

# Possible Impact of Weather and Climate on COVID-19 Spread

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## Commentary

The new Severe Acute Respiratory Syndrome-Coronavirus 2 (SARS-CoV-2) pandemic broke out around the end of 2019 and has since become one of the world's most serious public health crises in recent years. In this paper, we review the current literature on the impact of weather (temperature, humidity, precipitation, wind, etc.) and climate (temperature as an essential climate variable, ultraviolet solar radiation, sunshine duration) variables on SARS-CoV-2 and discuss their implications for the COVID-19 pandemic. The majority of studies demonstrate a negative relationship between ambient temperature and humidity on the one hand and the frequency of COVID-19 cases on the other, while others show no or even a positive relationship. COVID-19 transmission dynamics and case fatality rates are believed to be influenced by the urban environment, notably the rate of air ventilation and air pollution. Due to the inherent constraints in earlier published studies, it's unclear whether the extent of the influence of temperature or humidity on COVID-19 is confounded by the vast public health initiatives implemented during the first pandemic wave. When it came to the effect of weather and climate variables on COVID-19, the results of previous published studies that used measurements from specific countries were conflicting. Most

studies indicated a negative relationship between temperature or other climatic variables and the number of COVID-19 cases, whereas others found a favourable relationship. Based on data from localised and worldwide evaluations, the reverse link between weather (i.e. temperature or humidity) and climate (i.e. site incident UV radiation, sunshine duration) and COVID-19 is the most feasible scenario. However, it is uncertain if the decrease in transmission and, as a result, COVID-19 cases is attributable to the public health activities taken or to the rise in temperature or humidity. When the latter covariates were included in the model, there was no significant relationship between current climatic conditions and COVID-19.

Although the impact of weather and environment variables on other coronaviruses or influenza virus has been recorded in the past, it may be difficult to identify under the conditions of the first pandemic wave, when many measures were implemented. In studies, containment measures were found to have a considerably greater impact than weather and climate variables, which only account for 18% of the variation in COVID-19 doubling time. As observed in several studies evaluating the impact of climate on SARS-CoV-2 transmission, human mobility and the impact of imported cases are two other critical variables for COVID-19 transmission. Air pollution has the potential to impede COVID-19 transmission. The velocity of air changes in a location and the amount of ventilation are two important parameters associated to virus transmissibility. In high-population, high-building-density areas, ventilation is limited, and specific solutions are needed to improve public health. Despite the fact that air pollution is likely to affect the COVID-19 case fatality rate, additional research is needed to draw conclusions about the effect of these variables on COVID-19 due to several flaws in prior studies.

Although the impact of weather and climate variables on the COVID-19 transmission rate looks probable, more research is needed to determine the size of the impact. The rise of COVID-19 cases during the summer in countries with high ambient temperatures, on the other hand, suggests that, in the absence of public health measures, weather and climatic variables will not be able to prevent outbreaks from recurring.

More study is needed, especially in the absence of public health activities, to correctly estimate the impact of weather and climate variables on the COVID-19 transmission rate and the resulting number of cases.