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New Nationwide U.S. and Canadian Air Quality and Health Studies:

Largest Such Studies Ever Undertaken...

Impressive Initial Results at Low Levels of Exposure - but More to be Done

Boston, MA November 25, 2019. Two of the largest studies ever undertaken to examine effects of air pollution on health were published today by the Health Effects Institute (HEI)¹ at www.healtheffects.org. The two studies – one in 61 million Medicare recipients and the second in nearly 9 million Canadian census participants – were funded by HEI to test whether there might be effects from air pollution exposure at levels below even the current national clean air standards.

Initial results from these two studies - *Assessing Adverse Health Effects of Long-Term Exposure to Low Levels of Ambient Air Pollution: Phase I* by Francesca Dominici and colleagues at Harvard University² and *Mortality–Air Pollution Associations in Low-Exposure Environments (MAPLE): Phase I* by Michael Brauer and colleagues at the University of British Columbia and across Canada³ – were subjected to intensive peer review before their release by HEI’s Low-Exposure Epidemiology Studies Review Panel.

Overall, the Panel found that these two studies – in populations where many participants live in areas below the current US national air quality standard for fine particles (PM_{2.5}) – have:

- Constructed a detailed and carefully evaluated set of exposure estimates for each person in the population;
- Conducted extensive analyses to test whether other risks (e.g. smoking or socioeconomic status) might contribute to the observed association between air pollution and health; and
- Reported statistically significant associations of mortality with PM_{2.5} at levels below the current US National Ambient Air Quality Standards (or NAAQS) with no observable thresholds.

¹ The Health Effects Institute (HEI) is an independent, non-profit research institute funded jointly by the US Environmental Protection Agency, industry, foundations and development banks to provide credible, high quality science on air pollution and health for 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

² Dominici F, Schwartz J, Di Q, Braun D, Choirat C., Zanobetti A. 2019. Assessing Adverse Health Effects of Long-Term Exposure to Low Levels of Ambient Air Pollution: Phase I. Research Report 200. Boston, MA: Health Effects Institute

³ Brauer M, Brook JR, Christidis T, Chu Y, Crouse DL, Erickson A, et al. 2019. Mortality–Air Pollution Associations in Low-Exposure Environments (MAPLE): Phase I. Research Report 203. Boston, MA: Health Effects Institute

At the same time, the Panel emphasized that these are initial results, with additional important further analyses underway and uncertainties to be tested, including, for example, planned application of so-called “causal inference” methods in the Medicare cohort, and efforts to enhance control for important measured and unmeasured confounding (e.g. additional pollutants and trends in health over time that may occur for other reasons, such as improved medical care). The final results from both the reports are expected to be published by HEI in 2021.

In an era of debate of transparency in science, the Panel also emphasized the extensive work of the investigators to make all of their work as transparent as possible. For example, in the Medicare study, the investigators are posting their data, and analyses to a secure high-performance computing server with the objective of developing an open science research data platform, making all of the codes and software tools available, and providing detailed instructions on how to access the Medicare Data from the Center for Medicare and Medicaid Services. The MAPLE study will make refined exposure estimates publicly available for use in future research studies.

HEI Statements summarizing each study are attached; full reports and the Commentary of the HEI review Panel can be found at www.healtheffects.org.