

Attachment 6 - Health and Environmental Impacts

Tobacco Use Prevalence and Use Patterns

Sonoma County youth continue to use tobacco at rates that are unacceptably high. Electronic smoking device use among youth has decreased from 29% during the height of the vaping epidemic 2017-2019. Currently, 13% of local high school 11th graders report recent use of electronic smoking devices (2023, Youth Truth). This rate is more than double the use of traditional cigarettes and chewing tobacco among Sonoma County youth (6%). In 2021-22, Sonoma County's adult electronic smoking device use rate decreased from 4.2% to 3.4%, while adults smoking (cigarettes) was at 5.9%. In California, adult use of vapes was higher than in Sonoma County, at 4.7% in 2021-22 (an increase from the previous year).

Cessation Efficacy and Health Effects of Electronic Smoking Devices

While there are several Food and Drug Administration (FDA) approved cessation medications and quit aides such as nicotine patches and gum, vapes are not among them. There is now ample research on the negative health impacts, safety, and efficacy of these products.

Electronic smoking devices use more highly concentrated nicotine than traditional cigarettes, equating to a higher dose of nicotine per puff. One device may have the equivalent of 20+ packs of cigarettes. These devices contain other harmful chemicals used as flavors and propellants, including known carcinogens, such as benzene, and heavy metals, such as cadmium. Toxicity can occur in the lungs of the user and expelled vapor is also harmful for those nearby, akin to secondhand smoke. A recent study by Stanley Glantz et al points out that "electronic devices expose users to a different toxic chemical mix than cigarettes, including compounds formed during heating and aerosolization that are not present in the e-liquid itself." Hence, dual use (using both ESD and cigarettes) exposes users to a wider range of toxins than using either one alone would.

The device design makes for a detrimental pattern of use that involves long, deep inhalations repeated frequently, further increasing nicotine intake and susceptibility for dependence. Furthermore, a 2019 study found that using vapes increases one's odds of having a stroke (by 72%), heart attack/angina (by 59%) and coronary heart disease (by 40%). The risks of vape use are particularly pronounced for youth whose brains are still developing. Research has found that nicotine, being highly addictive, can prime the brain's reward system making the risk for addiction to other drugs greater.

Electronic Smoking Device Disposal and Environmental Impacts

Most vapes are disposed of as trash, whether they are marketed as single-use or refillable systems; they are non-recyclable and are toxic. Vape design and contents make it very difficult to dispose of them responsibly; the only safe option is incineration. Lithium-ion batteries and other e-waste elements must be processed separately but they are not easily separated from

the devices. The nicotine contained in most devices is a considered *hazardous waste* by the Environmental Protection Agency (EPA). As such, special disposal requirements apply for businesses, schools, and governments, while households are allowed to throw them in the garbage as household waste. These devices end up in the landfill where the chemicals can leach into the environment and batteries pose a fire risk. A 2022 waste characterization study conducted at Sonoma County's central landfill found that vapes accounted for 70 tons of waste.