COVID-19 Living Evidence Synthesis 16.1b: Effectiveness of physical distancing in reducing transmission of COVID-19 and other respiratory infections in non-health care community-based settings

Executive summary

Question

- What is the effectiveness of physical distancing in reducing transmission of COVID-19 and other respiratory illnesses (e.g., influenza, respiratory syncytial virus (RSV)) in non-healthcare community-based settings?

Background

- As COVID-19 spread around the world in early 2020, a number of non-pharmaceutical interventions were put in place to curb the spread of the virus, prevent hospitalizations and deaths, and reduce the strain on the healthcare system. One key measure was physical distancing, with recommendations in countries such as Canada to maintain 2 m or 6 feet from others to reduce risk of transmission. An important lesson to be learned from the data collected is whether physical distancing policies, or individual's practicing of physical distancing were effective in reducing transmission of COVID-19 specifically, and other respiratory illnesses generally, in preparation for future pandemics.

Key points

- We included 8 studies, of which one was a systematic review and seven were observational studies.
- Evidence from studies that report on individual physical distancing practices via self-report suggest that maintaining 2 m or 6 feet from others may reduce the risk of COVID- 19 transmission.
- Evidence from studies that compared physical distancing policies within school settings suggest that these policies may not reduce the risk of COVID-19 transmission. These studies reflect what happens in a real-world school setting, amongst students who do and do not adhere to policies, in contrast with other studies that compare those who report adhering vs. not adhering to physical distancing guidelines.
- Modelling studies and outbreak investigations were not included, and these studies may have different findings.
- No studies were found that looked at the effect of physical distancing alone on risk of transmission, thus the certainty of the evidence available is very low. However, the identified studies represent the best available evidence to be used for decision-making.
- While these studies report on the overall association between physical distancing and COVID-19 incidence, it does not address the impact on individuals at increased risk of serious COVID-19 (e.g., immunocompromised), nor does the evidence consider the impact of measures on equity-deserving groups. While the magnitude of the reduction in transmission for those reporting physical distancing may be small, there may be an important reduction in risk for some groups.
- The four identified studies on individual practices rely largely on retrospective self-report data, which are subject to recall and reporting bias and thus may overestimate the results of physical distancing, especially when other measures are in place.
- It is possible that those who practice physical distancing may also practice other preventative behaviours (e.g., mask-wearing), and thus the effect of physical distancing may be confounded in some studies.
- An important consideration in understanding the effectiveness of physical distancing is the ability of individuals to adhere to interventions in particular settings, which was not considered in the included studies (for example, schools). Three studies reported on the impact of physical distancing policies in school settings, it is not known whether these findings translate to other community-based settings, such as workplaces.

Suggested Tweet

- Evidence suggests that those who report physical distancing from others have a lower risk of #COVID transmission and influenza-like illness. However, distancing policies in school settings may not reduce the risk of transmission. Findings may change as more data is available.

Date of last literature search: 3 March 2023

Suggested citation: Neil-Sztramko SE, Hagerman L, Thai A, Traynor R, Hopkins S, Stoby K, Sala N, Kostopoulos A, Neumann S, Choudhry N, Ford C, Dobbins M, COVID-END PHSM LES Working Group. Effectiveness of physical distancing in reducing transmission of COVID-19 and other respiratory infections in non-health care community-based settings. The National Collaborating Centre for Methods and Tools, 24 March 2023.

Please note: This living evidence synthesis (LESs) is part of a suite of LESs of the best-available evidence about the effectiveness of six PHSMs (masks, quarantine and isolation, ventilation, physical distancing and reduction of contacts, hand hygiene and respiratory etiquette, cleaning, and disinfecting), as well as combinations of and adherence to these measures, in preventing transmission of COVID-19 and other respiratory infectious diseases in non-health care community- based setting. This first full version was developed after two interim versions, which are available upon request. The next update to this and other LESs in the series is to be determined, but the most up-to-date versions in the suite are available on the COVID-END website. We provide context for synthesizing evidence about public health and social measures in Box 1 and an overview of our approach in Box 2.

Box 1: Context for synthesizing evidence about public health and social measures (PHSMs)

This series of living evidence syntheses was commissioned to understand the effects of PHSMs during a global pandemic to inform current and future use of PHSMs.

General considerations for identifying, appraising and synthesizing evidence about PHSMs

- PHSMs are population-level interventions and typically evaluated in observational studies.
  - Many PHSMs are interventions implemented at a population level, rather than at the level of individuals or clusters of individuals such as in clinical interventions.
  - Since it is typically not feasible and/or ethical to randomly allocate entire populations to different interventions, the effects of PHSMs are commonly evaluated using observational study designs that evaluate PHSMs in real-word settings.
  - As a result, a lack of evidence from RCTs does not necessarily mean the available evidence in this series of LESs is weak.
- Instruments for appraising the risk of bias in observational studies have been developed; however, rigorously tested and validated instruments are only available for clinical interventions.
  - Such instruments generally indicate that a study has less risk of bias when it was possible to directly assess outcomes and control for potential confounders for individual study participants.
  - Studies assessing PHSMs at the population level are not able to provide such assessments for all relevant individual-level variables that could affect outcomes, and therefore cannot be classified as low risk of bias.
- Given feasibility considerations related to synthesizing evidence in a timely manner to inform decision-making for PHSMs during a global pandemic, highly focused research questions and inclusion criteria for literature searches were required.
  - As a result, we acknowledge that this series of living evidence syntheses – about the effectiveness of specific PHSMs (i.e., quarantine and isolation; mask use, including unintended consequences; ventilation, reduction of contacts, physical distancing, hand hygiene and cleaning and disinfecting measures), interventions that promote adherence to PHSMs, and the effectiveness of combinations of PHSMs – does not incorporate all existing relevant evidence on PHSMs.
  - Ongoing work on this suite of products will allow us to broaden the scope of this review for a more comprehensive understanding of the effectiveness of PHSMs.
  - Decision-making with the best available evidence requires synthesizing findings from studies conducted in real-world settings (e.g., with people affected by misinformation, different levels of adherence to an intervention, different definitions and uses of the interventions, and in different stages of the pandemic, such as before and after availability of COVID-19 vaccines).

Our approach to presenting findings with an appraisal of risk of bias (ROB) of included studies

To ensure we used robust methods to identify, appraise and synthesize findings and to provide clear messages about the effects of different PHSMs, we:

- acknowledge that a lack of evidence from RCTs does not mean the evidence available is weak
- assessed included studies for ROB using the approach described in the methods box
- typically introduce the ROB assessments only once early in the document if they are consistent across sub-questions, sub-groups and outcomes, and provide insight about the reasons for the ROB assessment findings (e.g., confounding with other complementary PHSMs) and sources of additional insights (e.g., findings from LES 20 in this series that evaluates combinations of PHSMs)
- note where there are lower levels of ROB where appropriate

- note where it is likely that risk of bias (e.g., confounding variables) may reduce the strength of association with a PHSM and an outcome from the included studies
- identify when little evidence was found and when it was likely due to literature search criteria that prioritized RCTs over observational studies.

Implications for synthesizing evidence about PHSMs

Despite the ROB for studies conducted at the population level that are identified in studies in this LES and others in the series, they provide the best-available evidence about the effects of interventions in real life. Moreover, ROB (and GRADE, which was not used for this series of LESs) were designed for clinical programs, services and products, and there is an ongoing need to identify whether and how such assessments and the communication of such assessments, need to be adjusted for public-health programs, services and measures and for health-system arrangements.

Findings

- The search identified one synthesis and six single studies that reported on the impact of physical distancing on COVID-19 transmission and one single study on the risk of other respiratory illnesses. Studies were generally of serious risk of bias.
- The number of studies identified in the search, screened, and included is outlined in Figure 1.

Summary of findings about the primary outcome: Reducing transmission of COVID-19

One synthesis and six single studies were included that report on reducing transmission of COVID-19 as an outcome. The characteristics, findings, and assessment of risk of bias for each study is presented in Table 1 and 2.

Self-reported physical distancing may be associated with lower risk of COVID-19 transmission, although studies were generally of serious risk of bias. Although findings from single studies did not reach statistical significance, pooled results from the included meta-analysis provide evidence that physical distancing does reduce transmission.

Physical distancing policies in school settings may not reduce risk of COVID-19 transmission when other measures are in place, studies were of serious risk of bias.

Summary of findings about secondary outcome 1: Reducing COVID-19 associated hospitalizations and deaths

Within the identified studies, none reported on COVID-19 associated hospitalizations and deaths.

Box 2: Our approach

We retrieved candidate studies by searching: 1) PubMed via COVID-19+ Evidence Alerts; and 2) pre-print servers. Searches were conducted for studies reported in English, conducted with humans and published since 1 January 2020 (to coincide with the emergence of COVID-19 as a global pandemic). Our detailed search strategy is included in **Appendix 1**.

Studies that report on empirical data with a comparator were considered for inclusion, with modelling studies, simulation studies, case reports, case series, and press releases excluded. A full list of included studies is provided in **Tables 1-3**. Studies excluded at the last stages of reviewing are provided in **Appendix 2**.

Population of interest: All population groups that report data related to all COVID-19 variants and sub-variants.

Intervention and control/comparator: Physical distancing (e.g., 6 feet or 2 m) compared to no distancing (close contact, or closer distancing policies, e.g., 3 feet or 1m).

Primary outcome: Reduction in transmission of COVID-19; **Secondary outcomes**: Reduction in COVID-19 associated hospitalizations and deaths, and transmission of other respiratory infections.

Data extraction: Data extraction was conducted by one team member and checked for accuracy and consistency by another using the template provided in **Appendix 3**.

Critical appraisal: Risk of Bias (ROB) of individual studies was assessed using validated ROB tools. For observational studies, we used an adapted ROBINS-I (Linkins, 2023) and the Joanna Briggs Institute (JBI) Checklist for Analytical Cross Sectional Studies. Judgements for the domains within these tools were decided by consensus within the synthesis team. Systematic reviews were assessed using AMSTAR 1. ROB was assessed by one reviewer and verified by a second.

Summaries: We summarized the evidence by presenting narrative evidence profiles across studies by outcome measure.

The next update to this document is to be determined.

Summary of findings about secondary outcome 2: Reducing transmission of other respiratory infections

Of the identified studies, only one reported on other respiratory infections (self-reported influenza-like illness). The characteristics, findings, and assessment of risk of bias for this study is presented in Table 3. Those who self-report practicing physical distancing always or often have lower odds of self-reported influenza-like illness than those who did not report physical distancing.

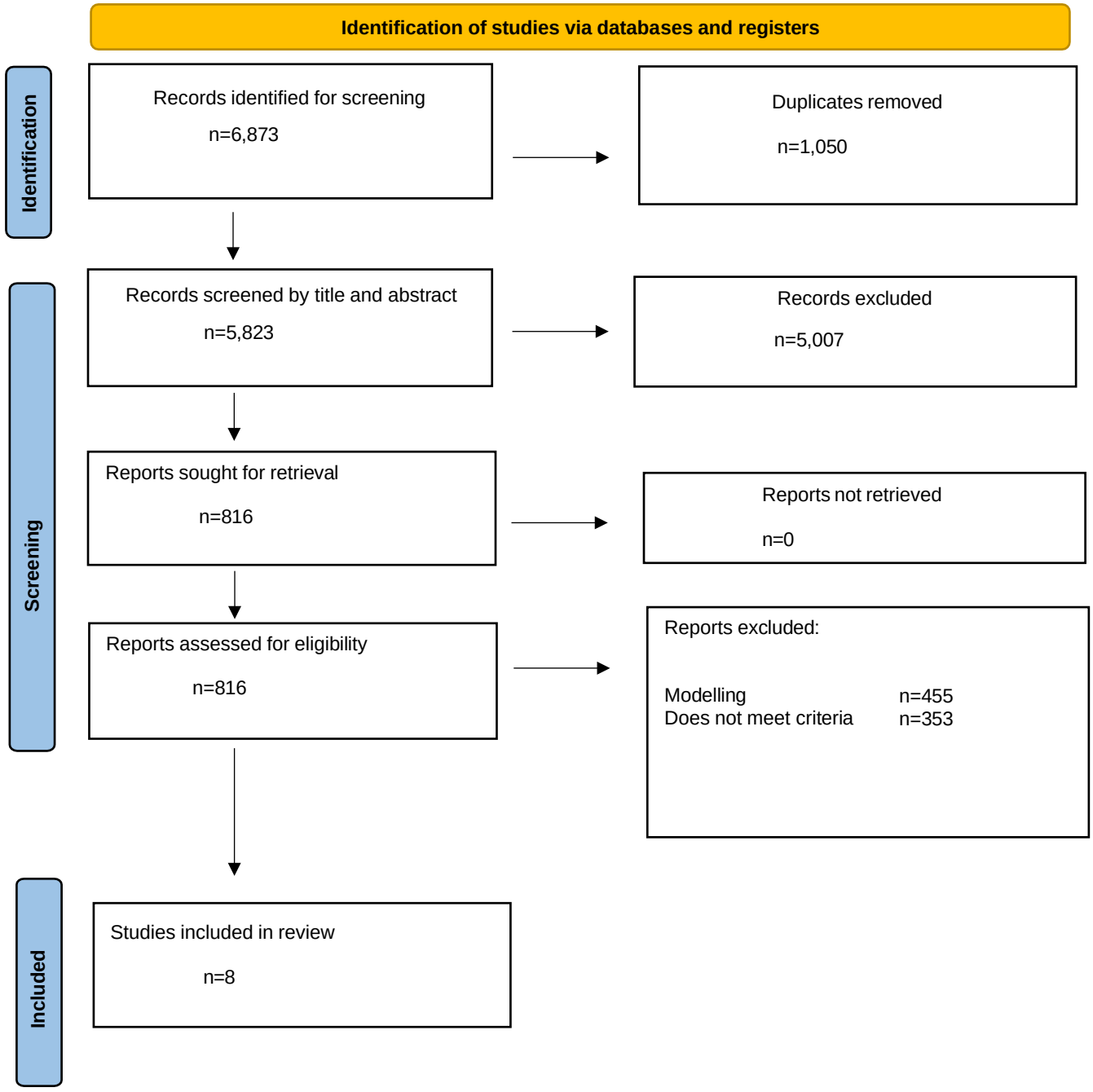

Figure 1. PRISMA diagram of new studies identified.

Table 1: Summary of syntheses reporting on effectiveness of physical distancing in preventing COVID-19 infections

Reference	Date released	Setting and time covered	Study characteristics	Summary of key findings in relation to the outcome	Quality Rating
Previously reported evidence					
Talic, S., Shah, S., Wild, H., Gasevic, D., Maharaj, A., Ademi, Z., … Ilic, D. (2021). Effectiveness of public health measures in reducing the incidence of covid-19, SARS-CoV-2 transmission, and covid-19 mortality: systematic review and meta-analysis. *BMJ, 375*, e068302.	03 November 2021	Global Included studies published to June 2021	**Design**: Systematic review **Intervention**: Physical distancing (distance not specified). **Sample**: n = 8 studies assessing physical distancing **Key outcomes**: Reproduction number (Ro), time-varying reproduction number (Rt), COVID-19 incidence (units not reported), COVID-19 mortality (# of deaths), and risk of COVID-19 infection (%) **VOCs assessed**: NR	In a meta-analysis (n = 6), physical distancing was associated with reduced COVID-19 incidence (RR = 0.75, 95% CI: 0.59, 0.95). Included studies had moderate-serious risk of bias	High

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Table 2: Summary of studies reporting on effectiveness of physical distancing in preventing COVID-19 infections

Reference	Date released	Setting and time covered	Study characteristics	Summary of key findings in relation to the outcome	Risk of Bias
New evidence reported on March 24, 2023					
Nash, D., Rane, M.S., Robertson, M.M., Chang, M., Kulkarni, S.G., Zimba, R., … Grov, C. (2023). Severe Acute Respiratory Syndrome Coronavirus 2 Incidence and Risk Factors in a National, Community-Based Prospective Cohort of US Adults. *Clinical Infectious Diseases, 76*(3). e375-e384.	14 July 2022	United States May 2020 - January 2021	**Design**: Cohort study **Exposure**: Self-reported physical distancing with people they do not know (always, sometimes, never, not applicable) and people they know (always, sometimes, never, not applicable). **Sample**: Adults who provided ≥1 antibody test results (n = 4510). **Key outcomes**: COVID-19 seroincidence. **VOCs assessed**: None	Individuals who reported practicing physical distancing with people they knew sometimes had a lower seroincidence of COVID-19 vs. those that never did (IRR: 0.60, 95% CI: 0.38, 0.96). No significant association was seen in those who practiced physical distancing with people they knew always vs. never (IRR: 0.64, 95% CI: 0.39, 1.06) No significant association was observed in individuals who reported practicing physical distancing with people they did not know always vs. never (IRR: 0.42, 95% CI: 0.20–1.00) or sometimes vs. never (IRR: 0.47, 95% CI: 0.22, 1.19). Outcomes were adjusted for age, gender, race/ethnicity, comorbid conditions, and county-level changes in community-level transmission.	Critical

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Reference	Date released	Setting and time covered	Study characteristics	Summary of key findings in relation to the outcome	Risk of Bias
Previously reported evidence					
Donovan, C.V., Worrell, M.C., Steinberg, J., Montgomery, B.K., Young, R., Richardson, G., … Missouri School Measurement Team (2022). An Examination of SARS-CoV-2 Transmission Based on Classroom Distancing in Schools With Other Preventive Measures in Place-Missouri, January-March 2021. *Public health reports*, *137*(5), 972–979.	16 July 2022	Missouri, United States Jan 2021 – March 2021	**Design**: Cohort study **Exposure**: Classroom layout to support physical distancing of >3 ft. **Sample**: Close contacts of 34 students and staff members who tested positive for COVID-19 (n = 164). School districts implemented a range of COVID-19 prevention measures, including wearing face masks, limiting lunchroom occupancy, sanitizing desks, requiring symptom screening and monitoring, and following local isolation and quarantine guidance. **Key outcomes**: Secondary transmission of COVID-19. **VOCs assessed**: Prior to widespread prevalence of the B.1.617.2 (Delta) variant	Of 122 contacts who sat >3 ft away from possibly infectious people, no transmission events were identified. Of 42 close contacts who sat <3 ft away from possibly infectious people, 1 probable transmission event occurred.	Critical

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Reference	Date released	Setting and time covered	Study characteristics	Summary of key findings in relation to the outcome	Risk of Bias
Marchant, E., Griffiths, L., Crick, T., Fry, R., Hollinghurst, J., James, M., … Brophy, S. (2022). COVID-19 mitigation measures in primary schools and association with infection and school staff wellbeing: An observational survey linked with routine data in Wales, UK. *PloS one*, *17*(2), e0264023.	28 February 2022	Wales, United Kingdom October 2020 – December 2020	**Design**: Cross-sectional study **Exposure**: Self-reported 2 m distance from students and other staff (always, most of the time, sometimes, rarely, and never) **Sample**: School staff (n = 353) from 59 primary schools located in 15 local authorities **Key outcomes**: Primary outcome: At least 1 positive COVID-19 test reported at the school. **VOCs assessed**: NR	There was no association between self-reported physical distancing from students and the odds of a COVID-19 case in the school • Sometimes (vs. rarely/never), OR: 0.79, 95% CI: 0.36, 1.75 • Most of the time/always (vs. rarely/never), OR: 0.89, 95% CI: 0.33, 2.38 There was no association between self-reported physical distancing from other staff and the odds of a COVID-19 case in the school • Sometimes (vs. rarely/never), OR: 0.1.82, 95% CI: 0.63, 5.26 • Most of the time/always (vs. rarely/never), OR: 2.85, 95% CI: 0.97, 8.37	Low *(Cross-sectional study)*
van den Berg, P., Schechter-Perkins, E.M., Jack, R.S., Epshtein, I., Nelson, R., Oster, E., & Branch-Elliman, W. (2021). Effectiveness of 3 Versus 6 ft of Physical Distancing for Controlling Spread of Coronavirus Disease 2019 Among Primary and Secondary Students and Staff: A Retrospective, Statewide Cohort Study. *Clinical infectious diseases*, *73*(10), 1871–1878.	10 March 2021	Massachusetts, United States	**Design**: Cohort study **Intervention**: School districts with >/3 ft of physical distancing vs. districts with >/6 ft of distancing policies **Sample**: Public school districts open for in-person or hybrid learning with detailed infection plans were selected (n = 251). **Key outcomes**: Daily incidence of COVID-19 per 100,000 for students and staff attending school in-person or hybrid **VOCs assessed**: NR	There was no difference in incidence of COVID-19 in districts with policies requiring 3 vs. 6 ft of physical distancing amongst students (IRR: 0.904, 95% CI: 0.616, 1.325). or staff (IRR: 1.015, 95% CI: 0.754, 1.365), after adjusting for community incidence.	Serious

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Reference	Date released	Setting and time covered	Study characteristics	Summary of key findings in relation to the outcome	Risk of Bias
Clipman, S.J., Wesolowski, A.P., Gibson, D.G., Agarwal, S., Lambrou, A.S., Kirk, G.D., … Solomon, S.S. (2021). Rapid Real-time Tracking of Nonpharmaceutical Interventions and Their Association With Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Positivity: The Coronavirus Disease 2019 (COVID-19) Pandemic Pulse Study. *Clinical infectious diseases*, *73*(7), e1822–e1829.	02 September 2020	Maryland, United States June 2020	**Design**: Cross-sectional study **Exposure**: Self-reported physical distancing indoors (always, sometimes, never, and outdoors (always, sometimes, never) **Sample**: Residents from the state of Maryland (n = 1030) **Key outcomes**: Self-reported ever testing positive for COVID-19 infection (yes/no) **VOCs assessed**: None	Individuals who reported practicing physical distancing indoors always (OR: 0.32, 95% CI: 0.10, 0.99) and sometimes (OR: 0.26, 95% CI: 0.08, 0.90) were less likely to report ever testing positive for COVID-19 compared to individuals who never distanced indoors. Individuals who reported practicing physical distancing outdoors always (OR: 0.10, 95% CI: 0.03, 0.33) were less likely to report ever testing positive for COVID-19 compared to individuals who never distanced outdoors. No association was observed in individuals who reported practicing physical distancing outdoors sometimes vs. never (OR: 0.34, 95% CI: 0.10, 1.19). Outcomes were adjusted for ethnicity, age, gender, used public transport, and visited place of worship.	Moderate *(Cross-sectional study)*
Wang, Y., Tian, H., Zhang, L., Zhang, M., Guo, D., Wu, W., … MacIntyre, C. R. (2020). Reduction of secondary transmission of SARS-CoV-2 in households by face mask use, disinfection and social distancing: a cohort study in Beijing, China. *BMJ global health*, *5*(5), e002794.	28 May 2020	Beijing, China February 2020	**Design**: Case-control study **Exposure**: Close contact within 1 m of a COVID-19 case at home. **Sample**: Households with (n = 41) and without (n = 83) secondary transmission **Key outcomes**: Families with secondary transmission were defined as those where some or all of the family members became infected within one incubation period (2 weeks) of symptom onset of the primary case. **VOCs assessed**: None	Individuals who report contact within 1 m 1-3 times (OR: 3.30, 95% CI: 1.05, 10.40) and >/4 times (OR: 18.26, 95% CI: 3.93, 84.79) were more likely to have secondary transmission within the household than those that reported no close contact within 1m. Outcomes were adjusted for the following variables: primary case had diarrhea (yes/no), number of family members wearing a mask at home (#), and frequency of chlorine or ethanol-based disinfectant use for house cleaning.	Critical

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Table 3: Summary of studies reporting on the effectiveness of physical distancing in preventing other respiratory infections

Reference	Date released	Setting and time covered	Study characteristics	Summary of key findings in relation to the outcome	Risk of Bias
Previously reported evidence					
Youssef, D., Issa, O., Kanso, M., Youssef, J., Abou-Abbas, L., & Abboud, E. (2022). Practice of non-pharmaceutical interventions against COVID-19 and reduction of the risk of infuenza-like illness: a cross-sectional population-based study. *Journal of pharmaceutical policy and practice*, *15*(1), 54.	30 August 2022	Lebanon Oct 2020-March 2021	**Design**: Cross-sectional study **Exposure**: Self-reported frequency of physical distancing (never, rarely, sometimes, frequently, always) **Sample**: Arab-speaking Lebanese adults (n = 1019) **Key outcomes**: Self-reported influenza-like illnesses **VOCs assessed**: N/A	Individuals who reported practicing physical distancing frequently/always were less likely to report symptoms of influenza-like illnesses compared to individuals who never practiced distancing (OR: 0.65, 95% CI: 0.48, 0.83). There was no difference in the odds of influenza-like illness between those who reported practicing physical distancing sometimes vs. never (OR: 0.81, 95% CI: 0.60, 2.13). Outcomes were adjusted for influenza vaccination status, wearing face masks, practicing hand hygiene, engaging in cough etiquette, practicing surface disinfection, and avoiding crowded places.	Low *(Cross-sectional study)*

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Coronavirus Disease 2019 Among Primary and Secondary Students and Staff: A Retrospective, Statewide Cohort Study. *Clinical infectious diseases*, *73*(10), 1871–1878.

Wang, Y., Tian, H., Zhang, L., Zhang, M., Guo, D., Wu, W., … MacIntyre, C. R. (2020). Reduction of secondary transmission of SARS-CoV-2 in households by face mask use, disinfection and social distancing: a cohort study in Beijing, China. *BMJ global health*, *5*(5), e002794.

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Appendices

Appendix 1: Detailed search strategy

The search was conducted in the following databases:

- PubMed
- iCITE
- Embase
- CINAHL
- Web of Science

Sample Search: PubMed

Line	Query
1	((("COVID 19"[MeSH Terms] OR "COVID 19"[All Fields] OR "SARS CoV 2"[All Fields] OR "SARS CoV 2"[MeSH Terms] OR "severe acute respiratory syndrome coronavirus 2"[All Fields] OR ("SARS CoV 2"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "ncov"[All Fields]) OR "2019 ncov"[All Fields] OR "coronavirus infections"[MeSH Terms] OR "coronavirus"[MeSH Terms] OR ("coronavirus"[MeSH Terms] OR "coronavirus"[All Fields] OR "coronaviruses"[All Fields]) OR ("coronavirus"[MeSH Terms] OR "coronavirus"[All Fields] OR "coronaviruses"[All Fields]) OR "betacoronavirus"[MeSH Terms] OR ("betacoronavirus"[MeSH Terms] OR "betacoronavirus"[All Fields] OR "betacoronaviruses"[All Fields]) OR ("betacoronavirus"[MeSH Terms] OR "betacoronavirus"[All Fields] OR "betacoronaviruses"[All Fields]) OR "wuhan coronavirus"[All Fields] OR "2019nCoV"[All Fields] OR "betacoronavirus*"[All Fields] OR "corona virus*"[All Fields] OR "coronavirus*"[All Fields] OR "coronovirus*"[All Fields] OR "CoV"[All Fields] OR "CoV2"[All Fields] OR ("SARS CoV 2"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "covid"[All Fields] OR "COVID 19"[MeSH Terms] OR "COVID 19"[All Fields]) OR ("COVID 19"[MeSH Terms] OR "COVID 19"[All Fields] OR "covid19"[All Fields]) OR ("COVID 19"[All Fields] OR "COVID 19"[MeSH Terms] OR "covid 19 vaccines"[All Fields] OR "covid 19 vaccines"[MeSH Terms] OR "covid 19 serotherapy"[All Fields] OR "covid 19 serotherapy"[Supplementary Concept] OR "covid 19 nucleic acid testing"[All Fields] OR "covid 19 nucleic acid testing"[MeSH Terms] OR "covid 19 serological testing"[All Fields] OR "covid 19 serological testing"[MeSH Terms] OR "covid 19 testing"[All Fields] OR "covid 19 testing"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "SARS CoV 2"[MeSH Terms] OR "severe acute respiratory syndrome coronavirus 2"[All Fields] OR "ncov"[All Fields] OR "2019 ncov"[All Fields] OR (("coronavirus"[MeSH Terms] OR "coronavirus"[All Fields] OR "CoV"[All Fields]) AND 2019/11/01:3000/12/31[Date - Publication])) OR ("SARS CoV 2"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "hcov 19"[All Fields]) OR ("SARS CoV 2"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "ncov"[All Fields]) OR "SARS CoV 2"[All Fields] OR ("SARS CoV 2"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "sars2"[All Fields]) OR "SARSCoV"[All Fields] OR ("sars virus"[MeSH Terms] OR ("sars"[All Fields] AND "virus"[All Fields]) OR "sars virus"[All Fields] OR ("sars"[All Fields] AND "CoV"[All Fields]) OR "sars cov"[All Fields]) OR "SARS-CoV2"[All Fields]) AND "English"[Language] AND 2020/01/01:2023/01/01[Date - Publication] AND ("physical distancing"[MeSH Terms] OR (("personal isolation"[Title/Abstract] OR "social distance"[All Fields] OR "social distancing"[All Fields] OR "lockdown"[Title/Abstract] OR "lock-down"[Title/Abstract] OR "stay-at-home"[Title/Abstract] OR "self-isolation"[Title/Abstract] OR "physical spacing"[Title/Abstract] OR "physical separation"[Title/Abstract] OR "physical contact"[Title/Abstract] OR "physical separation"[Title/Abstract]) AND ("diminish"[Title/Abstract] OR "limit"[Title/Abstract] OR "policy"[Title/Abstract] OR "mandate"[Title/Abstract] OR "mandate"[Title/Abstract]))) AND ("search*"[Title/Abstract] OR "meta-analysis"[Publication Type] OR "meta-analysis"[Title/Abstract] OR "meta analysis as topic"[MeSH Terms] OR "review"[Publication Type] OR "diagnosis"[MeSH Subheading] OR "associated"[Title/Abstract])) OR (("COVID 19"[MeSH Terms] OR "COVID 19"[All Fields] OR "SARS CoV 2"[All Fields] OR "SARS CoV 2"[MeSH Terms] OR "severe acute respiratory syndrome coronavirus 2"[All Fields] OR ("SARS CoV 2"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "ncov"[All Fields]) OR "2019 ncov"[All Fields] OR "coronavirus infections"[MeSH Terms] OR "coronavirus"[MeSH Terms] OR ("coronavirus"[MeSH Terms] OR "coronavirus"[All Fields] OR "coronaviruses"[All Fields]) OR ("coronavirus"[MeSH Terms] OR "coronavirus"[All Fields] OR "coronaviruses"[All Fields]) OR "betacoronavirus"[MeSH Terms] OR ("betacoronavirus"[MeSH Terms]

	OR "betacoronavirus"[All Fields] OR "betacoronaviruses"[All Fields]) OR ("betacoronavirus"[MeSH Terms] OR "betacoronavirus"[All Fields] OR "betacoronaviruses"[All Fields]) OR "wuhan coronavirus"[All Fields] OR "2019nCoV"[All Fields] OR "betacoronavirus*"[All Fields] OR "corona virus*"[All Fields] OR "coronavirus*"[All Fields] OR "coronovirus*"[All Fields] OR "CoV"[All Fields] OR "CoV2"[All Fields] OR ("SARS CoV 2"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "covid"[All Fields] OR "COVID 19"[MeSH Terms] OR "COVID 19"[All Fields]) OR ("COVID 19"[MeSH Terms] OR "COVID 19"[All Fields] OR "covid19"[All Fields]) OR ("COVID 19"[All Fields] OR "COVID 19"[MeSH Terms] OR "covid 19 vaccines"[All Fields] OR "covid 19 vaccines"[MeSH Terms] OR "covid 19 serotherapy"[All Fields] OR "covid 19 serotherapy"[Supplementary Concept] OR "covid 19 nucleic acid testing"[All Fields] OR "covid 19 nucleic acid testing"[MeSH Terms] OR "covid 19 serological testing"[All Fields] OR "covid 19 serological testing"[MeSH Terms] OR "covid 19 testing"[All Fields] OR "covid 19 testing"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "SARS CoV 2"[MeSH Terms] OR "severe acute respiratory syndrome coronavirus 2"[All Fields] OR "ncov"[All Fields] OR "2019 ncov"[All Fields] OR (("coronavirus"[MeSH Terms] OR "coronavirus"[All Fields] OR "CoV"[All Fields]) AND 2019/11/01:3000/12/31[Date - Publication])) OR ("SARS CoV 2"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "hcov 19"[All Fields]) OR ("SARS CoV 2"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "ncov"[All Fields]) OR "SARS CoV 2"[All Fields] OR ("SARS CoV 2"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "sars2"[All Fields]) OR "SARSCoV"[All Fields] OR ("sars virus"[MeSH Terms] OR ("sars"[All Fields] AND "virus"[All Fields]) OR "sars virus"[All Fields] OR ("sars"[All Fields] AND "CoV"[All Fields]) OR "sars cov"[All Fields]) OR "SARS-CoV2"[All Fields]) AND "English"[Language] AND 2020/01/01:2023/01/01[Date - Publication] AND ("physical distancing"[MeSH Terms] OR (("personal isolation"[Title/Abstract] OR "social distance"[All Fields] OR "social distancing"[All Fields] OR "lockdown"[Title/Abstract] OR "lock-down"[Title/Abstract] OR "stay-at-home"[Title/Abstract] OR "self-isolation"[Title/Abstract] OR "physical spacing"[Title/Abstract] OR "physical separation"[Title/Abstract] OR "physical contact"[Title/Abstract] OR "physical separation"[Title/Abstract]) AND ("diminish"[Title/Abstract] OR "limit"[Title/Abstract] OR "policy"[Title/Abstract] OR "mandate"[Title/Abstract] OR "mandate"[Title/Abstract]))) AND (("Clinical"[Title/Abstract] AND "Trial"[Title/Abstract]) OR "clinical trials as topic"[MeSH Terms] OR "clinical trial"[Publication Type] OR "random*"[Title/Abstract] OR "random allocation"[MeSH Terms] OR "therapeutic use"[MeSH Subheading])) OR (("COVID 19"[MeSH Terms] OR "COVID 19"[All Fields] OR "SARS CoV 2"[All Fields] OR "SARS CoV 2"[MeSH Terms] OR "severe acute respiratory syndrome coronavirus 2"[All Fields] OR ("SARS CoV 2"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "ncov"[All Fields]) OR "2019 ncov"[All Fields] OR "coronavirus infections"[MeSH Terms] OR "coronavirus"[MeSH Terms] OR ("coronavirus"[MeSH Terms] OR "coronavirus"[All Fields] OR "coronaviruses"[All Fields]) OR ("coronavirus"[MeSH Terms] OR "coronavirus"[All Fields] OR "coronaviruses"[All Fields]) OR "betacoronavirus"[MeSH Terms] OR ("betacoronavirus"[MeSH Terms] OR "betacoronavirus"[All Fields] OR "betacoronaviruses"[All Fields]) OR ("betacoronavirus"[MeSH Terms] OR "betacoronavirus"[All Fields] OR "betacoronaviruses"[All Fields]) OR "wuhan coronavirus"[All Fields] OR "2019nCoV"[All Fields] OR "betacoronavirus*"[All Fields] OR "corona virus*"[All Fields] OR "coronavirus*"[All Fields] OR "coronovirus*"[All Fields] OR "CoV"[All Fields] OR "CoV2"[All Fields] OR ("SARS CoV 2"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "covid"[All Fields] OR "COVID 19"[MeSH Terms] OR "COVID 19"[All Fields]) OR ("COVID 19"[MeSH Terms] OR "COVID 19"[All Fields] OR "covid19"[All Fields]) OR ("COVID 19"[All Fields] OR "COVID 19"[MeSH Terms] OR "covid 19 vaccines"[All Fields] OR "covid 19 vaccines"[MeSH Terms] OR "covid 19 serotherapy"[All Fields] OR "covid 19 serotherapy"[Supplementary Concept] OR "covid 19 nucleic acid testing"[All Fields] OR "covid 19 nucleic acid testing"[MeSH Terms] OR "covid 19 serological testing"[All Fields] OR "covid 19 serological testing"[MeSH Terms] OR "covid 19 testing"[All Fields] OR "covid 19 testing"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "SARS CoV 2"[MeSH Terms] OR "severe acute respiratory syndrome coronavirus 2"[All Fields] OR "ncov"[All Fields] OR "2019 ncov"[All Fields] OR (("coronavirus"[MeSH Terms] OR "coronavirus"[All Fields] OR "CoV"[All Fields]) AND 2019/11/01:3000/12/31[Date - Publication])) OR ("SARS CoV 2"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "hcov 19"[All Fields]) OR ("SARS CoV 2"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "ncov"[All Fields]) OR "SARS CoV 2"[All Fields] OR ("SARS CoV 2"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "sars2"[All Fields]) OR "SARSCoV"[All Fields] OR ("sars virus"[MeSH Terms] OR ("sars"[All Fields] AND "virus"[All Fields]) OR "sars virus"[All Fields] OR ("sars"[All Fields] AND "CoV"[All Fields]) OR "sars cov"[All Fields]) OR "SARS-CoV2"[All Fields]) AND "English"[Language] AND 2020/01/01:2023/01/01[Date - Publication] AND ("physical distancing"[MeSH Terms] OR

	((("personal isolation"[Title/Abstract] OR "social distance"[All Fields] OR "social distancing"[All Fields] OR "lockdown"[Title/Abstract] OR "lock-down"[Title/Abstract] OR "stay-at-home"[Title/Abstract] OR "self-isolation"[Title/Abstract] OR "physical spacing"[Title/Abstract] OR "physical separation"[Title/Abstract] OR "physical contact"[Title/Abstract] OR "physical separation"[Title/Abstract]) AND ("diminish"[Title/Abstract] OR "limit"[Title/Abstract] OR "policy"[Title/Abstract] OR "mandate"[Title/Abstract] OR "mandate"[Title/Abstract]))) AND ("comparative study"[Publication Type] OR "controlled clinical trial"[Publication Type] OR "quasiexperiment"[Title/Abstract] OR "quasi experiment"[Title/Abstract] OR "quasiexperimental"[Title/Abstract] OR "quasi experimental"[Title/Abstract] OR "quasi-randomized"[Title/Abstract] OR "natural experiment"[Title/Abstract] OR "natural control"[Title/Abstract] OR "Matched control"[Title/Abstract] OR ("unobserved"[Title] AND "heterogeneity"[Title]) OR "interrupted time series"[Title/Abstract] OR "difference studies"[Title/Abstract] OR "two stage residual inclusion"[Title/Abstract] OR "regression discontinuity"[Title/Abstract] OR "non-randomized"[Title/Abstract] OR "pretest-posttest"[Title/Abstract])) OR (("COVID 19"[MeSH Terms] OR "COVID 19"[All Fields] OR "SARS CoV 2"[All Fields] OR "SARS CoV 2"[MeSH Terms] OR "severe acute respiratory syndrome coronavirus 2"[All Fields] OR ("SARS CoV 2"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "ncov"[All Fields]) OR "2019 ncov"[All Fields] OR "coronavirus infections"[MeSH Terms] OR "coronavirus"[MeSH Terms] OR ("coronavirus"[MeSH Terms] OR "coronavirus"[All Fields] OR "coronaviruses"[All Fields]) OR ("coronavirus"[MeSH Terms] OR "coronavirus"[All Fields] OR "coronaviruses"[All Fields]) OR "betacoronavirus"[MeSH Terms] OR ("betacoronavirus"[MeSH Terms] OR "betacoronavirus"[All Fields] OR "betacoronaviruses"[All Fields]) OR ("betacoronavirus"[MeSH Terms] OR "betacoronavirus"[All Fields] OR "betacoronaviruses"[All Fields]) OR "wuhan coronavirus"[All Fields] OR "2019nCoV"[All Fields] OR "betacoronavirus*"[All Fields] OR "corona virus*"[All Fields] OR "coronavirus*"[All Fields] OR "coronovirus*"[All Fields] OR "CoV"[All Fields] OR "CoV2"[All Fields] OR ("SARS CoV 2"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "covid"[All Fields] OR "COVID 19"[MeSH Terms] OR "COVID 19"[All Fields]) OR ("COVID 19"[MeSH Terms] OR "COVID 19"[All Fields] OR "covid19"[All Fields]) OR ("COVID 19"[All Fields] OR "COVID 19"[MeSH Terms] OR "covid 19 vaccines"[All Fields] OR "covid 19 vaccines"[MeSH Terms] OR "covid 19 serotherapy"[All Fields] OR "covid 19 serotherapy"[Supplementary Concept] OR "covid 19 nucleic acid testing"[All Fields] OR "covid 19 nucleic acid testing"[MeSH Terms] OR "covid 19 serological testing"[All Fields] OR "covid 19 serological testing"[MeSH Terms] OR "covid 19 testing"[All Fields] OR "covid 19 testing"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "SARS CoV 2"[MeSH Terms] OR "severe acute respiratory syndrome coronavirus 2"[All Fields] OR "ncov"[All Fields] OR "2019 ncov"[All Fields] OR (("coronavirus"[MeSH Terms] OR "coronavirus"[All Fields] OR "CoV"[All Fields]) AND 2019/11/01:3000/12/31[Date - Publication])) OR ("SARS CoV 2"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "hcov 19"[All Fields]) OR ("SARS CoV 2"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "ncov"[All Fields]) OR "SARS CoV 2"[All Fields] OR ("SARS CoV 2"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "sars2"[All Fields]) OR "SARSCoV"[All Fields] OR ("sars virus"[MeSH Terms] OR ("sars"[All Fields] AND "virus"[All Fields]) OR "sars virus"[All Fields] OR ("sars"[All Fields] AND "CoV"[All Fields]) OR "sars cov"[All Fields]) OR "SARS-CoV2"[All Fields]) AND "English"[Language] AND 2020/01/01:2023/01/01[Date - Publication] AND ("physical distancing"[MeSH Terms] OR (("personal isolation"[Title/Abstract] OR "social distance"[All Fields] OR "social distancing"[All Fields] OR "lockdown"[Title/Abstract] OR "lock-down"[Title/Abstract] OR "stay-at-home"[Title/Abstract] OR "self-isolation"[Title/Abstract] OR "physical spacing"[Title/Abstract] OR "physical separation"[Title/Abstract] OR "physical contact"[Title/Abstract] OR "physical separation"[Title/Abstract]) AND ("diminish"[Title/Abstract] OR "limit"[Title/Abstract] OR "policy"[Title/Abstract] OR "mandate"[Title/Abstract] OR "mandate"[Title/Abstract]))) AND ("cohort studies"[MeSH Terms:noexp] OR "longitudinal studies"[MeSH Terms:noexp] OR "follow up studies"[MeSH Terms:noexp] OR "prospective studies"[MeSH Terms:noexp] OR "retrospective studies"[MeSH Terms:noexp] OR "cohort"[Title/Abstract] OR "longitudinal"[Title/Abstract] OR "prospective"[Title/Abstract] OR "retrospective"[Title/Abstract])) OR (("COVID 19"[MeSH Terms] OR "COVID 19"[All Fields] OR "SARS CoV 2"[All Fields] OR "SARS CoV 2"[MeSH Terms] OR "severe acute respiratory syndrome coronavirus 2"[All Fields] OR ("SARS CoV 2"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "ncov"[All Fields]) OR "2019 ncov"[All Fields] OR "coronavirus infections"[MeSH Terms] OR "coronavirus"[MeSH Terms] OR ("coronavirus"[MeSH Terms] OR "coronavirus"[All Fields] OR "coronaviruses"[All Fields]) OR ("coronavirus"[MeSH Terms] OR "coronavirus"[All Fields] OR

LES 16.1b: Effectiveness of physical distancing in reducing transmission of COVID-19 and other respiratory infections in non-health care community-based settings

	"coronaviruses"[All Fields]) OR "betacoronavirus"[MeSH Terms] OR ("betacoronavirus"[MeSH Terms] OR "betacoronavirus"[All Fields] OR "betacoronaviruses"[All Fields]) OR ("betacoronavirus"[MeSH Terms] OR "betacoronavirus"[All Fields] OR "betacoronaviruses"[All Fields]) OR "wuhan coronavirus"[All Fields] OR "2019nCoV"[All Fields] OR "betacoronavirus*"[All Fields] OR "corona virus*"[All Fields] OR "coronavirus*"[All Fields] OR "coronovirus*"[All Fields] OR "CoV"[All Fields] OR "CoV2"[All Fields] OR ("SARS CoV 2"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "covid"[All Fields] OR "COVID 19"[MeSH Terms] OR "COVID 19"[All Fields]) OR ("COVID 19"[MeSH Terms] OR "COVID 19"[All Fields] OR "covid19"[All Fields]) OR ("COVID 19"[All Fields] OR "COVID 19"[MeSH Terms] OR "covid 19 vaccines"[All Fields] OR "covid 19 vaccines"[MeSH Terms] OR "covid 19 serotherapy"[All Fields] OR "covid 19 serotherapy"[Supplementary Concept] OR "covid 19 nucleic acid testing"[All Fields] OR "covid 19 nucleic acid testing"[MeSH Terms] OR "covid 19 serological testing"[All Fields] OR "covid 19 serological testing"[MeSH Terms] OR "covid 19 testing"[All Fields] OR "covid 19 testing"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "SARS CoV 2"[MeSH Terms] OR "severe acute respiratory syndrome coronavirus 2"[All Fields] OR "ncov"[All Fields] OR "2019 ncov"[All Fields] OR (("coronavirus"[MeSH Terms] OR "coronavirus"[All Fields] OR "CoV"[All Fields]) AND 2019/11/01:3000/12/31[Date - Publication])) OR ("SARS CoV 2"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "hcov 19"[All Fields]) OR ("SARS CoV 2"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "ncov"[All Fields]) OR "SARS CoV 2"[All Fields] OR ("SARS CoV 2"[MeSH Terms] OR "SARS CoV 2"[All Fields] OR "sars2"[All Fields]) OR "SARSCoV"[All Fields] OR ("sars virus"[MeSH Terms] OR ("sars"[All Fields] AND "virus"[All Fields]) OR "sars virus"[All Fields] OR ("sars"[All Fields] AND "CoV"[All Fields]) OR "sars cov"[All Fields]) OR "SARS-CoV2"[All Fields]) AND "English"[Language] AND 2020/01/01:2023/01/01[Date - Publication] AND ("physical distancing"[MeSH Terms] OR (("personal isolation"[Title/Abstract] OR "social distance"[All Fields] OR "social distancing"[All Fields] OR "lockdown"[Title/Abstract] OR "lock-down"[Title/Abstract] OR "stay-at-home"[Title/Abstract] OR "self-isolation"[Title/Abstract] OR "physical spacing"[Title/Abstract] OR "physical separation"[Title/Abstract] OR "physical contact"[Title/Abstract] OR "physical separation"[Title/Abstract]) AND ("diminish"[Title/Abstract] OR "limit"[Title/Abstract] OR "policy"[Title/Abstract] OR "mandate"[Title/Abstract] OR "mandate"[Title/Abstract]))) AND ("case control studies"[MeSH Terms:noexp] OR "retrospective studies"[MeSH Terms:noexp] OR "control groups"[MeSH Terms:noexp] OR ("case"[Title/Abstract] AND "control"[Title/Abstract]) OR ("cases"[Title/Abstract] AND "controls"[Title/Abstract]) OR ("cases"[Title/Abstract] AND "Controlled"[Title/Abstract]) OR ("case"[Title/Abstract] AND "comparison*"[Title/Abstract]) OR ("cases"[Title/Abstract] AND "comparison*"[Title/Abstract]) OR "control group"[Title/Abstract] OR "control groups"[Title/Abstract]))) NOT ("animals"[MeSH Terms] NOT ("animals"[MeSH Terms] AND "humans"[MeSH Terms]))

LES 16.1b: Effectiveness of physical distancing in reducing transmission of COVID-19 and other respiratory infections in non-health care community-based settings

Appendix 2: Studies excluded at the last stages of reviewing

A. Cheema, S., Kifayat, T., R Rahman, A., Khan, U., Zaib, A., Khan, I., & Sooppy Nisar, K. (2021). Is Social Distancing, and Quarantine Effective in Restricting COVID-19 Outbreak? Statistical Evidences from Wuhan, China. *Computers, Materials & Continua, 66*(2), 1977-1985. doi:10.32604/cmc.2020.012096

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Appendix 3: Data extraction form

1. Date released (DD Month YYYY)

...

2. Setting and time covered

(City/region, Country; OR "Global")

...

3. Study Characteristics: Design

(Your assessment which may/may not align with authors; for quasi-experimental studies include details if able about approach such as interrupted- time-series or difference in differences, etc.)

...

4. Study Characteristics: Intervention/Exposure

(How is this defined in the study)

...

5. Study characteritics: sample

...

6. Study characteristics: Key Outcomes

(Only include those relevant to our research question, be succinct but specific)

...

7. Study characterstics: Variants of Concern assessed

(Authors may state explicitly in analysis for example comparing alpha vs. delta waves, but may need to look in the introductino or discussion for context about the variants of concern circulating at the time period of data collection; for data collected early in the pandemic please use your judgement as to when it is safe to state No VoCs circulating)

...

Appendix 4: Plain Language Summary: Does physical distancing help to control the spread of COVID- 19?

What is physical distancing?

Physical distancing rules (i.e. asking people to stay 2m or 6ft apart) were put in place to decrease the spread of COVID-19.

What questions did this review answer?

- Does physical distancing decrease the number of COVID-19 cases?
- Does physical distancing decrease the number of people who are hospitalized or die from COVID-19?
- Does physical distancing for COVID-19 decrease the number of other infections that are mainly spread through the airways?

What did we do?

We searched for studies in scientific databases that sought to answer these questions. We included studies from around the world that were published from January 1, 2020 to March 3, 2023.

Key results

We found 8 studies. Most studies described how physical distancing changed the number of cases of COVID-19 (7 studies), and the remaining study described changes in reporting of other respiratory viruses.

Studies were included from around the world, but most were from North America (4 studies).

Decreasing the number of COVID-19 cases

People who practiced physical distancing were less likely to report getting COVID-19 compared to those who did not (4 studies).

In school settings, physical distancing polices did not appear to decrease the number of COVID- 19 cases (3 studies).

Reducing COVID-19 hospitalizations and deaths

No studies reported on the impact of physical distancing on COVID-19 hospitalizations and deaths.

Reducing spread of other respiratory infections

Practicing physical distancing may decrease the chances of getting influenza-like illness (1 study).

How confident are we in the results of the studies?

Our confidence in these findings is limited because the types of studies a researcher would have to do to be more certain are not possible or ethical during public health emergencies. People who practice physical distancing may also be more likely to use other protective measures (e.g., wearing masks, getting vaccinated). It is difficult to know which protective measure is most important. None of the studies looked at the role of physical distancing on preventing transmission in those at highest risk for serious illness from COVID-19.

Conclusions

Physical distancing may limit the spread of COVID-19 and influenza-like illnesses. There were no studies that explored whether physical distancing reduces COVID-19 hospitalizations or deaths.