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Statement of
Susanne E. Tanski, MD, MPH, FAAP

On behalf of the
American Academy of Pediatrics

Before the
U.S. House of Representatives
Committee on Energy and Commerce
Health Subcommittee

"Legislation to Reverse the Youth Tobacco Epidemic"

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Good morning. Chairwoman Eshoo, Ranking Member Burgess, and members of the subcommittee, it is my pleasure to be here today to address the national youth tobacco epidemic, an urgent matter that requires Congress's prompt action. I would like to start by thanking Chairman Pallone and Rep. Shalala for their leadership in introducing the Reversing the Youth Tobacco Epidemic Act, which would make great strides toward reducing youth tobacco use. My name is Dr. Susanne Tanski, and I am a pediatrician and tobacco control expert with over 17 years of experience researching tobacco issues and counseling youth who use a wide range of tobacco products, including cigarettes, cigars, and e-cigarettes.

I am here today representing the American Academy of Pediatrics (AAP), a non-profit professional medical organization representing over 67,000 pediatricians, pediatric medical subspecialists, and pediatric surgical specialists across the United States. I previously served as the chair of the American Academy of Pediatrics Tobacco Consortium, a group of tobacco researchers committed to addressing tobacco as a child health issue. The Academy believes that all children should lead tobacco-free lives: free from the use of all tobacco products and free from exposure to secondhand smoke and e-cigarette aerosol.

As pediatricians, we often say tobacco use is a pediatric disease because the vast majority of tobacco users begin using tobacco products before the age of 18. We need comprehensive tobacco control policies in place to decrease the youth tobacco epidemic, and the bill we are discussing today critically hits the important elements that we know will work to keep tobacco away from children: limiting its appeal and limiting its access.

Tobacco use in any form is a threat to the health and well-being of young people. With regard to cigarettes, existing restrictions on marketing and flavors have played an important role in the now historically-low rates of cigarette use among teens. However, our progress toward a tobacco-free generation has been curtailed by the failure to implement the same common-sense rules for e-cigarettes, which has allowed an unprecedented increase in nicotine use to occur.

Appeal for vaping products has been driven by three factors: marketing, flavors, and product characteristics that have made the devices more discreet to use and more addictive. Adolescents are uniquely susceptible to all of these factors, by virtue of their stage of brain development.

PRODUCT CHARACTERISTICS: ADDICTION AND HARM

Adolescence is not dictated by a legal definition of age but is a developmental period of rapid change. We know that biologically, the brain is more susceptible to addiction during adolescence, and addiction in youth happens faster and earlier than it does in adults.[1] [2] Accordingly, it is well understood that there is no safe level of nicotine exposure for adolescents. Nicotine itself is not a benign substance. Nicotine is a psychoactive drug that is well known for its high level of toxicity, as well as the ease with which dependence occurs and its lasting and damaging effects on brain development. Nicotine dependence impacts areas of the brain that control executive function, memory, and mood.[3] At low doses it acts as a stimulant, leading to a feeling of pleasure and a reversal of unpleasant withdrawal symptoms. Very simply, at the level of the brain, nicotine works within the reward pathways. There are targets for nicotine (called “nicotine receptors”) throughout the body, however, which allow nicotine to have broad physiological effects. With repeated exposure to nicotine, tolerance to some of the effects of nicotine develops, and leads to needing more nicotine. Insufficient nicotine in someone who is dependent leads to craving and withdrawal symptoms of irritability, anxiety, restlessness, and anhedonia. The basis of nicotine addiction is reinforcement of behavior that restores nicotine and makes the user feel good and avoid withdrawal.[4] Regular users develop habits associated with nicotine use that also

become connected with the rewarding feelings of nicotine use, creating cues for use. This is how smokers become cued to want a cigarette after a meal, or with coffee, or in certain locations, for example.

Cigarettes are carefully engineered to deliver nicotine quickly and efficiently to the brain to reinforce addiction. An e-cigarette is a different delivery device, but it is the nicotine that is the basis of the psychoactive effects. In adolescents, the first symptoms of nicotine dependence can appear within days to weeks of the onset of occasional use, and well before the onset of daily use.[5] [6] [7] [8] Nicotine dependence drives consumption of a variety of dangerous nicotine-containing products and the negative health effects that follow.

The stakes are high. Pediatricians are on the front lines of counseling children, adolescents, and young adults about the harms posed by tobacco products and see firsthand the serious epidemic of tobacco use that is facing our young people today. The latest preliminary data from the National Youth Tobacco Survey show that 27.5 percent—more than a quarter—of high school students are current e-cigarette users in 2019. This shocking number represents the second dramatic increase in as many years, and, taken together, represents a 135 percent increase in use among high schoolers between 2017 and 2019. We're seeing similar trends among younger adolescents as well.

These are year-over-year increases unlike any we've ever seen for teenagers in the years that this type of surveillance has been conducted —not just for tobacco products but among all substances of abuse. What's more, for many young people, this is not just sporadic or occasional use, but consistent, frequent use. The most recent information regarding frequency of use demonstrates that 27% of these high school users were vaping on 20 or more days in the last month.[9] In speaking with young people in my practice and community, they describe high levels of dependence, noting that they use e-cigarettes immediately upon waking up in the morning. Recently, a colleague asked me if I had heard of teens getting up in the middle of the night to vape. I had not, but I quickly learned that this was simply because I had not been asking the right questions. Repeatedly since then, I have had many patients with intense nicotine addiction share that they are using vaping products throughout the night. I simply did not and do not see this with adolescent cigarette users.

The teens I see in my practice and my community are using a variety of e-cigarette products, but it's become clear over the last several years that the product of choice for many of my patients is JUUL and similar small devices. The popular e-cigarette brand has become virtually inescapable in my practice and those of my pediatric colleagues around the country. JUUL ushered in a new generation of e-cigarettes. These are cartridge-based devices with replaceable, single-use e-liquid pods that are easily switched out when the user has exhausted the contents of the pod. They differ from previous generations of e-cigarettes that make use of tank-based systems and require the user to refill the tank from bottled e-liquid.

These new products are sleek, small and discreet, which allows them to more easily evade detection by adults. JUUL, for example, resembles a USB flash drive in size and shape. This class of device also generally emits less visible aerosol than some previous devices, so many adolescents have found ways to vape without detection at home or even in classrooms and locker rooms. Taken together, the characteristics of JUUL and products like it have removed many of the traditional barriers to tobacco use, allowing adolescents and young adults to use them as often as they wish.

Another innovation ushered in by JUUL are nicotine salt-based solutions, an evolution from more noxious freebase nicotine e-liquid. Freebase nicotine solutions had greater limits on the amount of nicotine that could be delivered by the device in a single puff because increasing the concentration of nicotine made for a harsher, increasingly unpalatable experience for the user in part due to the alkalinity of the solution. By utilizing protonated nicotine salt solutions instead of freebase nicotine, JUUL created an e-liquid with a lower pH that

delivers dramatically higher levels of nicotine with less discomfort to the user. Within JUUL's patent application, they submitted a table demonstrating that plasma levels of nicotine from a 4% nicotine benzoate salt solution mirrored nicotine plasma levels seen in subjects smoking a Pall Mall cigarette.[10] JUUL reports on their website that one JUUL pod contains as much nicotine as a pack of cigarettes. In my practice I have adolescents reporting using more than one such pod per day. These pods lack any cues for how much has been used, meaning adolescents lack awareness of how much nicotine they are getting.

Any level of nicotine leaves adolescents vulnerable to developing dependence; with the introduction of nicotine salts to the equation, adolescents simply do not stand a chance. One recent study showed that adolescents who use pod-based e-cigarettes such as JUUL have higher concentrations of nicotine biomarkers in their body than adolescents who smoke cigarettes.[11]

Beyond the addiction to nicotine that is enabled by these product characteristics, there are additional significant health concerns that have been raised. While a combusted tobacco cigarette is a relatively standardized product, there is substantial heterogeneity in the product characteristics of e-cigarette devices (temperature, voltage, quantity of vapor production, refill capacity), as well as in the characteristics of the solutions used within the devices (humectant type, flavors and chemosensory effects, nicotine levels). Of concern, recent studies have found that glycerin and propylene glycol aerosol alter inflammatory pathways in the lung,[12] and direct cytotoxicity (cell damage) has been shown in cell experiments from flavoring chemicals.[13] These flavor chemicals are major ingredients of many e-cigarette fluids and may have higher concentrations within solutions than that of nicotine.[13] There have been few human studies, however, although toxicologically-relevant constituents have been identified in sufficient quantities within e-cigarette products to cause disease, including increased susceptibility to pneumococcal[14] and viral[15] [16] infections. Heavy metals have also been identified as delivered to users, as have volatile organic compounds, and carcinogenic tobacco-specific nitrosamines.[17]

There is biologic plausibility for acute respiratory compromise from e-cigarettes: similar to cigarettes, ultrafine particulates known to cause inflammation and respiratory disease are present in all e-cigarette aerosols, and in quantities analogous to traditional combusted tobacco cigarettes.[18] These particulates have respiratory irritation potential to the user as well as for those nearby. In fact, preliminary animal model data shows damage to growing lungs resulting from second-hand exposure to e-cigarette vapor. As of last week, there have been 1,299 reported cases of e-cigarette or vaping associated lung injury across 49 states, with 26 deaths reported across 21 states. The youngest death was in a 17-year-old patient.[19] This outbreak has called attention to the acute dangers of inhaling e-cigarette aerosol. While some have been quick to explain this outbreak as caused only by vaping THC, the most recent data from the Centers for Disease Control and Prevention (CDC) show that in 58% of cases, patients had consumed any nicotine-based products and in 13% of cases, patients had used exclusively nicotine-based products.[19]

While we have enough short-term data to be seriously concerned about the health harms of e-cigarette use, we have no long-term data on its health impacts on youth given that e-cigarette use is a relatively new phenomenon. In the case of cigarettes, it took decades before many of the health implications were recognized. Pediatricians worry about what harms from use will face our young patients in the future – will they be pulmonary, cardiac, cancer? The National Academies of Sciences, Engineering and Medicine, for instance, determined that there is "biological plausibility that long-term exposure to e-cigarette aerosols could increase risk of cancer and adverse reproductive outcomes."[20] Just last week, a study published in the *Proceedings of the National Academy of Sciences* found that exposure to e-cigarette aerosol induces lung and bladder cancer in mice—the first finding of its kind.[21]

MARKETING

As is apparent by this evidence of harm, prevention of use is paramount, and the Reversing the Youth Tobacco Epidemic Act will work to prevent e-cigarette use by adolescents and end the tobacco epidemic. One key aspect of the bill is to limit marketing to children. Adolescents are particularly sensitive to marketing, being more receptive to social norms and environmental cues than at any other period. Marketing works to change attitudes about a product and change the social norm; many e-cigarette companies have been masterful at using marketing to appeal to and attract a new generation of users.

E-cigarettes are being advertised with many of the same tools that were used by big tobacco companies prior to the Master Settlement Agreement (MSA): celebrity endorsements, glamorous models, event sponsorships, and the previously mentioned flavors. While event sponsorships are expressly prohibited in the Tobacco Control Act for cigarettes and smokeless tobacco, e-cigarettes have no such restrictions. An investigation released by Senator Rockefeller and other members of Congress in 2014 identified that e-cigarette companies "sponsored dozens of athletic, musical, social and cultural events that appeal to youth."[22] In addition, e-cigarettes are promoted with a variety of messages that are appealing to youth: freedom, rebellion, and independence. There are also implicit and sometimes explicit messages that e-cigarettes are a healthier alternative to smoking, again, a theme that is attractive to youth.

The 2014 Surgeon General's report clearly stated: "The evidence is sufficient to conclude that advertising and promotional activities by the tobacco companies *cause* the onset and continuation of smoking among adolescents and young adults."[23] (emphasis added) In spite of this, there remain few controls on the marketing of e-cigarettes, and there is significant penetration of e-cigarette marketing to youth audiences. Report after report in the past 5 years have shown significant penetration of marketing to the adolescent market. This proposed bill will hold e-cigarettes to the same marketing requirements as traditional cigarettes. This will importantly include prohibition of brand sponsorship of athletic, music and concert events and distribution of branded non-tobacco merchandise, creating parity for all tobacco products.

We commend the inclusion of marketing and promotion limitations for all tobacco products. These types of policies already apply to cigarettes and smokeless tobacco, and they have been effective at reducing children's exposure to marketing tactics that are designed to mislead viewers about tobacco products. Extending these limitations to all tobacco products is common sense.

FLAVORS

While marketing and changes in social norms are first steps in developing the positive attitude toward e-cigarettes, the wide array of available flavors are another significant driver of e-cigarette use. The body of evidence is clear: flavors in tobacco products attract young users. Flavors in tobacco products promote youth tobacco initiation.[24] For instance, JUUL pods come in a whole array of sweet fruit and dessert flavors including mint, mango, and crème. Youth surveys show that e-cigarette flavors are one of the primary reasons teens try e-cigarettes in the first place.[25] The flavors also help mask the harsh taste of nicotine, making repeated use more likely, and thereby increasing the likelihood of developing addiction.

We know from the traditional cigarette example that flavors increase smoking initiation among youth, which led to the prohibition on characterizing flavors (other than menthol) in cigarettes back in the Tobacco Control

Act. The appeal of flavors for children is well understood by e-cigarette manufacturers. A parent education website sponsored by one e-cigarette company noted that "kids may be particularly vulnerable to trying e-cigarettes due to an abundance of fun flavors such as cherry, vanilla, pina-colada and berry."[26] Despite understanding that these products appeal to children, that same company markets e-cigarettes in cherry, vanilla, piña colada and other candy flavors. Furthermore, some e-liquids come in flavors like "cotton candy" and "gummy bear" which clearly entice new youth users.

There is reasonable concern that flavors may also modify the addictiveness of e-cigarettes, but with the thousands of flavor combinations on the market, there has not been specific research yet to test this hypothesis. We know that flavors unto themselves are pleasurable. If you link a pleasurable flavor with a buzz of nicotine from a powerful nicotine delivery system such as the newer e-cigarettes, perhaps this is even more behaviorally and biologically reinforcing to drive the addictiveness of this new generation of products.

Importantly, the Reversing the Youth Tobacco Epidemic Act will institute a prohibition on all flavored tobacco products—including menthol cigarettes and flavored cigars. A flavor in an e-cigarette product would then only be allowed if the Food and Drug Administration (FDA) determines it would be appropriate for the protection of public health. In the view of the AAP, this is the single most important policy that Congress can pass to address the youth tobacco epidemic, and a step that Congress took years ago for other flavored cigarettes.

With regard to menthol, the FDA's tobacco advisory committee concluded that "the removal of menthol cigarettes from the marketplace would benefit public health".[27] In addition, worldwide the World Health Organization's Framework Convention on Tobacco Control supports government actions to regulate tobacco flavors, specifically citing menthol as an example of a masking flavor, "masking tobacco smoke harshness with flavors contributes to promoting and sustaining tobacco use".[28]

In Canada, menthol prohibitions were rolled out province-by-province beginning in 2015, culminating in a Canada-wide federal menthol prohibition implemented in October 2017 that applied to cigarettes, blunt wraps, and most cigars.[29] This allowed an assessment of the impact of menthol ban on cigarette sales, comparing similar provinces that had or had not yet implemented the ban. They found, as expected, that the policy was successful.[30] One study found that 29% of menthol smokers made quit attempts in Ontario after the menthol prohibition went into effect.[31]

ACCESS

The Reversing the Youth Tobacco Epidemic Act will raise the tobacco sales age to 21, a critically important policy priority that successfully reduces teen access to tobacco products. The Institute of Medicine has found that raising the tobacco sales age to 21 will lead to substantial reductions in smoking-related disease and death, improve maternal, infant, and fetal outcomes, and reduce exposure to secondhand smoke. Estimates indicate that tobacco 21 policies would prevent a quarter-million premature deaths by the end of the century.[32] This works in part by getting tobacco products out of high schools, cutting off a "social source". Most 21 -year-olds are not regularly interacting with 17-year-olds, however many high school seniors will turn 18 and legally be able to purchase tobacco in the states that have not enacted tobacco 21 legislation. We know that most young people will try their first e-cigarette from a friend. Interrupting the pipeline of social sources in high schools has proven effective. Eighteen states and two territories have enacted state-level 21 laws, and the AAP strongly supports this provision of the bill.

The prohibition on online sales included in the bill will also be an essential component of restricting youth access. Online retailers are often ineffective at verifying the age of tobacco product purchasers. Behind a computer screen or smartphone, young people can easily gain access to products where in-person age verification at brick and mortar retail stores would have prevented purchase.

COMBUSTIBLE TOBACCO USE

Skyrocketing youth use of e-cigarettes is only the latest tobacco trend to hit our children, but it is important to bear in mind that use and exposure to traditional combusted tobacco products, such as cigarettes, remains a major concern for youth, particularly those from marginalized communities. The health harms of traditional combusted tobacco products are well-documented and have been for over half a century. Cigarette smoking kills over 400,000 Americans every year. Despite the public health community's success in communicating these harms to our young people, use of these products, particularly flavored small cigars and menthol cigarettes, stubbornly persists. Compounding the problem, e-cigarette use puts adolescents at risk for subsequent cigarette smoking; compared to adolescents who do not use e-cigarettes, those who use e-cigarettes are 3.5 times more likely to begin smoking cigarettes.[33] As noted, rates of adolescent cigarette use have fallen significantly over the last several decades, due to wide-reaching public health strategies to educate the public and restrict access to tobacco products. If e-cigarettes continue to addict a new generation of youth to nicotine, we are at risk of undoing 50 years of progress against the health harms of tobacco use. As such, it is absolutely essential that tobacco control policies continue to take aggressive action to target traditional tobacco products as well.

SUMMARY

We've made significant progress over the years in reducing adolescent tobacco use, but that progress has been jeopardized by a tobacco industry that is constantly innovating in the business of addicting young people. Because youth have developmental and behavioral characteristics that make them uniquely vulnerable to nicotine, it is therefore paramount to implement strong tobacco control policies aimed, first and foremost, at preventing youth from starting tobacco use in the first place. Smart public policies will not only protect the health of our children today, but also spare the adults of tomorrow from the disease and death caused by these products. In the face of these challenges, the Reversing the Youth Tobacco Epidemic Act includes critically important policies to protect the health of young people. We urge Congress to quickly advance this important legislation.

Thank you for holding this important hearing for child health.

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