

Kids who vape face toxin dangers, study finds

March 5 2018, by Dennis Thompson, Healthday Reporter



(HealthDay)—Teenagers who use e-cigarettes expose themselves to

cancer-causing toxins, particularly if they choose fruit-flavored products, a new study reports.

Urine tests revealed elevated levels of five different toxins in the bodies of teens who use e-cigarettes (often called vaping). And all of the toxins are known or suspected carcinogens, said lead researcher Dr. Mark Rubenstein, a professor of pediatrics with the University of California, San Francisco.

Teens who used e-cigarettes had up to three times greater amounts of the toxins in their urine than teens who never vape, the researchers found.

"One of the reasons why more teens are using these products is they feel that they are safe and/or safer than [smoking](#)," Rubenstein said. "Based on these results, if the teenagers kept using these products over the years, we believe it could be dangerous."

The toxins—acrolein, acrylamide, acrylonitrile, crotonaldehyde and propylene oxide—all belong to a class of chemicals known as [volatile organic compounds](#) (VOCs).

In particular, fruit-flavored e-cigarettes produced significantly [higher levels](#) of acrylonitrile. That's a concern because fruit flavors are most popular among teens and acrylonitrile is a known carcinogen, the researchers said.

"Right now a lot of the flavors being marketed seem to clearly be targeting teens," Rubenstein said. "I think it's difficult to argue that you're marketing these products to adults trying to wean off cigarettes when you're offering flavors like 'unicorn poop' and bubble gum."

Volatile organic compounds are released when [e-cigarette](#) liquid is heated to the point when it becomes vapor, Rubenstein said. The liquid

contains solvents that are approved food additives, but when heated these additives can form other chemical compounds, including VOCs, he said.

Toxic VOCs also are present in traditional tobacco cigarettes, and in greater quantities. The researchers behind the new study said "dual users"—teens who alternate between cigarette smoking and e-cigarette smoking—had up to three times higher levels of five toxins than those who only vape.

Gregory Conley is president of the American Vaping Association, a nonprofit that advocates for e-cigarettes. He said: "The results of this study fall in line with prior literature estimating the cancer risk from e-cigarette use to be orders of magnitude lower than the risk from smoking cigarettes. While it is clear from the data that environmental sources of toxins played a considerable role in the levels measured among all groups, the data nonetheless shows significant reductions in exposure among exclusive e-cigarette users."

But to Dr. Norman Edelman, senior scientific advisor to the American Lung Association, the study results show that e-cigarettes aren't as harmless as some might think.

"Now, it's true that if they smoked combustible cigarettes they would get more of this stuff," Edelman said. "But this does make it quite clear that vaping is not safe."

To investigate chemical exposure from e-cigarettes, the researchers looked at three different groups—e-cigarette users, "dual users" who also smoke traditional cigarettes, and teens who don't smoke or vape.

The researchers recruited 103 participants with an average age of 16, and analyzed urine samples from all for the presence of potentially dangerous volatile organic compounds.

"They're doing it the right way. They're not measuring what's in the vaped liquid, they're measuring what gets into the kids' bodies, which is really the important question," Edelman said.

All e-cigarettes appear to create VOCs, even those that don't contain nicotine. The VOCs acrylonitrile and acrylamide were found in elevated levels in the urine of teens who said they don't use nicotine-laced e-liquid.

"That was interesting and surprising to us," Rubenstein said. "Although most of the teenagers used the nicotine-containing products, some did not and we were able to find these toxins even in them. That's because the solvents are still in these products, even if there's no nicotine."

Edelman said the study exposes the erroneous assumption that because e-cigarettes are "more safe" than tobacco, they can serve as a substitute for quitting smoking altogether.

"The most safe approach is smoking cessation, and for kids the most safe approach is smoking prevention," Edelman said. "What I'm concerned about is that all this talk about 'more safe' under the rubric of harm reduction is going to make us forget about the importance of smoking prevention and smoking cessation."

The U.S. Food and Drug Administration needs to step up regulation of e-cigarettes, particularly when it comes to teenage use and fruit-flavored products that appear to target teens, Rubenstein said.

"I definitely think there needs to be greater regulation to prevent teenagers from using these products," Rubenstein concluded.

The study appears in the March 5 online issue of the journal *Pediatrics*.

More information: Mark Rubenstein, M.D., professor of pediatrics, University of California, San Francisco; Gregory Conley, president, American Vaping Association, Stratford, Conn.; Norman Edelman, M.D., senior scientific advisor, American Lung Association, Washington, D.C.

The U.S. Department of Health and Human Services has more about [e-cigarettes](#).

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Citation: Kids who vape face toxin dangers, study finds (2018, March 5) retrieved 6 May 2024 from <https://medicalxpress.com/news/2018-03-kids-vape-toxin-dangers.html>

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