

## Why electronic cigarettes are a public health threat?

Por que os cigarros eletrônicos são uma ameaça à saúde pública?

¿Por qué los cigarrillos electrónicos son una amenaza para la salud pública?

Andre Luiz Oliveira da Silva <sup>1</sup>  
Josino Costa Moreira <sup>2</sup>

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In October 2018, the U.S. Food and Drug Administration (FDA) held a surprise inspection of the headquarters of the Juul company, manufacturers of electronic cigarettes, where thousands of documents were seized on grounds that the company was engaged in practices aimed at inducing young people to consume these tobacco products <sup>1</sup>.

The raid was part of the response by the FDA to what can be considered an e-cigarette epidemic use among elementary and High School students in the United States. Among High School students, e-cigarette vaping increased from 1.5% in 2011 to 20.8% in 2018, and 2017 saw the most significant increase <sup>2</sup>. Among elementary school students, e-cigarette use increased from 0.6% in 2011 to 4.9% in 2018 <sup>2</sup>. In short, practically 1 in 5 American High School students use e-cigarettes, mostly products with diverse flavors and mainly of the brand Juul <sup>2</sup>. The significant increase in 2017 is purportedly associated with this brand's popularity on the American market <sup>2</sup>.

The reasons for the great popularity of these products among students are their format, the possibility of low-profile use, the high nicotine content, and attractive flavors <sup>3</sup>.

The small and rectangular shape of the product, presenting several colors, resembling a pen drive, and charged via USB port is attractive and discreet. The nicotine is loaded via "pods", which contain the amount of nicotine equivalent to 20 conventional cigarettes (one pack) <sup>4,5</sup>.

Compared to other e-cigarettes, the "pods" used by Juul have far higher addictive potential, causing a physiological sensation similar to that experienced by smokers of conventional cigarettes. The product uses nicotine treated with benzoic acid (resulting in the nicotine salts, its natural form in tobacco leaves) to deliver concentrations 10 times higher than in other e-cigarettes, which use free-base nicotine in their formulations <sup>5</sup>. Other manufacturers, possibly inspired by Juul's commercial success, have also begun to adopt nicotine salts in their products <sup>4</sup>.

Interestingly, the tobacco industry has a history of manipulating nicotine levels in cigarettes, with techniques ranging from the addition of ammonia to cigarettes to increase the freebase nicotine to using modified tobacco strains that produce higher nicotine concentrations (Y-1 tobacco) <sup>6,7</sup>, but the use of these salts in e-cigarettes is unprecedented. One study suggests that Juul pods have greater addictive potential for young people than other e-cigarettes or even ordinary cigarettes <sup>8</sup>.

Like other electronic smoking devices, Juul comes in various flavors such as *creme brûlée*, mango, and menthol, making these products even more attractive to young people, just as flavors are used in

<sup>1</sup> Agência Nacional de Vigilância Sanitária, Rio de Janeiro, Brasil.

<sup>2</sup> Escola Nacional de Saúde Pública Sergio Arouca, Fundação Oswaldo Cruz, Rio de Janeiro, Brasil.

### Correspondence

A. L. O. Silva  
Agência Nacional de Vigilância Sanitária.  
Av. Rio Branco 147,  
16º andar, Rio de Janeiro, RJ  
20040-910, Brasil.  
andre.sp.ensp@gmail.com



conventional cigarettes to facilitate initiation and thus nicotine addiction<sup>9</sup>. In electronic cigarettes were described about 8,000 flavours<sup>10</sup>.

This combination has led to a considerable number of American schoolchildren addicted to nicotine. Considering that e-cigarettes can be the gateway to conventional cigarettes, since after one year of vaping these youngsters run a four times higher risk of starting to smoke regular cigarettes, and also increase the risk of future marijuana use<sup>11,12,13,14,15</sup>.

Another controversy that surrounds these products is their use in cessation treatment. Although some data suggest a possible increase in cessation rates, the published data are still not sufficient to claim that electronic cigarettes are an effective method to quit smoking<sup>16</sup>. However, the UK House of Commons Science and Technology Committee recently released a report, according to which these products could be used for cessation and may be contributing to the reduction in the prevalence of smoking and that they pose less risk than conventional cigarettes<sup>17</sup>.

However, the report that backed the House of Commons' position was harshly criticized in an editorial in *The Lancet*<sup>18</sup> on the following grounds: non-scientific references<sup>19</sup>, few references<sup>18</sup>, problems in the formation of the groups of expert consultants<sup>18</sup>, no attention to serious caveats in one reference<sup>20</sup>, and conflicts of interests in the main reference<sup>18</sup>. This indicates the size of the controversy still surrounding these products.

In Brazil, the prevalence of e-cigarette use is very low<sup>21</sup> due to the ban since 2009. However, online marketing of these products has been common despite the ban, even large department store chains sell e-cigarettes freely to children and adolescents; and even the sanctions and fines from the by Brazilian Health Regulatory Agency (Anvisa) do not seem inhibit these stores.

Data show that the decrease in smoking rates has stagnated in Brazil. Even more serious is that smoking prevalence among young people 18 to 24 years of age in the country's state capitals increased from 7.4% to 8.5%<sup>22</sup> between 2016 and 2017.

One factor that may have contributed to the increase in the number of young smokers is the widespread marketing of e-cigarettes via internet.

Thus, these products can quickly reverse tobacco control policies if more stringent regulatory measures are not taken.

Even though the ban on electronic smoking devices may have effectively protected Brazil from the Juul epidemic among youth, stricter measures should be taken against the sale of such products, besides seeking the means to prevent large retail chains from continuing to challenge the national health authorities and to keep these products from undermining Brazil's successful tobacco control policy.

## Contributors

Both authors collaborated in the drafting and final revision of the article.

## Additional informations

ORCID: Andre Luiz Oliveira da Silva (0000-0003-4768-959X); Josino Costa Moreira (0000-0002-7457-2920).

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