

SYNOPSIS

01/06/2021

Review of “Mask Use and Ventilation Improvements to Reduce COVID-19 Incidence in Elementary Schools — Georgia, November 16–December 11, 2020”

Article citation: Gettings J, Czarnik M, Morris E, Haller E, Thompson-Paul AM, Rasberry C, et al. Mask use and ventilation improvements to reduce COVID-19 incidence in elementary schools — Georgia, November 16–December 11, 2020. *MMWR Morb Mortal Wkly Rep.* 2021;70(21):779-84. Available from: <http://doi.org/10.15585/mmwr.mm7021e1>

One-minute summary

- Using a survey and epidemiological data, this study assessed the impact of school-level (kindergarten through grade 5) prevention strategies in Georgia, United States (US), on the incidence of Coronavirus Disease 2019 (COVID-19) among students and staff prior to vaccine availability.
- Rate ratio (RR), by prevention strategy, adjusted for county-level 7-day incidence (cases per 100,000 population) on December 1, 2020:
 - **Face mask use for staff and teachers (required vs. optional):** RR: 0.63 (95% confidence interval [CI]: 0.47–0.85)
 - **Face mask use by students (required vs. optional):** RR: 0.79 (95% CI: 0.50–1.08)
 - **Ventilation improvements (yes vs. no):** RR: 0.61 (95% CI: 0.43–0.87)
 - **Ventilation improvements (don’t know vs. no):** RR: 0.63 (95% CI: 0.42–0.95)
- Rate ratio (RR), by ventilation improvement strategy:
 - **Dilution (opening doors/windows or using fans) vs. none:** RR: 0.65 (95% CI: 0.43–0.98)
 - **Filtration ± purification only vs. none:** RR: 0.69 (95% CI: 0.40–1.21)
 - **Dilution and filtration ± purification vs. none:** RR: 0.52 (95% CI: 0.32–0.83)
- The authors recommended that schools take a multicomponent approach to COVID-19 prevention efforts, including improvement of ventilation and mandatory mask use (and correct use) for staff and students.

Additional information

- On November 16, 2020, surveys were sent to all Georgia public K–5 school district superintendents (1,321 schools) and private school leaders (140 schools). The survey was designed to assess school and student characteristics and the prevention strategies.
- **Ventilation strategies included:**
 - **Dilution methods:** opening doors and/or windows, and using fans to improve circulation from open windows
 - **Filtration methods:** installation of high-efficiency particulate-absorbing (HEPA) filters
 - **Purification methods:** ultraviolet germicidal irradiation (UVGI) units, installed in upper room areas and shielded from persons or installed in the heating, ventilation, and air conditioning (HVAC) system
- **Additional variables examined:**
 - Flexible medical leave for teachers (offered vs. not offered): RR: 0.81 (95% CI: 0.56–1.17)
 - Desks separated by 6 feet (all classrooms vs. some/none): RR: 0.97 (95% CI: 0.66–1.45)
 - Desks with barriers (all classrooms vs. some/none): RR: 0.98 (95% CI: 0.69–1.41)
 - Non-metropolitan vs. metropolitan setting: RR: 1.14 (95% CI: 0.83–1.58)
 - Hybrid instruction model vs. 100% in-person model: RR: 0.91 (95% CI: 0.60–1.36)
 - Public charter/magnet/alternative schools vs. public school: RR: 0.97 (95% CI: 0.50–1.97)
 - Private/parochial/independent vs. public: RR: 1.46 (95% CI: 0.31–5.33)
- From November 16 through December 11, 2020, responding schools reported a median of two COVID-19 cases (range: 0–15) and combined incidence was 3.08 (95% CI: 2.84–3.34) cases among students and staff members per 500 enrolled students. Community incidence in respective counties was 5.28 per 500 population.
- Median class size was 19.0 (interquartile range [IQR]: 15.0–21.0); median cohort size was 20.0 (IQR: 15.0–21.0). Most students were Caucasian (median: 55.1%), followed by Black (17.0%), Hispanic (9.0%), multiracial (4.5%) and Asian (1.0%).
- **Limitations:** 11.6% (169/1,461) of schools responded to the survey; however, the authors note that the incidence of COVID-19 in participating schools was 3.08 per 500 and 2.90 per 500 in non-participating schools. Day-to-day compliance with proper mask-wearing or other preventative measures was not assessed. An undisclosed number of cases were self-reported by staff, teachers and guardians. The power to detect differences among ventilation methods was low since only 16 schools implemented air filtration with or without purification systems. In addition, 26.6% (n=45) of schools did not report on ventilation improvements.

PHO reviewer's comments

- The authors found a reduced RR from ventilation improvements (CI did not include 1) despite a broad definition of ventilation that might be expected to bias the results towards the null (or wash out the effects). However, the findings in this study are still subject to bias due to a low response rate and there was no evaluation of the day-to-day implementation of interventions.
 - It is unclear as to whether reported cases are “school-associated” (i.e., acquired in school, or a catch-all of any case in school including community-acquired). There is a potential for significant bias based on the proportion of self-reported cases, proportion of lab-based reverse transcriptase polymerase chain reaction tests compared with rapid antigen tests.
 - Opening doors, opening windows, or using fans were categorized as dilution. It is not clear if/how mechanical ventilation systems (e.g., HVAC), which more reliably achieve dilution and usually includes filtration, were classified.
 - The relatively large proportion (27%) of participating schools that did not know if ventilation improvements were made, yet reported similar incidence as schools reporting ventilation improvements, renders the results associated with ventilation questionable. The survey question, “Are steps being taken to improve air quality and increase the ventilation in the school?” suggests the schools made a change to their existing practice. For example, if a school already had HEPA filters and good ventilation rates, the responder could possibly answer “no” because they are not making an improvement. However, this would also be expected to bias the results towards the null.
 - Since the authors did not audit compliance with in-school prevention measures, it is difficult to interpret the findings on school-level policies for ventilation and staff/teacher masking. A binary response on staff and teacher masking requirements do not provide an indication of whether masks were worn at all times, and properly. Schools that did not mandate masking may still have had a significant number of students wearing masks. Similarly, a school-level response on ventilation improvements do not indicate whether measures are actually implemented at the room level in terms of opening windows/doors and using fans. While the results seem to show effects of these policies, they do not directly link the findings to implementation at the room level (ventilation) or individual level (masking).
 - A multivariable model could have been used to investigate which prevention measures contributed the most to reducing COVID-19 incidence. Further research into effective COVID-19 prevention measures in schools is needed, including additional measures (e.g., screening, access to testing).
 - We do not know if the relationships between prevention measures and COVID-19 incidence in participating schools similarly represent non-participating schools.
- The literature to date notes that Black and Hispanic populations are disproportionately impacted by COVID-19 which is influenced by poverty. This study, however, was comprised mostly of Caucasian children (55%) and does not describe the socio-demographics of the communities further. It is unclear if the study results would be representative of school settings in communities with different demographics and socioeconomic status.

Citation

Ontario Agency for Health Protection and Promotion (Public Health Ontario). Review of “Mask use and ventilation improvements to reduce COVID-19 incidence in elementary schools — Georgia, November 16–December 11, 2020”. Toronto, ON: Queen’s Printer for Ontario; 2021.

©Queen’s Printer for Ontario, 2021

Disclaimer

This document was developed by Public Health Ontario (PHO). PHO provides scientific and technical advice to Ontario’s government, public health organizations and health care providers. PHO’s work is guided by the current best available evidence at the time of publication. The application and use of this document is the responsibility of the user. PHO assumes no liability resulting from any such application or use. This document may be reproduced without permission for non-commercial purposes only and provided that appropriate credit is given to PHO. No changes and/or modifications may be made to this document without express written permission from PHO.

Public Health Ontario

Public Health Ontario is an agency of the Government of Ontario dedicated to protecting and promoting the health of all Ontarians and reducing inequities in health. Public Health Ontario links public health practitioners, front-line health workers and researchers to the best scientific intelligence and knowledge from around the world.

For more information about PHO, visit publichealthontario.ca.

