

Air pollution exposure associated with increased risk of irregular heartbeat

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Does air pollution affect your heart? Acute exposure to air pollution was found to be associated with an increased risk of arrhythmia—irregular heartbeat—in a large study of 322 Chinese cities published in *CMAJ* (*Canadian Medical Association Journal*).

The common arrhythmia conditions atrial fibrillation and atrial flutter,

which can progress to more serious heart disease, affect an estimated 59.7 million people globally. Air pollution is a modifiable risk factor for heart disease, but the evidence linking it with arrhythmia has been inconsistent.

To determine whether there is a link, Chinese researchers evaluated hourly exposure to air pollution and the sudden onset of symptoms of arrhythmia using data from 2025 hospitals in 322 Chinese cities. Air pollution in China is well above the World Health Organization's guidelines for air quality, and the researchers conducted their analyses using air pollutant concentrations from monitoring stations closest to the reporting hospitals.

"We found that acute exposure to [ambient air pollution](#) was associated with increased risk of symptomatic arrhythmia," says Dr. Renjie Chen, School of Public Health, Fudan University, Shanghai, China, with co-authors. "The risks occurred during the first several hours after exposure and could persist for 24 hours. The exposure–response relationships between 6 pollutants and 4 subtypes of arrhythmias were approximately linear without discernable thresholds of concentrations."

The study included 190 115 patients with acute onset of symptomatic arrhythmia, including atrial fibrillation, atrial flutter, premature beats (originating in either the atria or ventricles of the heart) and supraventricular tachycardia.

Exposure to ambient air pollution was most strongly associated with [atrial flutter](#) and supraventricular tachycardia, followed by [atrial fibrillation](#) and premature beats. Additionally, among 6 pollutants, [nitrogen dioxide](#) (NO₂) had the strongest association with all 4 types of arrhythmias, and the greater the exposure, the stronger the association.

"Although the exact mechanisms are not yet fully understood, the

association between air pollution and acute onset of arrhythmia that we observed is biologically plausible," write the authors. "Some evidence has indicated that air pollution alters cardiac electrophysiological activities by inducing [oxidative stress](#) and systemic inflammation, affecting multiple membrane channels, as well as impairing autonomic nervous function."

The authors note that the association was immediate and underscores the need to protect at-risk people during heavy air pollution.

"Our study adds to evidence of adverse cardiovascular effects of air pollution, highlighting the importance of further reducing exposure to [air pollution](#) and of prompt protection of susceptible populations worldwide," they conclude.

More information: Hourly air pollution exposure and the onset of symptomatic arrhythmia: a case–crossover study in 322 Chinese cities, *Canadian Medical Association Journal* (2023). [DOI: 10.1503/cmaj.220929](#)

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