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Review

## Face masking for children - time to reconsider

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The use of facemasks to prevent infection and transmission of SARS-CoV-2 outside healthcare settings has been one of the most widely debated interventions in the current pandemic and, none more so, than its use in children attending educational settings. Whilst the protective barrier effects of well-fitted facemasks in adults are well-documented in laboratory studies, as we approach the end of the third year of the pandemic, there are no randomised controlled trials - the gold standard for determining the effectiveness of an intervention - on the protection offered by facemasks to children of any age in any setting. Yet, many countries continue to mandate facemasks for children, often as part of multi-layered mitigations, with the intent of preventing the spread of SARS-CoV-2 in educational settings.

Early in the pandemic, schools were closed as part of wider national lockdowns in most parts of the world because, understandably, little was known about the role of children in SARS-CoV-2 transmission. As SARS-CoV-2 infection rates declined in the community, many countries including the UK prioritised the reopening of schools in the Spring of 2020 and, rightly so, with caution, by limiting class sizes, moving outdoors, hybrid in-school/at-home learning and putting extensive mitigations in place. Facemask recommendations, however, varied in different parts of the world. The World Health Organization (WHO) and UNICEF encouraged adolescents aged 12+ years to follow the same masking guidance as adults, while 6-11 year-olds were recommended to wear a well-fitting mask in areas where SARS-CoV-2 is spreading, in poorly-ventilated indoor settings and in indoor settings where physical distancing of at least one meter (3.3 feet) could not be maintained. Children younger than six years were recommended not to wear a mask.<sup>1</sup> The European Centre for Disease Prevention and Control (ECDC) went further and recommended masks for adult educational staff but not for children in primary school, because

they were expected to have a lower tolerance to wearing masks for extended periods and/or fail to wear them properly.<sup>2</sup> European countries have broadly followed these recommendations, although schools in some countries mandated facemasks for primary school children while many Nordic countries never recommended facemasks for children. In England, facemasks were initially recommended for secondary school students (11-16 year-olds) in communal indoor areas but not in their classroom, except for a short period of a few weeks when secondary schools reopened after national lockdown following the SARS-CoV-2 Alpha variant wave in March 2021 and after the Omicron variant emerged in January 2022. In stark contrast, the US Centers for Disease Control and Prevention (CDC) recommended facemasks for children from two years of age starting in the summer of 2020,<sup>3</sup> with some states continuing to require 2-4 year-olds to wear a mask indoors and outdoors even after masking requirements were dropped for older children and adults.<sup>4</sup>

Proponents of facemasks will quote laboratory studies demonstrating the protective barrier effect of facemasks. They will also point out that there are very few downsides to children wearing facemasks, and any protection from masking would contribute to reducing infection rates as part of wider mitigation measures in educational settings. Indeed, attitudinal surveys show that children generally do not mind wearing facemasks in educational settings,<sup>5</sup> often because they consider facemasks will help prevent transmission of the virus to others rather than for personal protection.<sup>6</sup> Opponents, on the other hand, would argue that face masks can disrupt speech understanding by concealing lipreading cues and reducing transmission of high-frequency acoustic speech content, especially for children with sight and hearing problems.<sup>7</sup> Opponents would also argue that young children would struggle to wear their mask properly and hygienically for prolonged periods even with the best of intentions.

While such arguments will have played an important part in early decisions about masking in educational settings, this should no longer be the standard for implementing large-scale interventions without any robust evidence of benefit. The lack of ran-

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domised controlled trials on the protective effects of facemasks in children in any settings means that we have to rely in observational studies. Unfortunately, even those published in peer-reviewed journals have been fraught with serious epidemiological and methodological confounders to such an extent as to invalidate their results.

In *this issue*, Chandra and Hoeg replicated a CDC study,<sup>8</sup> which had reported a significant association between school mask mandates and lower risk of COVID-19 in educational settings.<sup>8,9</sup> They used a larger, nationally representative dataset over a longer period and, after replicating the original result, failed to find a significant relationship between mask mandates and case rates in the expanded sample ( $p = 0.936$ ) even after controlling for differences across districts.<sup>9</sup> Other similar US observation studies reporting lower infection rates associated with mandatory masking policies, one conducted in Arizona during July-August 2021,<sup>10</sup> and another multistate study conducted during July-December 2021,<sup>11</sup> have also been faulted for methodological biases.<sup>12,13</sup> The problems with such observational studies, as discussed in detail by Chandra and Hoeg,<sup>9</sup> is that mask mandates are usually accompanied with other mitigations, such as stronger public health messaging, increased household and community testing, different contact tracing policies and COVID-19 vaccine requirement, which may all contribute to lower infection rates.<sup>13</sup>

It is critically important that studies that consolidate and build on rapidly collected evidence during the pandemic, such as the analysis by Chandra and Hoeg,<sup>9</sup> are published in peer-reviewed academic journals, especially when the original conclusions cannot be supported, often due to unrecognised methodological flaws and biases in study design. It should, however, also be noted studies showing no effect of masking may also be biased. The lack of difference between unmasked primary versus masked secondary school children in a recent Spanish study, for example, could be due to differences in class sizes, school activities and social interactions.<sup>14</sup>

So, *where now?* The first step must be to accept that there is no robust evidence to recommend face masks for children. Whilst a precautionary approach might have been appropriate early in the pandemic, the onus must be to prove that an intervention works before recommending large-scale implementation. What we decide now will have far-reaching consequences beyond the current pandemic and potentially harming generations of children. With studies increasingly showing no benefit of cloth or surgical masks in protection, especially after the highly infectious Omicron variants emerged, some are already advocating for more invasive masking for children, including N95, KN95, FF2 and respirator masks. As new SARS-CoV-2 variants and subvariants emerge, mask recommendations could be continued for a long time. Moreover, with the CDC initially recommending facemasks to prevent monkeypox,<sup>15</sup> there have been calls for masking students against monkeypox, despite their extremely low risk in educational settings.<sup>16</sup> As the pandemic settles, too, questions will eventually be asked about masking young children indefinitely against seasonal viruses. Importantly, one must question the value of masking and other mitigations in educational settings when the children are then free from all restrictions as soon as they step out of school premises and, especially when adults, who face higher risks from severe COVID-19, are now almost entirely free of such restrictions.

In conclusion, despite having the lowest risk of severe disease from SARS-CoV-2 infection, children have endured the most disproportionate disruption to their lives during their most formative years. We urgently need to return to first principles and focus on evidence-based interventions that help protect children, not only against COVID-19, but also against other infections. An obvious

first step would be to improve educational settings to provide a safer environment for staff and children. Larger premises, smaller class sizes, cleaner environment, better ventilation and improved outdoor facilities will all help reduce the risk of infections in educational settings and keep children healthy. Other interventions, however, should only be implemented after proven objective evidence of clear benefit with minimal perceived or actual harms to children.

SNL declares no competing interests. SNL is the clinical lead for surveillance of a number of vaccine-preventable infections, including paediatric COVID-19, at the UK Health Security Agency (UKHSA). The views and opinions expressed in this editorial belong solely to the author, and not necessarily to the author's employer, organization or committee.

## References

1. World Health Organization (WHO). Coronavirus disease (COVID-19): Children and masks (07 March 2022). Available at: <https://www.who.int/news-room/questions-and-answers/item/q-a-children-and-masks-related-to-covid-19> (accessed 06 September 2022).
2. European Centre for Disease Prevention and Control (ECDC). Questions and answers on COVID-19: Children aged 1–18 years and the role of school settings (updated 26 April 2022). Available at: <https://www.ecdc.europa.eu/en/covid-19/questions-answers/questions-answers-school-transmission> (accessed 06 September 2022).
3. Center for Disease Control and Prevention (CDC). Operational Guidance for K-12 Schools and Early Care and Education Programs to Support Safe In-Person Learning (updated 11 August 2022). Available at: [https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/k-12-childcare-guidance.html?CDC\\_AA\\_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fcommunity%2Fschools-childcare%2Fk-12-guidance.html](https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/k-12-childcare-guidance.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fcommunity%2Fschools-childcare%2Fk-12-guidance.html) (accessed 06 September 2022).
4. Fitzsimmons E.G. New York City Keeps Mask Mandate for Kids Under 5 as Cases Rise (01 April 2022). New York Times. Available at: NYC Keeps Mask Mandate for Kids Under 5 as Cases Rise - The New York Times (nytimes.com) (accessed 06 September 2022).
5. Ammann P, Ulyte A, Haile SR, Puhon MA, Kriemler S, Radtke T. Perceptions towards mask use in school children during the SARS-CoV-2 pandemic: descriptive results from the longitudinal Ciao Corona cohort study. *Swiss Med Wkly* 2022;152:w30165.
6. Powell AA, Ireland G, Aiano F, et al. Perceptions of adolescents on the COVID-19 pandemic and returning to school: qualitative questionnaire survey. September 2020, England. *BMC Pediatr* 2022;22(1):456.
7. Lalonde K, Buss E, Miller MK, Leibold LJ. Face masks impact auditory and audiovisual consonant recognition in children with and without hearing loss. *Front Psychol* 2022;13:874345.
8. Budzyn SE, Panaggio MJ, Parks SE, et al. Pediatric COVID-19 cases in counties with and without school mask requirements - United States. July 1-September 4, 2021. *MMWR Morb Mortal Wkly Rep* 2021;70(39):1377-8.
9. Chandra AH, T.B. expanded analysis of CDC study fails to identify correlation between school mask mandates and pediatric COVID-19 cases. *J Infect* 2022.
10. Jehn M, McCullough JM, Dale AP, et al. Association between k-12 school mask policies and school-associated COVID-19 outbreaks - maricopa and pima counties, Arizona, July-August 2021. *MMWR Morb Mortal Wkly Rep* 2021;70(39):1372-3.
11. Boutzoukas AE, Zimmerman KO, Inkelas M, et al. School masking policies and secondary SARS-CoV-2 transmission. *Pediatrics* 2022;149(6):e2022056687 Jun 1;149(6). doi:10.1542/peds.2022-056687.
12. Zweig D. The Atlantic: The CDC's Flawed Case for Wearing Masks in School (December 21, 2021). 2021. <https://www.theatlantic.com/science/archive/2021/12/mask-guidelines-cdc-walensky/621035/> (accessed 06 September 2022).
13. Hoeg TB, Prasad V, Porter T. Contact tracing policy for masked students may be an important confounding variable. *Pediatrics* 2022;150(1). e2022057636A. Available at <https://publications.aap.org/pediatrics/article-abstract/150/1/e2022057636A/188362/Contact-Tracing-Policy-for-Masked-Students-May-be?redirectedFrom=fulltext> (accessed 06 September 2022).
14. Coma E, Catala M, Mendez-Boo L, et al. Unravelling the role of the mandatory use of face covering masks for the control of SARS-CoV-2 in schools: a quasi-experimental study nested in a population-based cohort in Catalonia (Spain). *Arch Dis Child* 2022 published Online First: 23 August. doi:10.1136/archdischild-2022-324172.
15. Ferrechio S. CDC drops mask recommendation for monkeypox (07 June 2022). The Washington times. 2022. Available at: CDC drops mask recommendation for monkeypox - Washington Times (accessed 06 September 2022).
16. Center for Disease Control and Prevention (CDC). Monkeypox: Schools, Early Care and Education Programs, and Other Settings Serving Children or Adolescents (updated 19 August 2022). <https://www.cdc.gov/poxvirus/monkeypox/community/school-faq.html> (accessed 06 September 2022).