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Index-Based Policy to Guide Mask Wearing for SARS-COV-2 and Other Pandemics

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Cover Page Footnote

We thank Frank Pasquale for his encouragement, guidance, and review of our treatment of this topic; and Nir Menachemi for feedback.

INDEX-BASED POLICY TO GUIDE MASK WEARING FOR SARS-COV-2 AND OTHER PANDEMICS

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As the world experiences yet another surge in cases of COVID-19, many organizations and jurisdictions have reinstated or expanded mandates to protect workers, children, older people, and the public at large. Mandates to wear face masks in indoor public areas are often met with confusion, fear, anger, disagreement, and lack of knowledge about risks and benefits of action and inaction. To move towards an evidence-based approach, we propose that when five criteria collectively signal that a communicable disease poses greater harm to society than that of a benchmark, such as that of the average seasonal influenza during years 2010 to 2019, then the local, state, and federal government should introduce an indoor mask-wearing mandate, subject to certain exceptions.

We suggest the following five measures and corresponding metrics comprising composite criteria for the requirement to wear a mask: contagiousness (R_0), vulnerability of communities to infection (rate of growth in the percentage of the national population that is infected), harm caused by the disease (cumulative deaths per week), severity of harm (infection fatality rate), and direction of harm (percentage change in cumulative deaths per week). Each criterion would be scored. An aggregate score would then signal when the social health risk exceeds that of seasonal influenza as a point of reference, based on methodology. Although additional details would require clarification, attention to validity and timeliness of measurement, and development of appropriate scoring thresholds, the criteria provide a foundation for action that goes beyond rhetoric, politics, impulsiveness, and guesswork. Pursuing measurement of these factors would yield an improvement over the current approach.

As the world continues to experience periodic surges in cases of COVID-19, many organizations and jurisdictions have reinstated or expanded mandates to protect workers, children, older people, and the public at large. Mandates for the SARS-CoV-2 vaccine can be seen in many places, and have been guided by clear evidence of a favorable benefit-to-risk profile, at least in

medical terms.[1] Although face masks have been shown to protect both wearers and those nearby, thereby decreasing the spread of infection, mandates for masks are hardly universal.[2] Furthermore, unlike vaccination, clear and justified criteria for requirements to wear masks indoors seem nowhere to be found, despite increasing calls for such a policy.[3] Schools, businesses, and other organizations struggle to determine when to require masks.[4] Debates continue, mask mandates and bans to mandates are enacted, and confusion ensues while risking lives and livelihoods.[5] Fear of mandates, in conjunction with lack of knowledge about risk, seems to rule the day.[6] To aid the current pandemic, as well as the future ones that are inevitable, and to move from a seemingly random or impulsive state of action to one informed by evidence, we present suggestions for criteria that could form the foundation of a policy about when indoor masking should be required in public places.

When is the risk of infectious transmission "greater than baseline?" We propose that when five criteria collectively signal that a communicable disease poses greater harm to society than that of a "benchmark"—such as that of the average seasonal influenza during years 2010 to 2019, which include H1N1 and H3N2 years—then the local, state, and federal government should introduce an indoor mask-wearing mandate, subject to certain

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[1] *See Population-Level Risk-Benefit Analysis*, CENTERS FOR DISEASE CONTROL AND PREVENTION, https://www.cdc.gov/vaccines/covid-19/info-by-product/janssen/risk-benefit-analysis.html (Aug. 20, 2021).

[2] Andy Markowitz, *State-by-State Guide to Face Mask Requirements*, AARP, https://www.aarp.org/health/healthy-living/info-2020/states-mask-mandates-coronavirus.html (Sept. 12, 2022).

[3] *Use and Care of Masks*, CENTERS FOR DISEASE CONTROL AND PREVENTION, https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/about-face-coverings.html (Sept. 9, 2022).

[4] Edward Segal, *New Mixed Messages About Mask Mandates Are Creating Confusion and Doubt. Again.*, FORBES (Feb. 9, 2022, 3:43 PM EST), https://www.forbes.com/sites/edwardsegal/2022/02/09/new-mixed-messages-about-mask-mandates-are-creating-confusion-and-doubt-again/?sh=26cb6b246a17.
Morgan Balingit et al., *As New School Year Looms, Debates Over Mask Mandates Stir Anger and Confusion*, THE WASHINGTON POST (July 29, 2021), https://www.washingtonpost.coc/education/2021/07/29/school-masks-coronavirus/.

[5] Kaia Hubbard, *These States Have COVID-19 Mask Mandates*, U.S. NEWS, https://www.usnews.com/news/best-states/articles/these-are-the-states-with-mask-mandates (Mar. 28, 2022).

[6] *See* Lu He et al., *Why Do People Oppose Mask Wearing? A Comprehensive Analysis of U.S. Tweets During the COVID-19 Pandemic*, 28 J. OF AM. MED. INFORMATICS ASS'N 1564, 1565–71 (2021).

exceptions. We recognize that if a *national* mask policy is not introduced, then people's mobility can mitigate benefits of mask-wearing.

Based on knowledge about risk of transmission and harm, we suggest the following five measures and corresponding metrics comprising composite criteria for the requirement to wear a mask: *contagiousness* (R_0), *vulnerability* of communities to infection (rate of growth in the percentage of the national population that is infected), *harm* caused by the disease (cumulative deaths per week), *severity of harm* (infection fatality rate), and *direction of harm* (percentage change in cumulative deaths per week).[7] Although additional details would require clarification and development—appropriate scoring thresholds, mask type, specifications for monitoring, distancing if needed, the role of hospital capacity, issues of enforcement, etc.—the criteria provide a foundation for action that goes beyond rhetoric, politics, impulsiveness, and guesswork.

Each criterion would be scored. An aggregate score would then signal when the social health risk exceeds that of seasonal influenza as a point of reference, based on methodology. A debate on scoring methodology and when a score should trigger a mask mandate would very likely occur. Unlike the current conversation around what to do about SARS-CoV-2, however, it would be grounded on specific criteria associated with gauging the extent of social harm.[8]

The proposed measures have limitations. For example, R_0 can be difficult to measure and can vary based on age or other characteristics of a susceptible group. Death counts can lag by a month in some settings. Without accurate data about deaths and population prevalence of cases—available through testing of large random samples—the measured mortality rate can overestimate the infection fatality ratio.[9] Nonetheless, we suggest that pursuing the measurement of these factors would yield an improvement over the current approach, which has little foundation in evidence or measurement.

One imperfect assumption for our proposition is that seasonal influenza, which kills tens of thousands of Americans every year, remains, arguably, an "unexceptional" annual communicable disease, the harm of which many Americans have accepted by social and cultural custom.[10] Any political, cultural, or social conflicts around wearing or not wearing masks for this familiar disease appear small or largely unnoticed. This is not to say that

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[7] *See* J. A. P. Heesterbeek & K. Dietz, *The Concept of R_0 in Epidemic Theory*, 50 STATISTICA NEERLAND 89, 89–90 (1996).

[8] *Use and Care of Masks*, *supra*, note 3.

[9] Justin Blackburn et al., *Infection Fatality Ratios for COVID-19 Among Noninstitutionalized Persons 12 and Older: Results of a Random-Sample Prevalence Study*, 174 ANNALS OF INTERNAL MED. 135, 136 (2021).

[10] Gina Kolata, *Shrugs Over Flu Signal Future Attitudes About Covid*, N.Y. TIMES (March 18, 2022), https://www.nytimes.com/2022/03/18/health/flu-covid.html.

the lives lost to influenza each year should be lost, or that widespread influenza protections, such as masks, should not be implemented. In consideration of the recent experience with masks and other non-pharmaceutical interventions hindering the spread of influenza globally, more individuals might begin to wear masks during viral respiratory season.[11]

Although influenza has an incidence of 3% to 11% among seasons, SARS-CoV-2 has generated far more morbidity and mortality since 2019.[12] In consideration of its novelty relative to seasonal influenza, and its severity of harm as measured by aggregate deaths—over 1,058,690 in the United States alone—as well as the documented protection of masks—mask-wearing should be required to debilitate harm from SARS-CoV-2.[13] Exceptional circumstances call for exceptional measures. SARS-CoV-2 and mask-wearing satisfy both elements of the equation.

Creating and introducing a policy for a criteria-based mask-wearing mandate stand to move the national discussion beyond whether specific numbers and projections are accurate, beyond a reflexive disregard of the tradeoffs associated with individual autonomy and social health welfare, and beyond insistence on all-or-nothing measures that do not identify criteria for their imposition or relief. A methodology for introducing mask-wearing requirements, or relief from such requirements, stands to promote consideration of what levels of illness, hospitalization, and mortality we wish to tolerate in the name of individual autonomy.

This methodology will require value judgments regarding how and when individual behavior can be constrained to protect others' health. In addition, it opens discussion to at least two other categories of relevant consideration: first, whether mask-wearing creates collateral problems, such as children not optimizing social interactions and the learning of social cues because they cannot see facial expressions; and second, the standard of scientific evidence required for introducing mandates of any sort.

In contrast to current United States pandemic policy, in which there is little clarity on the circumstances in which governments introduce mask-wearing guidelines, a policy with understandable, visible, and measurable relevant criteria to trigger a mask-wearing mandate provides a basis for foreseeing when this measure could be introduced. This, in turn, reduces

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[11] Sonja J. Olsen et al., *Decreased Influenza Activity During the COVID-19 Pandemic - United States, Australia, Chile, and South Africa, 2020*, 69 MORBIDITY AND MORTALITY WKLY. REP. 1305, 1308 (2020).

[12] *Compare* Jerome I. Tokars et al., *Seasonal Incidence of Symptomatic Influenza in the United States*, 66 CLINICAL INFECTIOUS DISEASES 1511 at 1513 (2018), *with COVID-19 Mortality Overview*, CENTERS FOR DISEASE CONTROL AND PREVENTION https://www.cdc.gov/nchs/covid19/mortality-overview.htm (Sept. 9, 2022).

[13] U *COVID-19 Mortality Overview*, *supra* note 12; *see* John T. Brooks & Jay C. Butler, *Effectiveness of Mask Wearing to Control Community Spread of SARS-CoV-2*, 325 JAMA 10, 998–99 (2021); Mingming Liang et al., *Efficacy of Face Mask in Preventing Respiratory Virus Transmission: A Systematic Review and Meta-Analysis*, 36 TRAVEL MEDICINE AND INFECTIOUS DISEASE, 2020, at 5.

uncertainty about requirements for mask-wearing relative to the current state of affairs in which mask mandates and mask mandate relief appear *ad hoc*. Reduction in uncertainty is an objective of jurisprudence, economic theory, and social and economic policy.[14] Moreover, such a debate will bring to the surface preferences around individual autonomy versus social benefit, economic factors, and other tradeoffs implicit in regulating the spread of SARS-CoV-2 or future pandemic respiratory viruses, and questions about what kind of society we wish to be. Illuminating reasons underlying attachments to one position versus another will bring us a step closer to a more structured and coherent conversation.

[14] *See Science Brief: Community Use of Masks to Control the Spread of SARS-CoV-2*, U.S. CTR. FOR DISEASE CONTROL AND PREVENTION (Nov. 10, 2021), https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/masking-science-sars-cov2.html.