



## Smoking cessation or initiation: The paradox of vaping

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### ABSTRACT

In recent years, there has been a rapid expansion of the vaping market which has led many to question whether vaping can assist people in smoking cessation, or if it in fact paves the way for new smokers. While there has not been conclusive evidence regarding vaping as a smoking cessation tool, there is striking evidence that vaping is linked to new smoking addictions, especially in teenagers and young adults. Despite the prevalent belief that tobacco is more harmful to the body, early research on vaping has already shown very detrimental effects, and the comprehensive effects may become much clearer in the years to come. To curtail the rapidly increasing number of teenagers and young adults vaping, strict action must be taken. Legalization with tight control of vaping products would focus the efforts on those attempting to quit, while helping to prevent acquisition by teenagers and young adults that are not of legal age. In the years to come, vaping controls should be carefully considered to ensure that the purported benefits of helping those overcome a smoking addiction are not outweighed by the unintended consequences of creating a teenage demographic addicted to vaping.

When it comes to vaping, health professionals and researchers tend to fall into one of two camps: One that views it as a smoking cessation aid and another that perceives it as a risk for smoking initiation. Because of these opposing views, the public, and especially smokers, are unsure whether vaping is safe for smoking cessation. We present evidence on both views, and reason why strict legalization is the opportune way to regulate this issue from a public health perspective. This commentary provides guidance to all countries, regardless of e-cigarette legislative status. For countries that currently have loose or absent policies around e-cigarettes, this commentary reveals why stringent measures are needed instead. For countries with tight policy controls in place, this commentary provides reassurance.

### 1. Is vaping a viable smoking cessation aid?

Vaping products that contain nicotine are often marketed as smoking cessation aids for adults. Some forms deliver high nicotine concentrations, making them popular as a method for quitting smoking. There is some evidence that nicotine-based vaping products are more effective as smoking cessation aids than those without nicotine (Dimert et al., 2019).

Reviews examining the relationship between e-cigarette use and smoking cessation have converged in suggesting that the link is

inconclusive. Villanti et al. (2018) demonstrated that e-cigarettes could be used to decrease cigarette use; however, this review only included a limited number of studies, and most were not randomized control trials (RCTs) (Villanti et al., 2018). Banks et al. (2020) concluded that there is insufficient evidence to support the efficacy of electronic nicotine delivery systems (ENDS) (vs. no intervention) for smoking cessation (Banks et al., 2020). They also noted the quality of the evidence was low and the consideration of studies with no potential competing interest further limits the evidence (Banks et al., 2020).

A close look at individual observational studies, which form the bulk of the literature, highlight the inconsistency in findings on vaping and smoking cessation. For instance, one study found that e-cigarettes are effective for smoking cessation in young adults with high nicotine dependence levels (Selya et al., 2018). Two other studies found that e-cigarettes have similar smoking cessation effectiveness to not using any products or using conventional pharmacotherapy after 1–2 years of abstinence (Weaver et al., 2018; Pierce et al., 2020). A fourth found that hospital patients using e-cigarettes have less success with smoking abstinence compared to non-users after 6 months (Rigotti et al., 2018).

Even the handful of RCTs on this topic have evident methodological flaws. For instance, Hajek et al. (2018) demonstrated that the one-year smoking abstinence rates using e-cigarettes and nicotine replacement

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therapy (NRT) are 18% and 10%, respectively (Hajek et al., 2019). However, the study was unblinded, and the treatment provided to the control group was not standardized. Further, a combination of NRTs were used where 84% of the NRT group used patches in addition to other forms, one of which was nicotine inhalers which were only used by 37% of the NRT group (Hajek et al., 2019). Nicotine inhalers are fast-acting products that quickly satisfy cravings and offer a hand-to-mouth experience that is somewhat similar to e-cigarettes. However, nicotine patches are slow-acting and lack the physical aspects of inhalers, making them less comparable to e-cigarettes (Nicotine replacement therapy for quitting tobacco, 2017). Additionally, after one-year of smoking abstinence, 80% of those who quit smoking using e-cigarettes (vs. 9% who used NRTs) continued to use them (Hajek et al., 2019). This finding underscores the tendency of e-cigarettes to sustain nicotine addiction relative to NRTs.

## 2. Is the risk of smoking initiation due to vaping real?

Contrary to the inconclusive evidence produced by studies looking at the association between e-cigarettes and smoking cessation, there is consistent evidence from various reviews and cohort studies that vaping products are implicated in smoking initiation. A systematic review and meta-analysis by Soneji et al. (2017) concluded that there is strong evidence that initial e-cigarette use is associated with subsequent smoking initiation, and that e-cigarette use in the past 30-days is related to subsequent smoking in the past 30-days (Soneji et al., 2017). A second one by Khouja et al. (2021) echoed similar findings yet cautioned that all the studies in their review used self-report measures (Khouja et al., 2021). Another meta-analysis found that the association between e-cigarette use and tobacco smoking initiation was four-fold (Health Research Board, 2020), and the European Commission's committee on Health concluded that there was strong evidence of e-cigarette use leading to tobacco smoking initiation (Preliminary Opinion on electronic cigarettes, 2020). Last, a review by Stratton et al. (2018) concluded the presence of substantial evidence on the increased risk of ever use of combustible tobacco among youth and young adults due to e-cigarette use, and moderate evidence of increased intensity and frequency of combustible tobacco use following e-cigarette use among combustible tobacco ever users (Stratton et al., 2018).

Observational studies on the link between vaping and smoking initiation detail the consistency of this relationship. For instance, Berry et al. (2019) estimated that 21.8% of new smoking among youth vapers between the ages of 12 and 15 was linked to prior vaping (Berry et al., 2019). Further, Owotomo et al. (2020) found that regardless of youths' intentions, those that used e-cigarettes were 4.6 times more likely to use cigarettes and become tobacco smokers one year later (Owotomo et al., 2020). Osibogun et al. (2020) demonstrated that current e-cigarette users were five times more likely than non-current users to become cigarette users (Osibogun et al., 2020). Finally, Chaffee et al. (2018) found a positive correlation between ever e-cigarette use and combustible tobacco use among 12–17-year-old youth (Chaffee et al., 2018).

## 3. Is tobacco smoking worse than vaping?

Smoking cigarettes is very likely to be more harmful than vaping and have more negative consequences because of the difference in the number of chemicals inhaled from each product (41 chemicals from e-cigarettes and 7000 chemicals from cigarettes) (Goniewicz et al., 2018; What's in a cigarette?, 2020). Tobacco use is estimated to kill 480,000 people in the US every year (Stratton et al., 2018); however, many of these deaths arise from prolonged use. Conversely, data from the US Center for Disease Control, in February 2020, showed that a total of 68 people have died in 29 states and the District of Columbia as a result of vaping (Outbreak of lung injury associated with use of e-cigarette, 2019), but long-term effects of vaping are still unknown. However, current evidence makes it clear that any potential smoking cessation

benefit from vaping is likely to be offset by the positive link between vaping and smoking initiation, as the escalating rates of e-cigarette use are likely to reverse the decline in youth smoking rates (Pierce et al., 2021). Further, vaping has proven to be far from being benign as there have been more than 2000 cases of users hospitalized due to E-cigarette and Vaping Lung Related Injury (EVALI). In the same report, the ages of 1364 people were reported, and 54% of these cases were under the age of 25 (Outbreak of lung injury associated with use of e-cigarette, 2019). Vaping also increases the risk of myocardial infarction among middle aged men (OR = 1.79) vs. non-users (Alzahrani et al., 2018). Other research has linked vaping to various types of pneumonia, pneumonitis, and alveolar damage (Landman et al., 2019).

## 4. How should we regulate vaping from a public health policy perspective?

The answer is legalization without commercialization. These products should be available to adult smokers willing to quit smoking after trying evidence-based methods—counselling, prescription aids, and NRTs (Patnode et al., 2015; Cahil et al., 2013; Wu et al., 2006). If adult smokers fail to quit smoking after trying these proven methods, they may consider vaping as a smoking cessation aid after making an informed decision, including the consideration of potential and known harms of vaping.

Although it is important to ensure current smokers have the option of using e-cigarettes for smoking cessation, it is essential that public health policy create disincentives so young non-smokers are not lured into vaping and potentially smoking. This can be accomplished through stringent policies that include taxation, advertisement and flavour bans, and minimum age and online purchase restrictions. Taxation of e-cigarettes is vital to reducing demand. Currently, the cost of e-cigarettes is substantially lower than traditional cigarettes—on average, a single vaping pod delivers the amount of nicotine in one cigarette package (Willett et al., 2019) and costs around three times less than a cigarette package. Increasing taxes on e-cigarettes while keeping their price lower than cigarettes is key to deter youth from using them without making cigarettes financially favorable. Additionally, e-cigarette advertisements must be banned, akin to tobacco, to prevent use as a result of exposure to lifestyle marketing. E-cigarette flavourings, a frequently cited enticing factor for youth, should similarly be banned (Hareell et al., 2017; Gendall and Hoek, 2021). Other measures include increasing the minimum age of vaping to 21 and implementing safeguards against online purchases (Al-Hamdani et al., 2020). Alternatively, low prices, mere exposure to lifestyle advertisements, and easy access will continue to attract youth and increase their likelihood of vaping (Al-Hamdani et al., 2020). Further, vaping products should be subjected to the same regulatory standards as NRTs and sold in licensed stores to improve the safety standards and restrict access to adults.

## 5. Conclusion

The rapid expansion of the vaping market has led many to question whether vaping is a smoking cessation tool, or a pathway for new smokers. Evidence regarding vaping as a smoking cessation tool has been inconsistent; however, there is striking evidence that vaping is associated with a proliferation in the number of smokers, especially in youth. Although tobacco is currently thought to be more detrimental to health based on many years of research, early research has already shown harmful effects of vaping. Legalization with tight control of vaping products is needed to enable access for those attempting to quit smoking, while ensuring e-cigarettes do not inadvertently attract non-smoking adolescents.

## 6. Disclosure statement

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Lung Association of Nova Scotia. There may be a perceived conflict of interest based on this affiliation.

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