

COVID-19 and Ventilation in the Home; Investigating Peoples' Perceptions and Self-Reported Behaviour (the COVID-19 Rapid Survey of Adherence to Interventions and Responses [CORSAIR] Study)

Authors: Smith, Louise E, Potts, Henry WW, Amlôt, Richard, Fear, Nicola T, Michie, Susan, et al.

Source: Environmental Health Insights, 15(1)

Published By: SAGE Publishing

URL: <https://doi.org/10.1177/11786302211015588>

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.



COVID-19 and Ventilation in the Home; Investigating Peoples' Perceptions and Self-Reported Behaviour (the COVID-19 Rapid Survey of Adherence to Interventions and Responses [CORSAIR] Study)

Louise E Smith^{1,2} , Henry WW Potts³, Richard Amlôt^{2,4}, Nicola T Fear^{1,5}, Susan Michie⁶ and G James Rubin^{1,2}

¹Institute of Psychiatry, Psychology and Neuroscience, King's College London, London, UK.

²NIHR Health Protection Research Unit in Emergency Preparedness and Response, UK. ³Institute of Health Informatics, University College London, London, UK. ⁴Behavioural Science Team, Emergency Response Department Science and Technology, Public Health England, UK. ⁵King's Centre for Military Health Research and the Academic Department of Military Mental Health, King's College London, London, UK. ⁶Centre for Behaviour Change, University College London, London, UK.

ABSTRACT: Ventilating indoor spaces helps prevent COVID-19 transmission. We investigated self-reported rates of opening windows to improve ventilation in the home, perceived effectiveness of opening windows, and confidence that if you wanted to, you could open windows. One in 6 people reported rarely, if ever, opening windows in their home in the last week. Three in 4 people knew that opening windows to improve ventilation was an effective way to prevent the spread of COVID-19 and 5 in 6 were confident that they could open windows in their home. Official messaging should continue to seek to improve knowledge about the effectiveness of ventilation for reducing COVID-19 transmission, and increase the frequency of window opening.

KEYWORDS: COVID-19, ventilation, effectiveness, self-efficacy, confidence

RECEIVED: January 18, 2021. **ACCEPTED:** April 15, 2021.

TYPE: Letter to the Editor-COVID-19 and Environmental Health

FUNDING: The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: LS, RA and GJR are supported by the National Institute for Health Research Health Protection Research Unit (NIHR HPRU) in Emergency Preparedness and Response, a partnership between Public Health England, King's College London and the University of East Anglia. HWWP receives funding from Public Health England and NHS England. NTF is part funded by a grant from the UK Ministry of Defence. The views expressed are those of the authors and not necessarily those of the NIHR, Public Health England, the Department of Health and Social Care or the UK Ministry of Defence. The Department of Health and Social Care (DHSC) funded data collection.

Surveys were commissioned and funded by DHSC, with the authors providing advice on the question design and selection. DHSC had no role in analysis, decision to publish, or preparation of the manuscript.

Preliminary results were made available to DHSC and the UK's Scientific Advisory Group for Emergencies (SAGE).

DECLARATION OF CONFLICTING INTERESTS: The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: All authors had financial support from NIHR for the submitted work; RA is an employee of Public Health England; HWWP receives additional salary support from Public Health England and NHS England; no other financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work. NTF is a participant of an independent group advising NHS Digital on the release of patient data. All authors are participants of the UK's Scientific Advisory Group for Emergencies or its subgroups.

CORRESPONDING AUTHOR: Louise E Smith, Post-doctoral Researcher. Department of Psychological Medicine, King's College London, Weston Education Centre, Cutcombe Road, London, SE5 9RJ, UK. Email: louise.e.smith@kcl.ac.uk

COVID-19 spreads through droplet and airborne transmission.¹ Droplet transmission occurs when an infected individual coughs, sneezes or speaks, releasing droplets into the air that deposit quickly, typically within 2 m. If there is direct air flow from an infected individual, transmission can occur at a greater distance.² Airborne transmission occurs when smaller aerosols carrying a virus evaporate to form droplet nuclei that remain suspended in the air for long periods. Ventilation prevents the spread of infection by diluting droplet nuclei in the air and extracting them outdoors where they are dispersed.³

Improving ventilation in indoor spaces reduces transmission of COVID-19.⁴ This is important in home settings, where other protective measures (eg, physical distancing, wearing a face covering) may be less likely, and in non-domestic settings, where there is increased household mixing. Opening doors or windows also has other health benefits by dispersing airborne pollutants. We investigated self-reported rates of opening windows to improve ventilation in the home, perceived effectiveness for opening windows, and confidence that if you wanted to, you could open windows (self-efficacy).



Creative Commons CC BY: This article is distributed under the terms of the Creative Commons Attribution 4.0 License

(<https://creativecommons.org/licenses/by/4.0/>) which permits any use, reproduction and distribution of the work without further permission

provided the original work is attributed as specified on the SAGE and Open Access pages (<https://us.sagepub.com/en-us/nam/open-access-at-sage>).

Data from CORSAIR, a series of nationally representative cross-sectional online surveys conducted by BMG Research on behalf of the Department of Health and Social Care, England, were used (collected 26 October to 2 December 2020; $n = 10\,207$ responses from 10 199 participants). This period spanned the launch of a marketing campaign highlighting the importance of ventilation in reducing the spread of COVID-19 in England on 18 November 2020.⁵ We asked participants how often in the last 7 days they had “opened windows to improve ventilation in [their] home.” Participants were asked to what extent they agreed that opening windows regularly to improve ventilation in indoor spaces was an effective way to prevent the spread of COVID-19 and they were confident they could open windows regularly to improve ventilation in their home and other indoor spaces. We investigated whether perceptions and

behavior changed over time (comparing survey waves). We coded answers of “not applicable” or “don’t know” as missing (self-reported behavior $n = 122$, 1.2%; perceived effectiveness $n = 216$, 2.1%; confidence $n = 144$, 1.4%). This work was conducted as part of a service evaluation of the marketing and communications run by the Department of Health and Social Care, and so did not require ethical approval.

One in 6 people reported rarely, if ever, opening windows in their home in the last week (Table 1). Only 3 in 4 people agreed that opening windows to improve ventilation was an effective way to prevent the spread of COVID-19 and 5 in 6 were confident they could open windows. There was no difference in self-reported behaviour ($\chi^2(20) = 15.0$, $P = .78$), perceived effectiveness ($\chi^2(20) = 22.3$, $P = .32$) or confidence ($\chi^2(20) = 22.3$, $P = .32$) or confidence ($\chi^2(20) = 24.3$, $P = .23$) over time.

Table 1. Numbers (n) and percentages (%) of people who reported opening their windows in the last 7 days, and perceived effectiveness of, and confidence for opening windows to improve ventilation.

| RESPONSE OPTIONS | BEHAVIOUR IN LAST 7 DAYS N = 10 085, N (%) | RESPONSE OPTIONS | PERCEIVED EFFECTIVENESS N = 9991, N (%) | CONFIDENCE N = 10 063, N (%) |
|------------------|--|-------------------|---|------------------------------|
| Very frequently | 3120 (30.9) | Strongly agree | 3688 (36.9) | 4534 (45.1) |
| Frequently | 2783 (27.6) | Agree | 3970 (39.7) | 3945 (39.2) |
| Occasionally | 2386 (23.7) | Neither | 1703 (17.0) | 1120 (11.1) |
| Rarely | 1066 (10.6) | Disagree | 394 (3.9) | 320 (3.2) |
| Never | 730 (7.2) | Strongly disagree | 236 (2.3) | 144 (1.4) |

Percentages may not sum to 100% due to rounding errors.

Opening windows for short periods of time (10 minutes every hour or 2 hours) may be effective at reducing transmission without compromising temperature. The importance of ventilation in preventing the spread of COVID-19 should be emphasised in official messaging to help improve knowledge about the effectiveness of ventilation for reducing COVID-19 transmission and the frequency of people opening windows at home.

Acknowledgements

The authors would like to thank Professor Catherine Noakes for her contribution to the manuscript.

ORCID iD

Louise E Smith  <https://orcid.org/0000-0002-1277-2564>

REFERENCES

1. The Lancet Respiratory Medicine. COVID-19 transmission-up in the air. *Lancet Respir Med.* 2020;8:1159.
2. Kwon KS, Park JI, Park YJ, Jung DM, Ryu KW, Lee JH. Evidence of long-distance droplet transmission of SARS-CoV-2 by direct air flow in a restaurant in Korea. *J Korean Med Sci.* 2020;35:e415.
3. Qian H, Zheng X. Ventilation control for airborne transmission of human exhaled bio-aerosols in buildings. *J Thorac Dis.* 2018;10:S2295-S2304.
4. SAGE Environment and Modelling Group. Simple summary of ventilation actions to mitigate the risk of COVID-19. October 1, 2020. Accessed February 24, 2021. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/945754/S0973_Ventilation_Actions_Summary_16122020_V2.pdf
5. New film shows importance of ventilation to reduce spread of COVID-19. November 18, 2020. Accessed December 11, 2020. <https://www.gov.uk/government/news/new-film-shows-importance-of-ventilation-to-reduce-spread-of-covid-19#:~:text=For%20COVID%2D19%2C%20it%20is,transmission%20to%20other%20household%20members.&text=Remember%2C%20opening%20windows%20alongside%20washing,your%20risk%20of%20COVID%2D19>