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Vapers exhale from nose more often than cigarette smokers

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E-cigarette vapers and hookah smokers are more than twice as likely to exhale particles through their nose compared with cigarette smokers, who favor exhaling the emissions from their mouth, a new study shows.

The finding makes it plausible that the former group is at risk for inflammation and cancers of the nose, sinuses, and throat, conditions seen less often in cigarette smokers, according to the study authors.

Since their introduction in 2007, vaping devices have surged in popularity, with more than one in 20 American adults vaping, experts say. Past studies have suggested that these products, along with hookah waterpipes, expose the respiratory system to higher levels of nicotine, carbon monoxide, and other toxic chemicals than traditional cigarettes and cigars. However, experts say their long-term health effects remain poorly understood.

Led by researchers at NYU Grossman School of Medicine, the new investigation in 341 men and women showed that large numbers of vapers and hookah smokers exhaled through their nose (63% and 50% respectively). By contrast, only 22% of cigarette smokers did the same.

"Our findings suggest that the unique way vapers and hookah smokers use their devices may expose the nose and sinuses to far more emissions than cigarettes, which may in turn increase their risk for upper respiratory diseases," says study lead author Emma Karey, Ph.D., a postdoctoral research fellow in the Department of Environmental Medicine at NYU Langone Health.

Vaping products come in a variety of enticing flavors, such as pineapple, bubblegum, and blue raspberry. As scent enhances taste, Karey notes, such flavors may account for the nose-exhaling technique. In fact, vapers and smokers even have a term for this practice, "retrohaling," which is sometimes encouraged as a means of extracting as much flavor as possible from each puff.

Experts have long known that smoking techniques for traditional tobacco products can influence which parts of the respiratory tract are at highest

risk for disease. Past studies have shown, for example, that cigarette smokers, who tend to inhale more deeply, more frequently develop lung cancer. Cigar smokers, who tend to breathe more shallowly, are more likely to develop mouth and throat cancers.

However, the new study, publishing online March 1 in the journal *Tobacco Use Insights*, is the first to examine exhalation patterns in e-cigarette and hookah pipe users outside of a controlled laboratory setting, says Karey.

The study's authors discreetly observed 122 cigarette smokers and 123 vapers walking on the streets of New York City between March 2018 and February 2019. They also monitored 96 people smoking inside two Manhattan hookah bars. The researchers then noted whether each smoker or vaper exhaled through their nose, mouth, or both. For vapers, they also recorded whether a pod-style (such as a vape pen) or modular tank-style vaping device was used.

Among the findings, the results showed that more than 70% of those who used pod-like devices exhaled through their nose at some point during the observation period, while 50% of modular-tank style users did the same. One possible explanation for this trend, says Karey, is that the latter devices produce far more particles with each puff than the former. As a result, tank users may find their puffs simply too large to exhale through the nose alone.

"Because vaping and hookah devices are used differently than traditional cigarettes, we need to consider diseases of both the nose and lungs to evaluate their safety before judging whether one is more risky than another," says study senior author Terry Gordon, Ph.D., a professor in the Department of Environmental Medicine at NYU Langone.

Gordon notes that in a related study, the research team identified

increased damage in the nasal passages of vapers and hookah users but not in cigarette smokers, lending credence to the concern. In fact, they found as many as 10 times the levels of inflammatory compounds released by defense cells in the noses of the former group than in the latter.

He cautions, however, that the investigators still need to determine whether this nasal damage seen in vapers is truly a result of their unique breathing pattern and not due to an unrelated issue.

More information: Exhalation of alternative tobacco product aerosols differs from cigarette smoke—and may lead to alternative health risks, *Tobacco Use Insights*, 2022.

Provided by NYU Langone Health

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