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FOR IMMEDIATE RELEASE

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NEW STUDY FINDS ASSOCIATIONS BETWEEN AIR POLLUTION AND COVID INCIDENCE, HOSPITALIZATIONS, AND DEATH

BOSTON, MASSACHUSETTS, November 13, 2023 – Long-term exposure to outdoor air pollution appears to be linked with adverse COVID-19 health effects, according to a new study released today from the Boston-based nonprofit research organization the Health Effects Institute (HEI).

In the study, lead author Dr. Zorana Andersen of the University of Copenhagen, Denmark, and her colleagues sought to identify the most susceptible populations by socioeconomic status, ethnicity, and those with existing health problems. Researchers followed 3.7 million adults in Denmark between March 2020 and April 2021, focusing on five outdoor air pollutants: fine particulate matter, known as PM_{2.5} (particles less than 2.5 micrograms in diameter), coarse particulate matter, known as PM₁₀ (particles less than 10 micrograms in diameter), black carbon, nitrogen dioxide, and ozone. Their findings showed elevated risks of COVID-19 incidence, hospitalizations, and death associated with long-term exposure to PM_{2.5}, PM₁₀, black carbon, and nitrogen dioxide. Researchers did not find associations between exposure to ozone and COVID-19 incidence. Overall, older adults and lower socioeconomic populations had the greatest risk of contracting COVID-19.

Risks of increased COVID-19 incidence and hospitalizations were strongest with exposure to nitrogen dioxide, which is produced from combustion of fossil fuels, especially in motor vehicles. The risk of COVID-19 mortality, however, was strongest with exposure to fine particulate matter, for which major sources include industrial and agricultural activities, wildfires, and fuel combustion.

Dr. Andersen said, “This large nationwide study from Denmark brings strong new evidence in support of air pollution as a risk factor for COVID-19. The study also brings novel evidence showing that people in low socioeconomic groups, and those with prior chronic cardiorespiratory diseases, influenza, or dementia, may be most susceptible.”

Some earlier studies on air pollution and COVID-19 reported potential associations, suggesting that the number of COVID-19 deaths might have been higher in areas with higher levels of air pollution. The data and methods used in some of those early studies might contain errors, however, and the potential exists for biased results. Dr. Andersen’s study overcame many of those limitations by including the entire adult Danish population and by using a rich dataset that included detailed information about the socioeconomic characteristics of the population and the areas where they lived.

This report is the first of [five different COVID-19 studies](#) funded by HEI. Research is taking place in the United States, Europe, and Asia and focusing on two key areas:

- Accountability studies: Evaluating how interventions to control the pandemic might have affected emissions, air pollution, and human health.
- Susceptibility studies: Evaluating how air pollution exposure might affect the COVID-19 disease course, and how race, ethnicity, and socioeconomic status might also play a role.

The COVID-19 pandemic has challenged public health across the globe. It has also created unprecedented conditions that allowed for timely and novel air pollution research aimed at exploring just what might or might not be exacerbating the pandemic, and other key policy-relevant questions. Stay-at-home orders have reduced traffic volumes and industrial productivity, resulting in lower emissions that might have had some benefits to human health. At the same time, important questions – and some early analyses – have surfaced about possible relationships between air pollution exposure and susceptibility to the effects of COVID-19 infections, although such links remain inconclusive.

In its independent evaluation of the report, the HEI Review Committee concluded that this study represents an important contribution to our knowledge about potential associations between long-term exposure to outdoor air pollution and COVID-19–related health outcomes.

[Read the full report on HEI’s website.](#)

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ABOUT HEI

The Health Effects Institute (HEI) is an independent, non-profit research institute funded jointly by the U.S. Environmental Protection Agency, industry, and foundations to provide credible, high-quality science on air pollution and health to inform air quality decisions. HEI's research is selected, overseen, and peer reviewed by leading subject matter experts on environment and health without involvement of HEI's public or private sponsors.