

## Electronic Nicotine Delivery Systems (ENDS)

ENDS, including electronic cigarettes (i.e. e-cigarettes, or e-cigs) typically contain a battery-operated heating device that vaporizes a nicotine-containing solution, creating an aerosol that is then inhaled. They may be either disposable or refillable. Using ENDS is commonly referred to as vaping, and the aerosol is often referred to as vapor. Products come in over 7,000 flavors, including food and candy flavors, such as chocolate, strawberry, mint, and piña colada.



### HEALTH RISKS

The safety and efficacy of ENDS have not been fully studied, though the World Health Organization has determined that there is sufficient evidence for negative implications in brain development and cautions against use by children, youth, women of reproductive age, and pregnant women. These products are not considered to be safe or effective replacements for other tobacco products.

Recent studies have found that ENDS can contain as much nicotine as a regular cigarette – or more. The liquid nicotine solution is very toxic and can potentially be spilled onto skin or accidentally swallowed.

- Cartridges generally contain up to 20 mg of nicotine. The lethal dose of nicotine for small children is approximately 10 mg.

Consistency in the manufacturing of ENDS and e-juice or e-liquid is a concern. Inconsistencies that could impact health have been found, including differing levels of nicotine from one cartridge to another in the same product.

- U.S. Food and Drug Administration (FDA) analysis of ingredients in a small sample of cartridges from two leading brands found that one contained diethylene glycol, a toxic chemical used in antifreeze, and several others contained carcinogens, including nitrosamines.
- Some electronic devices claim to be nicotine-free. In tests of several of them, however, all but one had measurable levels of nicotine present.
- Refillable ENDS may make it possible to refill cartridges with liquid marijuana or other substances, including homemade e-liquids. Serious injuries have occurred when the devices were modified or filled with liquids that were not compatible with the heating element temperature.



## LAWS & REGULATIONS

E-cigarettes are not currently regulated by the FDA. They do not contain any health warnings comparable to FDA-approved nicotine replacement products or conventional cigarettes. It is illegal for youth under 18 to buy or possess them in Colorado; it is also illegal for adults to sell or give them to anyone under 18.

## AS NICOTINE REPLACEMENT THERAPY

Nicotine replacement therapy (NRT) is for temporary use as a smoking cessation aid. FDA-approved NRT exists in a variety of forms, including: dermal patches, gum, lozenges, and inhalers. These products all have standardized amounts of nicotine and undergo rigorous quality control.

ENDS are marketed as a means to avoid discomfort from smoke-free laws, and to continue nicotine use in places where traditional smoking is not allowed. They are not subject to quality control requirements, and have been demonstrated to have wide variability across brands and products, including containing levels of nicotine significantly different from the labelled amount. Continuous exposure to nicotine deepens addiction, and makes quitting nicotine more difficult for current tobacco users. Watching someone else use ENDS has been found to trigger cravings in former smokers, and may increase relapse.

*“If large numbers of adult smokers become users of both traditional cigarettes and e-cigarettes — rather than using e-cigarettes to quit cigarettes completely — the net public health effect could be quite negative.” Dr. Tim McAfee, Director of the Office on Smoking and Health, Center for Disease Control and Prevention (CDC)*

## SECONDHAND AEROSOL

Aerosol from ENDS can contain nicotine, heavy metals, nitrosamines, and a variety of other chemicals and ultrafine particulates, depending on the liquid used and the temperature of the heating element. The aerosol dissipates faster than secondhand cigarette smoke, though exposure patterns are not well studied. One study has demonstrated that bystanders were exposed, through secondhand aerosol, to the same level of nicotine as the user. Though it may be marketed as water vapor, ENDS aerosol has consistently been demonstrated to contain more than just water.

## YOUTH

Youth respond strongly to advertising, price, and behavior modeling from parents, peers, and community members. Unrestricted advertising; appealing flavors; messages of freedom, rebellion, and discretion; low prices; and ready availability have led to young people picking up a habit they may not have otherwise considered. In 2013, over a quarter of a million U.S. middle and high school students that had never smoked a cigarette used e-cigarettes. Of those, almost half reported that they intended to use conventional cigarettes in the next year.

To learn more about ENDS, and other tobacco-related products and issues, please contact Boulder County Tobacco Education and Prevention Partnership (TEPP) staff at 303.413.7524.