

Exploring indoor and outdoor dust as a potential tool for detection and monitoring of COVID-19 transmission

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Rationale and objective: While clinical diagnostic testing for COVID-19 plays a vital role in identifying and managing individual cases, relying solely on such testing may not provide a comprehensive understanding of community health risks, particularly given the presence of asymptomatic carriers. To effectively monitor the transmission of SARS-CoV-2 in communities, it is essential to incorporate additional surveillance tools alongside clinical testing data. This combined approach becomes even more crucial now as COVID-19 has shifted from a pandemic to an endemic state. Recent studies have shown that indoor dust in rooms where infected individuals were present contains detectable levels of SARS-CoV-2, suggesting that monitoring SARS-CoV-2 in indoor dust could effectively detect COVID-19 outbreaks. However, the relationship between the concentration of SARS-CoV-2 RNA found in dust and the incidence of COVID-19 cases in the community is still inadequately explored. This lack of understanding may obscure the potential of dust monitoring as a complementary method of COVID-19 surveillance. Therefore, the objective of this study is to investigate the dynamics of SARS-CoV-2 RNA concentration in dust within public locations and its correlation with the incidence of COVID-19 cases in the community.

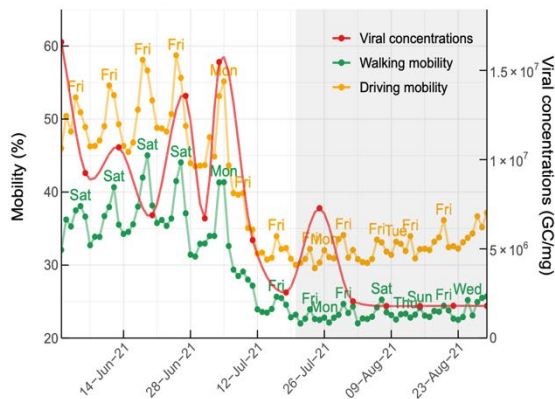
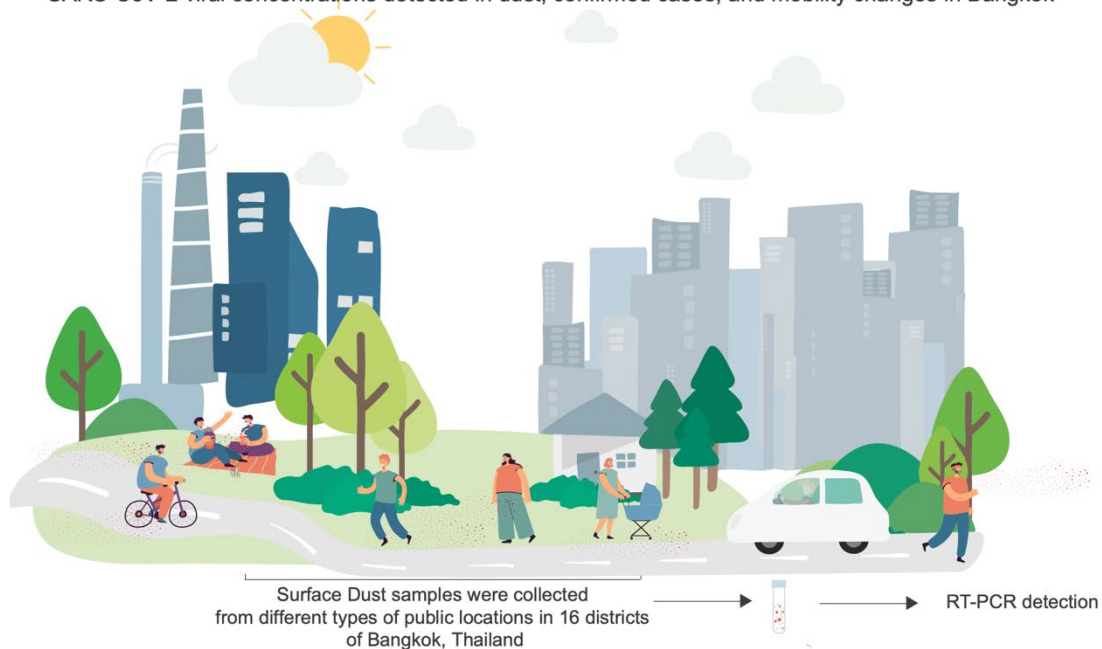
Summary: This study investigated the potential of using SARS-CoV-2 viral concentrations in dust as an additional surveillance tool for early detection and monitoring of COVID-19 transmission. Dust samples were collected from 8 public locations in 16 districts of Bangkok, Thailand, from June to August 2021. SARS-CoV-2 RNA concentrations in dust were quantified, and their correlation with community case incidence was assessed. Our findings revealed a positive correlation between viral concentrations detected in dust and the relative risk of COVID-19. The highest risk was observed with no delay, and this risk gradually decreased as the lag time increased. We observed an overall decline in viral concentrations in public places during lockdown, closely associated with reduced human mobility. The effective reproduction number for COVID-19 transmission remained above one throughout the study period, suggesting that transmission may persist in locations beyond public areas even after the lockdown measures were in place.

Outcome: This study provides insights into the relationship between SARS-CoV-2 RNA concentration in dust and the prevalence of COVID-19 cases within the community.

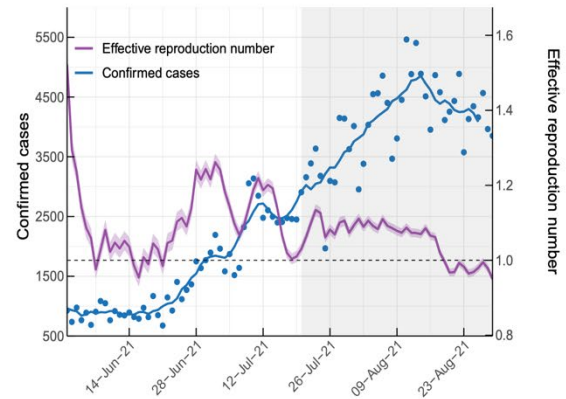
Research grant and acknowledgement: 1. The Thailand Center of Excellence in Physics (ThEP). 2. The Centre of Excellence in Mathematics, Thailand. 3. Center of Excellence on Medical Biotechnology (CEMB).

Related SDGs goal: 3. Good health and well-being.

SARS-CoV-2 viral concentrations detected in dust, confirmed cases, and mobility changes in Bangkok



(A) SARS-CoV-2 viral concentrations (all variants) detected in public places and changes in mobility (%), as indicated by the ratio of trips from homes to other locations classified by transportation type (driving and walking) compared to before the pandemic (January 13, 2020), which was defined as 100%



(B) Number of confirmed COVID-19 cases and estimated R_t . The grey area on the graph indicates the lockdown period, which lasted from July 21st until the end of the study period.

Graphical summary

Related publication:

Suparinthon Anupong, Sudarat Chadsuthi, ..., **Charin Modchang**, Dhammika Leshan Wannigama Exploring indoor and outdoor dust as a potential tool for detection and monitoring of COVID-19 transmission. *iScience* 27, 109043. <https://doi.org/10.1016/j.isci.2024.109043>