



I will prevent disease whenever I can, for prevention is preferable to cure: doctors' role in the vaping epidemic

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Teachers at high schools in the Netherlands have gained a new task: monitoring restrooms. They enter during breaks and between classes and consistently find groups of students in toilet stalls enveloped in a sweet cloud of peach, strawberry or banana toffee pie scent. Within 7 s, the high-dose nicotine rushes from their lungs to their brains, fulfilling the enormous craving they were experiencing for the last hour. In every school in the Netherlands – perhaps every school in Europe – there are students addicted to e-cigarettes. It's forbidden, but forbidden fruits have always tasted the best to teenagers, and with high doses of nicotine involved, the temptation is impossible to resist. If you think back to your 13-year-old self, could you have resisted lemon meringue pie flavor packaged in a brightly colored, high-tech device?

Global e-cigarette use among teenagers continues to rise [1–3]. In the Netherlands, some 25% of youths have experimented with vaping [4]. In this issue of the European Journal of Pediatrics, To et al. illustrate that e-cigarettes have direct adverse effects on Canadian adolescents, negatively affecting stress levels and quality of life [5]. These results

echo similar findings in the United States and Europe [6–8] and reflect what has been shown in animal models [9, 10]: nicotine is a detrimental factor in a developing adolescent brain [11]. Nicotine use in childhood results in an increased likelihood of developing psychiatric and cognitive disorders later in life [6, 10]. However, the most concerning statistic is the robust evidence indicating that e-cigarettes serve as a gateway to traditional cigarette use. Once exposed to nicotine, two-thirds of adolescent e-cigarette users will transfer to smoking tobacco [12–15].

Next to nicotine, e-cigarette aerosols contain an array of chemicals and metals, leading to cellular and DNA damage [16], increased risk of chronic bronchitis and asthma exacerbations [17, 18], compromised immunity [19], and potentially life-threatening conditions such as EVALI (e-cigarette or vaping product use-associated lung injury) [20]. Long-term effects are being awaited, but there are grounded concerns for e-cigarette-related cancer and vascular and pulmonary diseases.

Candy-colored, sweet-smelling nicotine carriers: the Trojan Horse of the 2020's

Initially, the e-cigarette was introduced in the early 2000s as a smoking cessation aid. In fact, a recent landmark clinical trial [21], along with an editorial [22], directs to healthcare professionals that “it is now time ... to ... add e-cigarettes to the smoking-cessation toolkit” and to “reconsider their cautious positions on e-cigarettes for smoking cessation.” This statement was based on an added 12.6% increase in successful tobacco smoking cessation using e-cigarettes compared to a control group with traditional smoking cessation measures. Interestingly, the control group had a significantly higher amount of participants stopping nicotine altogether. Thus, comparing the two-thirds of adolescent e-cigarette users transforming into tobacco smokers to the extra 12.6% of tobacco smokers

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who quit smoking cigarettes with the help of e-cigarettes, the total number of tobacco users in society may well rise.

The authors and the editors of the *New England Journal of Medicine*, where the study was published, seem to underestimate the fact that e-cigarette endorsements strongly contribute to the unwarranted positive perception of e-cigarettes within society. This ‘healthier’ image of the e-cigarette has significantly contributed to its approval in many countries all over the world and rapid rise in sales. Combined with big tobacco’s aggressive marketing with flashy designs, vibrant colors, and enticing flavors, this led to an increase in e-cigarette use, specifically among teenagers – by some called ‘the vaping epidemic’ [23].

What can healthcare providers do?

It’s well recognized globally that government-led initiatives to discourage behavior are most effective: raising prices via taxation, reducing points of sale, banning e-cigarettes and implementing legislation to secure a tobacco- and nicotine end-game. However, a typical pattern seen is that every change in government is seized as an opportunity to renegotiate. Contrary to article 5.3 of the WHO FCTC [24], which calls on parties to protect public health policies from the commercial interests of the tobacco industry, the tobacco industry often manages to influence decisions [25].

Medical doctor Judith Mackay, an international anti-tobacco control advocate and senior adviser to the WHO, describes the ‘tobacco scream test’ to gauge the effectiveness of anti-tobacco measures. If the tobacco industry screams, a measure is undoubtedly effective. If not, then the measure probably will have no significant effect [26]. The tobacco industry screams at taxes and bans, but it screams much less at health education.

Health education targeting adolescents, whom peers and social media mainly influence, is tricky. The most evidence-based prevention model seems to be the social competence or influence model [27, 28]. These are based on social impact and intervene in a multi-setting, such as school, (sports) clubs, parenting, (social) media and medical professionals. The interventions should be repeated periodically, as their effect wears off quickly when they stop [29].

Meanwhile however, the vaping epidemic is raging, and young people are becoming addicted in droves. For healthcare providers, the question arises of whether it is still justifiable to stand idly by. Even though health education may not be the most effective measure, failing to inform young people about how addictive e-cigarettes are and not providing

any counter-narrative against the widespread misinformation about vaping on social media cannot be easily morally justified.

What are we doing in the Netherlands?

Countrywide, Dutch physicians could no longer tolerate witnessing ‘the smoke-free’ generation go up in smoke. Multiple initiatives are active; #artsenslaanalarm, a coalition of physicians united to achieve a smoke-free society, is raising awareness through impactful campaigns funded by the National Knowledge Institute for mental health, alcohol, tobacco, and drug use [30, 31].

As medical doctors specializing in pediatric lung disease and lung cancer, we are confronted daily with the devastating consequences of smoking from an early age. Aware of the research delineating effective and ineffective prevention strategies, we sought to counteract the pervasive dissemination of misinformation. Given the tobacco industry’s deliberate targeting of young individuals, we deemed it essential to intervene at this critical juncture. Disposable e-cigarettes typically attract users as young as 14 to 15 years old; hence, we specifically targeted 12–14-year-olds. To achieve this, we developed a concise educational package accessible to teachers via a Dutch website (www.vapenjouwkeuze.nl) [32]. Additionally, we offered medical doctor guest lectures in classrooms upon request. Since the initiation in October 2023, over 5500 educational packages have been downloaded nationwide, with over 1000 schools requesting doctor’s guest lectures. Across various cities and medical specialties, over 700 physicians driven by a shared aversion against the e-cigarette epidemic and provided with standard learning materials have volunteered to deliver these educational sessions (See Fig. 1). This joint, continuously expanding effort has now garnered significant attention from national media and political platforms.

Let’s dive in together

The study by To et al. in this issue of the *European Journal* [5] underscores the need for our actions. We have promised in our Hippocratic oath to drive the prevention of disease. In this case, we have to team up with all healthcare advocates to keep stressing the responsibility of the government to safeguard its youth and protect them against the tobacco industry. In the meantime, we will continue our prevention journey, providing schools and colleagues with (translatable) material to educate our youth. Let’s clean the high school toilets from e-cigarettes and make sure these can serve their original purpose: providing a safe house for gossip and cheat sheets.



Fig. 1 Compilation of medical doctors lecturing on the risks of vaping in secondary schools in The Netherlands. Left to right: Sophie Cohen (pediatrician), Peter de Winter (pediatrician), Frank Borm (pulmonologist), Danielle Cohen (pathologist) and Emily van't Wout (pulmonologist)

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