

Electronic cigarettes and adolescents

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Abstract

Question I see in my office an increased number of adolescents who use electronic cigarettes (e-cigarettes). Should I encourage adolescents to choose e-cigarettes over regular cigarettes if they decide to smoke? Are e-cigarettes less harmful and a potential smoking cessation method for adolescents?

Answer While e-cigarettes do not have carcinogenic tobacco, most contain nicotine, which not only leads to addiction, but can also impair brain development and cognitive function in youth. Recent studies have also shown that adolescents who use e-cigarettes are more likely to begin smoking tobacco cigarettes. It is therefore essential that physicians explain to adolescents the risks and health concerns e-cigarettes present, and implement measures to prevent or cease e-cigarette use.

Les cigarettes électroniques et les adolescents

Résumé

Question Je vois de plus en plus d'adolescents à ma clinique qui utilisent des cigarettes électroniques (vapoteuses). Devrais-je encourager les adolescents à choisir la vapoteuse plutôt que la cigarette ordinaire s'ils décident de fumer? Les vapoteuses sont-elles sans danger et constituent-elles une méthode potentielle de cessation du tabagisme pour les adolescents?

Réponse Même si les vapoteuses n'ont pas de tabac carcinogène, la plupart d'entre elles contiennent de la nicotine qui non seulement entraîne la dépendance, mais peut aussi compromettre le développement du cerveau et la fonction cognitive chez les jeunes. De récentes études ont aussi démontré que les adolescents qui utilisent des vapoteuses sont plus enclins à commencer à fumer des cigarettes de tabac. Il est donc essentiel que les médecins expliquent aux adolescents les risques et les préoccupations pour la santé que posent les vapoteuses, et qu'ils mettent en œuvre des mesures pour prévenir ou cesser l'usage des cigarettes électroniques.

A dramatic reduction in the rate of adolescents who smoke cigarettes has been reported in the past 2 decades in response to new government policies, such as the Tobacco Control Act in the United States (US)¹ and the Tobacco Products Control Act in Canada,² with enforced restrictions on minors' access to cigarettes.³ However, the fight to "end the tobacco epidemic," the leading cause of preventable and premature death, has recently stagnated.⁴

Electronic cigarettes (e-cigarettes) are battery-powered devices that deliver a nicotine-containing aerosol to the user by vaporizing a solution to simulate smoking a traditional cigarette (ie, vaping).⁵ This vapour solution usually consists of propylene glycol or glycerol, nicotine, and flavouring agents.⁶ Electronic cigarettes were originally marketed as a way to help cigarette smokers quit smoking⁷; however, neither the US Food and Drug Administration nor Health Canada has approved e-cigarettes as an effective cessation tool, as this correlation has not been confirmed.^{8,9} From a toxicology perspective, e-cigarettes are considered safer than tobacco cigarettes, as they have no carcinogenic tobacco, but their long-term health effects are still unknown.^{10,11}

Epidemiology

Electronic cigarettes were first introduced in 2007,¹² and by 2015 the US National Youth Tobacco Survey found that over 4 years the percentage of high school students who used e-cigarettes increased from 1.1% to 16.0%.¹³ An estimated 4.7 million middle school and high school students are using different types of tobacco products in the US, and e-cigarettes are the most used product.⁴ Similarly, e-cigarette smoking is highly prevalent among Canadian youth aged 15 to 19, with 20% having used e-cigarettes, based on the 2013 Canadian Tobacco, Alcohol and Drugs Survey.¹⁴ Use among adolescents was strongly associated with having family members (3-fold increase) and friends (7-fold increase) who smoked,¹⁵ and while Canada's official prohibition on nicotine-containing e-cigarettes has limited traditional advertising, advertisements on social media and the Internet are rampant and directly target youth.¹⁶

Although e-cigarettes were initially marketed to assist in smoking cessation of tobacco cigarettes,⁷ a longitudinal survey with 340 high school students from the US reported

that the most frequent reasons for trying e-cigarettes were curiosity, favourable flavours, and friends' use.¹⁷ For adolescents, e-cigarettes might actually be a gateway to other tobacco products, especially among previously non-smoking adolescents. In Southern California over a span of almost 20 years, data from 5 grade-12 cohorts showed an overall decrease in tobacco use between 1995 and 2014. However, between 2004 (before e-cigarettes) and 2014, a stark increase in the number of cigarette users from 9% to 13.7% was documented, which was explained by e-cigarettes "enlisting" a new group of users who would not have previously initiated smoking.¹³

What are the risks?


Nicotine exposure in adolescence is associated with deleterious effects on development in the prefrontal cortex and can lead to decreased cognitive function and severe addiction.^{4,18} A longitudinal study of 694 US adolescents and young adults aged 16 to 26 reported almost 70% of baseline e-cigarette users proceeding to smoke cigarettes within a year, in comparison to less than 20% of people who had not used e-cigarettes.¹⁹ A recent study reported that among those who had ever used e-cigarettes (ie, at least once), more than 40% had initiated cigarette use by the 16-month follow-up.²⁰ As e-cigarettes are designed to mimic the effect of smoking, even nicotine-free e-cigarettes should not be recommended for adolescents as they "renormalize" smoking and regularize the behaviour of tobacco-product use, which can lead to future tobacco use.²¹

What can be done?

Adolescents have been targeted by e-cigarette manufacturers with advertising, ease of access, and "fun" flavourings. In 1971 the Public Health Cigarette Smoking Act banned cigarette advertisements on television and radio in the US, but federal restrictions on e-cigarette advertisements currently do not exist. A recent study identified a direct correlation between exposure to e-cigarette advertisements and e-cigarette use among adolescents.²² Adolescents who viewed an e-cigarette television advertisement were 54% more likely to say they would use e-cigarettes compared with those adolescents who had not.²² Introducing restrictions on marketing for youth is critical in order to reduce e-cigarette use. Currently, there are around 8000 different flavours available for vaping solutions used in e-cigarettes, from fruit and candy to alcohol flavours.⁶ Many flavours cater to the adolescent population; in Connecticut, 44% of middle school and high school students who experimented with e-cigarettes did so because of the appealing flavours.²³ In order to reduce youth appeal, restrictions should be put in place on available flavours.

Conclusion

With almost 5 million middle school and high school students currently using different types of tobacco products

in the US and Canada, action has to be taken on different fronts in order to prevent a dangerous trend in e-cigarette use among youth. While policy changes that include age limitations, advertisement restrictions, and increased cost might help, it is crucial that schools and clinicians play a role in counseling and educating adolescents on the health risks associated with e-cigarettes. 

Competing interests

None declared

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