

Policy on Electronic Cigarettes

Originating Council

Council on Clinical Affairs

Adopted

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Purpose

The American Academy of Pediatric Dentistry (AAPD) recognizes the increased use of electronic cigarettes (**e-cigarettes**) among children and adolescents. This policy intends to educate professionals, parents, and patients about e-cigarettes. Nicotine is highly addictive and has negative effects on brain development from the prenatal period into adolescence.¹ In order to reduce health risks caused by nicotine addiction, the AAPD supports routine screening for tobacco use, treating tobacco dependence, preventing tobacco use among children and adolescents, and educating the public on the health and societal costs of use of e-cigarettes.

Methods

This policy reflects a review of dental and medical literature and sources of recognized professional expertise and stature, including both the academic and practicing health care communities, related to electronic cigarette use by the pediatric patient. In addition, a systematic search of the PubMed®/MEDLINE database was performed using the terms: e-cigarette use in children, e-cigarette use in adolescents, e-cigarette use in children, e-cigarette use in adolescents, nicotine effects on health; fields: all; limits: within the last 10 years, humans, English, birth through age 18. Papers for review were chosen from this search and from references within selected articles. When data did not appear sufficient or were inconclusive, recommendations were based upon expert and/or consensus opinion by experienced researchers and clinicians.

Background

E-cigarettes, also called electronic nicotine delivery systems, are battery powered devices with a heating element that vaporizes a nicotine laced solution which is inhaled by the user.²⁻⁴ The act of using an e-cigarette commonly is called vaping due to the vapors that are inhaled and exhaled.⁴ E-cigarettes are intended and are marketed⁵ as a less harmful alternative for tobacco smokers to consume nicotine.⁶ They also are used as an aid to stop smoking tobacco-containing products,⁷⁻⁹ although studies relating to the effectiveness of e-cigarettes as a smoking cessation aid are mixed.¹⁰ E-cigarette solutions come in a variety of flavors and nicotine concentrations.⁶

The U.S. Preventive Services Task Force found that two of the strongest factors associated with initiation of smoking by children are parental smoking and parental nicotine depend-

ence.¹¹ Studies have shown that exposure to nicotine has a deleterious effect on the brain of children and adolescents.^{1,12} The Centers for Disease Control and Prevention stated in 2013 that over 1.78 million students in middle and high school reported trying e-cigarettes,¹³ with e-cigarette use by youth is typically for social status, being perceived as cool, and social acceptance.⁴ Since 90 percent of all adult tobacco smokers reported starting smoking as a teenager,¹⁴ and almost 38 percent of habitual e-cigarette users never smoked tobacco products,^{15,16} the potential for increased use of e-cigarettes is a public concern. Recent studies show that e-cigarette use among teens has surpassed tobacco cigarette use.¹⁷ E-cigarettes may serve as an entry point for use of nicotine, an addictive drug.¹⁷

Due to lack of regulation in e-cigarette marketing, children, who are impressionable and model the behavior of adults, are at risk from viewing marketing that is normally banned for tobacco containing products.² The e-cigarettes solutions are available in a number of enticing and appealing flavors, such as chocolate, peppermint, and piña colada.¹⁸ Although they have not been banned for e-cigarettes, these flavors have been banned in cigarettes containing tobacco as they market and appeal to children, adolescents, and first time users.¹⁹

E-cigarettes currently are unregulated by state or federal laws, and manufacturers are not required to disclose their ingredients, nor the substances that are inhaled and exhaled by the user.^{20,21} The base solution contains propylene glycol which can cause eye, throat, and airway irritation²² and, with long term exposure, can cause asthma in children.²³ A five mL vial of e-cigarette refill solution can contain a nicotine concentration of 20 mg/mL or 100 mg per vial. The known lethal dose of nicotine has been estimated to be about 10 mg in children and between 30 and 60 mg in adults.²⁴

As e-cigarettes have become popular as a substitute for tobacco smoking due to indoor smoking restrictions,²⁵ the effect of the exhaled vapors is also a concern. A number of toxic and potentially carcinogenic compounds have been found in the vapors of e-cigarettes.²⁶⁻²⁸ Unrestricted access

ABBREVIATIONS

AAPD: American Academy Pediatric Dentistry. **CDC:** Food and Drug Administration. **E-cigarettes:** Electronic cigarettes.

to smoking of e-cigarettes not only poses health risks to the user, but also may pose health risks to people nearby due to second hand exposure of the vapors.¹³ One study showed a similar effect on serum levels of cotinine (a biomarker for exposure to tobacco smoke) with an one hour exposure to both secondhand cigarette smoke and e-cigarette vapors.²⁹

In April 2014, the U.S. Food and Drug Administration (FDA) proposed expanding its current regulation of tobacco products to include e-cigarettes. The proposal would ban the sale of e-cigarettes to anyone under 18, require producers to cease giving free samples, and require warning labels stating that nicotine is addictive. Manufacturers would have to disclose ingredients and could not state that their products are safer than tobacco products. The regulation does not address flavors and will not go into effect until two years after the proposal has been adopted.^{30,31}

Policy statement

- The AAPD recognizes the potential hazards associated with the use of e-cigarettes as a form of nicotine delivery system.
- The AAPD encourages all members to educate patients, parents, and guardians on the health consequences of e-cigarettes and other forms of nicotine delivery systems.
- The AAPD encourages the enactment of FDA regulations on e-cigarette distribution including, but not limited to, prohibiting sales to children under 18, banning the child-friendly flavoring of e-cigarettes, and limiting the use for smoking cessation purposes.
- The AAPD encourages that all e-cigarette solutions be required to be sold in childproof packaging to prevent poisoning of children.
- The AAPD supports more studies being done on the effects of the secondhand vapors and the compounds produced from e-cigarettes.
- The AAPD supports that e-cigarettes be included in the non-smoking laws in restaurants and public places.
- The AAPD supports national, state, and local legislation that bans the sale of e-cigarettes to children and eliminates advertising and/or promotion of e-cigarettes that appeals to or influences children, adolescents, or special groups.
- The AAPD opposes the use of all forms of unregulated nicotine delivery systems, such as tobacco lozenges, nicotine water, nicotine lollipops, or heated tobacco cigarette substitutes.

References

1. Dwyer J, McQuown S, Leslie F. The dynamic effects of nicotine on the developing brain. *Pharmacol Ther* 2009;122(2):125-39.
2. American Academy of Pediatrics Richmond Center. E-Cigarettes. January, 2014. Available at: "http://www2.aap.org/richmondcenter/pdfs/ECigarette_handout.pdf". Accessed September 14, 2015.

3. World Health Organization. Electronic nicotine delivery systems. July 21, 2014. Available at: "http://apps.who.int/gb/fctc/PDF/cop6/FCTC_COP6_10-en.pdf?ua=1". Accessed September 14, 2015.
4. Sutfin, E, McCoy T, Morrell H, Hoepfner B, Wolfson M. Electronic cigarette use by college students. *Drug and Alcohol Dependence* 2013;131(3):214-21.
5. Grana R, Ling P. Smoking revolution: A content analysis of electronic cigarette retail websites. *Am J Prev Med* 2014;46(4):395-403.
6. Taylor N, Choi K, Forster J. Snus use and smoking behaviors: Preliminary findings from a prospective cohort study among US Midwest young adults. *Am J Public Health* 2015;105(4):683-5.
7. Ayers J, Ribisl K, Brownstein J. Tracking the rise in popularity of electronic nicotine delivery systems (electronic cigarettes) using search query surveillance. *Am J Prev Med* 2011;40(4):448-53.
8. World Health Organization. Backgrounder on WHO report on regulation of e-cigarettes and similar products. Available at: "<http://www.who.int/nmh/events/2014/backgrounder-e-cigarettes/en/>". Accessed September 14, 2015.
9. Dawkins L, Turner J, Roberts A, Soar K. 'Vaping' profiles and preferences: An online survey of electronic cigarette users. *Addiction* 2013;108(6):1115-25
10. Bullen C, Howe, C, Laugesen, M, et al. Electronic cigarettes for smoking cessation: A randomized controlled trial. *Lancet* 2013;382(9905):1629-37.
11. Moyer VA, US Preventive Task Force. Primary care interventions to prevent tobacco use in children and adolescents: US Preventive Task Force recommendation statement. *Ann Intern Med* 2013;159(8):552-7.
12. Goriounova NA, Mansvelder HD. Nicotine exposure during adolescence alters the rules for prefrontal cortical synaptic plasticity during adulthood. *Frontiers Synaptic Neuroscience* 2012;4:3. doi: 10.3389/fnsyn.2012.00003.
13. Centers for Disease Control and Prevention. Notes from the Field: Electronic Cigarette Use Among Middle and High School Students – United States, 2011-2012. September 6, 2013. Available at "<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6235a6.htm>". Accessed September 14, 2015.
14. US Dept of Health and Human Services. Preventing Tobacco Use Among Youth and Young Adults, Fact Sheet, US Dept of Health and Human Services, Washington, DC. Available at: "<http://www.surgeongeneral.gov/library/reports/preventing-youth-tobacco-use/factsheet.html>". Accessed September 14, 2015.
15. Kong G, Morean, ME, Cavallo, DA, Camenga, DR, Krishnan-Sarin, S. Reasons for electronic cigarette experimentation and its continuation among adolescents and young adults. *Nicotine Tob Res* 2015;17(7):847-54. doi: 10.1093/ntr/ntu257.

References continue on the next page.

16. Wills T, Knight, R, Williams, R, Pagano, I, Sargent, J. Risk factors for exclusive e-cigarette use and dual e-cigarette use and tobacco use in adolescents. *Pediatrics* 2015;135(1):43-51.
17. Johnston L, O'Malley P, Bachman J, Schulenberg J. Monitoring the future national results on adolescent drug use: 1975-2013. Overview, key findings on adolescent drug use. Institute for Social Research, The University of Michigan. Ann Arbor, Mich.; February 2014.
18. Viking Vapor. E Cig E Liquid, E Juice Flavors and Over 100 E Cigarette Flavors! Available at: "http://www.vikingvapor.com/E_Cigarette_Flavor_s/2.htm". Accessed September 14, 2015.
19. U.S. Dept of Health and Human Services. Preventing Tobacco Use Among Youth and Young Adults: A Report of the Surgeon General. Atlanta, Ga.: U.S. Department of Health and Human Services, Centers for Disease Prevention and Control, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2012. Available at: "<http://www.surgeongeneral.gov/library/reports/preventing-youth-tobacco-use/full-report.pdf>". Accessed September 14, 2015.
20. Farsalinos KE, Spyrou A, Tsimopoulou K, Stefopoulos C, Romagna G, Voudris V. Nicotine absorption from electronic cigarette use: Comparison between first and new-generation devices. *Scientific Reports* 2014;4:4133.
21. Cobb NK, Byron M, Abrams D, Sheilds P. Novel nicotine delivery systems and public health: The rise of the "e-cigarette". *Am J Public Health* 2010;100(12):2340-2.
22. Wieslanmder G, Norback D, Lingren T. Experimental exposure to propylene glycol mist in aviation emergency training: Acute ocular and respiratory effects. *Occupational Environ Med* 2001;58(10):649-55.
23. Choi H, Schmidbauer N, Spengler J, Bornehag C. Sources of propylene glycol and glycol ethers in air at home. *Int J Environ Res Public Health* 2010;7(12):4213-37.
24. Cameron JM, Howell D, White J, Andrenyak D, Layton M, Roll M. Variable and potentially fatal amounts of nicotine in e-cigarette nicotine solutions. *Tob Control* 2014;23(1):77-8.
25. Etter J, Bullen C. Electronic cigarette: Users profile, utilization, satisfaction and perceived efficacy. *Addiction* 2011;106(11):2017-28.
26. Westenberger BJ. Evaluation of e-cigarettes. US Dept of Health and Human Services, Food and Drug Administration, Center for Drug Evaluation and Research. St. Louis, Mo. May 4, 2009. Available at: "<http://www.fda.gov/downloads/drugs/scienceresearch/ucm173250.pdf>". Accessed September 14, 2015.
27. Talhout R, Schultz T, Florek E, van Benthem J, Wester P, Opperhuizen A. Hazardous compounds in tobacco smoke. *Int J Environ Res Public Health* 2011;8(2): 613-28.
28. Geiss O, Bianchi I, Barahona F, Barrero-Moreno J. Characterisation of mainstream and passive vapors emitted by selected electronic cigarettes. *Int J Environ Health* 2014; Available at: "<http://dx.doi.org/10.1016/j.ijeh.2014.10.001>". Accessed September 14, 2015.
29. Flouris AD, Chorti M, Poulianiti K, Jamourtas A, Kostikas K, Tzatzarakis M. Acute impact of active and passive electronic cigarette smoking on serum cotinine and lung function. *Inhalation Toxicol* 2013;25(2):91-101.
30. U.S. Food and Drug Administration. Public focus: Electronic cigarettes (e-cigarettes), Updated 7-7-15. Available at: "<http://www.fda.gov/NewsEvents/PublicHealthFocus/ucm172906.htm>". Accessed September 14, 2015.
31. US Food and Drug Administration. FDA proposes to extend its tobacco authority to additional tobacco products including e-cigarettes. Press release April 24, 2014. Available at: "<http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm394667.htm>". Accessed September 14, 2015.