

# Study links e-cigarette use with higher risk of heart failure

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People who use e-cigarettes are significantly more likely to develop heart failure compared with those who have never used them, according to one of the largest prospective studies to date investigating possible links between vaping and heart failure. The findings are being presented at the [American College of Cardiology's Annual Scientific Session](#).

Heart failure is a condition affecting more than 6 million U.S. adults in which the heart becomes too stiff or too weak to pump blood as effectively as it should. It can often lead to debilitating symptoms and frequent hospitalizations as people age.

Electronic nicotine products, which include e-cigarettes, vape pens, hookah pens, personal vaporizers and mods, e-cigars, e-pipes and e-hookahs, deliver nicotine in aerosol form without combustion. Since they were first introduced in the U.S. in the late 2000s, electronic nicotine products have often been portrayed as a safer alternative to smoking, but a growing body of research has led to increased concern about potential negative health effects.

"More and more studies are linking e-cigarettes to harmful effects and finding that it might not be as safe as previously thought," said Yakubu Bene-Alhasan, MD, a [resident physician](#) at MedStar Health in Baltimore and the study's lead author. "The difference we saw was substantial. It's worth considering the consequences to your health, especially with regard to heart health."

For the study, researchers used data from surveys and [electronic health records](#) in All of Us, a large national study of U.S. adults run by the National Institutes of Health, to analyze associations between e-cigarette use and new diagnoses of [heart failure](#) in 175,667 study participants (an average age of 52 years and 60.5% female). Of this sample, 3,242

participants developed heart failure within a median follow-up time of 45 months.

The results showed that people who used e-cigarettes at any point were 19% more likely to develop heart failure compared with people who had never used e-cigarettes.

In calculating this difference, researchers accounted for a variety of demographic and socioeconomic factors, other [heart disease risk factors](#) and participants' past and current use of other substances, including alcohol and tobacco products. The researchers also found no evidence that participants' age, sex or smoking status modified the relationship between e-cigarettes and heart failure.

Breaking the data down by type of heart failure, the increased risk associated with e-cigarette use was statistically significant for heart failure with preserved ejection fraction (HFpEF)—in which the heart muscle becomes stiff and does not properly fill with blood between contractions.

However, this association was not significant for heart failure with reduced [ejection fraction](#) (HFrEF)—in which the heart muscle becomes weak and the left ventricle does not squeeze as hard as it should during contractions. Rates of HFpEF have risen in recent decades, which has led to an increased focus on determining risk factors and improving treatment options for this type of heart failure.

The findings align with previous studies conducted in animals, which signaled e-cigarette use can affect the heart in ways that are relevant to the heart changes involved in heart failure. Other studies in humans have also shown links between e-cigarette use and some risk factors associated with developing heart failure.

However, previous studies attempting to assess the direct connection between e-cigarette use and heart failure have been inconclusive, which Bene-Alhasan said is due to the inherent limitations of the cross-sectional study designs, smaller sample sizes and the smaller number of heart failure events seen in previous research.

Researchers said the new study findings point to a need for additional investigations of the potential impacts of vaping on heart health, especially considering the prevalence of e-cigarette use among younger people. Surveys indicate that about 5% to 10% of U.S. teens and adults use e-cigarettes. In 2018, the U.S. Surgeon General called youth e-cigarette use an epidemic and warned about the health risks associated with nicotine addiction.

"I think this research is long overdue, especially considering how much e-cigarettes have gained traction," Bene-Alhasan said. "We don't want to wait too long to find out eventually that it might be harmful, and by that time a lot of harm might already have been done. With more research, we will get to uncover a lot more about the potential health consequences and improve the information out to the public."

Bene-Alhasan also said e-cigarettes are not recommended as a tool to quit smoking, since many people may continue vaping long after they quit smoking. The U.S. Centers for Disease Control and Prevention recommends a combination of counseling and medications as the best strategy for quitting smoking.

Researchers said that the study's prospective observational design allows them to infer, but not conclusively determine, a causal relationship between [e-cigarette use](#) and heart failure. However, with its large sample size and detailed data on substance use and health information, Bene-Alhasan said the study is one of the most comprehensive studies to assess this relationship to date.

**More information:** Bene-Alhasan will present the study, "Electronic Nicotine Product Use Is Associated with Incident Heart Failure - The All of Us Research Program," on Sunday, April 7, 2024.

For more information about the health effects of e-cigarettes, visit [CardioSmart.org/StopSmoking](https://www.cardiosmart.org/StopSmoking).

Provided by American College of Cardiology

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