

Study links intensive blood pressure lowering to reduced CV risk in patients exposed to air pollution

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Evidence suggests particulate matter is the air pollutant which poses the greatest threat to global health. Studies have shown that exposure to

particulate matter smaller than 2.5 microns is associated with acute and chronic elevations in blood pressure (BP) as well as hypertension. In the study "The Benefits of Intensive Versus Standard Blood Pressure Treatment According to Fine Particulate Matter Air Pollution Exposure" published this week in the journal *Hypertension*, researchers at University Hospitals (UH) and Case Western Reserve University (CWRU) School of Medicine found intensive BP lowering is effective in reducing cardiovascular risk in patients exposed to high levels of air pollution.

Air [pollution](#), particularly fine [particulate matter](#), has been implicated in cardiovascular risk, partly through effects on BP. Particulate matter smaller than 2.5 microns is concentrated particles that develop from [human impact](#) on the environment, such as automobile exhaust, power generation and other fossil fuels. Researchers sought to determine if intensive BP lowering on cardiovascular events is modified by [air pollution](#) exposure in the NIH-funded Systolic BP Intervention (SPRINT) Trial.

Researchers linked integrated satellite-derived air pollution exposures with residential addresses for 9,286 patients enrolled in the SPRINT trial. The study showed that intensive BP lowering (defined as goal systolic blood pressure lower than 120 mmHg) led to significant reduction in cardiovascular events (combination of heart attack, strokes, heart failure, or death from cardiovascular disease) especially in patients exposed to higher pollution levels. The authors concluded that ambient air pollution may influence the benefit of intensive BP lowering. Lowering BP is particularly beneficial for patients who are exposed to high levels of [fine particulate matter](#) and it may even reduce adverse cardiovascular effects of particulate matter pollution.

"Air pollution impacts socioeconomically disadvantaged patients to a higher degree. Living within a particular neighborhood should not mean

you are more likely to suffer from cardiovascular disease," said Sadeer Al-Kindi, MD, cardiologist with UH Harrington Heart & Vascular Institute, Assistant Professor, CWRU School of Medicine and the lead author of the study. "University Hospitals has a history of addressing health care disparities in underserved communities and armed with the information from this study, we can thoughtfully create solutions to better serve these populations."

Patients exposed to high levels of air pollution can take control of their health in knowing that lowering their BP is effective in reducing [cardiovascular risk](#).

"This study improves our understanding of the intersection between air pollution, heart disease and [blood pressure](#). It also has implications in management of patients who are exposed to [high levels of air pollution](#)," said Sanjay Rajagopalan, MD, Chief of Cardiovascular Medicine, UH Harrington Heart & Vascular Institute, Professor, CWRU School of Medicine and the senior author of the study.

"This is one of the few findings from SPRINT showing potential heterogeneity in the benefit of BP lowering on cardiovascular outcomes," said Jackson Wright, MD, Ph.D., a member of the SPRINT Steering Committee, Director, Clinical Hypertension Program, UH Cleveland Medical Center and Professor Emeritus, CWRU School of Medicine. "The findings of this novel analysis of the SPRINT trial may provide additional insight and avenues of further investigation into the harmful impact of air pollution on [cardiovascular disease](#)."

"Next steps in this research involve studying the mechanistic underpinnings of this effect modification and identifying methods to reduce pollution exposure and reduce the harmful effects of air pollution on the cardiovascular system," said Dr. Al-Kindi.

Provided by University Hospitals Cleveland Medical Center

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