

Science for Environment Policy

Airborne particles increase diabetes, heart and lung disease deaths

Airborne particulate matter pollution leads to increases in death rates among people with underlying health conditions such as heart disease, according to a new study. The study suggests the effects are mainly related to the air pollution known as PM_{2.5} – particles smaller than 2.5 micrometres (µm). The study is the first to assess the health effects of this type of pollution across several European countries at once.

Particulate matter air pollution has been linked to a [wide range of different health impacts](#), from milder respiratory symptoms to heart disease deaths. It is categorised as either fine particles smaller than 2.5 µm (PM_{2.5}) or larger particles up to 10 µm (PM₁₀). Our current scientific understanding suggests that the smaller particles may be responsible for many of the short-term health impacts of particulate matter, with the elderly and those who have underlying conditions like heart disease, lung disease and diabetes generally thought to face greater risks. The health impacts of the larger particles, however, are less clear.

As part of an EU-funded project called [MED-PARTICLES¹](#), the authors studied the short-term effects of PM_{2.5} and particles between 2.5 and 10 µm in cities across the Mediterranean. Altogether, the cities they focused on were home to more than 14 million people and included seven cities in Italy, two in Greece, two in Spain and one in France. Three of the Italian cities were small, so were counted together as one region. For each region or city, the researchers collected data on daily pollutant levels and on daily deaths due to underlying conditions. They then estimated the effects of increases in particulate matter on the number of deaths.

Their results indicated that diabetes deaths increased by over 1% following a two-day increase in PM_{2.5} of 10 µg per m³ – equivalent to 40% of the [European legal limit for mean annual concentration of particulate matter](#) (25 µg per m³) that will come into force in 2015. After a six-day increase, deaths related to heart disease and lower respiratory-tract infections also increased by more than 1%, while deaths due to lung diseases including bronchitis and emphysema increased by 2.5%. These results were only statistically significant for heart disease deaths; however, the percentage increases in deaths were similar to those reported in US studies.

There were no significant effects of increasing PM_{2.5} on [cerebrovascular diseases](#), which affect the blood vessels supplying the brain. For the larger particles between 2.5 and 10 µm, there were increases in deaths related to diabetes and heart disease, but the effects were not statistically significant. These larger particles did not show any clear patterns of effects for deaths related to lung disease or lower respiratory-tract infections.

The authors say their work provides evidence that PM_{2.5} drives short-term health effects that cause deaths due to diabetes, and heart and lung diseases. They suggest that it will become increasingly important to provide more specific information on how pollution affects health in order to inform targeted policy measures.



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