



# How Regulations Endanger the Public Health

## *A Review of the Evidence on E-Cigarette Risks and Benefits, and Policy Missteps*

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## *A Review of the Evidence on E-Cigarette Risks and Benefits, and Policy Missteps*

*Liam Sigaud and Steve Pociask\**

### **Executive Summary**

In just a dozen years, electronic cigarettes (e-cigarettes) and vaping products have gone from fringe novelties to mainstream products used by millions of Americans. In response to rising teen use, policymakers in many jurisdictions have justified burdensome taxes and regulations meant to mitigate this perceived public health threat. Yet, the reality is more nuanced.

With some lawmakers looking to impose additional restrictions, bans, and excessive taxes on these products, this report investigates the empirical evidence and has the following findings:

- E-cigarettes and vaping products, while not totally safe, are 95% safer than smoking;
- Studies show these products to be twice as effective in getting smokers to quit compared to other nicotine-based smoking cessation treatments;
- Excessive regulations on e-cigarettes and vapes not only ignore the prevailing scientific consensus on health risks, but they deter cigarette smokers from switching to these safer alternatives and push vapers back to the pack;
- In fact, recent statistical evidence found that raising taxes on e-cigarette users produced poor policy outcomes because they pushed e-cigarette users back to smoking, while raising tobacco prices produced effective public policy outcomes because they

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discouraged smoking and pushed smokers to safer, lifesaving products; and

- Therefore, overregulating proven harm reduction products is having serious health consequences for millions of American consumers who smoke.

The overwhelming evidence shows that e-cigarettes are far less harmful than combustible cigarettes and constitute one of the most common -- and most effective -- smoking cessation aids. However, overzealous or poorly designed restrictions on vaping, combined with misleading information about e-cigarettes' actual health risks, are deterring smokers from pursuing a potentially lifesaving alternative. Furthermore, the Federal Drug Administration (FDA) has been slow to approve these products for adult use, having approved only one line of these products to date.

This report reviews the empirical evidence, debunks common misunderstandings about e-cigarettes, discusses recent regulatory measures undertaken by federal, state, and local governments, and highlights e-cigarettes' untapped potential to mitigate the extreme harm done by combustible tobacco products.

## Introduction

E-cigarettes are devices – often resembling cigarettes, cigars, or pipes – designed to deliver nicotine to users in the form of a vapor. Just twelve or so years ago, e-cigarettes were a peripheral phenomenon in the U.S. that attracted little attention from policymakers. Since 2014, however, e-cigarettes have experienced a boom in popularity, and their growing impact on public health has generated intense debate.

The stakes are high. In 2018, 3.2% of U.S. adults (8.1 million) were e-cigarette users.<sup>1</sup> At the same time, more than 480,000 people in the U.S. die each year of smoking-related illnesses, and approximately sixteen million Americans are living with a disease caused by smoking.<sup>2</sup> If e-cigarettes can reduce smoking rates, the public health gains – particularly when compounded

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<sup>1</sup> Maria A. Villarroel, Amy E. Cha, and Anjel Vahratian, "Electronic Cigarette Use Among U.S. Adults, 2018," National Center for Health Statistics, April 2020, <https://www.cdc.gov/nchs/data/databriefs/db365-h.pdf>.

<sup>2</sup> "Smoking & Tobacco Use: Fast Facts," Centers for Disease Control and Prevention, February 6, 2019, [https://www.cdc.gov/tobacco/data\\_statistics/fact\\_sheets/fast\\_facts/index.htm](https://www.cdc.gov/tobacco/data_statistics/fact_sheets/fast_facts/index.htm).

over long periods of time – could be substantial. On the other hand, some fear that vaping’s popularity among teens could entice more young people to take up cigarette smoking.

Lawmakers and regulators around the U.S. must decide where e-cigarettes fit into a broader tobacco harm reduction strategy and what policies are appropriate to protect the public while encouraging smokers to use e-cigarettes as healthier substitutes. In some countries, particularly the United Kingdom, public health officials have embraced e-cigarettes as effective smoking cessation aids. So far, policymakers in the U.S. have adopted a far more skeptical, even hostile, stance toward e-cigarettes. The next section will look at the facts.

## Health Consequences of E-cigarette Use

Compared to non-smoking, e-cigarettes are not totally without risk. In addition to nicotine, e-cigarette vapor can potentially contain traces of heavy metals, toxic flavorings, and carcinogens. Studies of e-cigarette users have documented increased levels of oxidative stress, impaired respiratory function, and light-headedness, among other effects.<sup>3</sup>

While e-cigarettes are not without risk, experts agree that they pose a considerably lower threat to health than regular cigarettes. Since e-cigarettes do not combust tobacco, they do not produce the more dangerous tars and disease-causing gasses associated with regular cigarettes. In addition, the doses of toxins contained in e-cigarettes are typically hundreds or even thousands of times lower than in regular cigarettes.

A 2011 study in the *Journal of Health Policy* reviewed more than a dozen scientific reports and found that, other than tobacco-specific nitrosamines (TSNAs) and diethylene glycol (DEG) which were found in trace amounts in some products, “few, if any, chemicals at levels detected in electronic cigarettes raise serious health concerns.”<sup>4</sup> The study noted:

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<sup>3</sup> Charlotta Pisinger, “A systematic review of health effects of electronic cigarettes,” World Health Organization, December 2015,

[https://www.who.int/tobacco/industry/product\\_regulation/BackgroundPapersENDS3\\_4November-.pdf](https://www.who.int/tobacco/industry/product_regulation/BackgroundPapersENDS3_4November-.pdf).

<sup>4</sup> Zachary Cahn and Michael Siegel, “Electronic cigarettes as a harm reduction strategy for tobacco control: A step forward or a repeat of past mistakes?,” *Journal of Public Health Policy*, February 2011, <https://link.springer.com/article/10.1057/jphp.2010.41>.

“Although the existing research does not warrant a conclusion that electronic cigarettes are safe in absolute terms and further clinical studies are needed to comprehensively assess the safety of electronic cigarettes, a preponderance of the available evidence shows them to be much safer than tobacco cigarettes and comparable in toxicity to conventional nicotine replacement products.”<sup>5</sup>

In 2015, Public Health England conducted a systematic review of the evidence and concluded that e-cigarettes are at least ninety-five percent less harmful than conventional cigarettes.<sup>6</sup> Other health organizations, including the Royal College of Physicians,<sup>7</sup> and National Academies of Science, Engineering, and Medicine,<sup>8</sup> have acknowledged that vaping is a safer alternative for adult cigarette smokers. One 2018 study written by a team from the Georgetown University Medical Center estimated that 6.6 million lives could be saved or extended in the U.S. if cigarette smokers transitioned to e-cigarettes over the next ten years.<sup>9</sup> In short, while non-smokers would be ill-advised to take up vaping, smokers stand to reap significant health benefits from switching to e-cigarettes.

## **Misinformation About E-cigarettes’ Health Risks**

Despite the findings of prominent scientific authorities, the public remains deeply skeptical of e-cigarettes, according to data from two multiyear, nationally representative surveys—the Tobacco Products and Risk Perceptions Surveys (TPRPS) and the Health Information National Trends Surveys (HINTS).<sup>10</sup> In 2017, the TPRPS indicated that 36.4 percent of American adults believed e-cigarettes were as harmful as regular cigarettes, while 4.3

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<sup>5</sup> Ibid.

<sup>6</sup> “E-cigarettes around 95% less harmful than tobacco estimates landmark review,” Public Health England, August 19, 2015, <https://www.gov.uk/government/news/e-cigarettes-around-95-less-harmful-than-tobacco-estimates-landmark-review>.

<sup>7</sup> “Nicotine without smoke: Tobacco harm reduction,” Royal College of Physicians, April 28, 2016, <https://www.rcplondon.ac.uk/projects/outputs/nicotine-without-smoke-tobacco-harm-reduction-0>.

<sup>8</sup> “Public Health Consequences of E-Cigarettes,” National Academies of Sciences, Engineering, and Medicine, 2018, <https://www.nap.edu/catalog/24952/public-health-consequences-of-e-cigarettes>.

<sup>9</sup> David T. Levy, Ron Borland, Eric N Lindblom, et al., “Potential deaths averted in USA by replacing cigarettes with e-cigarettes,” *Tobacco Control*, 2018, <https://tobaccocontrol.bmj.com/content/27/1/18>.

<sup>10</sup> Jidong Huang, Bo Feng, Scott R. Weaver, et al., “Changing Perceptions of Harm of e-Cigarette vs Cigarette Use Among Adults in 2 US National Surveys From 2012 to 2017,” *Journal of the American Medical Association*, March 29, 2019, <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2729471>.

percent believed e-cigarettes were more harmful than regular cigarettes. The HINTS found that 55.6 percent of American adults in 2017 believed e-cigarettes were as harmful as regular cigarettes, and 9.9 percent believed e-cigarettes were more harmful.

Moreover, the proportion of U.S. adults who perceived e-cigarettes to be as harmful as or more harmful than cigarettes increased substantially from 2012 to 2017, even as countervailing scientific evidence grew.<sup>11</sup> These misperceptions were also observed in a March 2020 empirical study by Public Health England:

“Perceptions of harm from vaping among smokers are increasingly out of line with the evidence. The proportion who thought vaping was less harmful than cigarettes declined from 45% in 2014 to 34% in 2019. These misperceptions are particularly common among smokers who do not vape.”<sup>12</sup>

The public can hardly be blamed for having erroneous views given the barrage of misleading or incomplete information peddled by a host of public health organizations and even government agencies. The National Institute on Drug Abuse for Teens, for example, posts on its website, “Aren’t E-Cigs Better Than Traditional Cigarettes? We don’t know.”<sup>13</sup> On January 21, 2019, the Pennsylvania Department of Health tweeted, “E-cigarettes, e-cigs, e-hookahs, mods, vape pens or vapes—whatever you call them, they are NOT safer than other tobacco products.”<sup>14</sup>

Similarly, FDA states that “All tobacco products are harmful to your health, despite what they taste, smell, or look like,” without making any distinction between the relative risks of different products.<sup>15</sup> “Scientists have been working hard to debunk the belief that e-cigarettes

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<sup>11</sup> Ibid.

<sup>12</sup> Ann McNeill, Leonie Brose, et al, “Vaping in England: An Evidence Update Including Mental Health and Pregnancy,” Commissioned by Public Health England, March 2020, p. 13. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/869401/Vaping\\_in\\_England\\_evidence\\_update\\_March\\_2020.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/869401/Vaping_in_England_evidence_update_March_2020.pdf).

<sup>13</sup> Sara Bellum, “E-Cig Popularity on the Rise,” National Institute on Drug Abuse for Teens, November 7, 2013, <https://teens.drugabuse.gov/blog/post/e-cig-popularity-rise>.

<sup>14</sup> Michelle Minton, “Anti-E-Cigarette Puritans Put Lives at Risk,” Competitive Enterprise Institute, March 6, 2019, [https://cei.org/sites/default/files/Michelle\\_Minton\\_-\\_Anti-E-Cigarette\\_Puritans\\_Put\\_Lives\\_at\\_Risk.pdf](https://cei.org/sites/default/files/Michelle_Minton_-_Anti-E-Cigarette_Puritans_Put_Lives_at_Risk.pdf).

<sup>15</sup> “Tobacco-Related Health Fraud,” U.S. Food and Drug Administration, January 18, 2018, <https://www.fda.gov/tobacco-products/health-information/health-fraud#reference>.

are less harmful than traditional cigarettes,” the American Lung Association announced in a recent blog post, citing a study that found that nicotine from e-cigarettes can impair airway functions -- much like combustible cigarette smoking can.<sup>16</sup> The American Lung Association failed to point out e-cigarettes do not cause a host of other health issues associated with combustible cigarette smoking.

In the summer of 2019, when reports began to surface of lung injuries – including some resulting in deaths – associated with vaping products, public health authorities were slow to acknowledge that these cases were linked to black-market home brews containing harmful chemicals like vitamin E acetate and tetrahydrocannabinol (THC), as the American Consumer Institute accurately predicted at the time.<sup>17</sup> Instead, the Centers for Disease Control and Prevent (CDC) failed to release this information for months, allowing the public to conclude that conventional e-cigarette products were responsible.

Despite CDC’s eventual correction to its delay showing the cause of these lung injuries, the damage was done. Polls in early 2020 showed that sixty-six percent of people believed that legal vapes had caused these illnesses, a figure ten points higher than in September 2019.<sup>18</sup>

There is also some growing evidence that the ongoing release of advertisements exaggerating the dangers of e-cigarettes may be having adverse consequences on the public. Specifically, government-sponsored health advertisements targeting teenagers of the dangers of vaping may be heightening their curiosity and increasing the use of these products among youth.<sup>19</sup> Consumers deserve to have the right information to make decisions about their health.

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<sup>16</sup> “Another Gross Reason to Put Down the E-Cigarettes,” American Lung Association, June 27, 2019, <https://www.lung.org/about-us/blog/2019/06/another-gross-reason.html>.

<sup>17</sup> “A Vaping Ban Will Send Smokers Back to the Pack,” Liam Sigaud and Steve Pociask, *The Wall Street Journal*, September 12, 2019, <https://www.wsj.com/articles/a-vaping-ban-will-send-smokers-back-to-the-pack-11568325386>.

<sup>18</sup> Sara Wilson, “E-Cigarettes Increasingly Blamed for Lung Illnesses, as Evidence Points Elsewhere,” *Morning Consult*, February 5, 2020, <https://morningconsult.com/2020/02/05/electronic-cigarettes-increasingly-blamed-by-public-for-lung-illnesses-even-as-evidence-points-elsewhere/>.

<sup>19</sup> Michael McGrady, “Do Anti-Vaping Ads and Media Actually Encourage Youth Vaping?” *Filter Magazine*, February 26, 2020, <https://filtermag.org/ads-encourage-youth-vaping/>; and Michelle Minton, “Blame Anti-Tobacco Advocates for Youth Vaping *Epidemic*,” *Competitive Enterprise Institute*, December 20, 2019, <https://cei.org/blog/blame-anti-tobacco-advocates-youth-vaping-epidemic>.

The purveyors of this misinformation might argue that scare tactics are justified as a means of discouraging non-smokers, particularly young people, from trying e-cigarettes in the first place. But while smoking initiation through e-cigarette use is a valid concern, spreading misleading information about e-cigarette risks also discourages smokers from trying safer alternatives. In a recent article, Cheantay Jensen explains how, after replacing her smoking habit with e-cigarettes a few years ago and ridding herself of smoker’s cough and unpleasant tobacco odors, she has transitioned back to regular cigarettes, partly motivated by the belief that the products were equally harmful. “E-cigarettes are supposedly safer for you,” she says, “although in this case I may just be trading the risk of cancer for the peril of heart disease.”<sup>20</sup>

Not only does the hysteria surrounding e-cigarettes’ risks endanger smokers and jeopardize public health, but it also undermines the credibility of health authorities on other critical issues like the coronavirus and vaccines. It also undermines the public’s health. The American public deserve the truth about e-cigarettes.

## **E-cigarettes, Teens, and Smoking Initiation**

For years, many media outlets and public health organizations have been declaring an “epidemic” of e-cigarette use among adolescents. There is some truth to this: E-cigarette use among teens increased nine-fold from 2011 to 2015, but more dangerous tobacco smoking plummeted.<sup>21</sup> However, since December 2019, vaping and e-cigarettes products are only legally sold consumer at and above the age of 21.<sup>22</sup>

Politicians have often point to teen use of to justify numerous restrictions on e-cigarettes. But, while the surge in e-cigarette use among American teens is troubling, defenders of e-cigarette alarmism too often omit key contextual facts. For example, e-cigarette use among teens has declined sharply in recent years; while 27.5 percent of high schoolers surveyed in

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<sup>20</sup> Cheantay Jensen, “I’m smoking cigarettes to quit my vaping habit... Yeah, I know,” The Hi-lo, July 7, 2019, <https://lbpost.com/hi-lo/im-smoking-cigarettes-to-quit-my-vaping-habit-yeah-i-know/>.

<sup>21</sup> “E-Cigarette Use Among Youth and Young Adults,” Office of the Surgeon General, 2016, [https://e-cigarettes.surgeongeneral.gov/documents/2016\\_sgr\\_full\\_report\\_non-508.pdf](https://e-cigarettes.surgeongeneral.gov/documents/2016_sgr_full_report_non-508.pdf).

<sup>22</sup> See the FDA’s public announcement on this at <https://www.fda.gov/tobacco-products/retail-sales-tobacco-products/tobacco-21>.



2019 reported using e-cigarettes in the past month, that number plunged to 11.3 percent in 2021.<sup>23</sup> These data suggest that a singular focus on reducing teen vaping is no longer appropriate, and that the broader public health implications of e-cigarette restrictions – particularly on adult smokers – should be given more weight.

It is also crucial to distinguish between teens for whom e-cigarettes may be the first step toward combustible tobacco products and teens for whom e-cigarettes replace a pre-existing propensity for combustible products. In attempting to prevent the former, policymakers may be impeding the latter and inflicting more harm than good.

The 2015 National Youth Tobacco Survey, for example, revealed that only 0.3 percent of non-smoking adolescents regularly vaped.<sup>24</sup> A paper in the *American Journal of Preventive Medicine* found that non-smoking high school students are highly unlikely to use e-cigarettes; only six percent of twelfth graders who had never smoked had used e-cigarettes in the past thirty days, and less than one percent used e-cigarettes regularly.<sup>25</sup>

Indeed, the vast majority of regular teen vapers are current or former smokers for whom e-cigarettes are a safer alternative to the products they currently or previously used. Moreover, the substantial increase in use of e-cigarettes among middle- and high-schoolers over the last decade has coincided with a steep decline in cigarette smoking among students, as the Center Against Government Waste reports:

“...from 2011 to 2017, cigarette smoking declined by almost 50 percent among middle and high school students. For middle school students it was 2.1 percent in 2017, down from 4.3 percent in 2011. For high school students, it was 7.6 percent in 2017, down from 15.8 percent in 2011. It appears some students that

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<sup>23</sup> <https://cei.org/blog/the-youth-vaping-epidemic-has-ended-so-should-extremism-youth-centric-anti-vaping-measures/>.

<sup>24</sup> Konstantinos Farsalinos, Venera Tomaselli, and Riccardo Polosa, “Frequency of Use and Smoking Status of U.S. Adolescent E-Cigarette Users in 2015,” *American Journal of Preventive Medicine*, June 2018, [https://www.ajpmonline.org/article/S0749-3797\(18\)31626-X/fulltext](https://www.ajpmonline.org/article/S0749-3797(18)31626-X/fulltext).

<sup>25</sup> Kenneth E. Warner, “Frequency of E-Cigarette Use and Cigarette Smoking by American Students in 2014,” *American Journal of Preventive Medicine*, August 2016, <https://www.ajpmonline.org/article/S0749-3797%2815%2900782-5/abstract>.

used to engage in the risky behavior of smoking cigarettes are moving to using less risky [vaping] products.”<sup>26</sup>

This finding was bolstered with a March 2020 study released by Public Health England, an executive agency of England’s Department of Health and Social Care.<sup>27</sup> The empirically-based study concluded that underage vaping by non-smokers was rare, which supports the conclusion that the decline in smoking among teens is at least partly attributable to the rise in vaping. Debunking the teen vaping myth, the Public Health of England report states that the “Current vaping is mainly concentrated in young people who have experience of smoking. Less than one percent of young people who have never smoked are current vapers.”<sup>28</sup>

A paper published in 2018 bolsters this view. It analyzed several national datasets on smoking behavior and found that, after controlling for previous trends, the downward trajectory in both current use and more established cigarette use substantially accelerated among youth and young adults in the U.S. once vaping became popular in 2014.<sup>29</sup>

To the extent that e-cigarettes are being used by teens as a substitute for smoking, these products have a positive effect on youth. Further, since children whose parents smoke are far more likely to smoke themselves, lowering the smoking rate among adults would likely reduce smoking among teens, helping to break this generational cycle.<sup>30</sup>

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<sup>26</sup> Tom Schatz, “Comment on FDA’s Proposed Rule Regarding Tobacco Product Flavors,” Citizens Against Government Waste, July 11, 2018, <https://www.cagw.org/legislative-affairs/agency-comments/comment-fdas-proposed-rule-regarding-tobacco-product-flavors>.

<sup>27</sup> Ann McNeill, Leonie Brose, et al., “Vaping in England: An Evidence Update Including Mental Health and Pregnancy,” Commissioned by Public Health England, March 2020, [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/869401/Vaping\\_in\\_England\\_evidence\\_update\\_March\\_2020.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/869401/Vaping_in_England_evidence_update_March_2020.pdf).

<sup>28</sup> *Ibid.*, p. 11.

<sup>29</sup> David T. Levy, Kenneth E. Warner, K. Michael Cummings, et al., “Examining the relationship of vaping to smoking initiation among US youth and young adults: a reality check,” *Tobacco Control*, November 20, 2018, <https://tobaccocontrol.bmj.com/content/early/2018/10/31/tobaccocontrol-2018-054446>.

<sup>30</sup> Denise B. Kandel, Pamela C. Griesler, and Mei-Chen Hu, “Intergenerational Patterns of Smoking and Nicotine Dependence Among US Adolescents,” *American Journal of Public Health*, November 2015, <https://ajph.aphapublications.org/doi/full/10.2105/AJPH.2015.302775>.

Preventing non-smoking youth from using e-cigarettes is a worthy goal, but poorly designed policies may make it harder for teen smokers to access a safer alternative. Federal and state restrictions on e-cigarettes likely contributed to the fact that sales of cigarettes increased in 2020 for the first time in two decades.<sup>31</sup>

## Smoking Cessation: The Role of E-cigarettes

While many public health organizations remain hostile to e-cigarettes, others have begun to acknowledge that vaping can be an effective smoking cessation method. The CDC acknowledges: “E-cigarettes have the potential to benefit adult smokers who are not pregnant if used as a complete substitute for regular cigarettes and other smoked tobacco products.”<sup>32</sup>

Indeed, though e-cigarettes are not FDA-approved as smoking cessation devices, vaping is widely used by smokers in the U.S. in their efforts to quit. According to a survey conducted from 2014 to 2016, a greater percentage of smokers used e-cigarettes as a substitute for some or all combustible cigarettes compared to smokers using the nicotine patch, nicotine gum, or any other cessation aids approved by the FDA as a substitute for combustible cigarettes.<sup>33</sup>

Smokers are turning to e-cigarettes in record numbers seeking a safer source of nicotine. A peer-reviewed study in 2016 found that one-third of U.S. smokers used e-cigarettes in their last attempt to quit, and that vaping has contributed to a fifty percent increase in the rate of smokers using cessation aids.<sup>34</sup>

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<sup>31</sup> Aaron Greg, “Why cigarette sales rose last for the first time in two decades,” *The Washington Post*, October 27, 2021, <https://www.washingtonpost.com/business/2021/10/27/cigarette-sales-ftc-data/>.

<sup>32</sup> “Electronic Cigarettes,” Centers for Disease Control and Prevention, March 11, 2019, [https://www.cdc.gov/tobacco/basic\\_information/e-cigarettes/](https://www.cdc.gov/tobacco/basic_information/e-cigarettes/).

<sup>33</sup> Ralph S. Caraballo, Paul R. Shafer, Deesha Patel, et al., “Quit Methods Used by US Adult Cigarette Smokers, 2014–2016,” Centers for Disease Control and Prevention, April 2017, [https://www.cdc.gov/pcd/issues/2017/pdf/16\\_0600.pdf](https://www.cdc.gov/pcd/issues/2017/pdf/16_0600.pdf).

<sup>34</sup> Yue-Lin Zhuang, Sharon E Cummins, Jessica Y Sun, et al., “Long-term e-cigarette use and smoking cessation: a longitudinal study with US population,” *Tobacco Control*, July 3, 2016, <https://pdfs.semanticscholar.org/f22e/666734b20d102e29a2f743bcac39d5f83fe4.pdf>.

Although few scientific studies of e-cigarettes' efficacy as smoking cessation aids have been conducted, the evidence so far is promising. In a recent randomized trial, the gold standard in scientific research, British researchers recruited about nine hundred smokers who expressed an interest in quitting and randomly assigned half to use e-cigarettes and the other half to use traditional nicotine replacement products. All participants received weekly individual counseling for four weeks, and then smoking their progress in cessation was assessed after one year. Among those using e-cigarettes, eighteen percent had stopped smoking after a year, while only 9.9% of those using nicotine replacement therapy had quit – making e-cigarettes nearly twice as effective as FDA-approved smoking cessation aids.<sup>35</sup>

In 2014, researchers in Belgium introduced e-cigarettes to forty-eight smokers who had never vaped and were unwilling to quit smoking. The results showed that vaping was as effective as smoking a cigarette in reducing nicotine cravings. Eight months after the start of the study, twenty-one percent of all participants were completely abstinent from conventional cigarettes, while twenty-three percent had dramatically cut down on their smoking.<sup>36</sup>

In another U.K. study last year, researchers interviewed forty participants who had previously smoked. After being introduced to e-cigarettes, three were no longer using either tobacco or e-cigarettes, thirty-one had switched entirely to vaping, five used both tobacco and e-cigarettes, and only one was exclusively smoking. The study's authors concluded:

“E-cigarettes meet the needs of some ex-smokers by substituting physical, psychological, social, cultural and identity-related aspects of tobacco addiction. Some vapers reported that they found vaping pleasurable and enjoyable—being more than a substitute but actually preferred, over time, to tobacco smoking,” wrote the study's authors.”<sup>37</sup>

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<sup>35</sup> Peter Hajek, Anna Phillips-Waller, Dunja Przulj, et al., “A Randomized Trial of E-Cigarettes versus Nicotine-Replacement Therapy,” *New England Journal of Medicine*, February 14, 2019, <https://www.nejm.org/doi/full/10.1056/NEJMoa1808779?query=TOC>.

<sup>36</sup> Karolien Adriaens, Dinska Van Gucht, Paul Declerck, et al., “Effectiveness of the Electronic Cigarette: An Eight-Week Flemish Study with Six-Month Follow-up on Smoking Reduction, Craving and Experienced Benefits and Complaints,” *International Journal of Environmental Research and Public Health*, November 2014, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4245610/>.

<sup>37</sup> Caitlin Notley, Emma Ward, Lynne Dawkins, et al., “The unique contribution of e-cigarettes for tobacco harm reduction in supporting smoking relapse prevention,” *Harm Reduction Journal*, June 20, 2018, <https://harmreductionjournal.biomedcentral.com/articles/10.1186/s12954-018-0237-7>.

In March 2020, a report by Public Health England reported that most consumers who vape do so in order to stop smoking.<sup>38</sup> Even more significantly, however, in December of 2021, an empirically based study published in the *Journal of the American Medical Association* found smokers who originally expressed no intention of quitting smokers were eight times more likely to quit with the subsequent introduction of e-cigarettes compared smokers with no e-cigarette use.<sup>39</sup>

In addition to these academic studies, public health surveys also indicate that e-cigarettes are a healthy substitute for a deadly habit. U.S. government surveys show that 2.6 million former smokers were vapers in 2016, nearly ninety percent of whom had quit smoking in the previous five years.<sup>40</sup> In addition, current smoking rates in the U.S. are at record lows for both adolescents and adults, the culmination of a sustained, decade-long decline which closely mirrors the rise in popularity of e-cigarettes.<sup>41</sup>

Taxpayers stand to benefit as e-cigarettes replace combustible tobacco products. One study found that if all smokers on Medicaid, the federal/state health program for low-income Americans, had switched to e-cigarettes in 2012, Medicaid would have saved \$48 billion – more than ten percent of total Medicaid spending for that year – in smoking-related medical

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<sup>38</sup> Ann McNeill, Leonie Brose, et al, “Vaping in England: An Evidence Update Including Mental Health and Pregnancy,” Commissioned by Public Health England, March 2020, p. 13. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/869401/Vaping\\_in\\_England\\_evidence\\_update\\_March\\_2020.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/869401/Vaping_in_England_evidence_update_March_2020.pdf).

<sup>39</sup> Karin A. Kasza, Kathryn C. Edwards, et. al., “Association of e-Cigarette Use with Discontinuation of Cigarette Smoking Among Adult Smokers Who Were Initially Never Planning to Quit, *Journal of the American Medical Association*, December 28, 2021, <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2787453>.

<sup>40</sup> Brad Rodu, “2016 CDC Data Shows E-Cigarette Use Declines Again,” *Tobacco Truth*, September 27, 2017, <https://rodutobaccotruth.blogspot.com/2017/09/2016-cdc-data-shows-e-cigarette-use.html>.

<sup>41</sup> William T. Godshall, Comments to the Food and Drug Administration Center for Tobacco Products, Consumer Advocates for Smoke-free Alternatives Association, December 2015, <http://www.casaa.org/wp-content/uploads/GodshallFDAcomment-December-2015.pdf>.

treatment.<sup>42</sup> Another analysis calculated that if just one percent of smokers permanently switched to e-cigarettes, Medicaid would save \$2.8 billion over 25 years.<sup>43</sup>

## Public Policy Implications

The rise of e-cigarette use in the U.S. has attracted regulations from all levels of government. While well-intentioned, many of these laws may be doing more harm than good. After declaring in 2014 that it considered e-cigarettes to be tobacco products and therefore within its regulatory purview, the FDA took seven years to approve the first vaping products for marketing and sale in the U.S.<sup>44</sup> In the midst of what still appears to be foot-dragging by the FDA, to date, the Vuse Solo in tobacco flavor remains the only e-cigarette product approved.<sup>45</sup> This delay in the approval process by the FDA creates a regulatory obstacle for smokers who want to cut back and end tobacco smoking, therefore increasing the public health risk that ignited tobacco products pose to millions of consumers.

These delays created so much legal uncertainty that some vaping manufacturers withdrew from the market, leaving more consumers smoking, but these delays may have spurred an underground market that sells potentially unsafe products to the public, as well as the exploitation of a loophole for unregulated synthetic products. The agency has been so slow in issuing clear directions for the industry that federal courts had to intervene, and consumers are worse off due to the delay.<sup>46</sup>

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<sup>42</sup> J. Scott Moody, "E-Cigarettes Poised to Save Medicaid Billions," Heartland Institute, March 31, 2015, [https://www.heartland.org/\\_template-assets/documents/publications/20150331\\_sbsmediadecigarettes033115.pdf](https://www.heartland.org/_template-assets/documents/publications/20150331_sbsmediadecigarettes033115.pdf).

<sup>43</sup> Richard B. Belzer, "Expected Savings to Medicaid for Substituting Electronic for Tobacco Cigarettes," R Street Institute, December 2017, <http://2o9ub0417chl2lg6m43em6psi2i.wpengine.netdna-cdn.com/wp-content/uploads/2018/01/124-6.pdf>.

<sup>44</sup> U.S. Food and Drug Administration, "FDA Permits Marketing of E-Cigarette Products, Marking First Authorization of Its Kind by the Agency," October 12, 2021, <https://www.fda.gov/news-events/press-announcements/fda-permits-marketing-e-cigarette-products-marking-first-authorization-its-kind-agency>.

<sup>45</sup> Ibid.

<sup>46</sup> Jacob Sullum, "Since the FDA Has Not Approved Any Vaping Products, All of Them Are Now 'Subject to Enforcement Action'," *Reason*, September 12, 2021, <https://reason.com/2021/09/12/since-the-fda-has-not-approved-any-vaping-products-all-of-them-are-now-subject-to-enforcement-action/>.

## **1. Limits on E-liquid Flavors and Teen Use**

Some policymakers worry that the proliferation and aggressive marketing of flavored e-cigarettes may attract young non-smokers. There is little evidence to support this concern, except for one study found that flavors could entice youth to initiate using e-cigarettes.<sup>47</sup> As a result, efforts to ban or restrict flavored e-liquids have gained momentum. In February 2020, the federal government implemented a ban on all flavored closed e-cigarette cartridges (such as those manufactured by JUUL), except for tobacco and menthol.<sup>48</sup> While the federal ban does not affect refillable vaping devices, other jurisdictions have gone further. In November 2019, Massachusetts became the first state to restrict the sale of all flavored tobacco products; and in 2020, New Jersey, New York, and Rhode Island enacted their own bans.<sup>49</sup> At least 335 localities have imposed their own limits on flavored e-cigarette sales.<sup>50</sup>

It is worth noting that the prevalence of flavored vaping, beyond experimentation, is relatively small among teens, according to a newly released annual study funded by the National Institutes of Health and conducted by the University of Michigan.<sup>51</sup> That study found only 0.8% of high school seniors reported a daily use of flavored vaping products in 2021. In terms of any use over the last twelve months, according to the same data, 11.7% of high school seniors reported using flavored vaping products, compared to 28.8% of seniors reported being drunk, and 33.2% of seniors reported using an illicit drug (including inhalants).<sup>52</sup> The urgency and risk associated with the teen use of flavored vaping, while concerning, seems a little

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<sup>47</sup> "E-Cigarette Use Among Youth and Young Adults," Office of the Surgeon General, 2016, [https://www.cdc.gov/tobacco/data\\_statistics/sgr/e-cigarettes/pdfs/2016\\_sgr\\_entire\\_report\\_508.pdf](https://www.cdc.gov/tobacco/data_statistics/sgr/e-cigarettes/pdfs/2016_sgr_entire_report_508.pdf).

<sup>48</sup> Erika Edwards, "Federal flavor ban goes into effect Thursday, but many flavored vape products will still be available," NBC News, February 5, 2020, <https://www.nbcnews.com/health/vaping/federal-flavor-ban-goes-effect-thursday-many-flavored-vape-products-n1130466>.

<sup>49</sup> Laura Bach, "States & Localities That Have Restricted the Sale of Flavored Tobacco Products," Campaign for Tobacco-Free Kids, October 20, 2021, <https://www.tobaccofreekids.org/assets/factsheets/0398.pdf>.

<sup>50</sup> Ibid.

<sup>51</sup> "Monitoring the Future," National Institute for Drug Abuse, National Institutes of Health, conducted by the University of Michigan, December 2021, news release available here -- <https://www.drugabuse.gov/news-events/news-releases/2021/12/percentage-of-adolescents-reporting-drug-use-decreased-significantly-in-2021-as-the-covid-19-pandemic-endured>, and statistical tables available here -- <http://monitoringthefuture.org/data/21data.htm>.

<sup>52</sup> Ibid.

misplaced compared to the prevalence of use of more dangerous products, including tobacco smoking, by teens.

While well-intentioned, restricting the availability of e-liquid flavors could have unintended consequences. A survey of non-smoking teens in 2015 found that they had very low interest in e-cigarettes (0.4 on a 0-10 scale, on average), and the availability of different flavors had no impact on their level of interest. The study also found that interest in e-cigarettes among adult smokers did vary by flavor, suggesting that sweeping measures to reduce the availability of flavored e-cigarettes might impose high costs on adult smokers and deliver few benefits to teen non-smokers.<sup>53</sup>

Meanwhile, a survey of young adults who use both e-cigarettes and combustible cigarettes indicated that bans on e-liquid flavors would lead to reductions in e-cigarette use and simultaneous increases in combustible cigarette use.<sup>54</sup> Researchers at Yale University surveyed a nationally-representative sample of 2,031 adult smokers and recent quitters and found that a ban on all flavored tobacco products would cause e-cigarette use to decline by 7.9 percent, combustible cigarette use to increase by 2.7 percent, and non-smoking to increase by 5.2 percent.<sup>55</sup> Another recent study found that a flavor ban would cause 17.1 percent of adult e-cigarette users to stop vaping and smoke instead.<sup>56</sup>

When denied their first choice of flavored e-cigarettes, vapers split between choosing combustible cigarettes and kicking the habit entirely. If e-cigarettes and combustible cigarettes were equally harmful, then the tradeoff might make sense. But they are not. As noted above,

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<sup>53</sup> S. Shiffman, M. A. Sembower, J. L. Pillitteri, et al., “The Impact of Flavor Descriptors on Nonsmoking Teens' and Adult Smokers' Interest in Electronic Cigarettes,” Society for Research on Nicotine and Tobacco, October 2015, <https://www.ncbi.nlm.nih.gov/pubmed/25566782>.

<sup>54</sup> Lauren R. Pacek, “What Would You Do If...?: Analysis of Young Adult Dual User’s Anticipated Responses to Hypothetical E-cigarette Market Restrictions,” Duke University, 2017, [https://www.rti.org/sites/default/files/related-content-files/pacek\\_ppt.pdf](https://www.rti.org/sites/default/files/related-content-files/pacek_ppt.pdf).

<sup>55</sup> J. Buckell, J., Marti, and J.L. Sindelar, “Should flavours be banned in cigarettes and e-cigarettes? Evidence on adult smokers and recent quitters from a discrete choice experiment.” Tobacco Control, September 2017, [https://www.nber.org/system/files/working\\_papers/w23865/w23865.pdf](https://www.nber.org/system/files/working_papers/w23865/w23865.pdf).

<sup>56</sup> S. Gravely, D. M. Smith, A. C. Liber, K. M. Cummings, K. A. East, D. Hammond, D., et al. “Responses to potential nicotine vaping product flavor restrictions among regular vapers using non-tobacco flavors: Findings from the 2020 ITC Smoking and Vaping Survey in Canada, England and the United States.” *Addictive Behaviors*, February 2022, <https://www.sciencedirect.com/science/article/pii/S0306460321003373>.



prominent scientific bodies estimate that combustible cigarettes are up to twenty times more dangerous than e-cigarettes. While flavor bans may carry modest health benefits for e-cigarette users who respond by abandoning tobacco products entirely, their gain is outweighed by the harms to e-cigarette users who switch to combustible cigarettes.

Another study published in the *Journal of Harm Reduction* in 2018 found that U.S. adults who frequently used e-cigarettes and had “completely switched from smoking cigarettes to using e-cigarettes” were much more likely to have started their “e-cigarette use with non-tobacco flavors and to have transitioned from tobacco to non-tobacco flavors over time.”<sup>57</sup> The study concluded that actions to limit smokers’ access to vaping and e-cigarette flavors could discourage tobacco smokers from transitioning to safer noncombustible products.”<sup>58</sup>

Despite all of this evidence, laws to discourage e-cigarette use have cropped up everywhere, from restrictions on retailers to higher taxes and flavor bans. In fact, in June 2019, San Francisco went even further, effectively banning e-cigarettes entirely.<sup>59</sup>

## **2. Taxes**

More than a dozen states have implemented special taxes on e-cigarettes, typically in order to bring them in line with taxes on combustible tobacco products.<sup>60</sup> But while tax parity might seem fair, proposals to jack up prices on e-cigarettes threaten to undermine policymakers’ broader goals of improving public health.

The primary objective of high taxes on tobacco products is to reduce consumer demand and curb the significant costs, including nearly \$170 billion in direct medical care and more than

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<sup>57</sup> Mitchell Nides, Tiffany Dickson, Neil McKeganey, et al., “Changing Patterns of First E-Cigarette Flavor Used and Current Flavors Used by 20,836 Adult Frequent E-Cig Users,” *Harm Reduction Journal*, June 28, 2018, <https://harmreductionjournal.biomedcentral.com/articles/10.1186/s12954-018-0238-6>.

<sup>58</sup> Ibid.

<sup>59</sup> Michael Nedelman, “San Francisco passes ban on e-cigarette sales, a US first,” CNN, June 25, 2019, <https://www.cnn.com/2019/06/25/health/san-francisco-e-cigarette-ban-sales-bn/index.html>.

<sup>60</sup> “States with Laws Taxing E-Cigarettes,” June 15, 2019, Mitchell Hamline School of Law: Public Health Law Center, <https://www.publichealthlawcenter.org/sites/default/files/States-with-Laws-Taxing-ECigarettes-June152019.pdf>.

\$156 billion in lost productivity, associated with smoking.<sup>61</sup> Cigarette taxes, like other “sin taxes,” aim to change consumer behavior and mitigate the spillover effects of harmful habits.

Imposing similar taxes on e-cigarettes runs counter to this logic, since the aggregate public health impact of e-cigarettes, compared to smoking, is positive. For example, a recent study found that, even under pessimistic assumptions, e-cigarettes will deliver significant public health benefits over the next half-century, extending the aggregate longevity of the U.S. population by 580,000 years.<sup>62</sup>

Consumers are sensitive to price. Economists estimate that a 10% increase in price reduces sales of disposable e-cigarettes by approximately 12%, and by about 19% for reusable e-cigarettes.<sup>63</sup> Discouraging e-cigarette use, however, comes at a cost. A study of more than one million American adolescents from 2010 to 2019 found that high e-cigarette tax rates cause large increases in combustible cigarette smoking. The authors concluded: “the unintended effects of [e-cigarette] taxation may more than fully offset any public health gains.”<sup>64</sup>

Another analysis estimated that a national e-cigarette tax of \$1.65 per milliliter of vaping liquid (in line with proposals that have been floated in the U.S. House of Representatives) would raise the proportion of adults who smoke cigarettes daily by approximately one percentage point, translating to 2.5 million additional adult daily smokers.<sup>65</sup>

In addition, these taxes are regressive, pushing additional costs to lower-income consumers. In the face of higher costs, some consumers are attracted to an underground

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<sup>61</sup> “Economic Trends in Tobacco,” Centers for Disease Control and Prevention, July 23, 2019, [https://www.cdc.gov/tobacco/data\\_statistics/fact\\_sheets/economics/econ\\_facts/index.htm](https://www.cdc.gov/tobacco/data_statistics/fact_sheets/economics/econ_facts/index.htm).

<sup>62</sup> K. E. Warner and D. Mendez, “E-cigarettes: Comparing the Possible Risks of Increasing Smoking Initiation with the Potential Benefits of Increasing Smoking Cessation,” *Nicotine and Tobacco Research*, 2019, <https://www.ncbi.nlm.nih.gov/pubmed/29617887>.

<sup>63</sup> Frank J. Chaloupka, “Taxing E-Cigarettes—Options & Potential Impact,” Council of State Governments Policy Workshop, December 12, 2015, <https://knowledgecenter.csg.org/kc/system/files/Chaloupka.pdf>.

<sup>64</sup> Abouk, R., Courtemanche, C. J., Dave, D. M., Feng, B., Friedman, A. S., Maclean, J. C., et al. “Intended and Unintended Effects of E-cigarette Taxes on Youth Tobacco Use,” September 2021, National Bureau of Economic Research, [https://www.nber.org/system/files/working\\_papers/w29216/w29216.pdf](https://www.nber.org/system/files/working_papers/w29216/w29216.pdf). A more recent study will be discussed in the next section.

<sup>65</sup> M. F. Pesko, C. J. Courtemanche, J. C. Maclean, “The effects of traditional cigarette and e-cigarette tax rates on adult tobacco product use,” *Journal of Risk and Uncertainty*, July 2020, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7880200/>.

economy that peddles potentially unsafe products to consumers. That also means that government jurisdictions that look to increase revenues from these taxes are bypassed altogether.

E-cigarette taxes also reduce smoking cessation by making safer alternatives more expensive. A recent study in Minnesota – the first state to impose a tax on e-cigarettes in 2010 – found that if e-cigarettes were taxed at the same rate as combustible cigarettes throughout the U.S., 2.75 million current smokers would be deterred from quitting over a ten-year period.<sup>66</sup>

### **3. Policy Effectiveness from Imposing Onerous Regulations**

Some policymakers may believe that the imposition of onerous regulations, restrictions, bans, and taxes are effective in reducing the number of e-cigarette and vape users, but what is the impact on e-cigarette use and smoking tobacco?

Answering this question requires determining whether e-cigarettes and cigarette products represent economic substitutes or complementary goods for each other. An extensive and very recent statistical study by a team of economists found a one percent increase in e-cigarette prices would lead to nearly a one-half percent increase of the much larger market for cigarette sales – effectively pushing most e-cigarette users back to the pack. This is consistent with other studies referenced earlier in our report, and it shows that this policy approach produces unquestionably poor health outcomes for American consumers. This is an approach that policymakers should regret.<sup>67</sup>

Conversely, the same study found that a one percent increase in cigarette prices would lead to over a one percent increase in e-cigarette sales.<sup>68</sup> In other words, public policy can

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<sup>66</sup> H. Saffer, D. Dench, M. Grossman, and D. Dave, “E-cigarettes and adult smoking: Evidence from Minnesota,” *Journal of Risk and Uncertainty*, December 2019, [https://www.nber.org/system/files/working\\_papers/w26589/w26589.pdf](https://www.nber.org/system/files/working_papers/w26589/w26589.pdf).

<sup>67</sup> Chad D. Cotti, Charles J. Courtemanche, et al, “The Effects of E-Cigarette Taxes on E-Cigarette Prices and Tobacco Product Sales: Evidence from Retail Panel Data,” National Bureau of Economic Research, Cambridge, MA, revised April 2021, p. 29, <https://www.nber.org/papers/w26724>.

<sup>68</sup> *Ibid*, p. 29.

encourage many tobacco smokers to move to safer products – products that have a better track record of cessation from smoking.

Based on these cross-elastic effects, public policy could be better directed to saving lives by leading smokers to safer products, rather than encouraging them to smoke or drawing them to an underground that peddles unsafe e-cigarette and vaping products. Taxing e-cigarette products is not an effective public policy tool, because it does not encourage smokers to quit and does not improve the safety of consumers. One plausible explanation for the imposition of these taxes is to raise revenue, even at the cost of American lives.

Based on the findings that e-cigarettes are economic substitutes for smoking, and coupled with the comparative health risks between smoking and vaping products, consumers will go back to smoking when faced with increased regulations, restrictions, bans, and higher taxes. While higher taxes and regulations on e-cigarettes may have the beneficial effect of discouraging some nonsmoking teens from vaping, they also deter cigarette smokers from switching to these safer alternatives, which will unquestionably cost lives.

## Conclusion

In many U.S. jurisdictions, policymakers have been openly hostile to e-cigarettes, casting them as dangerous gateways to tobacco smoking. This comes despite overwhelming evidence on the health benefits resulting from e-cigarettes as an effective tobacco harm reduction tool.

While some targeted regulatory actions to discourage non-smoking teens from taking up vaping can be justified, the demonization of e-cigarettes in the U.S. is counterproductive. As part of a tobacco harm reduction strategy, the potential public health benefits from e-cigarettes are substantial. As noted earlier, a 2018 study in the journal *Tobacco Control* projected that if cigarette use were largely replaced by vaping over a 10-year period in the U.S., it would prevent as many as 6.6 million premature deaths.<sup>69</sup>

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<sup>69</sup> David T. Levy, Ron Borland, Eric N. Lindblom, et al., “Potential deaths averted in USA by replacing cigarettes with e-cigarettes,” *Tobacco Control*, 2018, <https://tobaccocontrol.bmj.com/content/27/1/18>.

In summary, without vaping and e-cigarette products as tobacco harm reduction tools at consumers' disposal, smokers will be left without arguably the most potent smoking cessation treatment on the market, limiting their ability to quit smoking and enjoy the numerous health benefits of a smoke-free lifestyle. Instead, policymakers from municipalities to the federal government have sought to impose onerous and unreasonable restrictions on e-cigarettes and vaping products.

Too often, policymakers have acted without carefully weighing the costs and benefits of their actions. Knee-jerk opposition to e-cigarettes, often fueled by misleading information, curbs their use as a smoking cessation aid that could benefit millions of Americans. It is for time policymakers follow the science and allow adult consumers to access to these lifesaving products.