

E-cigs with cigarette-like nicotine delivery may help smokers quit

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Electronic cigarettes with cigarette-like nicotine delivery may help some people stop smoking cigarettes, according to a new study by Penn State College of Medicine and Virginia Commonwealth University

researchers. By switching to e-cigarettes, the researchers said tobacco users may reduce their exposure to certain carcinogens, or cancer causing substances.

For six months, the research team followed 520 smokers who were looking to reduce their cigarette consumption by at least 50% but had no plans to quit. They observed whether the use of various electronic [nicotine](#) delivery systems (or ENDS)—used by around 10 million U.S. adults—led to reduced cigarette consumption. Participants randomly received an ENDS containing 0 mg/mL (placebo), 8 mg/mL or 36 mg/mL nicotine, or a cigarette substitute with no nicotine, electronics or aerosols.

Throughout the study, researchers encouraged participants to reduce their cigarette consumption. At the end of six months, significantly more participants who had received the 36 mg/mL nicotine ENDS, which has similar nicotine delivery to a cigarette, reported remaining abstinent from cigarettes compared to the other study groups.

"Across the board, quit rates were low as none of the participants entering the trial had plans to quit, nor did they receive advice to quit during those six months," said Jonathan Foulds, lead author and professor of public health sciences at the College of Medicine.

"However, over time, we noticed that the number of those receiving the high nicotine-delivery ENDS who abstained from cigarettes gradually increased. That trend was not observed in those receiving the placebo ENDS or the non-ENDS cigarette substitute.

"This is the first randomized clinical trial of [electronic cigarettes](#) to find that a nicotine e-cig produced a significant increase in smoking cessation at six months follow-up, compared with a placebo e-cig as well as compared to a non-ENDS cigarette substitute," said Foulds.

Previous trials have examined the effects of ENDS on cigarette cessation, but the researchers noted many of those studies used devices and liquids with unknown or unconfirmed nicotine delivery profiles.

"One of the strengths of our study was that the nicotine delivery of the specific ENDS device paired with the different liquids used in this study were confirmed before the trial," said Thomas Eissenberg, co-author and professor at Virginia Commonwealth University. "It is evident based on our findings that ENDS with ineffective or less potent nicotine delivery likely won't help participants to quit cigarette smoking."

The researchers encouraged participants to reduce their cigarette consumption by 50% and then 75% for a six-month period. They measured cigarette consumption and various biomarkers, such as exhaled carbon monoxide levels, during eight follow-up visits. They determined the proportion of participants in each group who reported that they had smoked no cigarettes in the prior week. At the six-month mark, significantly more participants in the 36 mg/mL nicotine group (about 11%) reported cigarette abstinence than in the 0 mg/mL (1%) and cigarette substitute (3%) groups. Approximately 5% of participants in the 8 mg/mL group reported cigarette abstinence at the six-month mark.

"We were surprised to see that the 8 mg/mL group didn't have a significantly higher quit rate than the placebo group," said Jessica Yingst, Penn State Cancer Institute researcher and assistant professor of public health sciences at Penn State College of Medicine. "These results indicate that if an ENDS doesn't deliver as much nicotine as a cigarette, then it's less likely that smokers using those devices will abstain from using cigarettes."

According to the researchers, the main conclusion of their study is that when people seeking to reduce smoking try ENDS, few quit cigarettes in the short term. However, smokers that continued to use an ENDS with

cigarette-like nicotine delivery (the 36 mg/mL group), were more likely to stop smoking in the short term and completely switch to ENDS, compared to those who used a placebo ENDS. Devices with nicotine delivery similar to a cigarette may be more effective in enabling ambivalent smokers to quit cigarettes. The results were published in the journal *Nicotine and Tobacco Research*.

"In addition to having a higher quit rate at the end of the trial, the 36 mg/mL group also reported more days without smoking cigarettes throughout the trial than the other three groups," noted Caroline Cobb, co-author and associate professor at Virginia Commonwealth University.

The study team said that more research is needed to confirm and expand upon their findings, but they were encouraged that participants using ENDS products while still smoking cigarettes did not have a higher frequency of serious adverse events. They noted that the medical monitors did not attribute any serious adverse events observed during the study to the use of the ENDS devices.

"The results of our study reflect many patterns of ENDS use that have been found in other studies and in society in general," said Foulds, a Penn State Cancer Institute researcher. "Many people use ENDS and continue smoking cigarettes for a period of time before quitting smoking. ENDS are not a magic bullet, but our results support the idea that ENDS with cigarette-like [nicotine delivery](#) may be critical to someone's ability to abstain from cigarettes."

More information: Jonathan Foulds et al, Effect of Electronic Nicotine Delivery Systems on Cigarette Abstinence in Smokers with no Plans to Quit: Exploratory Analysis of a Randomized Placebo-Controlled Trial, *Nicotine & Tobacco Research* (2021). [DOI: 10.1093/ntr/ntab247](https://doi.org/10.1093/ntr/ntab247)

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