

SYNOPSIS

09/11/2020

Review of “What settings have been linked to SARS-CoV-2 transmission clusters?”

Article citation: Leclerc QJ, Fuller NM, Knight LE, CMMID COVID-19 Working Group, Funk S, Knight GM. What settings have been linked to SARS-CoV-2 transmission clusters? Wellcome Open Res. 2020;5:83. Available from: <https://doi.org/10.12688/wellcomeopenres.15889.2>

One-Minute Summary

- This paper is a systematic review to determine the **types of indoor and outdoor settings where transmission and clusters of COVID-19 have been reported**. The authors’ stated aim is to inform strategies to avoid a resurgence in transmission as lockdown measures are lifted.
- The reviewed reports included peer-reviewed articles from PubMed (67 articles found), media reports in English from Google searches, and publically available data on settings in which the first 100 “transmission events” occurred. Finally, following the initial publication of the article, additional clusters suggested by readers were reviewed by the authors and the data on reported clusters were updated in version 2 of the article published June 5, 2020 (reviewed in this synopsis).
- There was evidence of COVID-19 transmission clusters in 201 reported events that were classified into 22 types of settings (e.g., bar, conference, elderly care, food processing, funeral, hospital, household, religious, school, transport). By setting type, 21/22 were indoor or indoor/outdoor settings. The one setting type in which all clusters occurred outdoors was a building site, which was outdoor by definition – “Outdoor space where construction work takes place.” Many of the reports with information on settings came from China (47/201) and Singapore (51/201).
- Setting characteristics (e.g., type of setting, indoor or outdoor) were documented by cluster event in the online database. Of all clusters, the majority were associated with indoor or indoor/outdoor settings; however, in the [publically available online database](#), which includes updates made after publication, the majority of clusters are indoor settings (90% or 238/265 as of September 3, 2020).
 - The settings with the most clusters were households (36 clusters) and worker dormitories (21 clusters). Elderly care and meals (places where people eat together, e.g., restaurants) were associated with 17 clusters each.
 - The cluster size ranged from 2 to 1,156 cases across the 22 settings. The setting types with the largest median cluster sizes (>50 cases) were ships, prisons, and food processing plants.
 - The majority of clusters had fewer than 100 cases per cluster. Some clusters in religious gatherings, food processing plants, large cohabitating settings (e.g., worker dormitories, prisons, and ships), healthcare, elderly care, schools and shopping had >100 (in some cases >1000) cases. Settings with >50 and up to 100 cases were bars, sport-related settings (e.g.,

indoor sports gyms, indoor zumba or tennis classes, outdoor running with a partner), weddings, workplaces (e.g. office spaces, retail stores, fast food restaurant), and conferences. The authors noted the following about these settings:

- Worker dormitories and prisons are similar to households where people live together and come into close contact. Hygiene facilities can be limited in the former.
- Settings such as elderly care homes, hospitals, and ships are known risk settings for infectious disease clusters.
- Large clusters in religious venues were associated with annual events that took place over days or weeks or “transmission events which took place without prior knowledge of any infections and before the WHO declared the pandemic”. In South Korea, eventual transmission to over 5000 cases was connected to a religious venue where no preventive measure was taken. Large numbers of attendees, confined spaces and close contact were noted characteristics of interactions in religious venues.
- Food processing plants have cold atmospheres which could facilitate the spread of the virus; employees may need to speak loudly to communicate over the sound of noisy machines; and staff may work in close proximity for prolonged periods.
- Schools were associated with only a small number of reported events (potentially explained by school closures), and most cases were teachers or other staff.

Additional Information

- A “setting” was defined as a site where COVID-19 transmission was recorded resulting in a cluster.
- A “cluster” was defined as first-generation COVID-19 cases infected as a result of transmission in a single specific setting at a specific time. If an individual was infected due to transmission on a cruise ship, anyone they infected after disembarking was not counted as part of the cruise-ship cluster.
- The authors aimed to estimate the proportion of people in a setting that became infected (“final attack rate”) and the proportion of contacts of one case that became infected (“secondary attack rate”) in each setting; however, they were unable to do so as a result of substantial missing data in the various settings. Often, only case numbers were available (no total numbers in the setting or total contacts).

PHO Reviewer’s Comments

- This study illustrates that among documented clusters, the transmission is predominantly in indoor settings rather than outdoor settings. The close proximity of individuals was hypothesized to facilitate transmission in both indoor and outdoor settings.
- PHO ran an updated search in PubMed on August 24th, 2020 using the search terms in the review article, given the time elapsed since the authors’ last update. A total of 142 articles were identified during the updated search. The vast majority of transmission clusters occurred in places that would be assumed to be indoor settings, consistent with the article summary (e.g., workplace, hospital, elderly care, household, and public settings such as community centres or indoor entertainment sites).
- The authors appropriately identified the following limitations of their study:

- Many of the reports on transmission clusters were from media articles that lacked relevant epidemiological data. No denominator information was available to calculate final and secondary attack rates to compare rates of transmission between types of settings. The authors advise caution on interpreting the relative importance of setting types based on the findings.
- Media coverage may be biased towards controversial news or news with an interesting narrative, and could bias the clusters or setting types identified through media reports (E.g. Large outbreaks are probably less likely to be missed by media and may provide a truer representation of settings at risk of such clusters).
- Recall bias is also important to consider due to individuals being more likely to recall events that were special or where many people attended, leading to such events being more likely to be linked to reported clusters. (An implication may be that while household settings represented the highest number of clusters in this study, household transmission is likely to be underreported).
- Many of the articles included in this study were from the early outbreaks in China and Singapore, so the settings and results may not be reflective of the global outbreak.
- This study also could not incorporate data from public health surveillance systems as most are not publically available. Thus, many (if not most) transmission clusters captured through public health follow up would not be included in these findings.
- The systematic review did not complete the following:
 - Publish an *a priori* protocol
 - Search more than one bibliographic database
 - Specifically state if title/abstract/full text were reviewed by two reviewers
 - State the types of studies included as per inclusion criteria or justify language restrictions
 - Provide a list of excluded studies or describe the included studies in adequate detail
 - Assess the rigour of studies or certainty of evidence using an appraisal tool or describe the potential impact of risk of bias in the discussion
 - Assess publication bias

Citation

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