Short-term exposure to most major air pollutants raises the risk of hospitalization for and death from heart failure

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Short-term exposure to most major air pollutants appears to increase the risk of being hospitalised for and dying from heart failure, according to a systematic review and meta-analysis of data from 12 countries published in *The Lancet*.

The researchers estimate that a modest reduction in levels of just one major pollutant (3.9 µg/m3 of fine particulate matter found in exhaust fumes and industrial air pollutants) could prevent roughly 8000 heart failure hospitalisations and save more than US$300 million every year in the USA alone.

Nicholas Mills from the University of Edinburgh and colleagues combined data from 35 studies assessing the impact of daily increases in gaseous air pollutants (carbon monoxide, sulphur dioxide, nitrogen dioxide, and ozone) and particulate matter (PM) with a diameter of 2.5 micrometers (PM2.5) or less, or 10 micrometers (PM10) or less, on the risk of hospitalisations or death due to heart failure.

The research, funded by the British Heart Foundation, found a strong and consistent association between heart failure hospitalisation or death and exposure to all air pollutants, with the exception of ozone.

By pooling overall risk estimates for each pollutant, they calculated that the population risk of being hospitalised or dying from heart failure rose

by 3.52% with every increase of 1 part per million of carbon monoxide, 2.36% for every increase of 10 parts per billion of sulphur dioxide, 1.70% for every 10 parts per billion increase in levels of nitrogen dioxide, and by about 2% for every increase of 10 micrograms per cubic meter of particulate matter.

Importantly, the increased risks seemed to be strongest on the day of exposure.

According to Mills, "Heart failure is a common, costly, and fatal condition affecting more than 20 million people worldwide and is one of the most frequent reasons for hospital admission. While the role of air pollution is well recognised as a risk factor for heart attacks, it has been less clear whether exposure increases the risk of adverse events in patients with other cardiovascular conditions like heart failure. Since the entire population is exposed to air pollution, even modest reductions in air pollution could have major cardiovascular health benefits and substantial healthcare cost savings. "

Commenting on the study Francesco Forastiere and Nera Agabiti from Lazio Regional Health Service in Rome, Italy, say, "This report is…timely, since 2013 has been declared the Year of Air by the European Union (EU). The current EU limit for fine particulate matter is 25 ?g/m^3 (annual average, which is higher than the 10 ?g/m^3 set by WHO); however, the adverse health effects of air pollution are present even at concentrations well below this limit. The European Respiratory Society's Ten Principles for Clean Air state that "citizens are entitled to clean air, just like clean water and safe food". In light of Shah and colleagues' report, these principles should be pursued by all necessary means, especially within the context of EU legislation."

More information: Paper: www.thelancet.com/journals/lan … (13)60898-3/abstract

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