

# Passive smoking causes irreversible damage to children's arteries

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Exposure to passive smoking in childhood causes irreversible damage to the structure of children's arteries, according to a study published online today (Wednesday) in the *European Heart Journal*.

The thickening of the arteries' walls associated with being exposed to parents' smoke, means that these [children](#) will be at greater risk of heart attacks and strokes in later life. The researchers from Tasmania, Australia and Finland say that exposure to both parents [smoking](#) in childhood adds an extra 3.3 years to the age of blood vessels when the children reach [adulthood](#).

The study is the first to follow children through to adulthood in order to examine the association between exposure to parental smoking and increased carotid intima-media thickness (IMT) – a measurement of the thickness of the innermost two layers of the arterial wall – in adulthood. It adds further strength to the arguments for banning smoking in areas where children may be present, such as cars.

The study was made up of 2401 participants in the Cardiovascular Risk in Young Finns Study, which started in 1980, and 1375 participants in the Childhood Determinants of Adult Health study, which started in 1985 in Australia. The children were aged between three and 18 at the start of the studies. The researchers asked questions about parents smoking habits and they used ultrasound to measure the thickness of the children's artery walls once they had reached adulthood.

The researchers found that carotid IMT in adulthood was 0.015 mm thicker in those exposed to both parents smoking than in those whose parents did not smoke, increasing from an average of 0.637 mm to 0.652 mm.

"Our study shows that exposure to passive smoke in childhood causes a direct and irreversible damage to the structure of the arteries. Parents, or even those thinking about becoming parents, should quit smoking. This will not only restore their own health but also protect the health of their children into the future," said Dr Seana Gall, a research fellow in cardiovascular epidemiology at the Menzies Research Institute Tasmania and the University of Tasmania.

"While the differences in artery thickness are modest, it is important to consider that they represent the independent effect of a single measure of exposure – that is, whether or not the parents smoked at the start of the studies – some 20 years earlier in a group already at greater risk of heart disease. For example, those with both parents smoking were more likely, as adults, to be smokers or overweight than those whose parents didn't smoke."

The results took account of other factors that could explain the association such as education, the children's smoking habits, physical activity, body mass index, alcohol consumption and biological cardiovascular risk factors such as blood pressure and cholesterol levels in adulthood.

Interestingly, the study did not show an effect if only one parent smoked. "We think that the effect was only apparent with both parents smoking because of the greater overall dose of smoke these children were exposed to," said Dr Gall. "We can speculate that the [smoking behaviour](#) of someone in a house with a single adult smoking is different. For example, the parent that smokes might do so outside away from the

family, therefore reducing the level of passive smoking. However, as we don't have this type of data, this is only a hypothesis."

Dr Gall and her colleagues had shown previously that exposure to passive smoking in childhood reduced the ability of the main artery in the arm to dilate in response to blood flow in adulthood. This new study adds to the evidence on the dangers of passive smoking for children.

In the paper, the authors write: "Together, these studies suggest a direct and pervasive effect of exposure to environmental cigarette smoke during this period on both the vascular structure and function in adulthood."

They continue: "Reducing young people's exposure to tobacco smoke is a public health priority. Legislation can reduce passive smoke exposure, with restriction of smoking in public places reducing hospitalizations for cardiovascular and respiratory disease. Home smoking bans specifically benefit young people and data from the USA suggest such bans have increased from about 50% in the mid-1990s to 85% in 2006-7, suggesting that exposure to passive smoke at home is declining. Unfortunately, these reductions have largely occurred in higher socio-economic groups, meaning socio-economic inequalities in passive smoke exposure remain. Banning smoking in cars where young people are present, which is enforceable and targeting an environment where exposure is high, could reduce these inequalities. Such legislation already exists in Australia, Canada, and USA. Our results support adoption of all measures that protect young people from [passive smoke](#)."

In an accompanying editorial, David Celermajer, Scandrett Professor of Cardiology at the University of Sydney, Australia, and Dr Edmund Lau, clinical associate lecturer at the University of Sydney, call on legislators worldwide to do more to protect children from the harmful effects of tobacco smoke. "Much more work needs to be done to control the

tobacco epidemic and it is up to legislators backed by the support of clinicians, scientists, and advocates to end the tobacco epidemic in the 21st century. Today, this is one of our greatest health care priorities," they write.

**More information:** [1] "Exposure to parental smoking in childhood or adolescence is associated with increased carotid intima-media thickness in young adults: evidence from the Cardiovascular Risk in Young Finns study and the Childhood Determinants of Adult Health Study", by Seana Gall et al. European Heart Journal. [DOI: 10.1093/eurheartj/ehu049](https://doi.org/10.1093/eurheartj/ehu049)

[2] "Protecting our children from environmental tobacco smoke – one of our great healthcare challenges", by Edmund MT Lau and David S. Celermajer. European Heart Journal, [DOI: 10.1093/eurheartj/ehu098](https://doi.org/10.1093/eurheartj/ehu098)

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