

Potentially hazardous effects of mechanical and chemical characteristics of e-cigarettes

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Unlike standard cigarettes, the components of electronic cigarettes are not regulated and standardized, thus they vary widely between products. The characteristics of these e-cigarette elements, including their delivery systems, combustion apparatuses, and the composition of the nicotine solutions they contain may affect the levels of potentially hazardous substances in the vapor they produce, according to a new study presented at the 2015 American Thoracic Society International Conference.

"While the chemical compositions and [negative health effects](#) of [tobacco smoke](#) have been well studied, e-cigarettes have yet to undergo the same level of scrutiny," said lead author Daniel Sullivan, MD, of the University of Alabama School of Medicine. "In our study, we found that differences in the mechanical and chemical makeup of e-cigarettes affected their generation of combustion products known to have adverse effects on human health."

The power generated by the tested units was found to correlate with the production of acrolein, an irritant associated with an increased risk for lung cancer, acetaldehyde, which is also associated with an increased cancer risk and may increase the risk of addiction, and formaldehyde, another known carcinogen. Under some test conditions, formaldehyde levels were comparable to those seen in traditional tobacco cigarettes.

The formation of these chemicals was found to be positively correlated with the glycerol:[propylene glycol](#) ratio in the solutions tested. Glycerol and propylene glycol are commonly used as nicotine solvents in e-

cigarettes.

In addition, the researchers found that e-cigarette condensate inhibited the enzymatic activity of LTA4H, an enzyme involved in the resolution of pulmonary inflammation, in a dose dependent manner similar to that observed with tobacco smoke.

"Our results reveal the essential properties of e-cigarettes that affect their production of substances known to be toxic to [human health](#)," said Dr. Sullivan. "This data speaks to the importance of more careful scrutiny and standardization of the components of these widely used devices."

More information: Abstract 67997: Mechanical and Chemical Components of Electronic Cigarettes Affect Combustion Product Formation and Biological Pathways of Inflammation

Provided by American Thoracic Society

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