

## REPORT TO THE BOARDS OF HEALTH

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*Mid-Michigan District Health Department, Wednesday, July 25, 2018*

*District Health Department #10, Friday, July 27, 2018*



### Secondhand Vapor

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E-cigarettes have become increasingly popular. Compared to smoking traditional cigarettes, e-cigarettes may be less harmful, but are not harm free. E-cigarettes do not make smoke or vapor between puffs; however, e-cigarettes create second-hand vapor when the first-hand vapor is exhaled by the smoker (Fernández, & Martínez-Sánchez, 2016.) The amount of chemicals and toxins in this second-hand vapor depends mainly on how much was in the first-hand vapor to begin with (Fernández, & Martínez-Sánchez, 2016.) Blood testing for nicotine has proven that second-hand vapor is taken in by bystanders near someone smoking e-cigarettes (Fernández, & Martínez-Sánchez, 2016.)

1. **Toxic Chemicals.** Second-hand vapor contains the same toxic chemicals as first-hand vapor (Fernández, & Martínez-Sánchez, 2016.) The vapor from e-cigarettes contains many unsafe things (Rigotti, 2018.) The main ingredient in vapor liquid used in e-cigarettes is propylene glycol or glycerol (Rigotti, 2018.) When propylene glycol is heated to a high temperature, it may form propylene oxide, which has been found to be a likely cause of cancer (Rigotti, 2018.) Glycerol produces acrolein, a toxic chemical that is also found in cigarettes (Rigotti, 2018.) Both propylene glycol and glycerol break down into formaldehyde and acetaldehyde, two toxins known to cause cancer (Rigotti, 2018.) Several other toxins and cancer-causing agents are present in e-cigarette vapor including: nitrosamines, carbonyl compounds, volatile organic compounds, phenolic compounds, and metals including lead (Rigotti, 2018.)
2. **Small-Particle Pollution.** E-cigarettes also release very tiny particles into the air called fine and ultrafine particles (Protano, et al, 2017.) Pollution caused by small particles is felt to be one of the most serious environmental risks to public health at this time. This type of pollution is linked to heart and lung disease, degenerative diseases of the nervous system, and poor outcomes in babies exposed before birth (Protano, et al, 2017.) Whether exposed to e-cigarettes or traditional cigarettes, the number of ultrafine particles taken up by the body is higher the younger a person is; meaning that infants absorb the highest amount of these harmful particles (Protano, et al, 2017.) These small particles tend to settle in the deep portions of the lungs, causing inflammation, and even enter the bloodstream where they can travel to other organs and cause damage (Protano, et al, 2017.) In infants and young children, these small particles are even able to pass through the olfactory nerve - the nerve in the nose that provides our sense of smell - and travel into the brain (Protano, et al, 2017.)

There is also third-hand exposure to vapor from e-cigarettes caused from nicotine and other chemicals and particulate materials that have deposited on surfaces. People are exposed by touching these items, getting them in their mouth, or inhaling dust (Brandon, et al, 2015.) In particular, nicotine is very difficult to remove from surfaces and fine particles remain on surfaces long after an e-cigarette was used (Brandon, et al, 2015; Protano, et al, 2017.)

3. **Nicotine.** Nicotine is the main ingredient in most e-cigarette liquids. Nicotine can affect the development of a fetus during pregnancy. Experienced e-cigarette users have been found to get more nicotine in their body than cigarette users (WHO, 2016; Rigotti, 2018.) Children exposed to nicotine before birth as well as teens exposed to nicotine may have long-term consequences to brain development, potentially leading to learning and anxiety disorders (WHO, 2016.) Nicotine may also contribute to heart disease and may encourage cancer development (WHO, 2016.) There are thousands of different vapor liquid flavors and certain ones, particularly popcorn, cinnamon, cherry, and other sweet flavoring, have been found to cause irritation, inflammation, and damage to the tissue in our airway, making those exposed to the vapor more likely to get viral infections (WHO, 2016.)

4. **Other Hazards.** There are other risks to children besides second-hand vapor. From 2012 to 2015, over 1,800 calls were made to poison control in the United States regarding children under two years of age having exposures to e-cigarettes or e-cig liquids (Peterson, & Hecht, 2017.) The liquid used in e-cigarettes, whether it is swallowed or absorbed through the skin, can cause seizures, lactic acidosis, anoxic brain injury, and death (Rigotti, 2018.) E-cigarette devices have been found to malfunction either during or between use, causing burns to the face, hands, thigh and/or groin (Rigotti, 2018.) Kids and teens that see parents using e-cigarettes may see it as safer and acceptable and have easier access to e-cigarettes. Unfortunately, teens and young adults that use e-cigarettes are 3.5 times more likely to start smoking cigarettes than those that haven't used e-cigarettes (Rigotti, 2018.)

### Healthy Living Recommendations

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1. Recognize second- and third-hand vaping is not harmless, and all the harms at this time are not known.
2. E-cigarettes and e-cigarette liquid should be kept out of reach of children as they can be a risk.
3. E-cigarette use by children and teens must be discouraged as it increases their likelihood of cigarette use.

### References

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