

Electronic Smoking Devices and Young People: Know the Risks

E-cigarette use poses a significant – and avoidable – health risk to young people in the United States. Besides increasing the possibility of addiction and long-term harm to brain development and respiratory health, e-cigarette use is associated with the use of other tobacco products that can do even more damage to the body. Even breathing e-cigarette aerosol that someone else has exhaled poses potential health risks.

Brain Risks

The part of the brain that's responsible for decision making and impulse control is not yet fully developed during adolescence. Young people are more likely to take risks with their health and safety, including use of nicotine and other drugs. Youth and young adults are also uniquely at risk for long-term, long-lasting effects of exposing their developing brains to nicotine. These risks include nicotine addiction, mood disorders, and permanent lowering of impulse control. Nicotine also changes the way synapses are formed, which can harm the parts of the brain that control attention and learning.

Nicotine Addiction

How does the nicotine in e-cigarettes affect the brain? Until about age 25, the brain is still growing. Each time a new memory is created or a new skill is learned, stronger connections – or synapses – are built between brain cells. Young people's brains build synapses faster than adult brains. Because addiction is a form of learning, adolescents can get addicted more easily than adults. The nicotine in e-cigarettes and other tobacco products can also prime the adolescent brain for addiction to other drugs such as cocaine.

Behavior Risks

E-cigarette use among youth and young adults is strongly linked to the use of other tobacco products, such as regular cigarettes, cigars, hookah, and smokeless tobacco. Some evidence suggests that e-cigarette use is linked to alcohol use and other substance use, such as marijuana. And certain e-cigarette products can be used to deliver other drugs like marijuana.

Use of Two or More Tobacco Products

Some people have suggested that use of e-cigarettes by young people might "protect" them from using cigarettes. There is no evidence to support this claim. Some studies show that non-smoking youth who use e-cigarettes are more likely to try conventional

cigarettes in the future than non-smoking youth who do not use e-cigarettes. And among high school students and young adults who use tobacco, more use both e-cigarettes and burned tobacco products than use e-cigarettes alone. Burned tobacco products like cigarettes are responsible for the overwhelming majority of tobacco-related deaths and disease in the United States.

Aerosol and Other Risks

The aerosol from e-cigarettes is not harmless. It can contain harmful and potentially harmful chemicals, including nicotine; ultrafine particles that can be inhaled deep into the lungs; flavoring such as diacetyl, a chemical linked to a serious lung disease; volatile organic compounds such as benzene, which is found in car exhaust; and heavy metals, such as nickel, tin, and lead. Scientists are still working to understand more fully the health effects and harmful doses of e-cigarette contents when they are heated and turned into an aerosol, both for active users who inhale from a device and for those who are exposed to the aerosol secondhand. Another risk to consider involves defective e-cigarette batteries that have been known to cause fires and explosions, some of which have resulted in serious injuries. Most of the explosions happened when the e-cigarette batteries were being charged.

The Bottom Line

Scientists are still learning more about how e-cigarettes affect health. However, there is already enough evidence to justify efforts to prevent e-cigarette use by young people.

Because most tobacco use starts during adolescence, actions to protect our nation's young people from a lifetime of nicotine addiction are critical.

Working together, we can keep America's youth and young adults safe from the dangers associated with tobacco use and nicotine addiction.

E-cigarette (ENDS, ESD, “Vape”) use is not harmless and poses a significant – and avoidable – health risk to young people in the United States.

■ U.S. Surgeon General

A Report of the Surgeon General: “E-Cigarette Use Among Youth and Young Adults”
298 page report, released, December 8, 2016