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First Report of the WMO COVID-19 Task Team on Meteorological and Air Quality (MAQ) factors affecting the COVID-19 pandemic.

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The World Meteorological Organization (WMO) Research Board has set up an interdisciplinary and international Task Team to respond to the challenge of providing timely decision support and relevant knowledge on Meteorological and Air Quality (MAQ) factors affecting the SARS-CoV-2/COVID-19 pandemic. The Task Team aims to provide decision makers and the public with a rapid summary of the state of knowledge regarding potential MAQ influences on SARS-CoV-2/COVID-19; to offer general technical guidance for researchers and service providers who wish to consider MAQ data in their analyses, estimates, predictions and projections of COVID-19 risks. The work of the task motivated both by the global relevance of the subject and by the staggering number of papers and pre-prints currently available, which emphasizes the need for careful review and communication of the state of the science. This first report presents a summary of key findings of the review to date, as informed by peer reviewed literature.

A key finding is that the underlying mechanisms that drive seasonality of respiratory viral infections are not yet well understood. To date, COVID-19 transmission dynamics appear to have been controlled primarily by government interventions rather than meteorological factors. Respiratory viral infections frequently exhibit some form of seasonality, particularly in temperate climates and some evidence from laboratory studies of SARS-CoV-2, suggests that the virus survives longer under cold, dry, and low ultraviolet radiation conditions. There is also evidence that chronic and short-term exposure to air pollution exacerbates symptoms and increases mortality rates for some respiratory diseases and this is consistent with early studies of COVID-19 mortality rates. However, there is no direct, peer reviewed evidence of pollution impacts on the

transmission of SARS-CoV-2 at this time. Process-based modeling studies anticipate that COVID-19 transmission may become seasonal over time, suggesting Meteorology and Air Quality (MAQ) factors may support monitoring and forecasting of COVID-19 in the coming months and years.

Additional research quantifying links between MAQ factors and COVID-19 is needed.