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PRESS ADVISORY

Ultrafine Airborne Particles and Health: New, Independent Review Examines Over 300 Laboratory and Field Studies

(Boston, MA, USA) A new report from the Health Effects Institute (HEI¹), *Understanding the Health Effects of Ambient Ultrafine Particles* - concludes that, while there have been a growing number of laboratory and field studies of the effects of ultrafine particles (UFPs), “toxicologic studies in animals, controlled human exposure studies, and epidemiologic studies to date have not provided consistent findings on the effects of exposures to ambient levels of UFPs, particularly in human populations. The current evidence does not support a conclusion that exposures to UFPs alone can account in substantial ways for the adverse effects that have been associated with other ambient pollutants such as PM_{2.5}.”

“There is extensive evidence today that the complex mix of fine airborne particulate matter, PM_{2.5} (or particles less than 2.5 microns in diameter), can contribute to a variety of cardiovascular, respiratory and other health effects,” said Dan Greenbaum, President of HEI. “But despite a large number of studies of the smallest particles (or particles less than 0.1 microns in diameter), our expert panel found that the evidence to date has not confirmed the hypothesis of some in the scientific community that these ultrafine particles are the principle reason for these broader PM_{2.5} health effects.”

Particulate matter emissions are a complex mixture, containing particles of a variety of sizes and composition, and there have been continuing questions from the scientific and policy communities about whether some components or characteristics of that mixture, or particles from some sources, are more toxic and deserving of priority efforts for control. The ultrafine particles – which are emitted from a variety of sources including traffic, industry, and cooking - have gained special attention, because of their potential for traveling deeper into the lungs, into the bloodstream, and into the brain. They are important as well because a number of regulatory actions in Europe and the United States have required new filters on diesel engines to reduce UFP emissions, while at the same time fuel economy rules are encouraging the use of more fuel efficient gasoline engines that may increase UFP emissions.

The report - the latest in a series of *HEI Perspectives* that attempt to provide broader insights from HEI’s research - was prepared by an expert panel formed by HEI, led by Dr. Mark Frampton (University of Rochester and member of the HEI Review Committee), and composed of six multidisciplinary scientific experts. At HEI, Senior Scientist Dr. Katherine Walker led the project and several other staff members contributed. The team reviewed over 300 studies and syntheses of data to arrive at its conclusions, and its report was further peer reviewed by ten outside experts who had not participated in the preparation of the review. (A full list of Contributors is attached.)

¹ The Health Effects Institute is an independent, non-profit research institute funded jointly by government and industry to provide credible, high quality science on air pollution and health for air quality decisions. HEI sponsors do not participate in the selection, oversight or review of HEI science, and HEI’s reports do not necessarily represent their views.

The Panel found that despite the substantial number of studies completed to date, by HEI and other research institutions, challenges and limitations remain. “The fact that the current database of experimental and epidemiologic studies does not support strong and consistent conclusions about the independent effects of UFPs on human health does not mean that such effects, as one part of the broader effects attributable to PM_{2.5}, can be entirely ruled out,” said Mark Frampton, Chair of the Panel. “There are limitations in the evidence base, including deficiencies in exposure data, and numerous challenges in comparing and synthesizing results of existing studies.”

Overall, the Panel’s major findings can be summarized as follows:

- Motor vehicles, especially diesel engines, have been important sources of emissions and exposures to UFPs but emissions are likely to change substantially in the years ahead.
- UFPs clearly differ from larger particles in their lung deposition, lung clearance, and potential for translocation to other parts of the body.
- Experimental and epidemiologic studies provide suggestive, but not consistent evidence of adverse effects of short-term exposures to ambient UFP.
- Currently, we do not have strong evidence that effects of short-term exposures to UFP are dramatically different from those of larger PM; information on long-term exposures is not available.

Copies of the report can be downloaded for free from www.healtheffects.org . For more information about the report, please contact: Dan Greenbaum at 617 488 2311 or dgreenbaum@healtheffects.org .

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