

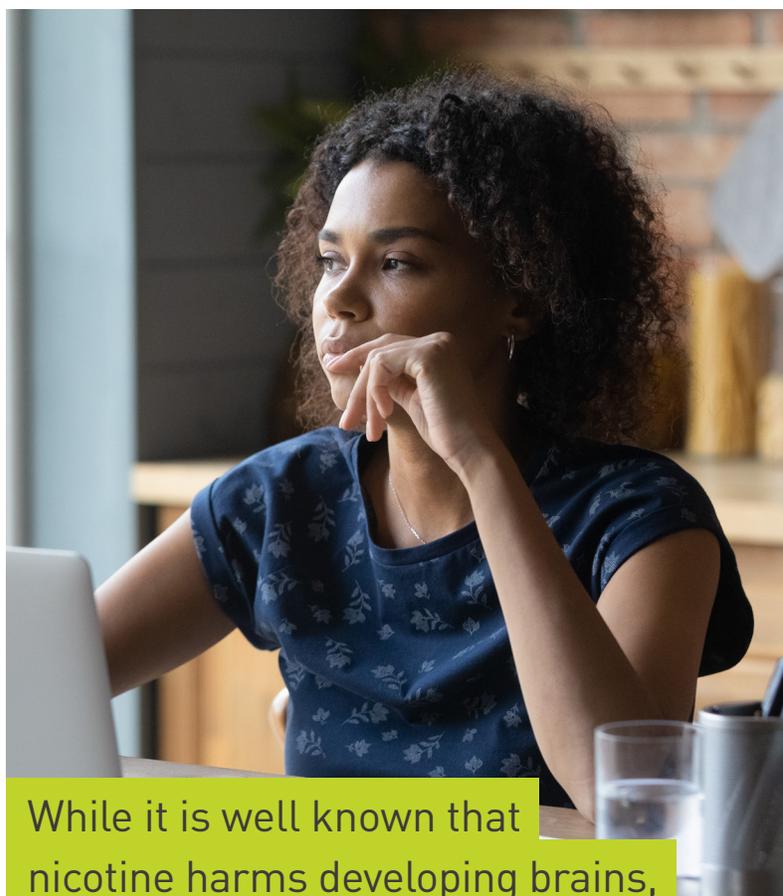
Colliding Crises: Youth Mental Health and Nicotine Use

Many young people turn to nicotine to alleviate stress, anxiety, and depression, but it may be making them feel worse

Two health crises among youth — a mental health crisis and a vaping epidemic — pose increasing threats to a generation of young people. They are also linked in ways many may not realize, according to a body of peer-reviewed studies.

Both crises have intensified during the COVID-19 pandemic. Even before the pandemic, 70% of young people said anxiety and depression were a major problem among peers in their community, according to a Pew Research Center [report](#).² Since then, the problem has gotten worse, as the prevalence of depression and anxiety symptoms in youth has doubled compared to before the pandemic.⁹ Alongside this mental health crisis, youth e-cigarette use — driven by products that quickly deliver highly-addictive nicotine — has remained at epidemic levels, with one in five high school students vaping in 2020, according to the National Youth Tobacco Survey. In the time since that survey, national e-cigarette sales have risen to record highs and the risks of vaping have become more apparent, as evidence shows it can harm lung health and may put users at greater risk of contracting COVID-19.¹⁷

While it is well known that nicotine harms developing brains, including by making young people more susceptible to addiction,^{1,6} lesser known are the worrying connections between nicotine and mental health. Though it is unknown whether a causal relationship between nicotine and mental health conditions exists, there are troubling links between vaping nicotine and worsening symptoms of depression and anxiety, as well as higher odds of having a depression diagnosis among those who use nicotine.



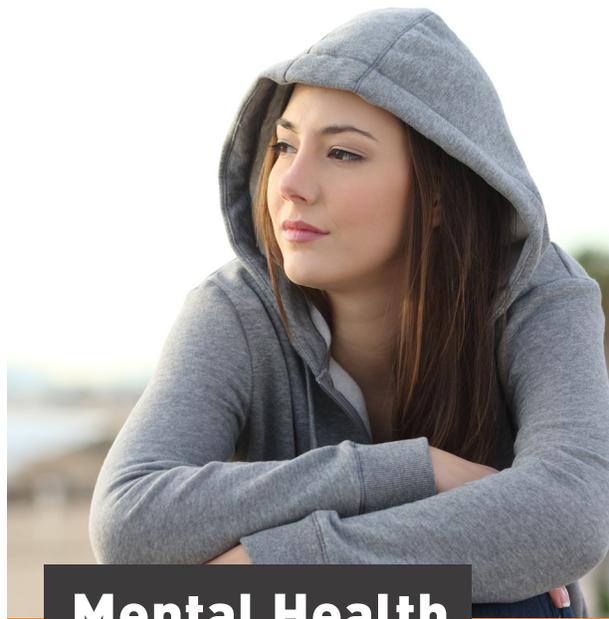
While it is well known that nicotine harms developing brains, including by making young people more susceptible to addiction, lesser known are the worrying connections between nicotine and mental health.

Research shows several connections between nicotine and mental health:

- > Nicotine can **worsen anxiety symptoms¹¹ and amplify feelings of depression.¹²**
- > Current e-cigarette users have **double the odds of having a diagnosis of depression compared to those who have never vaped**, according to a 2019 JAMA study of nearly 30,000 current e-cigarette users.¹⁵ Frequent vaping is tied to **even higher odds (2.4x) of having a diagnosis of depression** compared to never users.
- > Using e-cigarettes can **worsen symptoms of depression**, based on the results of a study of nearly 2,500 ninth graders who had never previously used e-cigarettes or combustible tobacco.
- > Using e-cigarettes at a higher frequency was associated with higher depressive symptoms — including feeling sad or having crying spells — a year later.¹²
- > Current e-cigarette users had 1.67 times higher odds and former e-cigarette users had 1.52 times higher odds of reporting **at least 1 day of poor mental health** in the past month compared to never users.¹⁵
- > Trace metals found in **vape liquid may play a role in the potential link between vaping and depression.**¹⁵
- > **Vaping is significantly associated with higher levels of ADHD symptoms**, based on a 2019 study of college students.²⁰ Using e-cigarettes as an adult also had nearly twice the odds of association with cognitive complaints — having serious difficulty concentrating, remembering, or making decisions — compared to those who had never used e-cigarettes.²

Many misinterpret the effects of tobacco products as a stress reliever. Indeed, Truth Initiative surveys show **a large majority of young people who have used e-cigarettes started vaping to lessen feelings of stress, anxiety, or depression, and many continue vaping to cope** with these feelings. Though they may be looking to nicotine for relief, many young people are unaware that vaping may make their symptoms worse.

The common misconception that nicotine relieves stress, anxiety, and depression, may be rooted in the cycle of nicotine withdrawal. Irritability, anxiety, and depression are some of the symptoms of nicotine withdrawal, and using nicotine relieves these symptoms temporarily. It's critical to recognize that the cycle of nicotine



Mental Health and COVID-19

Before the COVID-19 pandemic, 70% of young people said anxiety and depression were a major problem among people their age in the community they live in, according to a 2019 **report** from Pew Research Center.² Since then, the problem has gotten worse:

Depression and anxiety are up:

- > The prevalence of depression and anxiety symptoms in youth globally has **doubled** compared to before the pandemic, with 1 in 4 experiencing clinically elevated depression symptoms and 1 in 5 experiencing clinically elevated anxiety symptoms.⁹
- > 1 in 5 college students say their **mental health has significantly worsened** due to COVID-19.
- > More than half (56%) of young people (18-24) **reported symptoms of anxiety and/or depressive disorder** in December 2020.
- > One-quarter (25%) of young people (18-24) **reported having seriously considered suicide** in July 2020.

withdrawal, subsequent nicotine use, and alleviation of symptoms all starts with nicotine addiction in the first place. [See side bar “The illusion of nicotine as a stress-reliever” below]. In addition, the tobacco industry has invested significant resources in marketing that connects tobacco use with mental well-being, stress-relief, relaxation, and pleasure. [See side bar “How Big Tobacco has linked nicotine and mental health” page 5]. Given these two factors – the cycle of nicotine withdrawal combined with tobacco industry marketing – it’s no wonder that people have misconceptions about the role nicotine plays in mental well-being.

Published research on nicotine and mental health, combined with Truth Initiative survey data, point to an urgent need to increase awareness of the connections between youth vaping and mental well-being.

YOUNG PEOPLE VAPE NICOTINE-CONTAINING E-CIGARETTES TO TRY TO COPE

Truth Initiative surveys reveal that many young people cite feelings of stress, anxiety, or depression as reasons they start and continue vaping.^{14,5}

- **Overwhelming majority started vaping to decrease stress, anxiety, or depression:** 81% who had used e-cigarettes said they started vaping to decrease stress, anxiety, or depression, according to an August 2021 survey of 1,000 people between ages 15 and 24.⁵

78% of those who vaped before COVID-19 are vaping either the same or more during the pandemic

The illusion of nicotine as a stress-reliever

Many tobacco users believe tobacco products can relieve stress or anxiety.³ They might be interpreting the ability of the products to curb the symptoms of nicotine withdrawal as a beneficial effect on mental health, according to research on the effects of quitting smoking on mental health published in 2014.³ According to the paper, smokers experience irritability, anxiety, and depression when they have not smoked for a while,^{7,8} feelings which are relieved by smoking.¹⁰ The cycle of symptoms followed by relief from smoking can create the perception that smoking has psychological benefits.³



Image courtesy of [Stanford Research Into the Impact of Advertising](#).

- **More than half of vapers use e-cigarettes to cope:** 50.3% of frequent vapers – those who vaped 20 or more days in the past month – reported that they need to vape to cope with stress or anxiety, according to Truth Initiative continuous tracking data from June 2021.¹⁴ In a separate study, when respondents were asked about the **advantages of e-cigarette use**, one of the most frequently listed advantages was “**relaxation and stress relief**.”¹⁸
- 78% of those who vaped before COVID-19 **are vaping either the same or more** during the pandemic.⁵ As many young people return to in-person learning, **70% report that they anticipate seeing young people vape at similar or higher rates as they go back to school.**⁵
- Many tobacco users believe smoking reduces stress or anxiety. (See sidebar “The illusion of nicotine as a stress-reliever,” page 3).

YOUNG PEOPLE WHO VAPE ARE UNAWARE THAT VAPING CAN WORSEN MENTAL HEALTH CONCERNS

While young people may use e-cigarettes as a coping mechanism, they aren’t always aware of the negative role e-cigarette’s primary component — nicotine — can play in mental health. According to Truth Initiative Continuous Tracking Online (CTO) survey findings, most vapers are unaware of the mental health effects of vaping: only 44% of frequent vapers agreed that vaping can worsen anxiety and irritability, compared to 61% of those who don’t vape, according to data collected in June 2021.¹⁴

More than twice as many frequent vapers (45%) agreed that it is OK to vape for stress relief compared to non-vapers (20%).¹⁴ Similar patterns exist for survey respondents with any past 30-day use of e-cigarettes. The results suggest that, aside from not knowing that vaping can exacerbate mental health concerns, e-cigarette users are instead using them to cope with anxiety and stress, potentially worsening mental health in the long term.

QUITTING VAPING CAN IMPROVE MENTAL HEALTH

Quitting smoking is linked with lower levels of anxiety, depression, and stress, as well as improved positive mood and quality of life compared with continuing to smoke, **according to a 2014 meta-analysis of 26 studies about smoking and mental health** published in the British Medical Journal.³

“I started vaping during my sophomore year of high school. Vaping affected my mental health by making me feel like I was controlled by nicotine. I couldn’t go anywhere without it, and that started making me anxious. There was always a feeling in the back of my mind that was telling me I should have quit sooner and that I shouldn’t have become addicted.”

– **Cashmir**

“Quitting vaping had the most positive impact on my life. It helped my mental health so much and I became more productive. I haven’t always been feeling sick and nauseous. I feel so much better mentally and physically.”

– **Lacie**

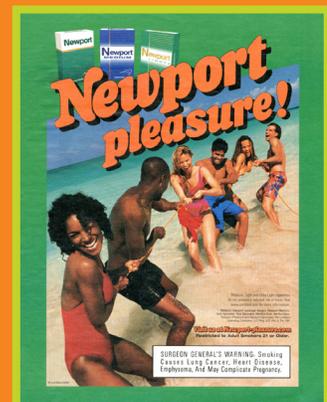
“Quitting vaping had a very positive impact on my life, especially being an athlete. I feel better, I perform better, and my mental health is better. Vaping affected me in more ways than you can imagine. I went from having panic attacks and being paranoid, to having a sound mind and the ability to suppress my anxiety.”

– **Ethan**

How Big Tobacco has linked nicotine and mental health

The tobacco industry has invested significant resources to **connect tobacco with mental well-being**, including giving away cigarettes to psychiatric facilities, supporting research that positions cigarettes as a way to self-medicate, and using stress relief themes in marketing. One prominent theme used in their tobacco advertising is that “smoking can help solve some personal and emotional problems by relieving stress and promoting relaxation,” according to the National Cancer Institute’s **2008 report on the role of media in tobacco use**.⁴

This theme can be seen in many tobacco ads, from early **Camel ads that picture people relaxing with a cigarette** which reads: “It’s a psychological fact, pleasure helps your disposition. For more pure pleasure — have a Camel,” to the long-running **Newport marketing campaign featuring the tagline “Pleasure”** and images that **associate cigarettes with care-free fun**. Many e-cigarette brands are now tapping into themes of stress relief and mental well-being as well, including the popular disposable e-cigarette brand Puff Bar, which during the pandemic **marketed its product** as a way to “stay sane,” advertising it as “the perfect escape from back-to-back zoom calls, parental texts, and WFH stress.”



Images courtesy of [Stanford Research Into the Impact of Advertising](#).

Similarly, there is emerging evidence of a link between quitting vaping and improvements in mental health symptoms. Truth Initiative survey data show support for this link between quitting nicotine-containing e-cigarettes and improved mental health outcomes.⁵

- > 90% of those who quit said **they felt less stressed, anxious, or depressed**
- > 47% of respondents who quit vaping reported that **when they quit vaping they felt more in control**
- > 78% of respondents who reported ever vaping but had not quit said **they would feel better about themselves if they quit vaping**

Previous [Truth Initiative research published in Preventive Medicine Reports](#) show high interest in quitting among young people. A majority of current young e-cigarette users surveyed say they intend to quit, with one-third reporting a past-year quit attempt and 15% aiming to quit in the next month.

[Truth Initiative's This is Quitting® \(TIQ\)](#), the first-of-its-kind program from **truth** to help young people quit vaping, has helped more than 370,000 youth and young adults on their journey to quit vaping. Teens and young adults can text "DITCHVAPE" to 88709 and get immediate help. Parents of young people who vape can get support at [BecomeAnEX.org](#).

Support for those experiencing mental health concerns

Many resources exist for those concerned about their mental health, including immediate help for people experiencing crises:

- > [Mental Health America](#) offers an online mental health screening. The tests can help determine whether people are experiencing symptoms of a mental health condition.
- > [The Suicide Prevention Lifeline](#) connects callers to trained crisis counselors 24/7. They also provide a chat function on their website. Phone: 1-800-273-TALK [8255].
- > [24/7 Crisis Text Line](#): Text "HOME" to 741741 from anywhere in the U.S. to connect with a volunteer crisis counselor by text.



"Youth are experiencing a mental health crisis right now, and we're glad that Truth Initiative is raising awareness around the fact that vaping nicotine can intensify anxiety and depression. Young people should consider this information when they make choices about using vape products. We're committed to providing that information and we stand alongside Truth Initiative as a resource."

– Schroeder Stribling, president and CEO at Mental Health America

"Equitable access to comprehensive, high-quality services and programs is key in supporting young people's mental health and wellbeing. By shining a light on how nicotine can amplify feelings of anxiety and depression in youth—and offering proven-effective quit support programs like This Is Quitting — Truth Initiative is actively working to promote the mental health and wellbeing of America's youth. We are happy to support and collaborate with them in this work."

– Chuck Ingoglia, president and CEO at National Council of Mental Wellbeing

ACTION NEEDED

The associations between youth vaping nicotine and mental health concerns add to the urgency to regulate and reduce youth access to e-cigarette products. As young people continue to weather the COVID-19 pandemic and cope with its attendant stressors on mental well-being, we must work to create a supportive environment that reduces the availability of products that exacerbate symptoms of depression and anxiety. Preventing the use of nicotine and helping those addicted quit is critical to helping to ensure today's young adults are best equipped for the future.

Policymakers and regulators must **take steps to reduce the use of e-cigarettes**, including:

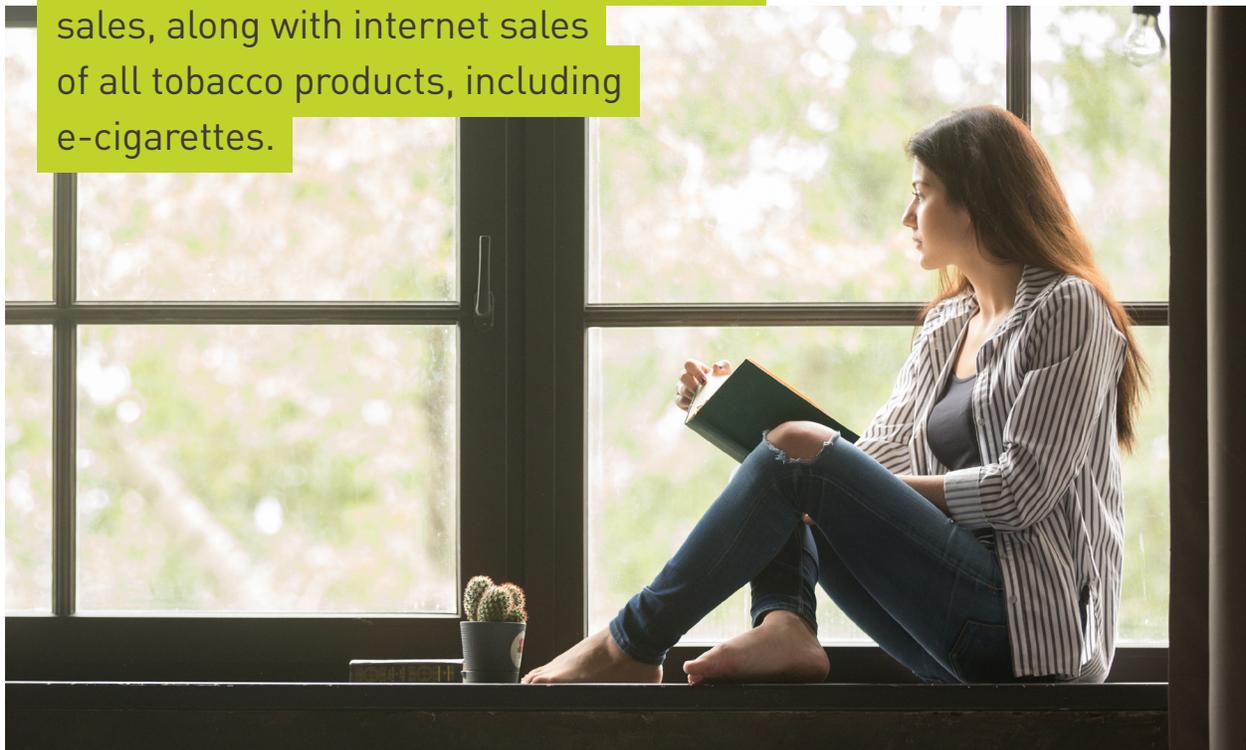
- **Removing all flavored products:** The FDA must act to remove from the market all non-tobacco flavors – including menthol – from all tobacco products, including cigarettes, e-cigarettes, little cigars, cigarillos, cigars, smokeless tobacco, and hookah. Federal actions to date to limit the marketing of e-cigarettes, including removing some pod-type flavored e-cigarette products, have proven insufficient to significantly reduce the alarming number of young people who use e-cigarettes.
- **Restrict nicotine levels:** The FDA should limit nicotine levels of e-cigarettes by capping nicotine strength as is done in the EU and Canada. Truth Initiative supports restricting not only nicotine levels, but also the mechanism by which nicotine is delivered (e.g. restrictions on levels of nicotine salts), to reduce the amount of nicotine e-cigarettes deliver to the body. These restrictions will help reduce the addictiveness of the products.
- **Ensure a thorough and transparent pre-market review process:** FDA needs to be transparent about both the review process and its enforcement of the regulations against those products and companies who are operating outside of the existing regulatory structure. This diligence is especially critical as the agency postponed its decisions on the pre-market reviews of the products that make up the largest share of the market. As the FDA continues its review process for these products, including JUUL, Vuse, blu, Logic, and NJOY, it must ensure a thorough and transparent process.



Preventing the use of nicotine and helping those addicted quit is critical to helping to ensure today's young adults are best equipped for the future.

- **Restrict e-cigarette marketing to ensure it is aimed at adults:** FDA must impose restrictions on all marketing, including social media marketing, to ensure e-cigarette advertising to be aimed at adults switching away from combustible tobacco.
- **Restrict access to adult smokers:** FDA authorization of e-cigarettes should be accompanied by strict requirements that restrict access to adult smokers, including selling e-cigarettes in adult-only retail spaces, no self-service sales, and no in-store/window promotional signage near schools.
- **Internet sales:** FDA should prohibit all non-face-to-face sales, along with internet sales of all tobacco products, including e-cigarettes.
- **Taxation:** Federal, state and local tax-writing authorities should set taxes on e-cigarettes at a level sufficient to discourage youth use.

FDA should prohibit all non-face-to-face sales, along with internet sales of all tobacco products, including e-cigarettes.



REFERENCES

- 1 U.S. Department of Health and Human Services. The Health Consequences of Smoking—50 years of Progress: A Report of the Surgeon General. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2014.
- 2 Pew Research Center, “Most U.S. Teens See Anxiety and Depression as a Major Problem Among Their Peers.” February 2019.
- 3 Taylor G, McNeill A, Girling A, et al. Change in mental health after smoking cessation: systematic review and meta-analysis. *British Medical Journal* 2014;348
- 4 Davis R, Gilpin E, Loken B, et al. Influence of tobacco marketing on smoking behavior. *The Role of the Media in Promoting and Reducing Tobacco Use Tobacco Control Monograph* 2008(19):211-91.
- 5 Truth Initiative Mental Health x Vaping Headline Survey Internal Data - August 2021.
- 6 ER Kandel. A Molecular Basis for Nicotine as a Gateway Drug. *New England Journal of Medicine* 2014;371(21):2038-39. doi: 10.1056/NEJMc1411785
- 7 Hughes JR. Effects of abstinence from tobacco: valid symptoms and time course. *Nicotine & Tobacco Research* 2007;9(3):315-27.
- 8 Guthrie SK, Ni L, Zubieta J-K, et al. Changes in craving for a cigarette and arterial nicotine plasma concentrations in abstinent smokers. *Progress in Neuro-Psychopharmacology and Biological Psychiatry* 2004;28(4):617-23.
- 9 Racine N, McArthur BA, Cooke JE, et al. Global Prevalence of Depressive and Anxiety Symptoms in Children and Adolescents During COVID-19: A Meta-analysis. *JAMA Pediatrics* 2021
- 10 Parrott AC. Does cigarette smoking cause stress? *American Psychologist* 1999;54(10):817.
- 11 Kutlu MG, Gould TJ. Nicotine modulation of fear memories and anxiety: Implications for learning and anxiety disorders. *Biochemical* Published Online First: 2015/08/02
- 12 Lechner WV, Janssen T, Kahler CW, et al. Bi-directional associations of electronic and combustible cigarette use onset patterns with depressive symptoms in adolescents. *Preventive Medicine* 2017;96:73-78.
- 13 The Impact of COVID-19 on Student Mental Health - April 2020 Survey Data [Available from: <https://www.activeminds.org/studentsurvey/>].
- 14 Truth Initiative Continuous Tracking Online Internal Data - March 2019 - June 2021.
- 15 Obisesan OH, Mirbolouk M, Osei AD, et al. Association between e-cigarette use and depression in the behavioral risk factor surveillance system, 2016-2017. *JAMA Network Open* 2019;2(12):e1916800-e00.
- 16 Wang TW, Neff LJ, Park-Lee E, et al. E-cigarette use among middle and high school students—United States, 2020. *Morbidity and Mortality Weekly Report* 2020;69(37):1310.
- 17 Gaiha SM, Cheng J, Halpern-Felsher B. Association between youth smoking, electronic cigarette use, and COVID-19. *Journal of Adolescent Health* 2020;67(4):519-23.
- 18 Sangalang A, Volinsky AC, Liu J, et al. Identifying Potential Campaign Themes to Prevent Youth Initiation of E-Cigarettes. *American Journal of Preventive Medicine* 2019;56(2, Supplement 1):S65-S75. doi: <https://doi.org/10.1016/j.amepre.2018.07.039>
- 19 Bandiera FC, Loukas A, Li X, et al. Depressive symptoms predict current e-cigarette use among college students in Texas. *Nicotine & Tobacco Research* 2017;19(9):1102-06.
- 20 Bierhoff J, Haardörfer R, Windle M, et al. Psychological risk factors for alcohol, cannabis, and various tobacco use among young adults: a longitudinal analysis. *Substance Use & Misuse* 2019;54(8):1365-75.
- 21 Xie C, Xie Z, Li D. Association of electronic cigarette use with self-reported difficulty concentrating, remembering, or making decisions in US youth. *Tobacco Induced Diseases* 2020;18
- 22 Xie Z, Ossip DJ, Rahman I, et al. Electronic cigarette use and subjective cognitive complaints in adults. *PLoS ONE* 2020;15(11):e0241599.
- 23 Yuan S, Yao H, Larsson SC. Associations of cigarette smoking with psychiatric disorders: Evidence from a two-sample Mendelian randomization study. *Scientific Reports* 2020;10(1):1-9.
- 24 Siqueira LM. Nicotine and tobacco as substances of abuse in children and adolescents. *Pediatrics* 2017;139(1)



900 G Street, NW
Fourth Floor
Washington, DC 20001
202.454.5555

truthinitiative.org
[@truthinitiative](https://twitter.com/truthinitiative)

