



## Commentary

## Vaping: A growing global health concern

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The epidemic of teen vaping [1–3] and the outbreak of vaping-related lung injuries and deaths in the U.S. [4] underscore the urgent need to systematically regulate electronic cigarette manufacturing, marketing, and distribution. However, development of plausible and effective vaping regulations and most importantly, their enforcement are likely to present unique challenges to countries across the globe. The challenges may vary depending on the legal, regulatory, economic, and sociopolitical contexts of each nation. History has taught us that simply banning a product may not fully or properly address a 'complex' problem, and often times, comprehensive and carefully considered plans are needed to resolve such problems. Following the ratification of the 18th Amendment in 1919, which banned the production, importation, transportation, and sale of alcoholic beverages in the U.S., alcoholism rates soared during the 1920s [5]. Whilst strict enforcement of the law resulted in a substantial drop in smuggling alcohol from Canada and other countries, organized crime gangs responded by stealing tens of millions of gallons of industrial alcohol – used in paints and solvents, fuels, and medical supplies – and redistilling it to make it potable. However, the bootlegged whiskeys and gins often made people sick because the liquor produced in hidden stills frequently came tainted with metals and other impurities. Frustrated with the people's defiant response and continued consumption of banned, yet, tainted booze, the federal government ordered poisoning of the industrial alcohol manufactured in the U.S. to scare people into giving up illicit drinking. Instead, by the time Prohibition ended in 1933, the government poisoning program had killed, by some estimates, at least 10,000 people [5].

Philosopher, George Santayana, famously said: "Those who cannot remember the past are condemned to repeat it." Reflecting on historical examples, opponents of ban on electronic cigarettes argue that outlawing vaping would not only deprive smokers of a potentially less harmful alternative but it would also lead to creation of a black

market with counterfeit products whose safety, at best, might be as questionable (if not dangerous) as those currently available in the market. More likely, black-marketed unregulated vaping products might be even more problematic than the existing electronic cigarette products. The overall effects would likely be much similar to those that drove people to imbibe tainted alcohol during Prohibition. It should, however, be noted that alcohol was widely used in well-established markets before Prohibition, whereas the electronic cigarette market is still developing and mostly focused on youth and young adults. So, it is unclear whether teens and young adults would respond to vaping bans in ways similar to that observed during alcohol prohibition. In addition, in Brazil, which is one of the first countries to ban electronic cigarettes in 2009, the prevalence of vaping is considerably low, around 0.43%, and has remained steadily low for the past years [6]. It should also be acknowledged that the continued exposure of teens and young adults in other countries to aggressive marketing and alluring electronic cigarette products for more than a decade varies from the relatively limited experience of the Brazilian population with electronic cigarettes. Furthermore, electronic cigarette advocates contend that a ban on vaping might also force electronic cigarette users to switch to conventional tobacco cigarettes that are proven to kill 8 million people per year [6]. Opponent of electronic cigarettes, however, cite other lessons of history and warn officials of not making the same mistake as they did with other products, such as heroin, which was originally developed as a pain killer, and later was marketed as a safe alternative to morphine [7].

Currently, 35 million people around the world are estimated to use electronic cigarettes or "heat-not-burn" tobacco products [6,8]. Although the global market for electronic cigarettes is still small compared to tobacco cigarettes, it is growing very rapidly. Last year, worldwide sales of tobacco cigarettes reached more than \$713 billions, compared to \$15.7 billions for electronic cigarettes. By 2023, the sales of vaping products are projected to more than double to \$40 billions, while cigarette sales are expected to decline slightly [6,8]. Governments around the world are facing the predicament of how to best deal with the epidemic of vaping. An ideal solution would entail improving the public's health, as the highest priority, while avoiding compromising the nations' economy, causing social backlash or political fallout, and getting engulfed by a tsunami of litigations, most certainly, to be brought by vaping industry, tobacco companies, and other stakeholders.

Throughout the years, development of effective regulations on tobacco products leading to successful declines in smoking rates has always been intertwined with scientific breakthroughs providing

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'irrefutable' evidence on the adverse health consequences of smoking [6]. Thus, evidence-based regulations and scientifically driven recommendations on vaping will not only be more effective, sensible, and enforceable, but they will also minimize/eliminate the risk of unintended outcomes, such as inadvertently turning electronic cigarettes into a "forbidden fruit". While research data are accumulating on the adverse biological effects of electronic cigarette use [9], evidence is also emerging on the efficacy of vaping combined with behavioral therapy in helping smokers quit [10]. The existing data clearly show that vaping is not risk free. This together with the growing concern that vaping may lead to nicotine addiction and smoking, especially among youth, underscores the importance of investigating the health risks associated with vaping. The health-risk profile of vaping should be determined both relative to smoking (to inform smokers about the relative risks), and in absolute terms (to inform never-smokers of potential risks posed by vaping). Let's keep a fair and open mind while continuing our important research on the health risks or potential benefits of vaping vs. smoking.

#### Declaration of Competing Interest

Both authors (AB and ST) declare that there are no financial or non-financial conflicts of interest.

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