

Noise from busy roads might increase heart disease risk, finds new study

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Credit: Imperial College London

Traffic noise, as well as air pollution, could affect heart health, according to new research.

Urban air [pollution](#) has been linked to a range of health problems, such as stroke, asthma, and heart disease. The risk of diseases or death related to air pollution is increased for those people living closer to busy roads. However, until now, there have been few studies to investigate the effects of [noise pollution](#) and air pollution on health – two factors which are often found together.

Noise pollution is defined as [noise](#) louder than conversation level, around 60 decibels (dB), and it mainly affects those living near busy roads, under flight paths, or those who are exposed to industrial machinery. It can cause health problems biologically, for example by raising blood pressure, and psychologically, from disturbed sleep and increased release of stress hormones.

Now, a group of scientists, led by Dr Yutong Cai from Imperial College London, has investigated the links between air and noise pollution and [biological markers](#) in the blood that might predict heart disease in the future. They found evidence that excessive traffic noise and air pollution are in fact both linked to increases in these [heart disease risk](#) markers.

The researchers studied data from 144,000 adults in Norway and the Netherlands, comparing levels of air pollution and traffic related [noise exposure](#) at their residential address with levels of blood biological markers, which are often used to assess heart disease risk.

Blood was tested for a number of markers, such as C-reactive protein (CRP) – a protein that indicates inflammation, which can be caused by stress and lead to [health problems](#) like heart disease when left untreated. The researchers also tested for lipids and triglycerides, which are linked to heart attacks at higher levels, and [blood sugar levels](#), which are linked to heart disease, diabetes and stroke at higher levels.

To distinguish between the effects of noise from air quality, the team

developed a statistical model. First, they estimated the link between poor air quality and biomarkers like blood sugar, blood lipids, and CRP, taking into account lifestyle factors which could change levels of biomarkers, like age, sex, education, employment, alcohol consumption, and smoking status. Then they added noise exposure to the model to measure any changes in the link with the biomarkers.

After analysing the data, the team found that an increase of just 5dB in noise levels was linked to 0.3% higher blood sugar levels than those living in quieter neighbourhoods. The researchers explained that when air pollution was taken into account, the same increase was still apparent, pointing to noise pollution as an independent cause: a 10 µg/m³ increase in [air pollution levels](#) was linked to 2.3% higher blood sugar levels independently of noise effects.

The results also showed that CRP levels increased by 2.6% when levels of nitrogen dioxide (NO₂), a gas pollutant released from road traffic, increased by 10 µg/m³. Additionally, triglycerides increased by 10% when exposure to air pollutants increased by 10 µg/m³. These effects were independent of traffic noise, so likely due to air pollution, not noise.

Dr Cai, from Imperial's School of Public Health, said: "When studying [road traffic noise](#), it can be difficult to differentiate between air and noise pollution, as they often go hand in hand. Our findings contribute to the strong scientific evidence that both air pollution and traffic noise are bad for our health, although to further differentiate between air and noise pollution will need more work. Either way, the message is clear: public health policy must act on these environmental stressors to protect our health and wellbeing."

Varying mechanisms

The authors say that long term exposure to noise can increase the risk of [heart disease](#) both biologically and psychologically. While noise exposure appears to have a similar biological effect as air pollution in terms of [blood](#) chemistry changes, it can also cause long-term psychological stress due to, for example, lack of sleep and the production of stress hormones – both already known to increase cardiovascular risk. This could then add to the effects of [air pollution](#) that road [traffic noise](#) is often combined with.

In future, the authors plan to investigate the effect on these biological markers of air and noise pollution depending on gender, weight status, and in those with pre-existing hypertension and diabetes. Co-author Dr Susan Hodgson, also from Imperial's School of Public Health, added: "Our study moves us a step closer to understanding the link between air and noise pollution exposure and cardiovascular disease, evidence which to date is very limited."

More information: Yutong Cai et al. Long-term exposure to road traffic noise, ambient air pollution, and cardiovascular risk factors in the HUNT and lifelines cohorts, *European Heart Journal* (2017). [DOI: 10.1093/eurheartj/ehx263](#)

Provided by Imperial College London

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