in your journal, entitled “Identifying airborne transmission as the dominant route for the spread of COVID-19.”¹ The paper made extraordinary claims about routes of transmission, the effectiveness of mask-wearing, and by implication, the ineffectiveness of other non-pharmaceutical interventions. While we agree that mask-wearing plays an important role in slowing the spread of COVID-19, the claims in this study were based on easily falsifiable claims and methodological design flaws. We present only a small selection of the most egregious errors here. Given the scope and severity of the issues we present, and the paper’s outsized and immediate public impact, we ask that the Editors of PNAS retract this paper immediately and reassess the Contributed Submission editorial process by which it was published.

The main conclusions of this paper are based in comparison of linear case count slopes within and between regions, with mask mandates as the observed variable of interest. It ignores other clear differences in disease control policy between these areas, including broader heterogeneity in face mask policy. In one critical example, the paper asserts that “after April 3, the only difference in regulatory measures between NYC and the United States lies in face coverings on April 17 in NYC.” This is verifiably false, based on widely available (e.g., HIT-COVID²) sources. It is flatly untrue that there were no other regulatory differences between NYC and the rest of the US on those dates; it is also untrue that NYC was the only region in the US mandating use of face coverings. In another example, the paper asserts that airborne transmission is the dominant route for COVID-19 spread. To justify this headline conclusion, the authors state that “With social distancing, quarantine, and isolation in place worldwide and in the United States since the beginning of April, airborne transmission represents the only viable route for spreading the disease.” In fact, in April, many regions (e.g., Sweden, parts of the United States) were not in lockdown, and quarantine and isolation were not in place in most parts of the world. If similarly false statements about exposure were made widely in a cohort study or a randomized control trial, a rapid and complete retraction of the study would quickly follow. Hence, it is our view that PNAS is obligated to issue retraction of this work on these grounds alone.

Beyond this, the study is afflicted with serious methodological errors that undermine any confidence in its findings. These include the following: 1) The analysis ignored the lag between changes in disease transmission and changes in reported case counts, 2) Dates of policy implementation are extremely poor proxies for mass behaviors, including social distancing and mask use, 3) Dates of policy implementation were concurrent with an enormous set of changes across society which plausibly affected reported incidence of COVID-19, 4) Case counts were modeled with a simple linear regressions, which is not consistent with infectious disease dynamics, 5) Demographics, policies, and contact behaviors in Wuhan, Italy, New York City, and the USA are inappropriately treated as being nearly equivalent to one

¹ Renyi Zhang, Yixin Li, Annie L. Zhang, Yuan Wang, Mario J. Molina. Identifying airborne transmission as the dominant route for the spread of COVID-19. Proceedings of the National Academy of Sciences Jun 2020, 202009637; DOI: 10.1073/pnas.2009637117

² <https://akuko.io/post/covid-intervention-tracking>

another with respect to the epidemic, and 6) No measures of statistical uncertainty are measured or presented, which is a departure from scientific norms and particularly concerning given an analysis based on only three regions. Any one of the above issues in isolation would be cause for serious concern, but in combination, they are alarming.

While masks are almost certainly an effective public health measure for preventing and slowing the spread of SARS-CoV-2, the claims presented in this study are dangerously misleading and lack any basis in evidence. Unfortunately, since its publication on June 11th, this article has been distributed and shared widely in traditional and social media,³ where its claims are being interpreted as rigorous science. As societies debate the risks of re-opening and relaxing social distancing measures, it is crucial that decisions rely on a solid evidence base.

The scale, scope, and intensity of the issues in this paper and the immediacy of the decisions being made based on its claimed conclusions do not make it amenable to either correction or extended debate within the academic literature. Accordingly, we ask that the editorial board of PNAS retract this paper immediately. Further, the scale of the methodological flaws raise concerns about the publication process. For this reason, we would argue that it may be time for PNAS to reconsider its policies on the Contributed Submissions track under which this paper was published, as this mechanism effectively bypasses editorial decisions and undermines peer review. While these may be painful processes, we believe that they constitute the best way forward in an extraordinary time for the scientific endeavor, and more importantly, for the health and well-being of the public.

Sincerely,

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³ After 48 hours, AltMetrics placed this article's global sharing and discussion in the top 5% of all research and the highest (#1 of 84,648) from PNAS. <https://pnas.altmetric.com/details/83863073/news>

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