

Secondhand smoke raises risk of hardened arteries among 13-year-olds

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Frequent exposure to environmental tobacco smoke among 13-year-olds is associated with an increased risk of future blood vessel hardening and greater risks of other heart disease factors, according to new research published in *Circulation: Cardiovascular Quality and Outcomes*, a journal of the American Heart Association.

The study of 494 children showed that those with higher levels of exposure to secondhand smoke from ages 8 to 13 had, by age 13, significantly increased blood vessel wall thickness and functioning problems, both of which are precursors to arterial structural changes and hardening.

Greater exposure to tobacco smoke also was associated with higher levels of apolipoprotein B (apoB), a component of low-density lipoprotein (LDL) or "bad" cholesterol and another indicator of [heart disease](#) risk.

Study participants were recruited as infants into Finland's ongoing prospective randomized Special Turku Coronary Risk Factor Intervention Project (STRIP), which began in 1990 and is aimed at lowering children's risks of heart disease by controlling their exposure to known environmental dangers.

"Although previous research has found that passive smoke may be harmful for blood vessels among adults, we did not know until this study that these specific effects also happen among children and adolescents,"

said Katariina Kallio, M.D., Ph.D., lead author of the study and research fellow at the Research Centre of Applied and Preventive Cardiovascular Medicine at the University of Turku in Turku, Finland.

The research adds to a growing body of evidence indicating that secondhand smoke has objectively measurable effects on children's heart health.

Compared to teens with the lowest tobacco smoke exposure levels, carotid arterial wall thickness was 7 percent greater and aortic arterial wall thickness was 8 percent greater among teens with the highest tobacco smoke exposure levels, Kallio said.

Brachial artery flow-mediated dilation (FMD), a measurement of blood vessel function in the upper arm, decreased as [tobacco smoke exposure](#) levels increased among participants. FMD was 15 percent lower in teenagers with the highest levels of exposure versus those with the lowest levels.

Researchers used high-resolution ultrasound to measure carotid and aortic arterial wall thickness and brachial artery FMD.

ApoB levels and the ratio of apoB to apolipoprotein A1 (apoA1), a component of high-density lipoprotein (HDL) or "good" cholesterol, both increased with higher secondhand smoke exposure. Previous research suggests the apoB to apoA1 ratio may be an even more powerful predictor of heart disease risk than the traditional LDL cholesterol measurement that most Americans undergo today. ApoB and apoA1 were determined using standard lipid profile tests.

Researchers determined long-term exposure levels to secondhand smoke by measuring blood levels of the substance cotinine, a byproduct of nicotine that indicates how much tobacco smoke was encountered over

the last few days.

Most study participants had six annual blood tests for cotinine levels. Researchers averaged the results and divided participants into three levels of tobacco exposure: high (163 participants), intermediate (171) and low (160).

"These findings suggest that children should not face exposure to tobacco smoke at all," Kallio said. "Even a little exposure to [tobacco smoke](#) may be harmful for blood vessels. We need to provide children a smoke-free environment."

[Secondhand smoke](#) exposure levels among Finnish children are comparable to those among American children, Kallio said.

Provided by American Heart Association

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