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Testimony in support of S.24
An act relating to banning flavored tobacco products and e-liquids

Good morning, and thank you for the opportunity to return to speak to the committee about electronic cigarettes and the role of flavors in tobacco products. My name is Dr. L.E. Faricy, and I am a practicing pediatrician at the University of Vermont Children's Hospital. I specialize in caring for children with lung and breathing problems. I am here to speak on behalf of the Vermont Medical Society and the Vermont State Chapter of the American Academy of Pediatrics in support of legislation that eliminates flavors in tobacco products and e-liquids, including mint and menthol flavoring.

You may remember that last year when we were discussing the dramatically increasing rates at which youth and young adults were using e-cigarettes, people were referring to this as a "vaping epidemic." And then along came an infectious epidemic that rightfully captured our full attention. That said, it would be naïve to ignore the continued problem of youth e-cigarette use and the associated health risks to our young people. You have just heard from Dr. Villanti that youth use of these products is not going away.

I see a lot of teenagers in my office, and I talk to them a lot about vaping, because once I started asking about it, kids started telling me what they were doing or what their friends were doing. And I can attest that I have seen the scenario play out exactly as others have told you, that flavors act as a hook to get kids addicted to nicotine. One 17 year old patient I think about often was someone I followed for asthma that was hard to control. He loved vaping, and specifically mentioned how much he loved the fruit flavor he used. He insisted that this was not a big deal because it did not contain nicotine. The next time I saw him, he was using nicotine containing e-liquids. Every time I have seen him since then, he has described vaping as soon as he wakes up and using throughout the day. He has an asthma flare that needs to be treated with steroids almost every time I see him, and his lungs can barely handle the common cold. He is on the highest dose of inhaled asthma medications that I can prescribe him, and he still doesn't want to talk about cutting down his use.

This teenager, like many youth, did not think the contents of an e-cigarette were harmful. E-cigarettes reached the market without extensive preclinical toxicology testing or long term safety trials, and then were heavily marketed to target a youth population as a perfectly safe product. They are generally under FDA regulation, but the contents are not well regulated, and the listed ingredients may or may not reflect what is in the liquid, including nicotine content. We know that e-cigarettes contain fewer toxins than combustible cigarettes, which has led some to prematurely assert that these are inherently safer than combustible cigarettes. In reality, we know that e-cigarettes contain different potential toxins than combustible cigarettes and likely carry their own set of unique risks.

The ingredients in e-cigarettes may be "generally recognized as safe" as food additives, but this label does not apply to inhalational safety. The lung has evolved to breathe in oxygen and breathe out carbon dioxide. Although it has some defenses against inhaling irritants, it can't make it through repetitive noxious insults over time like irritant chemicals without getting damaged. In fact, significant lung disease has been reported when people accidentally inhale food flavorings over time, for example in

factory workers. Even more worrisome is that concentrations of flavors in e-liquids often exceed the “occupational exposure” limit recommended for the protection of workers who encounter these chemicals on the job. The inhalation of these chemicals is regulated in the workplace but not in e-cigarettes.

We obviously do not have long-term safety data about e-cigarette use over time the way that we have about combustible cigarettes. The serious dangers of cigarette smoking were established much too late, at a time when half of Americans were regular smokers. Pediatricians are worried that our nation will follow the same pattern with e-cigarettes. Based on what I know about other lung damage from inhaled irritants, I have every reason to believe that people who regularly vape are at risk for developing chronic lung disease similar to COPD.

The negative short term effects in youth such as repeated asthma flares, ongoing cough, and wheeze are concerning enough. In the summer and fall of 2019, you may recall thousands of cases nationwide of lung injury related to vaping that was severe enough the people needed to be hospitalized, many needed to be on ventilators, some died, and a young athlete required a double lung transplant. We also know that youth can have a reaction similar to an allergic reaction that can also require hospitalization. I saw an otherwise healthy 18 year old patient that fall who had been vaping for 3 years and had previously been a competitive athlete, but had to quit his sport because he couldn’t exercise without coughing or wheezing. His symptoms worsened over the course of three months, during which time he wasn’t able to stop vaping even though he was having difficulty breathing. He had to be admitted to the hospital for low oxygen levels and needed to be treated with 10 weeks of steroids to calm down the inflammatory response his lungs had to e-cigarettes.

This young man’s inability to stop vaping despite feeling sick and so short of breath that he had to go the hospital speaks to how dependent his body was on nicotine. Both teenagers and adults that I talk to tell me how difficult it is to overcome a nicotine addiction. Nicotine withdrawal can cause headaches, poor sleep, irritability, anxiety, and depression, and these symptoms make it very hard stop using it. Nicotine has unique effects on the adolescent brain, which is in the process of strengthening signals that are used repeatedly. Vaping delivers a fast rush of nicotine to the brain, where it imitates a chemical that releases dopamine, a reward/pleasure pathway. The brain pathways that support a quick and easy dopamine release are strengthened, and those behaviors are reinforced. Once the brain becomes dependent on nicotine, it will continue to seek other quick and easy forms of reward/pleasure. This leads to increased risk for addiction, including other forms of nicotine, such as combustible cigarettes, as well as other addictive substances or drugs (1). Other long-term impacts of nicotine on the adolescent brain include impairments in attention capacity and working memory as well as increased risk for mood disorders and poor impulse control (2).

Understanding these patterns can explain why 90% of adults who smoke cigarettes daily started when they were teenagers. It also helps us understand the concerning patterns shown in several separate research studies that youth who use e-cigarettes are more likely to go on to use combustible cigarettes at around four times the rate of youth who don’t use e-cigarettes, even if they specifically express an intention not to smoke (3-5). In other words, these are youth who would not otherwise just start smoking cigarettes. The vaping epidemic is creating a generation of youth at risk for nicotine dependence that will take a lot of undoing. Policies like the one before you that will help prevent or delay teen use of nicotine-containing products should be a priority.

Pediatricians, parents, and schools are struggling to support a large number of youth with nicotine dependence. The degree of widespread use we are seeing is not harmless experimentation, nor is it inevitable. Many youth show signs of serious nicotine addiction. I have spoken with school nurses who have seen so much use in their high schools that they have considered one potential solution would be to have a blanket prescription for nicotine gum that they could have available in the office to give out as needed to youth who are irritable and can't focus in class because they are withdrawing from nicotine. There is not a lot of research in how to help teenagers with nicotine dependence. We can do our best to extrapolate how we use nicotine replacement therapy, like nicotine patches or nicotine gum, for adults – but this use remains off-label for youth under 18. As pediatricians, we try to adapt to support youth however we can. In fact, I'm giving a presentation next month focused on how to go about using off-label nicotine replacement for youth if necessary, because of the scale of this problem. Even if we can prescribe nicotine replacement, there is no guarantee it will be effective, and studies on nicotine replacement for youth with nicotine dependence from e-cigarettes hasn't been studied. The patient I described earlier who was hospitalized for a vaping related illness was still struggling to quit tobacco products 3 months after his hospitalization – he didn't like the way nicotine lozenges made his throat feel, and the nicotine patch made his skin too uncomfortable to keep on for any length of time. Pediatricians and other health care providers, parents, and schools are scrambling for solutions to help nicotine dependent youth, but the most effective thing to do would be to prevent nicotine dependence in youth from ever occurring.

We know that the tobacco industry has a long history of using flavored tobacco products to attract youth. Flavors are used to increase the appeal of tobacco and e-cigarettes by improving flavor and reducing harshness. This is particularly true for menthol. There is no public health reason to exempt menthol from a ban on flavors, and the public health data on menthol strongly support the need to remove it from the market. As you have heard or will hear from others today, including menthol in this legislation is paramount in our goals of reducing health disparities. In order to protect children from initiating tobacco use, the Vermont Medical Society and the Vermont State Chapter of the American Academy of Pediatrics advocates for a complete removal of all flavored tobacco products, including mint and menthol, from the market. This legislation can be a key part of that prevention as we work to make harmful and addictive substances less appealing for youth to use.

Thank you

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- 2) DiFranza JR, Rigotti NA, McNeill AD, et al. Initial symptoms of nicotine dependence in adolescents. *Tob Control.* 2000;9(3):313-319. doi:10.1136/tc.9.3.313
- 3) Soneji S, Barrington-Trimis JL, Wills TA, et al. Association between initial use of e-cigarettes and subsequent cigarette smoking among adolescents and young adults: a systematic review and meta-analysis. *JAMA Pediatr.* 2017;171(8):788
- 4) Barrington-Trimis, Jessica L., et al. "E-cigarette product characteristics and subsequent frequency of cigarette smoking." *Pediatrics* 145.5 (2020).
- 5) Pierce, John P., et al. "Use of E-cigarettes and Other Tobacco Products and Progression to Daily Cigarette Smoking." *Pediatrics* 147.2 (2021).