

Potential Solutions to Electronic Cigarette Use Among Adolescents

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A controversy is raging as to whether e-cigarettes are adding to or merely replacing tobacco use among youth. The stakes for answering this question are high and will influence tobacco control policy decisions for the next decade. In this issue of *Pediatrics*, Barrington-Trimis et al¹ demonstrate that e-cigarettes have expanded total adolescent tobacco use beyond what would have been expected by the trends of tobacco use in a Southern California population of 11th and 12th grade students. In 2004, before e-cigarettes had been introduced, ~1 in 11 were smoking cigarettes; 10 years later, 1 in 7 were smoking cigarettes or e-cigarettes. In this sample, e-cigarette use has increased to the point that ~10% use them. Furthermore, recent Food and Drug Administration deeming regulations are a step in the right direction but will not change the fundamental dynamic of rapidly increasing youth e-cigarette use.² We think the science on expanding e-cigarette use among adolescents is sound, the list of serious health risks is growing, and the conversation must now shift to solving the problem.

We have placed potential solutions in several categories (Table 1).

SCHOOL-BASED

First, the educational approach in school around e-cigarettes needs to be updated and enhanced. One of us (Ms Winickoff) is a current public school student and reports that e-cigarettes were only mentioned briefly as a “bad habit” in health class, with a clear contrast drawn between e-cigarettes

and other more serious drugs. Educational strategies in school should include discussions about the following issues: early nicotine exposure as a gateway for other drugs of abuse^{3–8}; the fact that harmful chemicals are already known in e-cigarettes and that many chemical constituents have not been systematically cataloged in the over 300 e-cigarette brands available; the fact that inhaled ultrafine particles that are found in e-cigarette aerosol pose a hazard to human health⁹; and that these products are marketed to adolescents with appealing flavors and messaging suggesting that people would be inhaling harmless water vapor instead of fine particulates, nicotine, and other chemicals.¹⁰ Second, we recommend that student councils work with their local government to establish smoke-free and tobacco product free zones in and around schools to prevent exposure to nicotine containing aerosols, minimize the visual impressions of peers using these products, and to minimize social spread of nicotine products from older to younger students around campus.

CLINICAL CARE-BASED

To mitigate the harm to adolescents who are currently using e-cigarettes, clinicians need to screen and counsel about e-cigarette use. Messaging might include the following: it is not safe to inhale ultrafine particulates into the lungs; it is not safe to expose your brain to nicotine during brain development; and facts about how the brain changes in response to nicotine with visual images showing how these changes make the brain

FREE

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Opinions expressed in these commentaries are those of the authors and not necessarily those of the American Academy of Pediatrics or its Committees.

DOI: 10.1542/peds.2016-1502

Accepted for publication May 9, 2016

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PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

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FINANCIAL DISCLOSURE: The authors have indicated they have no financial relationships relevant to this article to disclose.

FUNDING: No external funding.

POTENTIAL CONFLICT OF INTEREST: The authors have indicated they have no potential conflicts of interest to disclose.

COMPANION PAPER: A companion to this article can be found online at www.pediatrics.org/cgi/doi/10.1542/peds.2015-3983.

To cite: Winickoff JP and Winickoff SE. Potential Solutions to Electronic Cigarette Use Among Adolescents. *Pediatrics*. 2016;138(2):e20161502

TABLE 1 Range of Potential Options to Address Rising E-Cigarette Use in Adolescence

Solutions	Interventions	Specific Locations	Strategic Points to Consider
School-based	Educate in health class	Middle and high school	Present the science of early nicotine exposure and gateway drug phenomenon; inoculate against industry marketing messages, promotions, and images that make youth susceptible to e-cigarette use
	Enact tobacco product free zone	Elementary, middle, high school, and college grounds	Include e-cigarettes in tobacco free campuses. Include high schools in tobacco free campus movement.
Clinical care-based	Screen and counsel	Inpatient and outpatient health care settings	Screening for parent and adolescent e-cigarette use will ensure opportunity for family and household level intervention
Policy-based	Increase minimum age of sale to 21	Town and city, county, state, and federal level actions are possible	Make sure tobacco age of sale laws include e-cigarettes and any e-cigarette laws include traditional tobacco products
	Increase the price	State and federal-level taxes and fees	Adolescents are very price sensitive: the higher the price the greater the effect on use
	Restrict sale locations	Town and city, county, state, and federal level actions	Restricting sales location to stores for ≥ 21 y olds would eliminate tobacco product sales in pharmacies, gas stations, malls, grocery and convenience stores.
	Ban e-cigarette use wherever combusted tobacco use is prohibited	Individual venue, town, city, county, state, and federal level actions	Restrictions should be added to existing and nascent regulations, including workplaces, multiunit housing, all indoor locations

more susceptible to other drugs. Adolescents tend to overestimate the proportion of peers engaging in tobacco use, so showing them that the vast majority do not use e-cigarettes should help denormalize the behavior.¹¹⁻¹³

POLICY-BASED

Policy interventions that have worked for traditional tobacco products¹⁴ should also work for e-cigarettes. First, raise the age of sale for e-cigarettes along with other tobacco products to 21.¹⁵ Getting people to use nicotine products at a young age is part of the core strategy of tobacco companies because the younger a person starts, the faster and stronger they become addicted, and the harder it is to quit. Reducing the number of kids in high school with access to e-cigarettes by raising the sales age should

decrease the rate of e-cigarette use dramatically, just as it did for traditional tobacco products in Needham, Massachusetts.^{16,17} Other policy strategies include raising the price of e-cigarettes through taxation or fees, and restricting tobacco product sales to stores with admittance for only those ≥ 21 years of age. Finally, banning e-cigarette use wherever combusted tobacco use is prohibited will decrease secondhand aerosol exposure and further denormalize e-cigarette use among the youth.

Moving beyond the documentation of e-cigarette use toward vigorously pursuing possible solutions could help many adolescents escape addiction to nicotine and other drugs. The multiple potential solutions suggested here at the school, clinic, and policy level may help blunt the recent and rapid expansion of e-cigarette use in youth.

REFERENCES

1. Barrington-Trimis JL, Urman R, Leventhal AM, et al E-cigarettes, cigarettes, and the prevalence of adolescent tobacco use. *Pediatrics*. 2016;138(2):e20163983
2. Food and Drug Administration. FDA takes significant steps to protect Americans from dangers of tobacco through new regulation. Available at: www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm499234.htm. Accessed May 6, 2016
3. Stanwick R. E-cigarettes: Are we renormalizing public smoking? Reversing five decades of tobacco control and revitalizing nicotine dependency in children and youth in Canada. *Paediatr Child Health*. 2015;20(2):101-105
4. Moore GF, Littlecott HJ, Moore L, Ahmed N, Holliday J. E-cigarette use and intentions to smoke among 10-11-year-old never-smokers in Wales. *Tob Control*. 2016;25(2):147-152
5. Bunnell RE, Agaku IT, Arrazola RA, et al. Intentions to smoke cigarettes

- among never-smoking US middle and high school electronic cigarette users: National Youth Tobacco Survey, 2011–2013. *Nicotine Tob Res.* 2015;17(2):228–235
6. Coleman BN, Apelberg BJ, Ambrose BK, et al. Association between electronic cigarette use and openness to cigarette smoking among US young adults. *Nicotine Tob Res.* 2015;17(2):212–218
 7. Wills TA, Sargent JD, Knight R, Pagano I, Gibbons FX. E-cigarette use and willingness to smoke: a sample of adolescent non-smokers. *Tob Control.* 2016;25(e1):e52–e59
 8. Leventhal AM, Strong DR, Kirkpatrick MG, et al. Association of electronic cigarette use with initiation of combustible tobacco product smoking in early adolescence. *JAMA.* 2015;314(7):700–707
 9. Barrington-Trimis JL, Samet JM, McConnell R. Flavorings in electronic cigarettes: an unrecognized respiratory health hazard? *JAMA.* 2014;312(23):2493–2494
 10. Latimer LA, Batanova M, Loukas A. Prevalence and harm perceptions of various tobacco products among college students. *Nicotine Tob Res.* 2014;16(5):519–526
 11. Chassin L, Presson CC, Sherman SJ, Corty E, Olshavsky RW. Predicting the onset of cigarette smoking in adolescents: a longitudinal study. *J Appl Soc Psychol.* 1984;14(3):224–243
 12. Sussman S, Dent CW, Mestel-Rauch J, Johnson CA, Hansen WB, Flay BR. Adolescent nonsmokers, triers, and regular smokers' estimates of cigarette smoking prevalence: when do overestimations occur and by whom? *J Appl Soc Psychol.* 1988;18(7 pt 1):537–551
 13. Reid JL, Manske SR, Leatherdale ST. Factors related to adolescents' estimation of peer smoking prevalence. *Health Educ Res.* 2008;23(1):81–93
 14. Centers for Disease Control and Prevention. *Preventing Tobacco Use Among Youth and Young Adults: 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; 2012
 15. Institute of Medicine. *Public Health Implications of Raising the Minimum Age of Legal Access to Tobacco Products.* Washington, DC: National Academies Press; 2015
 16. Kessel Schneider S, Buka SL, Dash K, Winickoff JP, O'Donnell L. Community reductions in youth smoking after raising the minimum tobacco sales age to 21. *Tob Control.* 2016;25(3):355–359
 17. Morain SR, Winickoff JP, Mello MM. Have tobacco 21 laws come of age? *N Engl J Med.* 2016;374(17):1601–1604

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Pediatrics originally published online July 11, 2016;

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Pediatrics originally published online July 11, 2016;

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