

## Talking Points

### ECigarettes and Asthma

E-cigarettes have adverse effects on lung health and health in general. The odds of having asthma are increased by about 50% among adolescents who are using e-cigarettes, controlling for cigarette smoking and other risk factors. The fact that there was an increased risk *even among current smokers* adds to the case that e-cigarettes have their own risk profile on top of cigarettes.

2017, Rebecca J. Schweitzer, Thomas A. Wills, Elizabeth Tam, Ian Pagano, Kelvin Choi. E-cigarette use and asthma in a multiethnic sample of adolescents. *Prev Med* <https://doi.org/10.1016/j.ypmed.2017.09.023>

### AAAAI

Long-term and even short-term effects of ECs are not known with certainty, they contain less, but still measureable, toxic elements than combustible cigarettes.

- Combustible cigarette smoke contains at least 70 carcinogens (substances that can cause cancer) and these toxins have been measured at 9- to 240- fold greater levels than those found in the aerosol from ECs.
- Second- and third-hand exposure to potential toxic elements from aerosol generated from ECs appears to be markedly less than that from combustible cigarettes.

E-liquid, generally consists of nicotine, water, propylene glycol (PG), glycerin, flavorings, and/or other additives. E-liquids can directly irritate the lungs and passive second- or third-hand exposure has been reported to have some harmful health effects. Although the ingredients in the liquids appear safer than those in combustible cigarettes, there are many concerns.

- Once heated, the chemical components in the liquids undergo chemical reactions that create new, potentially harmful compounds not present in the original liquid.
- In addition, the contents of the e-liquids may not be accurately reported in the package information. Many stores make their own formulations without regulations or oversight.
- Sampling of some e-liquids revealed inaccurate nicotine concentration labels.

Cooke A, Fergeson J, Bulkhi A, Casale TB. The Electronic Cigarette: The Good, the Bad, and the Ugly. *J Allergy Clin Immunol Pract*. 2015 Jul-Aug;3(4):498-505.

### Propylene Glycol and Vegetable Glycerin

Heating these results in the formation of reactive carbonyls:

- Formaldehyde
- Acetaldehyde
- Acrolein

All have been implicated in the development and exacerbation of asthma and have known inhalational toxicity and irritant properties, especially concerning with newer-generation e-cig devices that allow users to increase the temperature of the heating coil, resulting in a larger amount of aerosol per puff.

Wang P, Chen W, Liao J, et al. [A device-independent evaluation of carbonyl emissions from heated electronic cigarette solvents.](#) *PLoS One*. 2017;12(1):e0169811.

### Unregulated Flavoring Agents:

7764 unique flavors have been identified, with 242 new flavors introduced monthly over a 17-month period.

Zhu SH, Sun JY, Bonnevie E, et al. [Four hundred and sixty brands of e-cigarettes and counting: implications for product regulation.](#) *Tob Control*. 2014;23(Suppl 3):iii3-iii9.



The food-safe flavoring agent diacetyl (2,3butanedione) has been shown to induce acute-onset bronchiolitis obliterans (inflammation leading to persistent cough and labored breathing) in workers exposed to the **aerosolized** form of the chemical.

Diacetyl has been detected in 69.2% of e-cig products tested, and it was estimated that many of these products would result in greater exposures than the limit recommended by the National Institute for Occupational Safety and Health and the Centers for Disease Control.

Farsalinos KE, Kistler KA, Gillman G, Voudris V. [Evaluation of electronic cigarette liquids and aerosol for the presence of selected inhalation toxins](#). *Nicotine Tob Res.* 2015;17(2):168-174.

Other flavoring agents:

- cinnamaldehyde (cinnamon)
- menthol (mint)
- eugenol (clove)
- limonene (citrus)

Have been implicated in the pathogenesis of asthma (transient receptor potential ankyrin 1 agonists). There have been some case reports of mint-induced asthma as well as occupational asthma among workers who inhaled cinnamon dust.

Other articles:

1. Amrock SM, Zakhar J, Zhou S, Weitzman M. [Perception of e-cigarette harm and its correlation with use among US adolescents](#). *Nicotine Tob Res.* 2015;17(3):330-336.
2. Clapp PW, Jaspers I. [Electronic cigarettes: their constituents and potential links to asthma](#). *Curr Allergy Asthma Rep.* 2017;17(11):79.
3. McNeill A, Brose L, Calder R, Hitchman S, Hajek P, McRobbie H. [E-cigarettes: an evidence update](#). A report commissioned by Public Health England. London, UK: Public Health England; 2015.
4. Fedele DA, Barnett TE, Dekevich D, Gibson-Young LM, Martinasek M, Jagger MA. [Prevalence of and beliefs about electronic cigarettes and hookah among high school students with asthma](#). *Ann Epidemiol.* 2016;26(12):865-869.
5. Varughese S, Teschke K, Brauer M, Chow Y, van Netten C, Kennedy SM. [Effects of theatrical smokes and fogs on respiratory health in the entertainment industry](#). *Am J Ind Med.* 2005;47(5):411-418.
6. Rehan VK, Liu J, Naeem E, et al. [Perinatal nicotine exposure induces asthma in second generation offspring](#). *BMC Med.* 2012;10:129.
7. Razani-Boroujerdi S, Singh SP, Knall C, et al. [Chronic nicotine inhibits inflammation and promotes influenza infection](#). *Cell Immunol.* 2004;230(1):1-9.