E-cigarette use rises while new data points to heart health risks

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A new study adds to mounting evidence that the use of electronic cigarettes (e-cigarettes), or vaping, has increased in recent years among U.S. adults, with nearly 1 in 20 reporting current use of e-cigarettes,

according to research presented at the American College of Cardiology's Annual Scientific Session Together with World Congress of Cardiology (ACC.20/WCC). In addition, two studies examining blood samples suggest e-cigarette exposure is roughly equivalent to tobacco smoke in terms of promoting oxidative stress that can lead to blood vessel damage and heart disease.

The first study, based on a survey of more than 930,000 U.S. adults, found nearly 29,000 people identified as current e-cigarette users, which translates to about 10.8 million U.S. adults. The proportion of survey respondents reporting current e-cigarette use rose from 4.3% in 2016 to 4.8% in 2018.

"While an increase of 0.5% over three years may not sound like a large increase, that's a lot of [new] e-cigarette users once you extrapolate out to the overall population," said Mahmoud Al Rifai, MD, MPH, a cardiology fellow at Baylor College of Medicine and the study's lead author. "Based on our findings, I think the trend is only going to go upward, but we don't know yet what the long-term health effects are."

For this study, researchers analyzed data from the Behavioral Risk Factor Surveillance System, a large phone-based survey conducted annually for more than 35 years that is designed to be representative of the U.S. adult population. Survey participants who said they used e-cigarettes every day or on some days were counted as current e-cigarette users.

While vaping rates rose across the overall population from 2016-2018, the increase was particularly pronounced in certain groups. Current e-cigarette use increased from 3.3% to 4.3% among women; from 3.9% to 5.2% among adults 45-54 years old; and from 5.2% to 7.9% among former smokers. Vaping also rose dramatically among users of smokeless tobacco products, from 9.2% in 2016 to 16.2% in 2018.

Al Rifai said he believes the trends may reflect a push by e-cigarette makers to position their products for smoking cessation. He added that the findings underscore an urgent need for further research on the prevalence of vaping and to understand its potential long-term health implications for both the individual and public health.

"Because e-cigarettes have only been around for about a decade, many large cohort studies have only just recently started incorporating e-cigarette information into their questionnaires. Yet, the cumulative effects of e-cigarettes may take years to develop, especially in the context of cardiovascular disease," Al Rifai said. "It's something that we need to keep a very close eye on."

Growing evidence points to potential heart risks

Two other small studies being presented bolster emerging evidence for potential links between e-cigarette use and heart disease. For these studies, researchers compared blood samples from non-smokers, smokers and e-cigarette users to examine immune cell characteristics and markers of oxidative stress associated with plaque buildup in the heart's arteries. They found that using e-cigarettes led to many of the same characteristics as tobacco smoke at the cellular level, with both e-cigarette users and tobacco smokers showing significantly more evidence of harmful oxidative stress than non-smokers.

"Oxidative stress is one of the main instigators for many diseases that contribute to aging," said Holly Middlekauff, MD, a cardiologist at the University of California, Los Angeles, and senior author of the studies. "We found that not only do the immune cells that are circulating have greater oxidative stress in smokers and e-cigarette users than non-smokers, there are also more of these chronic inflammatory cells present. Our study suggests there is a continuum of harm, with non-users having the least amount of oxidative stress, electronic cigarette users

showing an intermediate level and chronic tobacco smokers having the largest amount of oxidative stress."

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