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Testimony in support of S. 18
An act relating to banning flavored tobacco products and e-liquids

Good morning, and thank you for the opportunity to return to speak to this committee about the role of flavors in tobacco products, including electronic cigarettes, and their effects on child health. My name is Dr. L.E. Faricy, and I am a pediatric pulmonologist at the University of Vermont Children's Hospital. 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. I'm going to talk review again with your committee what physicians are seeing in Vermont with respect to youth nicotine product use, what is known about the health effects of electronic cigarettes, flavors, and menthol, what we know about the effect of flavor restrictions from areas outside of Vermont, and what nicotine does to the adolescent brain.

I see patients on a daily basis who are affected by tobacco use – I see teenagers who have breathing concerns related to their own product use, and I also see babies who have underdeveloped lungs because they were exposed to tobacco before they were born, and infants and children of all ages who have chronic respiratory conditions that are worsened by cigarette smoke in their homes. I have discussions with adults and teenagers on a daily basis about the harms of tobacco and vapor product use and about smoking cessation.

Vermont pediatricians are concerned about the extent of youth vaping we have seen in recent years. I have seen in action that flavored products lead to youth nicotine addiction.

I can tell you about a 16 year old patient who I saw for difficult to control asthma. He loved vaping and doing tricks with the aerosol, and he specifically mentioned his love of a strawberry kiwi product. 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, still fruit flavored products. Every time I saw him after that, he described vaping as soon as woke up and using throughout the day both at school and at home. He slept with a vape under his pillow. He has an asthma flare that needs to be treated with steroids almost every time I see him, and his lungs cannot handle even the common cold. I have prescribed him the highest dose of inhaled asthma medications that I can, and he is still sick all the time. Despite these health effects and his experience of nicotine withdrawal if he doesn't vape for even a few hours, he has not been willing to even talk about cutting down on his use.

A few points of interest about this child is that he didn't have a diagnosis of asthma before he started vaping – there was a family history of it, but his use actually precipitated this disease process in him that will likely affect him for his life. He was disgusted by cigarette smoking and the first time we talked about his vaping, he actually told me that he had helped his father quit smoking cigarettes – so this was not a child who would otherwise have been likely to start smoking cigarettes. He started with a product that he assumed was benign because he liked the flavors, then made the leap pretty quickly to a product

containing the incredible addictive chemical of nicotine. The last time I saw him he was using the amount of nicotine that is in 2 packs of cigarettes on a daily basis.

We know that the tobacco industry has a long history of using flavored tobacco products to attract youth – this is why the Tobacco Control Act in 2009 banned flavors from cigarettes. Flavors are used to increase the appeal of tobacco and e-cigarettes by improving flavor and reducing harshness. This is particularly true for menthol which has a cooling effect. Menthol helps people start smoking and makes it harder to quit, and research has shown that it enhances the addictive effects of nicotine in the brain. Although youth rates of cigarette smoking have decreased over recent decades, the rate of youth smoking in VT is still higher than the national average. When young people start smoking cigarettes, they are more likely to use a menthol product because it makes the product more palatable. Inhaled cigarette smoke is more noxious and difficult to breathe in without menthol.

E cigarettes frequently contain menthol flavoring. Flavors that contain the word “ice,” “cooler,” or “freeze” – so, “Caribbean ice,” “pop ice,” “raspberry freeze” contain menthol. If this bill were to go through as a partial flavor restriction that exempts menthol, we can expect to see a shift in use patterns toward the available menthol electronic cigarettes, the way we saw an increase in mint-flavor sales when Juul removed their other flavor options. Tobacco-flavored products do not have the same appeal to youth and therefore do not carry this same risk. Anything short of a comprehensive flavor ban that includes menthol will not adequately address this problem.

Menthol has been a longstanding tool of the tobacco industry to target communities of color and LGBTQ people, both of which are communities that experience more of the burden of tobacco-related diseases. Banning menthol and flavors will reduce the number of tobacco users and benefit public health. Policy evaluations of existing bans that include menthol indicate that these users have more cessation efforts, and there is not a sustained increase in cross-border sales. Menthol cigarettes comprise almost 40% of cigarette profits for tobacco companies and these companies have a huge financial stake to protect, which will drive lobbying efforts to oppose this legislation. As you consider this bill, I would strongly encourage you to hear from experts who specifically study menthol in tobacco products and policy.

There are precedents for flavor restrictions that include menthol – Massachusetts passed a comprehensive flavor ban that took effect in 2020, California just passed one in 2022. Although the FDA has signaled that they are considering a more comprehensive federal ban, this isn't something Vermont can wait for because the timeline is too unclear and the FDA has stalled in regulating these products for years while still allowing them to be on the market and hooking kids. Massachusetts did see a decrease in state-level menthol and cigarette sales compared to other states. There was an initial increase in cross-border sales in New Hampshire that was not sustained after two years (1, 2). Youth vaping rates decreased from about 32% to 17%, youth smoking rates declined from 4.3% to 2.9%, and adult cigarette smoking declined from 12.1% to 10.6% (3).

Flavors themselves are chemicals that have not been shown to be safe when used as inhalants – although they are “generally recognized as safe” by the FDA, this is referring to them as food ingredients and not inhalants. Researchers have identified concentrations of flavors in e-liquid products that exceed the “occupational exposure” limit recommended for these chemicals from the American Industrial Hygiene Association. When flavor chemicals are mixed, thousands of combinations are possible all with different toxicity potentials. The combination of these products can then react further in the airways after heating. Several flavors have also been shown to stun the hair cells that protect the lungs from

infection, which makes people more susceptible to illness (4). There are some very dramatic respiratory illnesses linked to vaping, which we have seen here in the pediatric ICU in Vermont, but the majority of the lung issues are lower acuity but still limiting for youth: repeated asthma flares, ongoing cough, wheeze, and difficulty with exercise.

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. The aerosol from this is not harmless water vapor – it contains heavy metals, carcinogens, and ultrafine chemical particles that are deposited deep in the lungs when inhaled because they are so small that they bypass the defense mechanisms of the lungs.

I want this committee to know that stories like the one I told you about my patient whose use of flavored e-cigarettes escalated over a short period of time and became a problematic addiction are the types of stories pediatricians across the state are seeing in clinical practice over the last several years with respect to nicotine addiction in youth. I have had the opportunity to visit about 15 primary care pediatric and family medicine practices across the state of Vermont, and the stories are really similar that there are a lot of youth using nicotine containing e-cigarettes, a lot of youth nicotine dependence, and a lot of difficulty quitting. This problem is new in recent years. There had been a significant decrease in teenage cigarette smoking after it peaked in the late 90s/early 2000s (when it was at about 30%). In my training I didn't learn how to treat nicotine dependence because teenage smoking rates were so low. Now with the rapid rise in recent years of teenage nicotine dependence that is now driven by flavored e-cigarette use, I have had to learn how to prescribe nicotine replacement off label for people under 18. I also teach other pediatricians across the state how to do this because if you trained in the last 20 years, this probably wasn't a big part of pediatric training.

Nicotine replacement products are available for youth under 18 years by prescription. This can be a really helpful tool to make it less uncomfortable for youth to quit nicotine products, but there are inevitably symptoms of nicotine withdrawal that are difficult to tolerate. I wish I had a lot of success stories to share with you about young people who have successfully quit nicotine if they were moderately or severely addicted, but in my experience they are few and far between. Helping young people overcome nicotine dependence is a really resource intensive process that requires frequent follow-up and behavioral support, much of which falls to substance use professionals in schools.

Schools are on the front lines of seeing the behavioral effects of nicotine dependence and withdrawal in their students. School nurses tell me that they see rampant use and are confiscating flavored nicotine products that are “basically candy” from students as young as 5th grade. A lot of youth show signs of serious nicotine addiction. Some students cannot sit through a 90 minutes class without vaping. Nicotine dependence is very disruptive to learning in the short term. There are also long-term impacts of nicotine on the adolescent brain that are relevant to learning, which include impairments in attention capacity and working memory as well as increased risk for mood disorders and poor impulse control (5).

Pediatricians are also very alarmed that the young people who use e-cigarettes are not necessarily kids who would otherwise just start smoking cigarettes. However, once they are dependent on nicotine they are more likely to smoke cigarettes. Several separate research studies show 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 had previously expressed an intention not to smoke (6-8). The prevalence of youth vaping is creating a new generation of nicotine-dependent youth that will take a lot

of undoing, and threatens the public health successes in recent decades that reduced the youth smoking rate to all time lows. Removing flavors that act as a hook will help prevent or delay teen use of nicotine-containing products and should be a priority to reverse these trends.

Both teenagers and adults that I talk to tell me how difficult it is to overcome a nicotine addiction. Nicotine withdrawal is uncomfortable. It can cause headaches, poor sleep, irritability, anxiety, and depression, and these symptoms make it very hard stop using it. It is often a much easier choice for an adolescent to just continue vaping rather than muscle through several months of feeling these unpleasant symptoms. The stories I hear about how quickly young people are developing dependence, how they experience a loss of control over their lives, and how hard it is for them to quit using nicotine products make me even more certain that preventing youth nicotine use entirely is the best approach to this problem.

Nicotine use in young people is dangerous because this chemical is so addictive. My patients often downplay the possibility that they will become dependent on this and then they are surprised to find out that they can't quit when they want to. 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 (9). Flavors act as a hook for youth to start using these products, and the nicotine dependence keeps them coming back for more.

Understanding these patterns can explain why 90% of adults who smoke cigarettes daily started when they were teenagers. The earlier a nicotine dependence develops, the harder it is to break. I see this from my patients' parents who smoke and wish they didn't. It's not that they don't want to quit smoking. These parents know that it's bad for their health and that it can harm their children's health. It's expensive and inconvenient. When we talk about approaches to quitting, many of them will talk about how hard it is ("harder to quit than heroin," one parent told me) - and that they wish they'd never started. Stories like this again emphasize the importance of policies that center prevention of nicotine dependence. This is something that starts in childhood. The reason that tobacco related illness and death (driven by nicotine dependence) is a problem at all for adult Vermonters is because tobacco and nicotine addiction is a problem for Vermont's young people. So when we say that flavor restrictions protect young people by reducing their rates of tobacco use, that's only part of the story. Eventually these teenagers age into adulthood and become the people that we are talking about when we refer to "adult smokers" in Vermont. This legislation protects Vermonters of all ages.

You are going to hear from your constituents who will tell you have a right to use these products. I'm here because children also have rights. They don't vote, they don't have much power, they have no money, they can't control their environments, and they need us to build environments that protect them. Young people in the state of Vermont deserve to have environments built for them to thrive – to pursue their passions, develop skills, and figure out who they are and what their place is in the world. They deserve to have a good chance of reaching adulthood without being targeted for addiction to substances by corporations. Flavors in tobacco products help introduce and establish the brain's

dependence on nicotine at a critical developmental stage. The bill before you is what prevention work looks like – reduce the appeal of and demand for harmful products by eliminating flavors as a hook.

I'm here to ask you to do everything you can to keep tobacco products and e cigarettes out of the hands of young people. We have to have policies that make them unappealing and unavailable. My work in trying to help young people overcome addiction has been really disheartening. Where I sit in my clinic to support them is downstream of whatever bills are or are not passed by your legislative body, and I can tell you that from where pediatricians stand in clinic, this is the wrong place in this process to intervene in this problem. Where you are sitting is a much more impactful place to intervene. 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 for your time.

- 1) Asare S, Majmundar A, Westmaas JL, et al. Spatial Analysis of Changes in Cigarette Sales in Massachusetts and Bordering States Following the Massachusetts Menthol Flavor Ban. *JAMA Netw Open*. 2022;5(9):e2232103
- 2) Kingsley M, McGinnes H, Song G, Doane J, Henley P. Impact of Massachusetts' Statewide Sales Restriction on Flavored and Menthol Tobacco Products on Tobacco Sales in Massachusetts and Surrounding States, June 2020. *Am J Public Health*. 2022 Aug;112(8):1147-1150.
- 3) Massachusetts Department of Public Health, Evaluation of An Act Modernizing Tobacco Control: Overview and Preliminary Results, presented September 28, 2022, <https://www.mass.gov/doc/illegal-tobacco-task-force-public-meeting-fifty-one-minutes/download>.
- 4) Tierney PA, Karpinski CD, Brown JE, Luo W, Pankow JF. Flavour chemicals in electronic cigarette fluids. *Tob Control*. 2016;25(e1):e10–e15
- 5) McGrath-Morrow S, et al. The effects of nicotine on development. *Pediatrics*. 2020; 145(3): e20191346.
- 6) 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
- 7) Barrington-Trimis, Jessica L., et al. "E-cigarette product characteristics and subsequent frequency of cigarette smoking." *Pediatrics* 145.5 (2020).
- 8) Pierce, John P., et al. "Use of E-cigarettes and Other Tobacco Products and Progression to Daily Cigarette Smoking." *Pediatrics* 147.2 (2021).
- 9) Silveira ML, Conway KP, Green VR, et al. Longitudinal associations between youth tobacco and substance use in waves 1 and 2 of the Population Assessment of Tobacco and Health (PATH) Study. *Drug Alcohol Depend*. 2018;191:25–36pmid:30077053