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"Sounding the Alarm: The Public Health Threats of E-cigarettes"

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Testimony of

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Chairman Pallone, Chairwoman DeGette, Ranking Member Guthrie and Members of the Subcommittee, thank you for the opportunity to testify today on the public health threats that e-cigarettes pose, especially to our youth and young people.

In December 2018, the U.S. Surgeon General Dr. Jerome Adams called e-cigarette use among youth an "epidemic". As a public health official, a pediatrician, and a preventive medicine physician, I see this epidemic in our schools and communities across North Carolina. In our state, we've seen a dramatic increase in e-cigarette usage among youth, which has rapidly reversed our earlier progress towards reducing overall youth tobacco use in North Carolina. These products are available in thousands of kid-friendly flavors including candy, fruit, bubble gum, cotton candy, graham cracker, mint and menthol and some have packaging that mimic kid-friendly products like Lucky Charms cereal. Of major concern are the newest models of e-cigarettes that look like USB drives or other ordinary items. Pods of e-liquids can contain nicotine levels that are equivalent to a pack or more of cigarettes. Further concerns have now risen with the multistate investigation of severe lung illness associated with e-cigarettes and vaping.

Data Trends

The data trends in North Carolina delineate the challenges we face as public health officials in addressing the alarming trends of youth vaping. The 2017 North Carolina Youth Tobacco Survey

(NCYTS) found that although combustible cigarette smoking was the lowest ever recorded among high school students at 8.9%, e-cigarette use increased 894% since 2011. E-cigarettes have become the most commonly used tobacco product among youth in North Carolina, with 16.9% of high school students currently using them, and with even more (23.3%) saying they plan to use them in the next year. Further, adolescents and young adults who have used e-cigarettes are more likely to report using traditional cigarettes at follow-up compared with those who had not.

Like in North Carolina, youth e-cigarette use is increasing across the country. The 2018 National Youth Tobacco Survey saw a 78% increase in high school e-cigarette use between 2017 and 2018. The 2019 Monitoring the Future survey revealed similar results, with youth e-cigarette use more than doubling between 2017 and 2019 among 8th, 10th and 12th grade students nationwide. The increase from 2017-2018 was the largest ever recorded in the survey's 43-year history for any single substance.

Based on this data, we believe that the 2017 NC Youth Tobacco Survey data underrepresents the scale of the youth e-cigarette use epidemic in North Carolina. Currently, our Division of Public Health is working with the NC Department of Public Instruction and randomly selected schools across the state to conduct the 2019 NC Youth Tobacco Survey. We expect to have the survey results in early 2020. Ninety percent of adults that report using tobacco products reported starting before the age of 18. That is why this trend in youth use is incredibly concerning.

The tobacco prevention and control experts in our Division of Public Health identify key reasons why the use of e-cigarettes among youth is continuing to grow. Chief among those reasons are marketing strategies that appeal to youth and have been found to be successful in marketing combustible tobacco products to youth, delivery systems (e.g., USB like systems) that are easy to conceal and not recognized by adults as e-cigarettes, and the use of flavors that attract young people to the products, as well as, highly addictive nicotine, which keeps them coming back. Per the North Carolina Youth Tobacco Survey (NCYTS), the main reasons NC students report using e-cigarettes are because a friend or family member uses them and because they were available in flavors. The 2018 National Youth Tobacco Survey reports 68% of high school students currently use e-cigarettes of any flavor and 51% currently use menthol or mint flavored cigarettes. A 2016-2017 FDA study showed nearly all (97%) current youth e-cigarette users had used a flavored e-cigarette in the past month and that 70% of youth users do so "because they come in flavors I like." In order to better understand the consumption of flavored e-cigarettes among the North Carolina youth population, we have added a question for the 2019 NCYTS that asks students what types of flavors they have used in the past 30 days. We will also ask students what specific brands they have used in the past 30 days.

Health Impacts

Nicotine is the major psychoactive substance found in e-cigarette solutions. Nicotine is highly addictive and youth and young adults are particularly at risk for long-term, long-lasting effects of exposing their developing brains to nicotine. These risks include nicotine addiction, mood disorders, permanent lowering of impulse control, attention and learning difficulties, and increasing the risk of use of combustible tobacco products. High levels of nicotine delivered by some e-cigarette products may be linked to seizures among teens and young adults. Nicotine has

also been linked to adverse health outcomes for the developing fetus including prematurity and stillbirth.

One North Carolina teen, Luka Kinard of High Point, has been willing to share the story of his addiction to Juul e-cigarettes, but his story is not unique. We have heard similar stories from across our state and nation. As a high school freshman, Luka started using Juul as a way to "fit in" with the upperclassmen on football Friday nights. He quickly became very addicted to the nicotine in the product, even to the point of selling his clothes and other items to raise the $150 a week he needed to support his nicotine addiction. Once a Boy Scout, an athlete and an A-student, Luka let his grades fall and dropped out of his extracurricular activities. Usually a well-behaved 15-year-old, Luka became irritable, angry – even throwing violent fits of rage. Finally, a nicotine-related seizure sent him to the emergency room and convinced his parents to do everything they could to get him off Juul. Luka participated in a nearly 40-day substance use treatment program in California twice and now lives substance-free. Now 16 years old, Luka has visited dozens of middle and high schools nationwide to talk to other youth about managing teen stress without substance use – including nicotine.

High levels of nicotine can also result in nicotine poisoning. The NC Poison Control recently published the numbers of people being poisoned from direct exposure to e-cigarette liquid. In 2019 to-date, 162 people have been reported as becoming ill from exposure to nicotine in e-cigarette products; 72 of the people treated for poisoning related to vaping products were children under the age of 5, with exposure routes including oral, eyes, and skin.
There is also emerging research on the risk of chronic lung disease associated with e-cigarette use. Published in the American Journal of Respiratory Critical Care Medicine in 2018, University of North Carolina researchers found that sputum from vapers and smokers contained elevated levels of enzymes and proteins associated with emphysema, a type of chronic obstructive pulmonary disease (COPD). Last month, a different team of researchers at UNC School of Medicine released additional research that suggests the use of e-cigarettes may lead to a higher risk of emphysema. Published in the *American Journal of Respiratory and Critical Care Medicine*, the study examined lung fluid samples from smokers, e-cigarette users and non-smokers. Researchers found that e-cigarette users, like smokers, had higher levels of protease enzymes than non-smokers. They also found that higher levels of those enzymes were induced by nicotine exposure. Elevated protease enzymes are associated with the process that causes damage to lung tissue seen in emphysema. The researchers concluded that individuals who use e-cigarettes long term may be at higher risk than nonusers for emphysema.

Investigation of Severe Lung Illness

The NC Department of Health and Human Services, Division of Public Health and our 85 local Health Departments are participating in the multistate investigation of severe lung illness associated with e-cigarette use. As of September 18, 2019, 33 cases of lung illness associated with the use of e-cigarette products have been reported in North Carolina; almost all have been hospitalized and more than half required intensive care. To date, there have been no deaths in North Carolina. Currently, we have not identified the exact cause of these illnesses -- whether they're caused by a substance, contaminant, additive, ingredient in the liquid or the actual device. Most (but not all) cases in North Carolina reported vaping products containing THC – the majority of patients interviewed in North Carolina used products containing both THC and

nicotine. North Carolina has been, and will continue to, collaborate with our federal partners at the CDC and FDA, as well as other states as part of this investigation. We submit case-patient data to CDC weekly and submit samples for product testing to the FDA.

While this investigation is ongoing, consistent with CDC guidance, we are recommending that all members of the public consider not using e-cigarette products. We are also advising individuals who continue using e-cigarette products and experience symptoms such as those reported in this outbreak to seek medical care promptly. In addition, we are reinforcing our routine recommendations that:

- Youth and young adults should not use e-cigarette products.
- Women who are pregnant should not use e-cigarette products.
- Adults who do not currently use tobacco products should not start using e-cigarette products.
- If you do use e-cigarette products, you should not buy these products off the street (for example, e-cigarette products with THC or other cannabinoids).
- You should not modify e-cigarette products or add any substances to these products that are not intended by the manufacturer.
- Adult smokers who are attempting to quit should use proven treatments, including counseling, FDA-approved medications, contacting their health professional, or utilizing our North Carolina Quitline.

Work with NC Schools

We hear a common misconception among both youth and adults that these e-cigarette products contain little or no nicotine and e-cigarettes deliver only "flavored water vapor". That misperception prompted our Tobacco Prevention and Control program to partner with the NC Department of Public Instruction and the State Laboratory for Public Health to conduct a small study in 2018 to analyze the nicotine content for a sample of e-cigarettes confiscated from students in schools. Exhibit 1. Our final analysis concluded that nearly all e-cigarettes from across seven schools contained nicotine, and of those that contained nicotine, 20 percent contained high levels of nicotine (about 40mg/ml or above).

North Carolina General Statue 115C-407 requires that every North Carolina school district have a written 100% tobacco free school policy that prohibits the use of any tobacco products, including e-cigarettes, on campus and at school-related events for students, staff, and visitors. Due to e-cigarettes, schools are newly challenged to enforce this policy.

In May 2019, our Department furthered our work with schools and partnered with the CDC to conduct a Rapid Response Assessment of school staff knowledge of high school students' e-cigarette use and school policy. School staff were invited to participate in a survey. Investigators also collected e-cigarette products confiscated from students during the 2018–19 academic year and determined e-cigarette retailer density within 5 miles of schools.

Among 599 staff members who completed the survey, 52 percent observed e-cigarettes on school grounds in the past year, 88 percent believe students' e-cigarette use is somewhat or very problematic and 84 percent believe that e-cigarettes contribute to learning disruptions. Most all respondents know their school's tobacco-free policy prohibits possession, use, and sale of e-cigarettes on school grounds. Nearly 32 percent of school staff were not confident that their school has the resources to prevent student e-cigarette use and 55 percent are not confident their school has resources to help students quit using e-cigarettes. From 35 interviews, emerging themes included concern that their school's tobacco-free policy is currently not effective in deterring students from using e-cigarettes on school grounds, and that additional resources and education are needed, such as peer to peer education, on e-cigarette harms. Investigators also collected 263 products from 9 schools, including 144 e-cigarettes and 81 pods. Exhibit 2. Eighty-nine (89) e-cigarette retailers were identified ≤5 miles of participating schools.

Our conclusions are that school staff believe e-cigarette use is a problem among students, but our state needs resources to address it. These conclusions are supported by our statewide and regional work in North Carolina, as we are continually contacted by school personnel with requests for presentations, educational resources and technical assistance on dealing with e-cigarette use among students in schools.

Our Department, through the Division of Public Health, continues to work with schools statewide to:

- educate staff, parents, and youth on e-cigarette harms
- assist schools with obtaining compliance with their tobacco-free school policy
- provide evidence-based tobacco use prevention curriculum and alternatives to out-of-school suspension programs
- recommend, consistent with CDC guidance, to not implement tobacco industry-sponsored school-based tobacco prevention programs which have been found to be ineffective and may promote tobacco use among youth and
- help youth quit using e-cigarettes

Other efforts in North Carolina to address e-cigarette use

The Division of Public Health has also been working since 2011 to reach out and educate adult influencers of young people, such as pediatricians, dentists, teachers, school health nurses and other school personnel on the use of and risk of e-cigarettes. When we began, many adults who work with children were unaware of e-cigarettes that are often designed to mimic other products that kids may have, like USB-drives, highlighters, or lipstick. This work has increased awareness among parents, pediatricians, and school personnel about these products and how they harm the developing brains of young people.

Federal funds through the CDC support our North Carolina Tobacco Prevention and Control infrastructure and staff at the state and regional level. It does not, however, provide adequate funds for evidence-based mass media campaigns to reach young people. North Carolina has used limited one-time state funds of $194,000 for evidence-based tobacco prevention messages – that include e-cigarette prevention – on social media to reach one high risk youth peer group statewide. Effective mass media campaigns are expensive to carry out and it is a challenge to compete with the pro-vaping messages that are continuing to go viral on social media every day.

The desire to stop using tobacco products is high, especially among our youth, with 73.7% of high school students and 58.2% of middle school students who currently use tobacco attempting to quit in the past year. Evidence-based tobacco treatment is a combination of counseling and FDA approved medications, provided with easy access. North Carolina provides a telephone and web-based tobacco treatment program (QuitlineNC) free to our state's residents who need help quitting tobacco use. Quit Coaching is available in different forms, for different populations, which can be used separately or together, to help any tobacco user give up tobacco. There is a special five-call program for teens who are addicted to tobacco products, including e-cigarettes. Teens who call receive coaching from a dedicated Quit Coach, specially trained to work with adolescents. The QuitlineNC could be more effective with more funding. For example, QuitlineNC is currently funded 24 hours a day/7 days a week with a combination of federal and state funds to serve only about 1-1.4% of North Carolinians who smoke or vape. CDC Best Practices recommends that state Quitlines should have funding to reach 8% of their state's tobacco users annually.

The Tobacco Prevention and Control Branch has also been working with local health departments across the state as they work with their respective Boards of Health, County Commissioners and municipalities to adopt new regulations that prohibit the use of e-cigarettes in local government buildings, government vehicles, government grounds and enclosed public places. To date, a total of 41 counties and 52 municipalities have adopted electronic cigarette regulations in North Carolina.

Due to concern of unintentional poisoning by exposure to e-cigarette liquid, the North Carolina General Assembly passed a law in 2015 requiring child-resistant packaging for any e-liquid container.

Recommendations

The e-cigarette epidemic among youth and young adults is a public health threat that will not be solved by one strategy or policy or a single federal agency or state. Much like the response to the opioid epidemic, federal, state and local agencies, along with many partners, need a coordinated, sustained, and sufficiently resourced effort to implement population-based public health interventions and policies that work to prevent the use of e-cigarettes among our youth and promote effective cessation for people currently using tobacco products. Lessons learned from tobacco control of combustible cigarettes along with available e-cigarette research can be used to build science-based regulations and interventions. A combination of federal and state policies may decrease access to and demand for e-cigarettes for youth. Increase funding can promote adoption of evidence- based state and local tobacco use prevention and cessation interventions.

The Office of the Surgeon General, the American Academy of Pediatrics, and the Association of State and Territorial Health Officers (ASTHO) have released recommendations for federal and state policies to consider that may decrease youth access to and demand for e-cigarettes. There is overall consensus to consider some type of policies within the following domains:

1) **Curb advertising and marketing to youth**: for example, regulate e-cigarette advertising and marketing that are appealing to young people, consistent with regulation of advertising of combustible cigarettes

2) **Limit youth access to e-cigarettes**: for example, restrict young peoples' access to e-cigarettes in retail and internet settings, license tobacco retailers, implement point-of-sale restrictions, increase the legal age of retailer and internet tobacco sales to persons aged 21 and over, and/or restrict all internet sales of e-cigarettes and e-cigarette solution.

3) **Reduce access to flavored tobacco products by youth**: for example, consistent with regulations of flavors for combustible cigarettes pursuant to the Family Smoking Prevention and Tobacco Control Act of 2009, regulate flavors for e-cigarettes. The federal government can regulate manufacturing of flavored e-cigarettes, while states can regulate sales and use. Consider including menthol and mint in flavor regulations, as more than half of current high school students who currently use e-cigarettes report using menthol or mint (2018 National Youth Tobacco Survey).

4) **Implement price policies**: for example, prohibiting the distribution and sampling of e-cigarettes and related products for free or at a nominal cost, prohibiting the use of coupons, rebates, and other discounting practices, imposing excise tax on e-cigarettes and related products comparable rates to those of conventional cigarettes.

The Surgeon General and ASTHO also recommend to:

5) **Add e-cigarettes in smoke-free indoor air policies** which can: reduce exposure to secondhand smoke and aerosol, reduce the prevalence of tobacco use, increase the number of tobacco product users who quit; reduce the initiation of tobacco use among young people; and reduce tobacco-related morbidity and mortality, including acute cardiovascular events.

To effectively address this epidemic, Congress and states should allocate more funding for states to further adopt and expand on CDC recommended evidence- based state and local tobacco use prevention and cessation interventions which include:

1) **Community interventions**: adoption and support of tobacco-free policies, partnerships with traditional and non-traditional organizations, youth empowerment and engagement, community education and engagement, evidenced based tobacco use prevention educational programs, alternative programs to suspension for students who violate tobacco-free policy, enforcement and compliance checks to prevent and reduce retailer tobacco sales to youth

2) **Mass-reach health communication interventions**: mass media campaigns, especially social media, to reach youth and youth people, counter-marketing ads and health promotion ads for cessation support.

3) **Evidence-based treatment and cessation interventions**: expand capacity of evidenced based cessation services, for example QuitlineNC, and local or regional cessation services and resources to community members;

4) **Surveillance and evaluation**: enhance states' statewide and local data collection, for example, the NC Behavioral Risk Factor Surveillance System (BRFSS), NC Youth Tobacco Survey (NC YTS), NC Youth Risk Behavior Surveillance System (YRBSS), Pregnancy Risk Assessment Monitoring System (PRAMS). Conduct process, outcome, and impact evaluations to make modifications to the program and measure the achievement of

objectives. Conduct surveillance to measure over time and to inform program and policy directions.

5) **Infrastructure, administration, and management**: conduct strategic planning; recruit and develop staff; provide technical assistance and training to local health departments, coalition members and other partners; develop and maintain needed websites and media resources.

I applaud the Subcommittee's work and help to address this urgent public health issue.

Sources:

Office of the Surgeon General, "Surgeon General's Advisory on E-Cigarette Use Among Youth," December 18, 2018, https://e-cigarettes.surgeongeneral.gov/documents/surgeon-generals-advisory-on-e-cigarette-use-among-youth-2018.pdf

US Department of Health and HumanServices. *The Health Consequences of Smoking—50 Years of Progress: A Report of the Surgeon General*. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2014. Available at: www. surgeongeneral. gov/library/ reports/ 50- years- of- progress/
Jenssen BP, Walley SC, AAP SECTION ON TOBACCO CONTROL. E-Cigarettes and Similar Devices. Pediatrics. 2019;143(2):e20183652

Modifications to Compliance Policy for Certain Deemed Tobacco Products Guidance for Industry .US. Department of Health and Human Services Food and Drug Administration Center for Tobacco Products March 2019

Reidel B, Radicioni G, Clapp PW, Ford AA, Abdelwahab S, Rebuli ME, Haridass P, Alexis N, Japsers I, Kesimer M. E-Cigarette Use Causes a Unique Innate Immune Response in the Lung, Involving Increased Neutrophilic Activation and Altered Mucin Secretion. American Journal of Respiratory Critical Care Medicine. 2018 Feb 15; 197(4): 492–501. Published online 2018 Feb 15. doi: 10.1164/rccm.201708-1590OC

Ghosh A , Raymond D Coakley RD , Andrew J. Ghio AJ , Marianne S Muhlebach MS , Charles R Esther Jr CR , Neil E. Alexis NE, and Robert Tarran R . Chronic E-Cigarette Use Increases Neutrophil Elastase and Matrix Metalloprotease Levels in the Lung. *American Journal of Respiratory and Critical Care Medicine*; published on line August 7, 2019. https://doi.org/10.1164/rccm.201903-0615OC

Tsai J, Walton K, Coleman BN, et al. Reasons for Electronic Cigarette Use Among Middle and High School Students — National Youth Tobacco Survey, United States, 2016. MMWR Morb Mortal Wkly Rep 2018;67:196–200. DOI: http://dx.doi.org/10.15585/mmwr.mm6706a5external icon.

Cullen KA, Ambrose BK, Gentzke AS, Apelberg BJ, Jamal A, King BA. *Notes from the Field:* Use of Electronic Cigarettes and Any Tobacco Product Among Middle and High School Students — United States, 2011–2018. MMWR Morb Mortal Wkly Rep 2018;67:1276–1277. DOI: http://dx.doi.org/10.15585/mmwr.mm6745a5external icon.

King, BA, Gammon DG, Marynak KL Electronic Cigarette Sales in the United States, 2013-2017. JAMA. 2018;320(13):1379-1380. Doi:10.1001/jama.2018.10488

Wang W, Trivers KF, Marynak KL, O'Brien EK, Persoskie A, Liu ST, King BA. Harm Perceptions of Intermittent Tobacco Product Use Among U.S. Youth, 2016; Journal of Adolescent Health; Volume 62, Issue 6, June 2018, Pages 750-753

Evidence Brief: Tobacco Industry Sponsored Youth Prevention Programs in Schools. https://www.cdc.gov/tobacco/basic_information/youth/evidence-brief/index.htm

Exhibit 1: E-cigarettes collected from 7 North Carolina High Schools, tested for nicotine content by the State

Exhibit 2: E-cigarettes collected from 10 North Carolina High Schools in collaboration with CDC