



HEALTH ADVISORY – October 2015

Vaping and Vaping Devices: A Summary of the Public Health Risks to Youth and Recommendations for School Personnel



This health advisory seeks to inform school personnel of the public health risks posed to children and young people by the marketing, sale and use of vaping devices (e-cigarettes).

Vaping devices are battery-operated, designed to resemble a cigarette, and deliver and emit a nicotine-containing aerosol. Vaping devices are considered electronic nicotine delivery devices (ENDS) and go by many names including e-cigarettes, e-cigs, e-hookahs, hookah pens, vapes, vape pens, vape pipes, or mods. There are disposable and rechargeable devices, as well as refillable “tank systems” that hold a larger volume of the vaping liquid (e-juice) and that heat the liquid to higher temperatures.¹

Toxicity of Vaping Devices and Exposure to Emissions

The heated liquid forms an aerosol that contains high concentrations of ultrafine particles that are inhaled and penetrate deep into the lungs.² Chemicals in the aerosol are absorbed through the lungs, go into the blood stream and are delivered directly to the brain and all body organs. Analyses of e-liquids by the U.S. Food and Drug Administration (FDA) and other laboratories found variability in the content of e-liquids and inaccurate product labeling related to nicotine content and chemicals.³

Typically, e-liquids contain nicotine, flavoring agents, propylene glycol and toxic chemicals known to cause cancer, birth defects and other reproductive harm.^{1,4,7} While several studies found many times fewer carcinogens in vapor device aerosol compared to traditional cigarettes, both the mainstream and secondhand vaping aerosol were found to contain at least 10 chemicals known to cause cancer, birth defects or other reproductive harm, including acetaldehyde, benzene, cadmium

formaldehyde, isoprene, lead, nickel, nicotine, n-nitrosornicotine, and toluene.^{1,5,7}

Vaping device emissions are also a health concern for those exposed to the secondhand aerosol. Although not as dangerous as secondhand smoke from combustible tobacco products, people exposed to vaping aerosol absorb nicotine at levels comparable to people exposed to secondhand smoke.⁸ Vaping device emissions also contain volatile organic compounds (VOCs) and fine/ultrafine particles.⁶

These ultrafine particles can travel deep into the lungs and may lead to tissue inflammation.⁹

Health Effects of Nicotine

Nicotine, the primary psychoactive ingredient in e-juice, stimulates pleasure/reward pathways in the brain. It is a highly-addictive neurotoxin that is as addictive as heroin and cocaine.^{10,11} It affects the cardiovascular and central nervous systems, causing blood vessels to constrict, raising the pulse and blood pressure.¹² Preliminary studies show that using a nicotine-containing vaping device for just five minutes causes lung irritation, inflammation and effect on blood vessels, which may increase the risk of a heart attack.^{1,9}

Exposure to, and use of, nicotine products by adolescents is of particular concern because adolescence is a critical period for brain growth and development. As a consequence, adolescents are especially vulnerable to the toxic effects of nicotine. Exposure to nicotine during adolescence may harm brain

development and predispose future tobacco use.^{13,16,17} The sensitivity of the adolescent brain to nicotine neurotoxicity may contribute to lasting neurobehavioral damage, even with just occasional use.¹⁸

Nicotine Poisonings

E-juice is available in flavors such as bubble gum, cherry and chocolate, which makes them appealing to children and youth. Vaping cartridges and e-juice bottles are not equipped with child resistant caps and often leak, creating a potential source of poisoning through ingestion and skin or eye contact. Even a small amount of e-liquid ingested by a small child can be lethal.¹⁹

In Washington state, according to Washington Poison Center, e-cigarette exposure calls peaked in 2014, and made up over 59 percent of all nicotine-related exposure calls. For adolescents and adults, e-cigarette exposures surpassed other tobacco products and accounted for as many as 64 percent of exposures. Nationally, there was a significant rise in the number of calls to poison control centers for both adults and children who were accidentally exposed to e-liquids.²⁰ Nationally, the number of calls rose from one per month in September 2010 to 215 per month in February 2014.²¹

Vapor Devices and Youth

And while more Spokane teens are considering alcohol use risky, fewer teens consider nicotine use to be risky according to recent results from the state Healthy Youth Survey.

“Youth substance use going up means that more of our teens are at higher risk for impairment and addiction,” said Dr. Joel McCullough, SRHD health officer. “These behaviors contribute to the leading causes of death, disability, and social problems among youth and adults locally and nationally. Family and community support is needed to keep vaping devices out of the hands of kids, and to provide a healthy home and community environment.”

The Healthy Youth Survey is taken every two years by students in grades six, eight, 10 and 12 in almost 1,000 public schools in Washington state. In Spokane County, nearly 10,000 youth in these grades took part in the survey in October 2014, answering a wide variety of questions about their health and health behaviors. All responses were voluntary and anonymous.

Here are some local survey results at a glance:

- Vaping device use—26 percent among sophomores—increased since the last survey and is at twice the state’s rate.
- Vaping device use, as well as marijuana use, among Spokane sophomores are each nearly double the rate of regular cigarette-use (12 percent).

Another survey, the National Youth Tobacco Survey, found that in 2013, that e-cigarette use among high school students tripled between 2011 and 2013, increasing from 1.5 percent to 4.5 percent²³. Over a quarter million students

who reported using vaping device had never used traditional cigarettes.²⁴ Overall, studies suggest that youth who may have otherwise never smoked cigarettes are now getting hooked on nicotine due to vaping devices, and that adolescents who use vaping devices are more likely to progress from experimenting with cigarettes to becoming established smokers.^{25,26}

Vaping devices may also be used to inhale illegal substances, such as marijuana and hash oil.¹⁹

Again, according to Healthy Youth Survey results in Spokane, marijuana use—19 percent among high school sophomores—has increased. One in four seniors reported marijuana use in the past 30 days.

Driving under the influence of marijuana remains a serious concern. Statewide, almost one in five (19 percent) high school sophomores reported riding in a car with a driver who had been using marijuana, and one in six (17 percent) high school seniors reported driving a car within three hours of using marijuana.

Because many of these devices are similar in appearance to a ball point pen, school and law enforcement personnel are unaware that inappropriate use of nicotine and illegal substances is occurring.

Vaping Device Availability & Marketing

Despite the fact that the sale and possession of these devices and components is banned to those under 18 in Spokane County, youth are still gaining access in a variety of ways. Some vendors located near schools continue to

sell to youth. Adolescents and teens also gain access through friends at school, and from parents, family and friends. Local youth also report ordering liquid nicotine online, as well as making their own e-juice. Additionally, the vaping industry is legally allowed to use marketing strategies and tactics that are no longer permissible for traditional tobacco products.

Many television networks with a substantial proportion of youth viewers, are airing vaping device advertising. There is also advertising on radio, internet, billboards, in magazine and print publications, and in stores.³¹ “E-juice” is sold in fruit and candy flavors. Promoting and labeling nicotine containing products as “juice” may mislead consumers to believe that e-liquid is safe to ingest and that vaping devices pose no health risk.

The use of cartoon characters in advertising and promoting of vaping devices as fashion accessories are other ways these products appeal to youth with the implication that these products are harmless. Another tactic to create a perception that vaping devices are family-friendly is through the association of these products with family-oriented attractions.

Cessation Claims

There is little scientific evidence that vaping devices help smokers to successfully quit traditional cigarettes or that they reduce consumption of traditional cigarettes.^{25, 33}

A number of recent studies show that vaping device users are no more likely to quit than

regular smokers. One study found that 89 percent of vaping device users are still using them one year later and another study found that vaping device users are a third less likely to quit cigarettes.^{34, 35} These studies suggest that vaping devices are effectively inhibiting people from successfully kicking their nicotine addiction. In addition, dual use of cigarettes and vaping devices is continuing to rise, which may diminish any potential benefits of cutting back on traditional cigarettes.³⁶ Continuing to smoke traditional cigarettes, while also using vaping devices, does not reduce the cardiovascular health risks.^{1, 37, 38}



Tobacco Prevent and Control Program
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It is recommended that school personnel:

Act to Protect Youth.

- If not done already, adjust pre-existing tobacco-free policies to encompass these newer products
- In accordance with applicable school policies, confiscate devices and ensure further measures are taken, such as informational classes for student and families that caution against the dangers of vaping
- Host an event to raise educators' and/or families' awareness about the prevalence of vaping devices in schools and their known health effects.

Educate, Advise Young Children and Adolescents.

- Educate adolescents and parents about these products:
 - They contain nicotine, which is highly-addictive and toxic
 - Increases in vaping-related poisonings, especially to children.
- Advise that these products are especially harmful to adolescents.
- Advise and warn vaping device users about toxicity of these products to themselves and those subjected to secondhand emissions.
- Access educational materials and anti-vaping flyers at srhd.org

Educate About Clean Indoor Air.

- Educate adolescents and parents to take steps to protect themselves from exposure to vaping emissions.

Encourage Cessation.

- Current smokers and vaping device users should be advised to quit and offered support.
- Refer users to local, state and national cessation resources listed on Spokane Regional Health District's website here: srhd.org/topics/cessation.asp

Protect Children from Nicotine Poisoning.

- Inform parents and vaping device users that vaping device cartridges and e-juice bottles are a potential source of poisoning through ingestion, skin or eye contact. Advise families to store these materials out of the reach of children, away from medications, and call the Washington Poison Center at 1-800-222-1222 for expert help in case of accidental exposure.

Promote Health Literacy: Educate about Misleading Marketing.

- Educate parents and vaping device users about misleading advertising and labeling.
- Educate adolescents, parents and others about unknown ingredients.

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