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SYNOPSIS

Review of "Effectiveness of Face Mask or Respirator Use in Indoor Public Settings for Prevention of SARS-CoV-2 Infection — California, February–December 2021".

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Article citation: Andrejko KL, Pry JM, Myers JF, Fuku N, DeGuzman JL, Openshaw J, et al. Effectiveness of face mask or respirator use in indoor public settings for prevention of SARS-CoV-2 infection — California, February–December 2021. MMWR Morb Mortal Wkly Rep. 2022;71(6):212-6. Available from: https://doi.org/10.15585/mmwr.mm7106e1

One-minute summary

- The authors conducted a test-negative case-control study to examine the effectiveness of wearing masks (surgical or cloth) or respirators (N95/KN95) in indoor public settings for SARS-CoV-2 infection prevention. Participants were randomly selected California residents who received a molecular SARS-CoV-2 test result from February 18 to December 1, 2021, and who reported being in indoor public settings within 2 weeks before the test. Participants included 625 test-positive cases and 1,176 test-negative controls.
- Compared to never wearing a face covering in indoor public settings:
  - Any face covering use (N95/KN95 respirator, surgical mask, or cloth mask) was associated with 49% lower odds of a positive test result (adjusted odds ratio [aOR]: 0.51, 95% confidence interval [CI]: 0.29–0.93).
  - Wearing a face covering "all" of the time was associated with 56% lower odds of a positive test result (aOR: 0.44, 95% CI: 0.24–0.82).
  - Wearing a face covering "most" or "some" of the time were associated with 45% and 29% lower odds of a positive test result, respectively, but these results were not statistically significant (aOR: 0.55, 95% CI: 0.29–1.05; aOR: 0.71, 95% CI: 0.35–1.46).

- A total of 534 participants reported the type of face covering they typically used in indoor public settings. Compared to no face covering in indoor public settings:
    - Wearing an N95/KN95 respirator was associated with 83% lower odds of a positive test result (aOR: 0.17, 95% CI: 0.05–0.64).
    - Wearing a surgical mask was associated with 66% lower odds of a positive test result (aOR: 0.34, 95% CI: 0.13–0.90).
    - Wearing a cloth mask was associated with 56% lower odds of a positive test result, but this result was not statistically significant (aOR: 0.44, 95% CI: 0.17–1.17).
- The authors concluded that consistent use of face masks or respirators in indoor public settings is protective against SARS-CoV-2 infection, with respirators providing the most protection to the wearer. The authors also emphasized the importance of wearing masks or respirators that are well-fitted, comfortable and used consistently.

Additional information

- Data was collected via telephone questionnaires; participants were asked if they wore a face covering "all", "most", "some" or "none" of the time in indoor public settings in the 2 weeks before their SARS-CoV-2 test. Participants enrolled from September 9 to December 1, 2021 were asked what type of face covering they typically wore in indoor public settings (i.e., N95/KN95 respirator, surgical mask or cloth mask). Control participants were matched to cases by age, sex and state region. Adjusted analyses accounted for vaccination status, household income, race/ethnicity, age, sex, state region, and county population density.
- Participants who reported known contact with any confirmed or suspect SARS-CoV-2 cases within 2 weeks before testing were not included in analysis, nor were those who reported having a positive test result or infection prior to the study period.
    - The exception to these criteria was for the analysis of face covering types, in which those who reported known contact with confirmed or suspect cases 2 weeks before testing were included (sample was underpowered at n = 316 without those participants). Analysis was adjusted to account for this variable.
- The authors conducted a sensitivity analysis for the first finding listed above (any face covering use versus none) that accounted for participants' reasons for testing (experiencing symptoms, required for medical procedure, routine work/school screening, pre-travel test, just wanted to see if infected, or required for an event or gathering). Results showed slightly lower odds of a positive test result, relative to the main analysis, for any face covering use in indoor public settings compared to no face covering (aOR: 0.42, 95% CI: 0.20–0.89).

- The authors reported eight specific limitations of this study:
    - The study did not account for the impact of other infection prevention measures (e.g., distancing). Results were representative of people who sought testing for various reasons and were willing to participate in the study. These individuals might adhere to protective measures more than the general public.
    - Results are based on aggregate self-reported experiences across any indoor public settings, and potentially a combination of multiple different indoor public settings.
    - Small strata limited the ability to examine different types of cloth masks or people wearing different face coverings in different settings.
    - The study did not account for correct use or fit of masks or respirators.
    - Data collection occurred before the significant expansion of the variant of concern Omicron (B.1.1.529, first identified in South Africa).
    - Social desirability bias may have impacted self-reported responses.
    - This study did not account for factors that impact the intensity of potential exposures in indoor public settings (e.g., duration, ventilation, activities).

PHO reviewer's comments

- The test-negative design used for this study is a form of nested case-control study that limits the eligible population to those tested for SARS-CoV-2. There are some theoretical benefits of a test-negative design to account for health care seeking behaviour,[1] however there is likely substantial residual confounding in this study.
    - The authors described the baseline characteristics of participants, but do not fully address some differences between them. For example, the study included both symptomatic and asymptomatic individuals, increasing the risk of confounding as the rationale for testing may differ between these groups. This was addressed in a sensitivity analysis examining the impact of any face covering versus none; however, was not addressed for the analysis of the impact of wearing different types of masks or respirators.
    - The authors listed retail stores, restaurants or bars, recreational facilities, public transit, salons, movie theaters, worship services, schools, or museums as examples of indoor public settings. Participants were not asked to specify if they were in these settings as patrons or as workers. This distinction could impact the durations and types of exposures experienced by participants (e.g. a time-limited shopping trip versus multiple work days), as well as the types of face coverings required or available.
    - Knowledge of participants' occupations could allow further identification and adjustment for factors that impact their overall risk of infection (e.g., working on-site in close proximity to coworkers versus working from home).

    - Different public settings may vary in terms of mask requirements and whether requirements are enforced. This would impact the proportion of other people wearing masks in the same space as participants, further contributing to their infection risk. For example, a setting with high public adherence to a mask requirement would reduce infection risk due to elevated source control.

    - People who select higher filtration face coverings (i.e., respirators, surgical masks) may generally be more cautious of COVID-19 in any setting, and more likely to adhere to layered infection prevention measures than people who select masks with poorer fit and filtration.

    - The ability to afford or access higher quality masks or respirators may have varied across participants and affected their mask selection, these factors may also impact participant ability to consistently adhere to other infection prevention measures.

- The study findings support the effectiveness of face coverings for personal protection against SARS-CoV-2 infection, however the likelihood of residual confounding makes the point estimates unreliable.

- Study results do not address the effectiveness of masks or respirators for reducing transmission through source control (i.e., protecting those around the mask wearer). Mask use in public spaces provides protection through source control as well as personal protection to the wearer. Masks that are worn consistently with improved fit and filtration are likely more effective. This study did not statistically compare respirators, surgical masks, and cloth masks, however the data are suggestive of increasing protection with masks that optimize fit and filtration and worn consistently.

- The increased transmissibility of Omicron, the increased risk of breakthrough infection and re-infection with Omicron, and the uncertain trajectory of Omicron in Ontario in the next weeks and months, all threaten the capacity of the health care system.[2,3] Regarding masks in this context, we recommend the general public select the highest quality masks or respirators available to them, that optimize fit and filtration and can be worn correctly and comfortably while in public spaces, along with adherence to other layered infection prevention measures (e.g., getting vaccinated including booster doses if eligible, isolating if you have symptoms, and avoiding crowded and poorly ventilated spaces).

References

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