

Reduction of environmental pollutants for prevention of cardiovascular disease

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In a current opinion article "Reduction of environmental pollutants for prevention of cardiovascular disease: it's time to act," published in the *European Heart Journal* this week, a group of international

environmental researchers summarized the epidemiologic and mechanistic evidence in support of an association between noise and air pollution with cardiovascular and metabolic disease, and recommended comprehensive mitigation measures.

Environmental risk factors are increasingly recognized as important determinants of cardiovascular disease (CVD). While the contribution of high cholesterol, diabetes, arterial hypertension, obesity and smoking are well established, the contribution by factors such as [noise](#) and air pollution to cardiovascular disease are often not acknowledged, despite the recognition that they represent the two most common and pervasive [environmental risk factors](#) globally.

Recent data indicate that air pollution attributable premature deaths approach 9 million per year globally (mostly cardiovascular causes), accounting for a loss of life expectancy that rivals that of tobacco smoking. The health burden due to [noise pollution](#) is mostly based on loss of healthy life years, amounting to several 100 Mio. of disability adjusted life years per year.

In particular with respect to air pollution, 90% of the world population lives in an environment with air pollution levels higher than $10\mu\text{g}/\text{m}^3$, being recommended by the WHO.

"The European levels of air pollution limits for $\text{PM}_{2.5}$ $\mu\text{g}/\text{m}^3$ is 2.5 fold higher than the WHO limit and a reduction of the air pollution limits down to the WHO recommendation mainly due to a phase out of fossil fuel use could prevent around 400,000 to 500,000 excess deaths of Europeans. Thus, we urgently need to reduce these limits," urges Thomas Münzel.

The environmental stressors such as air pollution and noise pollution cause primarily cardiovascular diseases such as chronic coronary artery

disease, stroke, diabetes mellitus, [arterial hypertension](#) but also neurological diseases, and thus represent per se cardiovascular risk factors that can be positively influenced not by doctors or patients themselves but rather by politicians by introducing noise and air pollution limits that protect us from [adverse health effects](#) caused by these environmental stressors," the lead author Münzel comments.

The author's team proposes mitigation maneuvers to protect from air pollution induced health side effects, such as active personal exposure mitigation with home air cleaning and personal equipment such as N95 respirators. While face masks are not effective in filtering PM2.5, modification of human behavior to reduce passive exposures such as advising patients with pre-established cardiovascular disease to continue to remain >400 m away from major roadways to avoid exposure to traffic pollutants is a reasonable measure, despite the current lack of strong evidentiary support. Although a variety of over-the-counter drugs and medications have been shown to mitigate the association between air pollution and surrogates, almost none can be recommended to protect against air pollution-mediated adverse health effects at this time.

With respect to noise [pollution](#) the team suggests for [road traffic noise](#) that the sound generated by the contact between the tires and the pavement is the dominant noise source, at speeds above 35 km/h for cars and above 60 km/h for trucks. Therefore, changing to electric cars will result in only minor reductions in road traffic noise. Generally applied strategies for reducing road traffic noise include noise barriers in densely populated areas, applying quiet road surfaces, and reducing speed, especially during nighttime. Furthermore, there is a great potential in developing and using low-noise tires. As many of these mitigation methods result in only relatively small changes in noise a combination of different methods is important in highly exposed areas.

For aircraft noise, mitigation strategies include to minimizing

overlapping of air traffic routes and housing zones, introduction of night bans, and implementation of continuous descent arrivals, which require the aircraft to approach on steeper descents with lower, less variable throttle settings. For railway noise, replacing cast-iron block breaks with [composite material](#), grinding of railway tracks and night bans, are among the preferred strategies for reducing noise. Lastly, installing sound-reducing windows and/or orientation of the bedroom towards the quiet side of the residence can reduce noise exposure.

To this end Münzel further proposes that "increased awareness of the health burden posed by the risk factors such as noise and [air pollution](#) and their incorporation in traditional medical guidelines will help propel legislation to reduce them and significantly improve cardiovascular health."

More information: Thomas Münzel et al, Reduction of environmental pollutants for prevention of cardiovascular disease: it's time to act, *European Heart Journal* (2020). [DOI: 10.1093/eurheartj/ehaa745](https://doi.org/10.1093/eurheartj/ehaa745)

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