

E-cigarette users experience vascular damage similar to that of smokers of combustible cigarettes

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Using e-cigarettes damages the arteries and blood vessel function much like smoking traditional cigarettes, according to new research published

today in the *Journal of the American Heart Association*, an open access journal of the American Heart Association, and funded through the Tobacco Center of Regulatory Science of the American Heart Association, the leading voluntary health organization devoted to a world of longer, healthier lives.

"Many people believe e-cigarettes are safer than combustible cigarettes. In fact, most e-cigarette users say the primary reason they use e-cigarettes is because they think e-cigarettes pose less of a health risk," said study author Jessica L. Fetterman, Ph.D., assistant professor of medicine at Boston University School of Medicine, Boston. "Meanwhile, the evidence from scientific studies is growing that e-cigarettes might not be the safer alternative to smoking traditional cigarettes when it comes to heart health. Our study adds to that evidence."

Fetterman and colleagues studied over 400 men and women, ages 21 to 45 years, who had not been diagnosed with heart disease or heart disease risk factors. Study participants included 94 nonsmokers, 285 cigarette smokers, 36 e-cigarette users and 52 dual users who smoke combustible cigarettes and use e-cigarettes. Combustible [cigarette smokers](#) and dual users were older than non-smokers and e-cigarette users, while e-cigarette users were more likely to be younger, male and white. All [e-cigarette users](#) were former smokers of [traditional cigarettes](#).

"We studied measures of blood vessel function in e-cigarette and dual users who had been using e-cigarettes for at least three months. Most studies to-date have looked at the impact of acute use of e-cigarettes on blood vessel function measured right before and after use, whereas our study evaluated blood vessel function in chronic e-cigarette use among young, healthy adults," Fetterman said.

The researchers found that former smokers who switched to e-cigarettes and dual users had an augmentation index similar to traditional cigarette

users, which means that their arteries were just as stiff.

"Stiffening of the arteries can cause damage to the small blood vessels, including capillaries, and puts additional stress on the heart, all of which can contribute to the development of heart disease," Fetterman said.

The researchers also found that the cells that line the blood vessels, called [endothelial cells](#), appeared to be equally as damaged whether people used e-cigarettes, combustible cigarettes or both.

"The endothelial cells from [e-cigarette](#) users or dual users produced less of the [heart](#)-protective compound nitric oxide, compared to non-tobacco users. Their cells also produced more reactive oxygen species, which cause damage to the parts of cells such as DNA and proteins," Fetterman said. "Our study results suggest there is no evidence that the use of e-cigarettes reduces cardiovascular injury, dysfunction or harm associated with the use of combustible tobacco products."

She noted longer-term studies are needed to determine if vascular damage from e-cigarettes alone changes over time.

More information: Jessica L. Fetterman et al. Alterations in Vascular Function Associated With the Use of Combustible and Electronic Cigarettes, *Journal of the American Heart Association* (2020). [DOI: 10.1161/JAHA.119.014570](https://doi.org/10.1161/JAHA.119.014570)

Provided by American Heart Association

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