

Status Quo of E-Cigarettes in Adolescents

A Comprehensive Review

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Although marketed as a safer alternative to traditional cigarettes, e-cigarettes still contain nicotine and other harmful chemicals that can negatively impact adolescent health. E-cigarette use by adolescents is associated with an increased risk of transitioning to smoking traditional cigarettes, as well as negative impacts on their overall wellbeing. Numerous factors contribute to the rise in e-cigarette use among adolescents. By acquiring a more profound comprehension of the concerns about e-cigarettes in young populations, researchers can formulate more efficacious preventative and intervention techniques to diminish e-cigarette consumption among adolescents and alleviate any health risks linked to their use.

Keywords: E-cigarettes; Adolescents; Risk Factors; Epidemiology; Wellbeing

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E-CIGARETTES have gained significant popularity among adolescents in the past decade (Chapman & Wu, 2014; Gaiha & Halpern-Felsher, 2020; Mattingly & Hart, 2024). These devices, which vaporize a liquid containing nicotine and flavorings for inhalation, have attracted interest in their possible harm reduction advantages for adult smokers seeking to discontinue traditional cigarettes (Murthy, 2016). The increase in e-cigarette usage among adolescents has elicited worries regarding the health dangers and potential for addiction linked to these devices (Drummond & Upson, 2014). Collaboration among parents, educators, healthcare practitioners, and policy-makers is essential to tackle the increasing prevalence of e-cigarette usage among youth and to guarantee their awareness of the associated risks of these devices (The Harmful Conse-

quences of Vaping: A Public Health Threat, 2020). Implementing comprehensive initiatives to prevent and diminish e-cigarette use among teenagers will safeguard juvenile health and foster a smoke-free generation.

Overview of E-Cigarettes

E-cigarettes, also known as e-cigarettes, have gained significant popularity in the past few years as an alternative to conventional tobacco cigarettes (Singh et al., 2020). These battery-powered devices vaporize a liquid solution referred to as e-liquid or vape juice, which generally comprises nicotine, flavorings, and various compounds. The liquid is subsequently evaporated and inhaled by the user (Oliver et al., 2023).

One of the primary appeals of e-cigarettes is their promo-

tion as a safer substitute for conventional cigarettes. Advocates contend that e-cigarettes may assist smokers in cessation or diminish their tobacco consumption, as they offer comparable experience to smoking devoid of the detrimental chemicals present in tobacco smoke (Ramo et al., 2014). Nonetheless, it is crucial to acknowledge that the long-term health implications of e-cigarette usage remain predominantly uncertain, and investigations into their safety are continuing (Buljubasich, 2015; Kaisar et al., 2016).

E-cigarettes are available in several forms, ranging from compact, inconspicuous devices akin to conventional cigarettes to larger, sophisticated modifications that enable users to personalize their vaping experience (Brown & Cheng, 2014; Carr, 2014; Grana et al., 2014). Certain devices are designed for single use, whilst others are rechargeable and refillable, enabling users to experiment with various flavors and nicotine concentrations (Ma et al., 2022).

Another concern regarding e-cigarettes is their attraction to adolescents. The appealing flavors and sophisticated designs of numerous vaping devices have rendered them popular among adolescents and young adults, resulting in a rise in youth vaping rates (Ferkol et al., 2018; Singh et al., 2020). This has elicited apprehensions on the possibility of e-cigarettes functioning as a precursor to conventional smoking and nicotine dependence among adolescents.

Notwithstanding these legislative initiatives, the prevalence of e-cigarettes persists, with a wide array of goods and flavors accessible in the marketplace (Amrock et al., 2016; Ramo et al., 2014). Numerous ex-smokers have effectively used e-cigarettes as a cessation aid, noting the capacity to progressively diminish their nicotine consumption or transition to nicotine-free e-liquids (Park-Lee et al., 2022; Schneller et al., 2018). It is essential for users to recognize the potential risks linked to e-cigarette usage and to make informed health decisions.

Prevalence and Trends of E-Cigarette Use among Adolescents

Globally, the prevalence of e-cigarette use among adolescents varies widely. In the United States, the Surgeon General has declared e-cigarette use an epidemic, with 2018 data showing that over 3.6 million youth were current e-cigarette users (Mirbolouk et al., 2022; Park-Lee et al., 2022). This represents a dramatic increase from previous years, nullifying the gains made in reducing conventional cigarette smoking. Similar trends have been observed in other countries, with the United Kingdom, Canada, and several European nations reporting significant rises in e-cigarette use among adolescents (Hammond et al., 2020; Mattingly & Hart, 2024; Miller et al., 2016).

A concerning trend has been observed in the United States, as the use of e-cigarettes among middle and high school students has been consistently increasing, according to national data on adolescent e-cigarette use (Foxon et al., 2024; McCarthy, 2013; Singh et al., 2020). The potential long-term health consequences of adolescent e-cigarette use have prompted concerns among health professionals, policymakers, and parents as a result of this increase in popularity. The Centers for Disease Control and Prevention (CDC) reported a 78% increase in e-cigarette usage among high school students from 2017 to 2018 (Creamer et al.,

2020; Park-Lee et al., 2022). The increase in usage can be ascribed to multiple factors, such as assertive marketing strategies employed by e-cigarette businesses, the accessibility of flavored e-cigarettes that attract youth, and the fallacy that e-cigarettes represent a safer substitute for conventional cigarettes. The staggering increase in prevalence over the past decade is one of the main findings from national data on adolescent e-cigarette use. The proportion of high school pupils who reported using e-cigarettes in the past 30 days increased from 1.5% in 2011 to 27.5% in 2019, as reported by CDC (Creamer et al., 2020; Park-Lee et al., 2022; Wang et al., 2020). In the same period, the proportion of middle school pupils who reported using e-cigarettes increased from 0.6% to 10.5% (Murthy, 2016; Siqueira et al., 2016). This public health issue is urgently in need of action, as these statistics underscore the rapid expansion of e-cigarette use among adolescents.

The incidence of e-cigarette use among teenagers differs by gender, age, and socioeconomic position (Mattingly & Hart, 2024). Studies indicate that males are more inclined to utilize e-cigarettes compared to females (Park-Lee et al., 2022), and older teenagers have a higher propensity for e-cigarette use than their younger counterparts (Kong et al., 2017). Furthermore, teenagers from low-income households exhibit a higher propensity for e-cigarette usage compared to their counterparts from higher-income households (Jenssen & Boykan, 2019; Levy et al., 2017). These discrepancies underscore the necessity of directing preventative and intervention initiatives towards demographic cohorts.

The health implications of e-cigarette consumption among adolescents are a significant issue. E-cigarettes contain nicotine, a substance that is highly addictive and can adversely affect the development of the adolescent brain (Laviolette, 2020; Singh et al., 2020; The Harmful Consequences of Vaping: A Public Health Threat, 2020). Furthermore, e-cigarette vapor may contain deleterious substances like acrolein and formaldehyde, which can lead to respiratory and cardiovascular issues. Prolonged usage of e-cigarettes has been associated with a heightened risk of subsequent tobacco use and dependency.

Factors Contributing to the Increase in E-Cigarette Use among Adolescents

The accessibility and availability of e-cigarettes is one of the primary factors that is leading to the rise in the usage of e-cigarettes among adolescents (Jenssen & Boykan, 2019; Oliver et al., 2023). As a result of the widespread availability of e-cigarettes, both online and in physical places, they are not difficult for teens to acquire (Hunter & Martin, 2019; Wang et al., 2020). In addition, a large number of companies that manufacture e-cigarettes provide a diverse selection of flavors and goods that are appealing to younger customers, which is another factor that contributes to the growing popularity of vaping among adolescents (Krishnan-Sarin et al., 2017).

The marketing and advertising methods that are utilized by companies that manufacture e-cigarettes are another element that is contributing to the rise in the usage of e-cigarettes among adolescents (Barrington-Trimis et al., 2016; Creamer et al., 2020). When it comes to marketing their products to younger consumers, several companies that manufacture e-cigarettes

employ strategies such as social media marketing, celebrity endorsements, and product placement in popular culture (Czaplicki et al., 2019; Le et al., 2023). As a result of these marketing methods, e-cigarettes are made to appear hip and stylish, which leads to an increase in their use among teens.

There is a considerable correlation between the rise in the usage of e-cigarettes among adolescents and the influence of peers as well as societal standards (Cheng et al., 2023). Studies have indicated that when teenagers see their classmates or peers using e-cigarettes, they are more likely to start using them themselves (Bold et al., 2016). In addition, the social norms that surround vaping, such as the belief that it is a safer alternative to traditional cigarettes, can also play a role in encouraging adolescents to experiment with e-cigarettes (Nicksic et al., 2019; Vogel et al., 2020).

The widespread belief that e-cigarettes are less hazardous than traditional cigarettes is another reason that is contributing to the rise in the number of adolescents who use e-cigarettes (Le et al., 2023; Khoury et al., 2016). There is a widespread misconception among young people that e-cigarettes are safer than traditional cigarettes because they do not contain tobacco and do not emit smoke. On the other hand, e-cigarettes still contain nicotine, which is highly addictive and has the potential to have adverse impacts on health, particularly on the brains of children and adolescents (Lim & Lee, 2023; Schraufnagel, 2015).

The rapid rise in the use of e-cigarettes among adolescents can be attributed to a number of factors, including the widespread availability of these devices, the allure of marketing methods, the influence of peers, and the misunderstanding that they are safe (Murthy, 2016). In addition, the surge in popularity of vaping devices such as Juul, which are easy to use and do not draw attention to themselves, has also contributed to the rise in the number of teens who use e-cigarettes (Czaplicki et al., 2019; Kong et al., 2014; Mattingly & Hart, 2024; Singh et al., 2020).

In addition, the absence of rules and restrictions on the marketing and sales of e-cigarettes has made it simpler for teens to obtain these products (Health, 2018; Huang et al., 2018). There has been a surge in the number of teens who use e-cigarettes, which has been attributed to the fact that companies that manufacture e-cigarettes have been accused of targeting young people with their advertising and marketing activities (Papaleontiou et al., 2019).

Once adolescents have begun using e-cigarettes, it may be difficult for them to discontinue using these products due to the addictive nature of nicotine that is contained in online cigarettes (Gaiha & Halpern-Felsher, 2020; Kong et al., 2014; Leslie, 2020). Due to the fact that nicotine addiction can have major long-term implications for health, it is essential that adolescents be taught about the dangers of using e-cigarettes and encouraged to make decisions that are beneficial to their health.

Potential Impact of Policy Changes on Adolescent E-Cigarette Use

Modifications to public policy that restrict the sale and promotion of e-cigarettes to minors have the potential to play a significant part in lowering the number of adolescents who vape (Duke et al., 2014; Gaiha & Halpern-Felsher, 2020). The availability of e-cigarettes to adolescents can be reduced by the im-

plementation of laws that include the enforcement of stringent age verification methods and the imposition of penalties on shops that sell e-cigarettes to those who are under the age of 18 (Abouk & Adams, 2017). Because of this, there is a possibility that the number of adolescents who use e-cigarettes may drop, which will eventually be beneficial to their health.

It is also possible to target the advertising and marketing of e-cigarettes, which frequently normalize and glorify vaping among young people (Le et al., 2023; Marynak et al., 2018). Policy changes can tackle this issue. The appeal of e-cigarettes to adolescents can be mitigated through the implementation of policies that restrict the marketing methods employed by companies who sell e-cigarettes to teenagers (Huang et al., 2014). It is crucial that this be done to prevent young people who do not smoke from beginning to use e-cigarettes and developing a dependency on nicotine.

There is a possibility that legislative adjustments could be centered on the control of flavors for e-cigarettes, which are known to lure adolescents and conceal the harshness of nicotine (Jenssen & Boykan, 2019). Policymakers have the potential to prevent adolescents from experimenting with flavored e-cigarettes and lessen the likelihood that they will get addicted to these products by prohibiting or restricting the availability of these items (Leslie, 2020; Park-Lee et al., 2022). Cotton candy, bubble gum, and fruit punch are just a few examples of flavors that are particularly well-liked among young people and contribute to the increasing popularity of e-cigarettes within this age range (Barrington-Trimis et al., 2014).

The absence of regulation that surrounds the production of e-cigarettes and the components that go into them can be addressed by legislation reforms. A significant number of vaping products contain toxic chemicals and other substances that are known to have adverse impacts on the health of adolescents (Singh et al., 2020; *The Harmful Consequences of Vaping: A Public Health Threat*, 2020). The implementation of stringent quality control standards and rules for the disclosure of ingredients is one way in which policies can guarantee that e-cigarettes are safe for consumption and do not present any health hazards to young consumers (Mattingly & Hart, 2024; *The Harmful Consequences of Vaping: A Public Health Threat*, 2020).

Moreover, modifications to policies can be used to encourage education and awareness campaigns in order to educate adolescents about the risks associated with vaping and the potential health problems that are related with the use of e-cigarettes (Le et al., 2023). Teenagers can be empowered to make educated decisions and defend themselves against the influence of their peers to use e-cigarettes if rules are implemented that raise awareness about the negative repercussions of vaping (Bandara et al., 2023; Kong et al., 2014). The provision of resources and assistance for young people who are battling with nicotine addiction and who are attempting to quit vaping can also be facilitated by educational programs.

Nicotine addiction is a severe problem among young people who vape, and policies can include steps to assist adolescents in overcoming withdrawal symptoms and quitting their addiction to nicotine (Barrington-Trimis et al., 2014; Rigotti, 2024). This can involve providing teenagers with access to mental health counseling, support groups, and nicotine replace-

ment therapies to aid them on their journey toward a life free of smoking (Karpinski et al., 2010; Aveyard & West, 2007).

The implementation of comprehensive prevention and intervention programs that target the use of e-cigarettes by adolescents can be accomplished through the collaboration of policy changes with healthcare providers and youth organizations (Guidelines for School Health Programs to Prevent Tobacco Use and Addiction, 1994). It is possible for policies to build evidence-based plans to effectively address the vaping epidemic among young people if they collaborate with professionals in the field (Bandara et al., 2023; Ranabhat et al., 2019; Smith et al., 2023). The promotion of healthy living choices, the performance of screens for the use of e-cigarettes, and the provision of referrals to treatment programs for adolescents who need help are all examples of this.

Alterations to policies have the potential to involve parents, educators, and community leaders in efforts to discourage the use of e-cigarettes by adolescents and to encourage the development of positive youth (Youths et al., 1994). Policies have the potential to provide a supportive environment for young people to make healthy choices and resist the appeal of e-cigarettes if they involve key stakeholders in the battle against teen vaping or vaping among adolescents (Gaiha & Halpern-Felsher, 2020). This strategy to working together can give communities the ability to tackle the underlying issues that lead to vaping among adolescents and to put into action long-term solutions that will safeguard young people from the negative effects of nicotine addiction.

If legislative reforms are implemented, they have the potential to have a major impact on the use of e-cigarettes by adolescents and to protect the health and well-being of adolescents (Farber et al., 2016; Public Health Implications of Raising the Minimum Age of Legal Access to Tobacco Products, 2015; Stopping the start: our new plan to create a smokefree generation, 2023). Policies can assist lower the prevalence of e-cigarette use among young people and prevent a new generation from becoming hooked to nicotine by implementing comprehensive measures to restrict access, regulate marketing, and create knowledge about the risks of vaping (The Harmful Consequences of Vaping: A Public Health Threat, 2020; Wang et al., 2020). These steps can be implemented in order through the implementation of comprehensive measures. For the purpose of addressing the vaping pandemic and establishing a future that is both safer and healthier for adolescents, it is very necessary for lawmakers, healthcare practitioners, educators, and parents to collaborate.

Interventions and Prevention Strategies for Addressing E-Cigarette Use in Adolescents

Education and awareness should be considered among the most essential preventative measures for the use of e-cigarettes among adolescents (Gaiha & Halpern-Felsher, 2020). It is critical that adolescents be made aware of the potential dangers and risks that are involved with e-cigarettes, including the potentially damaging effects of nicotine and other substances that are included in e-cigarettes. When it comes to educating teenagers about the risks associated with using e-cigarettes, schools, parents, and healthcare practitioners can all play a significant role.

Regulating the marketing and selling of e-cigarettes to adolescents is another significant technique for preventing the use of e-cigarettes (Urgent action needed to protect children and prevent the uptake of e-cigarettes., 2024). Restricting the sale of e-cigarettes to anyone under the age of 18 and enacting laws regarding the advertising and promotion of e-cigarettes are both included in this (Abouk & Adams, 2017; Bialous & Eijk, 2020). By putting restrictions on the availability of e-cigarettes to adolescents, we can assist prevent them from developing a dependency on nicotine.

In the process of designing prevention tactics for the use of e-cigarettes among adolescents, peer influence is another key issue to take into consideration. When adolescents see their classmates or peers using e-cigarettes, they are more likely to start using them themselves (Cheng et al., 2023). It is for this reason that it is essential to establish constructive peer norms for the non-smoking of cigarettes and to prevent the use of e-cigarettes among adolescents (Vogel et al., 2020).

The participation of parents is equally essential in the prevention of the use of e-cigarettes among adolescents. A positive example can be set by parents who do not smoke or use e-cigarettes themselves, and who also have conversations with their children about the risks associated with using e-cigarettes (Hughes et al., 2015; Rayes et al., 2023). To assist in preventing their children from using e-cigarettes, parents can also watch their children's conduct and encourage them to be involved in their life.

E-cigarette usage among adolescents can be reduced by encouraging healthy lifestyle choices, such as engaging in physical activity and eating a nutritious diet (Public Health Consequences of E-Cigarettes, 2018; Singh et al., 2020). This can also help avoid the use of e-cigarettes. For adolescents who participate in healthy behaviors, the use of e-cigarettes as a means of coping with stress or boredom is significantly less likely to occur.

It is also possible for public health efforts to be beneficial in preventing the use of e-cigarettes among adolescents (Drummond & Upson, 2014). Teenagers who are attempting to quit or abstain from using e-cigarettes can benefit from these efforts because they can raise awareness about the dangers of e-cigarettes and give information and assistance for them. It is also possible for public health campaigns to target specific populations, such as youth who identify as LGBTQ+ or young who are members of racial and ethnic minority groups, who may be at a higher risk for using e-cigarettes (Chacón et al., 2024; Wagoner et al., 2019).

Cessation programs could assist adolescents who are already using e-cigarettes in quitting and preventing them from using them further (Ahluwalia et al., 2020; Drummond & Upson, 2014). The goal of these programs is to assist adolescents in overcoming their addiction to nicotine and transitioning away from the use of e-cigarettes by providing counseling, support, and resources. The provision of smoking cessation programs for teenagers can be facilitated by a variety of entities, including schools, healthcare professionals, and community organizations (Karpinski et al., 2010).

Monitoring and surveillance of the use of e-cigarettes among adolescents is something that is necessary to build effec-

tive prevention methods (Foxon et al., 2024). Policymakers and public health professionals should do more effectively targeting prevention efforts if they monitor trends in the use of e-cigarettes and identify risk factors for their adoption. Emerging problems associated with the usage of e-cigarettes, such as new products or marketing strategies, can also be identified with the use of surveillance systems.

For academic institutions, healthcare providers, community organizations, and government agencies, they should work together and form partnerships to successfully execute comprehensive preventive initiatives for the use of e-cigarettes among teenagers. By cooperating with one another, these many stakeholders can pool their resources and knowledge to develop a unified strategy for avoiding the use of e-cigarettes among adolescents. When preventative activities are founded on research and are culturally suitable for the populations they serve, collaboration can also assist ensure that these programs are effective (Guidelines for School Health Programs to Prevent Tobacco Use and Addiction, 1994; VanFrank et al., 2024).

To prevent the use of e-cigarettes among adolescents, a multifaceted approach is required. This approach should include education and awareness, regulation, peer influence, parental involvement, healthy lifestyle choices, public health campaigns, cessation programs, monitoring and surveillance, as well as collaboration and partnerships. Through the implementation of these preventative measures, we may contribute to the protection of the health and well-being of adolescents and eliminate the possibility of their developing an addiction to nicotine through the use of e-cigarettes.

Future Directions for Research

Future research should prioritize the long-term health consequences of e-cigarette use in adolescents. Although some studies have indicated that e-cigarettes may be less harmful than traditional cigarettes (Drummond & Upton, 2014; Glantz & Bareham, 2018), there is still a lack of consensus regarding the overall health impact of e-cigarette use, particularly in young people. Additional research is required to ascertain whether e-cigarettes are a safer alternative to traditional cigarettes or if they present distinct health hazards.

It is crucial to examine the patterns of e-cigarette use among adolescents and the potential effects these patterns may have on their overall health. Studies have demonstrated that adolescents who utilize e-cigarettes are considerably more susceptible to the use of traditional cigarettes and other tobacco products (Hunter & Martin, 2019), which could have severe consequences for their long-term health (Leslie, 2020). It is essential to comprehend these usage patterns to create effective prevention and intervention strategies.

Future research should investigate the potential contributions of e-cigarettes to the development of substance use disorders in adolescents and the role they play in nicotine addiction. Nicotine is a highly addictive substance (National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health, 2014), and there is evidence to suggest that e-cigarettes can result in nicotine dependence in young individuals (Ferkol et al., 2018). Further research is required to ascertain the severity of this risk and to identify strategies for

preventing and treating nicotine addiction in adolescent e-cigarette users.

The impact of e-cigarette marketing on adolescents is another critical area for future research. The advertising campaigns of e-cigarette companies that glamorize and normalize vapor have garnered criticism for their targeting of young people (Ferkol et al., 2018; Marynak et al., 2018). To evaluate the impact of marketing strategies on the use of e-cigarettes by adolescents and to devise strategies to counteract these messages, further research is required.

It is imperative to investigate the social and environmental factors that influence the use of e-cigarettes among adolescents. The determination of whether young individuals experiment with vaping is influenced by family influences, peer pressure, and access to e-cigarettes (Chapman & Wu, 2014; Hughes et al., 2015; Vogel et al., 2020). It is time to comprehend these factors to create effective prevention and education initiatives that are designed to decrease the use of e-cigarettes among adolescents.

The effects of secondhand exposure to e-cigarette vapor on non-users, particularly in close quarters such as homes, vehicles, and public spaces, should be the focus of potential future research. E-cigarette vapor may contain harmful compounds and toxins that could pose a risk to bystanders (Callahan-Lyon, 2014; Czogała et al., 2013; Edmiston et al., 2022; Eltorai et al., 2018; Li et al., 2020; Liu et al., 2017; Marcham & Springston, 2019; Nguyen et al., 2017; Visser et al., 2019). Additional research is required to evaluate the potential health consequences of secondhand exposure to e-cigarette vapor and to inform policy decisions that are intended to safeguard non-users.

Another topic is the correlation between the use of e-cigarettes and the mental health outcomes of adolescents. Some studies have proposed a correlation between vaping and anxiety, melancholy, and other mental health disorders in young individuals (Kaisar et al., 2016; Leventhal et al., 2015). More research is required to gain a more comprehensive understanding of this relationship and to create interventions that are specifically designed to assist adolescent e-cigarette users in maintaining their mental health.

Future research should examine the influence of flavorings and additives in e-cigarettes on the health of adolescents. E-cigarettes are available in a wide range of flavors, many of which are particularly appealing to youthful individuals (Barrington-Trimis et al., 2014; Harrell et al., 2016). Nevertheless, there is an increasing apprehension that these flavorings may contain harmful compounds that could have adverse health consequences (Barrington-Trimis et al., 2014; Goldenson et al., 2019). Research is required to evaluate the safety of e-cigarette flavorings and their potential impact on the health of adolescents.

Lastly, future research should investigate the efficacy of policies and regulations that are designed to decrease the use of e-cigarettes among adolescents. In an effort to reduce the prevalence of adolescent vaping, numerous countries have imposed restrictions on the sale, marketing, and use of e-cigarettes (Abouk & Adams, 2017; Padon et al., 2016; Sreeramareddy et al., 2022). To assess the effectiveness of these policies and determine the most effective strategies for decreasing the use of e-cigarettes among adolescents, additional research is required.

Conclusion

An increasing issue in the field of public health is the current situation with the use of e-cigarettes among adolescents. Some research suggests that more than twenty percent of high school students have experimented with e-cigarettes. Recent studies have shown that the number of adolescents who use e-cigarettes has significantly increased on a major scale. One of the reasons that e-cigarettes are so popular among young people is that they are simple to use, have a sleek appearance, and come in a variety of flavors that are enticing. The long-term health implications of

vaping, on the other hand, are still largely unknown, and there is evidence to suggest that it may lead to nicotine addiction in addition to other negative health outcomes. In our capacity, it is of the utmost importance that we address this issue by means of education, lobbying for policy, and support for smoking cessation programs that are specifically designed for adolescents. Now that we have a better grasp of the current situation with the usage of e-cigarettes among adolescents, we can work toward the goal of avoiding future generations from falling prey to this hazardous trend. ■

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