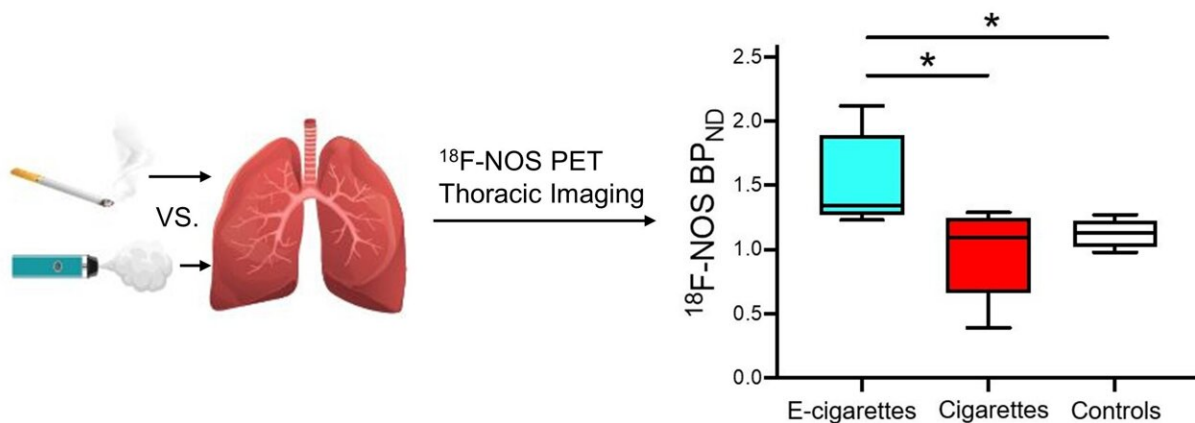


PET imaging shows greater lung inflammation in e-cigarette users than cigarette smokers

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Summary of the pilot study and preliminary PET imaging findings. Credit: R Wetherill, Department of Psychiatry, Perelman School of Medicine at the University of Pennsylvania, Philadelphia, PA.

Electronic cigarette (e-cigarette) users have greater lung inflammation than cigarette smokers and non-smokers, according to a new study published online in *The Journal of Nuclear Medicine*. This study is the first to provide evidence that vaping e-liquids with e-cigarettes creates a unique inflammatory response in the lungs that is different from cigarette smoking.

E-cigarette usage has increased dramatically in the past several years, particularly among adolescents and young adults. While many people assume that e-cigarettes are safer than conventional cigarettes, e-cigarettes can cause pulmonary [inflammation](#) and increase the risk of lung disease. In addition, their long-term safety has not been rigorously evaluated.

This is the first PET study to use a novel radiotracer, ^{18}F -NOS, to compare lung inflammation between cigarette and [e-cigarette](#) users in vivo. Although PET imaging with ^{18}F -FDG has been used in the past to investigate inflammation in smokers and vapers, its conclusions were limited.

"iNOS is an enzyme that is overexpressed in e-cigarette users and cigarette smokers and is associated with acute and chronic inflammatory diseases," said Reagan Wetherill, Ph.D., the study's lead author and faculty member at the Perelman School of Medicine at the University of Pennsylvania in Philadelphia. "This makes it a relevant target for molecular imaging of lung inflammation and inflammatory lung disease."

Study participants were divided into three age- and sex-matched groups: five e-cigarette users, five cigarette smokers, and five never-smoked/vaped controls. ^{18}F -NOS PET was performed to quantify and compare [lung](#) inflammation.

E-cigarette users showed greater pulmonary inflammation than [cigarette smokers](#) and never-smoked/vaped controls. A positive association between pulmonary and peripheral measures of inflammation was also found, suggesting that [e-cigarette use](#) may increase pulmonary inflammation.

"Having these findings provides patients with additional evidence about

the potentially harmful effects of e-cigarette use on the lungs," says Wetherill. "Our work advances what is currently known about the impacts of e-cigarette use on respiratory health and provides a better understanding of harm and harm reduction associated with e-cigarette use relative to cigarette smoking."

Senior author and Perelman School of Medicine Department of Radiology faculty member Jacob Dubroff, MD, Ph.D., sees a growing role for using molecular imaging to understand the effects of electronic cigarettes. He notes, "These findings suggest [molecular imaging](#) may be uniquely poised to detect and measure the potential pathophysiologic harms associated with electronic cigarettes, which have been touted as a safer vehicle for nicotine compared to traditional combustible cigarettes."

More information: Reagan R. Wetherill et al, Molecular imaging of pulmonary inflammation in electronic and combustible cigarette users: a pilot study, *Journal of Nuclear Medicine* (2023). [DOI: 10.2967/jnumed.122.264529](#)

Provided by Society of Nuclear Medicine and Molecular Imaging

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