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# Science Races to Catch Up to E-Cigarettes' Popularity

14 February 2015 Leigh Cooper (/person/leigh-cooper)

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E-CIGARETTES HAVE ONLY BEEN ON THE MARKET FOR ABOUT A DECADE, SO SCIENTISTS KNOW LITTLE ABOUT THEIR LONG-TERM EFFECTS. | SMOKE-FALL BY SODANIE CHEA ([HTTP://WWW.FLICKR.COM/PHOTOS/41942551@N02/8819220638/](http://www.flickr.com/photos/41942551@N02/8819220638/)) / CC BY 2.0 ([HTTPS://CREATIVECOMMONS.ORG/LICENSES/BY/2.0/](https://creativecommons.org/licenses/by/2.0/))

SAN JOSE, California — Science has firmly labeled tobacco products hazardous to human health, but the consequences of using e-cigarettes are still hazy. While the popularity of these battery-powered devices that produce nicotine vapor explodes, scientists are hurrying to gather data on the use of e-cigarettes and their health effects. Meanwhile, e-cigarette companies and consumers are waiting for governments to create regulations using the limited science that is available.

"E-cigarettes show tremendous promise as a tool for helping confirmed smokers that don't respond to other approaches to quitting smoking," said Wilson Compton, deputy director of the National Institute on Drug Abuse during a 13 February press conference on the health effects of e-cigarettes at the AAAS Annual Meeting. "But for non-smokers and particularly adolescent non-smokers, e-cigarettes are not without some risks and concerns."

Nicotine drives over 1 billion people to smoke throughout the world, but it is the tar within combustible cigarettes that causes 6 million deaths annually from tobacco-related diseases according to the World Health Organization.

E-cigarettes, or electronic nicotine delivery systems, remove the tar from smoking by eliminating tobacco. The device heats nicotine, other chemicals, and flavorings to create an aerosol inhalant. Many customers use e-cigarettes not only to stop inhaling the toxicants and carcinogens found in cigarettes, but also as a stepping-stone toward quitting nicotine addiction.

Although the nicotine dose in e-cigarettes varies with the product and the user, it is substantially smaller than the nicotine dose in regular cigarettes, according to Deborah Arnott, chief executive of Action on Smoking and Health, a British public health charity.

When comparing the health effects of nicotine products, e-cigarettes should be compared not to a placebo but to other nicotine products, Arnott argued. The health effects of e-cigarettes fall closer to nicotine gum and patches than to combustible cigarettes, she said.

Because e-cigarettes only have been on the market for about a decade, science cannot yet provide long-term data on these products. Groups fighting against e-cigarettes state that these unknowns are not worth risking people's health. Others argue that e-cigarettes will act as a gateway to combustible cigarettes for non-smokers including adolescents, who are especially prone to nicotine addiction because their brains are still developing. But these potential trends are just theories right now, said Compton.

Nonetheless, early numbers from the Monitoring the Future Study conducted in 2014 did concern Compton, because they suggest that non-smoking adolescents could become addicted to nicotine through e-cigarettes, which could, in turn, lead to the use of regular cigarettes. The study showed that 8 percent of eighth graders, 16 percent of tenth graders, and 17 percent of twelfth graders had used e-cigarettes in the past month. The students were more likely to have used e-cigarettes than regular cigarettes. Of the students partaking in "vaping," roughly a third of eighth and tenth graders and a fifth of twelfth graders used e-cigarettes only, while the rest had also smoked regular cigarettes.

In general, smoking and nicotine use for youth are decreasing in western countries and these trajectories have not changed with the launch of e-cigarettes, according to Arnott. "There is no evidence that these products are proving to be a gateway into smoking," she said.

The e-cigarette industry is booming with hundreds of products and a wealth of specialty stores. E-cigarette sales are even set to surpass regular cigarettes sales by 2021. The panel acknowledged the variability in quality found in current products. Regulation of e-cigarette manufacturing could reduce users' exposure to heavy metals and toxic chemicals including formaldehyde, acetaldehyde, acrolein, and acetone.

"A blanket endorsement for all these e-cigarettes is a bit too soon," said Kevin Bridgman, chief medical officer at Nicoventures, a company selling nicotine products. "I will be calling for international recognized standards around these products so we can build [consumer] confidence."



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AUDIO INTERVIEW: E-CIGARETTES MAY BE A NEW PATHWAY TO ADDICTION FOR TEENAGERS, SAYS WILSON COMPTON OF THE NATIONAL INSTITUTE ON DRUG ABUSE (NIH). | AAAS/CARLA SCHAFER

"Chocolate and cheesecake are not meant to be inhaled," said Thomas Hartung, a toxicologist at Johns Hopkins University. "It is necessary to prohibit the use of flavors which are safe probably if ingested but not inhaled."

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