

WHY VAPING IS SO DANGEROUS FOR TEENS

By Michael Nedelman, CNN

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(CNN) Most of what we know about nicotine addiction in teens, we know from cigarettes. But experts say the technology and chemistry of vaping might pose an entirely different threat.

"It turns out that e-cigarette use by kids doesn't look the same at all," said Dr. Sharon Levy, director of the [Adolescent Substance Use and Addiction Program](#) at Boston Children's Hospital. "How you're delivering [nicotine] and how much you're delivering ... everything you change really matters."

Levy said she's seen vape-addicted kids in her program showing what appear to be psychiatric symptoms rarely seen with traditional cigarettes or among adults. Some have anxiety and cannot focus, for example.



#JUUL: How social media hyped nicotine for a new generation

Meanwhile, vaping has become [ubiquitous](#) in many high schools, prompting the US Food and Drug Administration to tackle "[epidemic](#)" levels of use among minors.

On Friday, the agency will hold a public hearing to discuss the role of smoking cessation drugs for kids in

order to get them off vapes. There currently are no FDA-approved nicotine cessation products for e-cigarette users under 18.

Despite early fanfare that e-cigarettes might offer a less harmful alternative to adult smokers, experts say youth are being hit hard by a combination of how vapes deliver nicotine, how kids' brains are wired and developing, and the gadgets' unique [appeal to kids](#).

Their long-term health effects are still unclear.

"We let this Frankenstein loose without knowing what was going to happen," Levy said.

Teen vaping was a 'predictable problem'

Experts say that one Juul pod -- a cartridge of nicotine-rich liquid that users plug into the dominant e-cig brand -- contains the [same amount](#) of nicotine as a pack of cigarettes.

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"That may be true, but that's not the only consideration here," said Levy, adding that it's yet unclear "how high those peaks go and how quickly it gets into the bloodstream and into the brain."

Levy said that it's not uncommon for kids to report symptoms that "sound a lot like nicotine toxicity," including headaches and stomach aches. She suspects these devices cause nicotine levels in the blood to peak higher than they do with traditional cigarettes -- but experts say more research is needed to better understand how vapes work on the body and brain.



When your child vapes, what's a parent to do?

"These new generations of electronic cigarettes, like Juul ... they actually deliver a really high dose of nicotine, probably even higher than tobacco cigarettes," said Maciej Goniewicz, an associate professor of oncology and pharmacology at [Roswell Park Comprehensive Cancer Center](#) who specializes in toxicology.

In a [study](#) last year, Goniewicz found higher levels of cotinine -- a breakdown product of nicotine - in the urine of adolescent vapers than had been reported in prior research of teenage cigarette smokers.

According to Goniewicz, vape manufacturers may be able to pack more nicotine into their products by creating "nicotine salts," which may mask nicotine's naturally unpleasant taste and lead the drug to be absorbed by the body quicker.

The salt is created by combining nicotine -- a [base](#) in its natural form -- with an organic acid, he said. Experts worry that inhaling these and other added ingredients may cause other health problems down the line, but e-cigarettes haven't been around long enough to know.

Beyond the chemistry of the nicotine itself, e-cigarette companies have come under fire for adding pleasant, often sweet flavors to their "e-liquid" that are known to appeal to young people. And the absence of the harshness of inhaling combustible cigarettes may allow vapers to take deeper or more frequent puffs, Levy added.



High school e-cigarette use has jumped nearly 80%. Now, the FDA wants new regulations

FDA commissioner Dr. Scott Gottlieb [proposed in November](#) to strengthen the agency's policies against flavored e-cigarette products. These proposals could ultimately prompt their removal from shelves and websites that are accessible to minors. But the proposed changes do not include mint, menthol and tobacco flavors. Gottlieb said he wanted to leave the

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door open for adults who might use these products to quit smoking cigarettes, "but it can't come at the expense of addicting a generation of kids on nicotine," he previously told CNN.

Leading e-cigarette company Juul, which holds about 75% of the market in the United States, has also maintained that flavors are a useful tool to help adult smokers to switch from combustible cigarettes.

Ashley Gould, chief administrative officer at Juul Labs, told CNN last year, "We were completely surprised by the youth usage of the product." The company has maintained that its product is intended to convert adult former smokers to what Juul describes as a less-harmful alternative, and it says it is [taking steps](#) to limit kids' use of e-cigarettes.

But Levy describes vapes' popularity among teens as an "entirely predictable problem."

Teens' brains might be more vulnerable to nicotine

Levy said the impact of vapes on teens is changing the way people think about nicotine products.

Smoking was largely seen as a "medical problem" that could lead to cancer and other physical ailments, she said. Now, vaping is increasingly being seen as a psychiatric problem over concerns that nicotine is cultivating addictive behaviors among kids and interfering with their brain development.

"There's concern that the adolescent brain may be more vulnerable to the addictive effects of nicotine," said Adam Leventhal, director of the [Health, Emotion, and Addiction Laboratory](#) at the University of Southern California.

"The circuits underlying pleasure and the pursuit of novel, enjoyable experiences develop much faster than the circuits that promote decision making, impulse control and rational thinking," Leventhal said.



What parents should know about the 'huge epidemic' of vaping

We know from cigarette users that those who try nicotine products early in life are more likely to develop dependence to the drug, said Leventhal. This may also lead to the disruption of brain circuits that underlie attention and cognitive skills, he added.

What makes kids uniquely vulnerable to vapes is not merely biological; it's also psychosocial, according to

Leventhal. This may come in the form of peer pressure or stress, which may increase the likelihood of addictive behaviors, he said.

More broadly, the cultural and policy shifts that prevent many kids from picking up cigarettes -- including FDA regulation and a "long history of prevention programs" -- simply haven't kept pace with the vaping boom, Leventhal added.

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Kids and adults also tend to vape for different reasons, Goniewicz said. Adults tend to be former smokers who can handle a high dose of nicotine and want to avoid withdrawal symptoms, such as the inability to sleep or focus on work.

"They don't really need nicotine to feel good," he said. "They need nicotine not to feel bad -- because they are already addicted."

But e-cigarettes may be kids' first experience with nicotine. "Nicotine hits the brain," he said, tinkering with molecules that affect mood and other pathways. And they aren't used to it, he said.

"Nicotine is a potent chemical that changes our brain."

It's hard to get kids to quit

Levy said that "nearly all" adolescents in her program have some experience with e-cigarettes, but "what's new is that now, we're seeing patients in the substance use program whose only substance is nicotine."

Health experts worry that getting hooked on nicotine early in life may be a gateway to cigarette smoking and other drugs, and there are few tried-and-true resources out there for teens.

"Kids are often really struggling with this, and there are just not a lot of resources for them," Levy said, adding that many addiction programs may not be equipped to deal with some of the younger, nicotine-addicted kids she's seeing. Far better would be to ensure that primary care doctors are equipped to work with kids in their own communities, she said.

Some parents have pursued nicotine gum and other cessation tools off-label for their children under doctors' guidance. Levy said that can be tricky because some kids may use these products as a "bridge" between puffs of vapes and tobacco products.

Medications can be important in some advanced cases, but they're not enough, she said; kids also need "good, solid counseling."

"We end up needing to teach kids how they can deal with cravings, how they can identify high-risk situations, how they can actually deal with being surrounded by people who are using these things," Levy said. "Because the reality is that, for most kids, we treat them and put them back in school, and then they go to the bathroom, and everybody's Juuling."

Still, she said kids and their parents seem largely unaware of the potential dangers.

"Even to this day, I have kids saying, 'well, I thought it was safe' or 'I know it's safer than cigarettes,'" Levy said.

"And 'safer than cigarettes' is a really low bar."