

*Disclaimer: This case study is solely an educational exercise and does not necessarily reflect the position of Centers for Disease Control and Prevention on this issue.*

## **Policies for Restricting Use of Electronic Nicotine Delivery Systems (ENDS) in Indoor Public Spaces**

### **Background**

Electronic Nicotine Delivery Systems (ENDS), which include electronic cigarettes (e-cigarettes) and vaping devices, are battery-operated devices designed to deliver nicotine and other additives to the user in an aerosol. The cartridges contained in these devices contain a mixture of liquids, which can include propylene glycol, glycerol, nicotine and chemical flavorings. There are at least 400 brands of these devices, the liquid contained in the cartridge comes in over 7,000 flavors, and they are compatible for use with THC (the main active ingredient in marijuana) and other psychoactive drugs that can be inhaled.<sup>1</sup>

ENDS are widely available online and in retail stores. Product sales have rapidly increased over the past few years.<sup>2,3</sup> These products can appeal to young people because they are widely available, have a high-tech design, and are marketed with hundreds of fruit and candy flavors, such as bubble gum and cotton candy. In addition, advertisements for these products use celebrities who promote these devices on television, the internet and social media. Three million middle and high school students were current users of e-cigarettes in 2015, up from 2.46 million in 2014; 16.0 percent of high school and 5.3 percent of middle school students were current users of e-cigarettes in 2015, making e-cigarettes the most commonly used tobacco product among youth for the second consecutive year.<sup>4</sup>

Most ENDS contain nicotine, a fast-acting drug that the U.S. Surgeon General has found to be as addictive as cocaine and heroin.<sup>5</sup> One concern is that for young people, the use of these products may lead to initiation of cigarette smoking or use of other combustible tobacco products, which are a leading cause of preventable disease, disability and death in the United States. Several studies of U.S. adolescents and young adults have found an association between use of e-cigarettes and a progression to combustible tobacco smoking, lending support for this concern.<sup>6-9</sup> Additionally, animal research has shown that nicotine exposure during adolescence affects the formation of brain connections that control attention, learning, and susceptibility to addiction.<sup>10</sup>

Although promoted as a harm reduction alternative to combustible cigarettes among adults, there is no conclusive scientific evidence that ENDS are an effective long term smoking cessation aid.<sup>11</sup> In a 2014 review of 82 studies, Grana and colleagues found that adult use of e-cigarettes was highest among current smokers, followed by former smokers. They found that, across countries, e-cigarettes are commonly used concurrently with traditional combustible cigarettes (frequently referred to as “dual use”). In addition, there are concerns

***Disclaimer: This case study is solely an educational exercise and does not necessarily reflect the position of Centers for Disease Control and Prevention on this issue.***

that the use of ENDS products might “renormalize” smoking behavior and facilitate re-initiation to smoking by former smokers.<sup>3,11</sup>

It is well established that secondhand conventional, combustible cigarette smoke is harmful to the public’s health, and that there is no safe level of exposure to secondhand smoke.<sup>12</sup> Manufacturers of ENDS have contended that the aerosol that these products produce is safe; however, proponents of policies to restrict the use of these products in indoor public spaces respond that these claims are unproven. While the aerosol almost certainly contains fewer toxins and carcinogens than the 7000 found in traditional tobacco smoke, and while these devices are likely to be less harmful to individuals than traditional combustible cigarettes, their long term health effects and population health effects have not been sufficiently studied. The emerging evidence reveals e-cigarette aerosol is not “water vapor” and is not as safe as clean air.<sup>12</sup> The available research demonstrates that e-cigarette aerosol typically contains nicotine and can contain additional toxins such as aldehydes, metals, volatile organic compounds, phenolic compounds, polycyclic aromatic hydrocarbons, and tobacco alkaloids.<sup>13-14</sup> Because there are hundreds of manufacturers of ENDS and FDA regulations of the products have not yet been implemented, there is no way to ensure that these products have acceptably low levels of toxicants.

In addition to potential harms of exposure to secondhand aerosol, proponents of policies to restrict the use of ENDS in indoor public spaces also contend that their use in public spaces has the potential to recreate initial social acceptance around tobacco use in public and backtrack years of work on smoke-free air laws.<sup>3</sup> They add that, in addition to reducing the health impact of second hand exposure, prohibiting the use of these devices in indoor public spaces might have other benefits. For example, some studies have shown that children are influenced by adult smoking behaviors, suggesting that if children do not view smoking in public places, they may be less likely to grow up to use these devices themselves.<sup>3</sup>

Opponents of policies that would prohibit the use of these devices in indoor public places have raised several objections to these policies. First, opponents assert that the evidence base for the harm caused by second hand exposure to these devices is not sufficiently strong to prohibit their indoor public use. Some opponents cite studies indicating virtually no risk at all.<sup>15-17</sup> In addition, restricting the use of these devices could limit their use as a “harm reduction” activity for adults interested in substituting ENDS for conventional combustible cigarettes. For example, opponents argue that conventional smokers interested in switching to these devices should have an opportunity to sample these devices and their contents at a retail site before purchasing them, especially since the devices themselves are expensive. Further, opponents question whether indirect or behavioral harms, such as the risk to children for modeling this behavior, are sufficient justifications for prohibiting their use in indoor public spaces.

***Disclaimer: This case study is solely an educational exercise and does not necessarily reflect the position of Centers for Disease Control and Prevention on this issue.***

According to the Centers for Disease Control and Prevention, “as of March 31, 2016, 46 states Guam and the U.S. Virgin Islands have passed legislation prohibiting the sale of e-cigarettes to minors; 4 states (Massachusetts, Maine, Michigan, and Pennsylvania), the District of Columbia and Puerto Rico do not have any legislation requiring a minimum age restriction on the purchase of e-cigarettes. Seven states (California, Delaware, Hawaii, New Jersey, North Dakota, Oregon, and Utah) have passed comprehensive smokefree indoor air laws that include e-cigarettes. These laws prohibit smoking and the use of e-cigarettes in indoor areas of private worksites, restaurants, and bars.”<sup>18</sup>

### **Case Description**

Your community’s Board of Health has proposed a policy that would subject ENDS devices to the same restrictions in indoor public places as conventional cigarettes. The policy would apply to all indoor public places in your community, including retail stores that sell ENDS. The Board has called you, the local health department director, to testify at the upcoming hearing on the potential policy. How would you, as the local health department director, evaluate whether and how the policy should be enacted?

### **Discussion Questions**

1. Are there any legal considerations (e.g., laws or regulations mandating or prohibiting the activity) that must be taken into account?
2. Who are the stakeholders that should be considered in deciding if this policy should be enacted? What are the values and perspectives that these stakeholders bring to this issue?
3. What are the types of harms that this policy aims to address? What is the appropriate role for the health department in addressing these harms?
4. How does your understanding of the scientific evidence on the risk of exposure to second hand aerosol in indoor spaces factor into the advice you will give the Board?
5. What long term effects could the policy have on maintaining the public’s trust and support?

### **Scenario Shifts**

Would your recommendation change if the policy were to exempt retail locations that sell ENDS and/or private bars and lounges? What if the proposed ordinance included a ban on outdoor vaping in public parks?

***Disclaimer: This case study is solely an educational exercise and does not necessarily reflect the position of Centers for Disease Control and Prevention on this issue.***

## **Case References**

1. Durmowicz EL. The impact of electronic cigarettes on the paediatric population. *Tobacco Control* 2014;23:ii41-ii46. doi:10.1136/tobaccocontrol-2013-051468.
2. King BA, Patel R, Nguyen KH, Dube SR. Trends in awareness and use of electronic cigarettes among U.S. adults, 2010–2013. *Nicotine and Tobacco Research* 2015 Feb;17(2):219-27.
3. Marynak, K, Holmes, CB, King, BA, Promoff, G, Bunnell, R, McAfee, T. State laws prohibiting sales to minors and indoor use of electronic nicotine delivery systems — United States, November 2014, Centers for Disease Control and Prevention, *Morbidity and Mortality Weekly Report*, December 12, 2014, 63(49):1145-1150.
4. Singh, T, Arrazola, RA, Corey, CG, Husten, CG, Neff, LJ, J, Homa, D, King, BA. Tobacco Use Among Middle and High School Students — United States, 2011–2015, Centers for Disease Control and Prevention, *Morbidity and Mortality Weekly Report*, April 15, 2016, 65(14):361-367.
5. The Health Consequence of Smoking. Nicotine Addiction. A Report of the Surgeon General. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Center for Health Promotion and Education, Office on Smoking and Health, 1988. <https://profiles.nlm.nih.gov/ps/access/NNBBZD.pdf>.
6. Bunnell RE, Agaku IT, Arrazola RA, Apelberg BJ, Caraballo RS, Corey CG, Coleman BN, Dube SR, King BA. Intentions to smoke cigarettes among never-smoking US middle and high school electronic cigarette users: National Youth Tobacco Survey, 2011-2013. *Nicotine and Tobacco Research*, 2015 Feb;17(2):228-35.
7. Leventhal AM, Strong DR, Kirkpatrick MG, Unger JB, Sussman S, Riggs NR, Stone MD, Khoddam R, Samet JM, Audrain-McGovern J. Association of Electronic Cigarette Use With Initiation of Combustible Tobacco Product Smoking in Early Adolescence. *JAMA*, 2015 Aug 18;314(7):700-7. doi: 10.1001/jama.2015.8950.
8. Primack BA, Soneji S, Stoolmiller M, Fine MJ, Sargent JD. Progression to traditional cigarette smoking after electronic cigarette use among U.S. adolescents and young adults. *JAMA Pediatrics*, 2015 Nov;169(11):1018-23. doi: 10.1001/jamapediatrics.2015.1742.
9. Wills TA, Knight R, Sargent JD, Gibbons FX, Pagano I, Williams RJ. Longitudinal study of e-cigarette use and onset of cigarette smoking among high school students in Hawaii. *Tobacco Control*, 2016 Jan 25. doi:10.1136/tobaccocontrol-2015-052705.
10. England LJ, Bunnell RE, Pechacek TF, Tong VT, McAfee TA. Nicotine and the developing Human: A neglected element of the e-cigarette debate. *Am J Prev Med*, 2015;49(2):286–293.

***Disclaimer: This case study is solely an educational exercise and does not necessarily reflect the position of Centers for Disease Control and Prevention on this issue.***

11. Grana, H, Benowitz, N and Glantz, SA. E-cigarettes: A scientific review. *Circulation*, May 13, 2014; 129(19):1972-1986.
12. The Health Consequences of Smoking – 50 Years of Progress. A Report of the Surgeon General. U.S. 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. <http://www.surgeongeneral.gov/library/reports/50-years-of-progress/>.
13. Czogala J, Goniewicz ML, Fidelus B, Zielinska-Danch W, Travers MJ, Sobczak A. Secondhand exposure to vapors from electronic cigarettes. *Nicotine Tobacco Research*, June, 2014, 16(6): 655-662.
14. Cheng T. Chemical evaluation of electronic cigarettes. *Tobacco Control*, 2014;23:ii11-ii17 doi:10.1136/tobaccocontrol-2013-051482.
15. Burstyn I. Peering through the mist: Systematic review of what the chemistry of contaminants in electronic cigarettes tells us about health risks. *BMC Public Health*, 2014;14:18.
16. Farsalinos KE, Polosa R. Safety evaluation and risk assessment of electronic cigarettes as tobacco cigarette substitutes: A systematic review. *Therapeutic Advances in Drug Safety*, 2014;5:67–86.
17. Hajek P, Etter JF, Benowitz N, Eissenberg T, McRobbie H. Electronic cigarettes: Review of use content, safety, effects on smokers and potential for harm and benefit. *Addiction*, 2014;109:1801–10.
18. Centers for Disease Control and Prevention. State System E-Cigarette Fact Sheet. <http://www.cdc.gov/STATESystem/>.

### **Acknowledgements**

This case was developed by Alan Melnick, MD, MPH, CPH, Public Health Director/Health Officer, Clark County Public Health, Washington and Drue Barrett, PhD, Public Health Ethics Unit, Office of Scientific Integrity, Office of the Associate Director for Science, Office of the Director, Centers for Disease Control and Prevention. The CDC Office of Smoking and Health provided input on the case.

**Date:** July 6, 2016