

Pollutants and climate change contribute to millions of deaths from cardiovascular disease each year, warn scientists

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A new series published in the *Journal of the American College of Cardiology* highlights how pollution, in all its forms, is a greater health

threat than that of war, terrorism, malaria, HIV, tuberculosis, drugs and alcohol combined.

The researchers from the University of Edinburgh, Icahn School of Medicine at Mount Sinai, Global Observatory on Planetary Health Boston College, Center Scientifique de Monaco, University Medical Center Mainz, and the Victor Chang Cardiac Research Institute focus on global warming, [air pollution](#) and exposure to wildfire smoke, and highlight the lesser-known drivers of heart disease including soil, noise and [light pollution](#), and exposure to [toxic chemicals](#).

They say there is an urgent need to improve the monitoring of these pollutants to identify communities most at risk, and better understand how exposure to specific pollutants raises the risk of [cardiovascular disease](#) at the individual level.

Professor Jason Kovacic, Director and CEO of the Australian-based Victor Chang Cardiac Research Institute, says there needs to be far greater recognition of the dangers of pollution and the role they play in causing around nine million deaths each year globally.

Professor Kovacic says, "Every year around 20 million people worldwide die from cardiovascular disease with pollutants playing an ever-increasing role.

"Pollutants have reached every corner of the globe and are affecting every one of us. We are witnessing unprecedented wildfires, soaring temperatures, unacceptable road noise and light pollution in our cities and exposure to untested toxic chemicals in our homes.

"Our bodies are being bombarded with pollutants from every angle and they are taking a toll on our heart health. The evidence suggests that the number of people dying prematurely because of these very different

forms of pollution is far higher than currently recognized."

Pollutants are known drivers of cardiovascular disease, but they affect the body in different ways. Smoke and other toxins can be directly inhaled deep into the [lower respiratory tract](#) and reach the blood and then be transported to other organs and throughout our bodies. They can cause oxidative stress which can damage cells and organs including the heart.

Other pollutants like noise and light pollution can affect sleep patterns, drive inflammation and lead to an increase in blood pressure and weight gain. Extreme heat can also lead to dehydration, decreased blood volume, increased cardiovascular strain, and acute kidney failure.

Professor Kovacic adds, "While many of these biological mechanisms are known, we still have a huge gap in our understanding of the link between pollutants and heart disease.

"There are hundreds of thousands of chemicals that haven't even been tested for their safety or toxicity, let alone their impact on our health. We also need to discover if there are other risk factors that make people more susceptible—such as pre-existing conditions, lifestyle factors or where they live."

Professor Kovacic and the other authors say that in the future, people will be routinely tested for exposure to more pollutants—just like children are currently tested for lead exposure in the U.S..

The authors note that while the environmental crisis is imminent, and its impact on health ever more pressing, the impetus for change appears sporadic. "Urgent action is required as climate change strides forward and pollution infiltrates the air we breathe, the water we drink, the food we eat, and the places we live in," they write.

The team of researchers make a series of recommendations including:

1. Calling for the implementation of heart-healthy changes to city design, such as increasing [tree cover](#), safe means of active travel and reduced use of vehicles.
2. Ending subsidies to the fossil fuel industry to enable more investment in renewables and cleaner energy production.
3. Public health campaigns about the dangers of air pollution.
4. Medical education to better reflect the growing dangers of pollutants.

Key statistics

- Outdoor and indoor air pollution combined, are associated with over seven million premature deaths per year, of which over 50% are attributable to cardiovascular causes, principally ischemic heart disease and stroke.
- A fifth of all cardiovascular deaths are caused by air pollution.
- During heat waves, the risk of heat-related cardiovascular mortality may increase by more than 10%.
- In the U.S. there has been a 77% increase in exposure to wildfire smoke since 2002.
- Globally, wildfire smoke has been estimated to be responsible for 339,000 to 675,000 [premature deaths](#) per year.
- Over 300,000 new synthetic chemicals have been manufactured since 1950, and the human safety profile of many of these chemicals is unknown.
- In Europe it is estimated 113 million people are affected by long-term day-evening-night traffic noise levels of at least 55 dB(A).

More information: JACC Focus Seminar: Pollution and Cardiovascular Disease, *Journal of the American College of Cardiology* (2024).

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