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UNPACKING THE UNINTENDED CONSEQUENCES OF E-CIGARETTE POLICY IN THE NORTHEAST

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EXECUTIVE SUMMARY

From the time they were first introduced into the market, e-cigarettes have been at the center of a public health debate about their value as smoking-cessation devices versus their appeal to adolescents and potential youth uptake. Since 2019, elected officials in the Northeastern region of the United States—defined herein as Maryland to Maine—have put more weight on the risk of the latter, enacting regulations and legislation that aim to quell youth uptake. Primarily, these states have enacted some legislative combination of restricting access to flavored liquids in e-cigarettes, capping the amount of nicotine in e-cigarette liquids and raising excise taxes on e-cigarettes.

Unfortunately, each of these strategies has the potential unintended consequence of driving former combustible cigarette users back to combustibles, which presents far greater risks than using e-cigarettes. Public health is best served when there are a variety of significantly less harmful alternatives to combustible cigarettes, and Northeast

CONTENTS

Executive Summary	1
Introduction	1
Comparing the Harms of E-cigarettes to Combustibles	2
E-cigarette Policy in the Northeast	3
Flavor Bans	3
Nicotine Caps	5
Tax-Related Issues	5
Impacts of Policy	7
Consequences of Flavored E-cigarette Bans	7
Effects of Nicotine Caps	8
Repercussions of High Excise Taxes on E-cigarettes	8
Conclusion	9
About The Authors	9

TABLE 1: Comparison of Current Tax Rates on E-cigarettes, Combustible Cigarettes and Non-combustible Tobacco in Northeast States	6
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legislators should carefully consider the unintended negative health consequences of impeding the transition from combustibles to e-cigarettes.

INTRODUCTION

The innovators behind the modern e-cigarette—also called “electronic nicotine delivery systems” (ENDS)—originally intended to fundamentally alter the relationship between nicotine and combustible cigarettes.¹ They set out not to benefit the “big tobacco” industry, but to disrupt it, offering a product that delivered nicotine more cleanly and without the carcinogenic side effects of combustible tobacco products.

It took only a few short years and various innovations for e-cigarettes to begin flying off the shelves. While many landed in the hands of adult smokers, as intended, and offered a less harmful alternative to combustible cigarettes, some found their way to adolescents. Steps were rightly taken to limit both the accessibility and desirability of e-cigarettes to young people who had never used nicotine before, including raising the age of any nicotine purchase to 21 years and educating students on the addictive quality of these prod-

1. Martinne Geller, “E-cigs a ‘consumer-driven’ revolution born from a bad dream,” *Reuters*, June 9, 2015. <https://www.reuters.com/article/us-ecigarettes-inventor/e-cigs-a-consumer-driven-revolution-born-from-a-bad-dream-idUSKBN00-PIYV20150609>; Marie C. Baca, “How two Stanford grads aimed for Big Tech glory and got Big Tobacco instead,” *The Washington Post*, Sept. 4, 2019. <https://www.washingtonpost.com/technology/2019/09/04/how-two-stanford-grads-aimed-big-tech-glory-got-big-tobacco-instead>.

ucts.² Early indicators suggest that these policies have been successful in reducing teen vaping: The percentage of teens vaping appears to have peaked in 2019 at 27.3 percent and has since declined to 11.3 percent in the most recent 2021 figures.³ Importantly, though, these policies are still relatively new and should be considered within the context of the COVID-19 pandemic, during which many students attended school virtually and did not have access to the environment where vaping often begins.⁴

Still, these decreasing trends do not support the narrative of a growing vaping crisis among youth that continues to be used by elected officials to enact restrictive policies on products at the federal, state and local levels. Although these policies are well intentioned—adolescents should not use nicotine products at all—they are blunt instruments that have little effect on youth vaping. Instead, such policies inhibit easy access to reduced-risk products for adult cigarette smokers who would benefit from transitioning to less harmful nicotine products.

State legislators in the Northeast region of the United States took particularly strong action to regulate e-cigarettes, even to the extent of removing many of these products from shelves.⁵ Their strategies to quell youth uptake of e-cigarettes resulted in three distinct approaches:

- Banning the sale of flavored e-cigarettes
- Capping the amount of nicotine in e-liquids
- Levying state excise taxes that are at parity with or higher than those levied on combustible tobacco products (e.g., cigarettes) or non-combustible tobacco products (e.g., chewing tobacco)

Unfortunately, because each of these approaches lowers the relative draw of e-cigarettes compared to combustible cigarettes for smokers, they may unintentionally result in worse health outcomes.

COMPARING THE HARMS OF E-CIGARETTES TO COMBUSTIBLES

A number of U.S. and international public health agencies (e.g., U.S. Food and Drug Administration [FDA]; National Academies of Science, Engineering and Medicine; Royal College of Physicians; and UK Health Security Agency) have recognized that e-cigarettes are significantly less harmful than combustible cigarettes; on the risk spectrum of such products, they sit on the lower end near traditional nicotine replacement therapies.⁶ In fact, the National Health Service (NHS), England's publicly funded healthcare system, specifically endorses these products as tools for smoking cessation.⁷ In addition, Public Health England and the UK Health Security Agency estimate that e-cigarettes are unlikely to surpass 5 percent of the risk associated with combustible cigarettes.⁸

This significant drop in associated risk comes from the way e-cigarettes provide nicotine. Rather than burning tobacco leaves and releasing over 7,000 chemicals—more than 70 of which are carcinogenic—e-cigarettes work by heating a nicotine-containing liquid, which is then inhaled to satisfy a nicotine craving without releasing the harmful chemicals found in smoke.⁹ In fact, the innovation of e-cigarette technology was driven by the goal of providing a less harmful way to satisfy a smoker's urge for nicotine than combustible cigarettes.¹⁰

When used exclusively, e-cigarettes are highly effective smoking-cessation devices. Studies have found that e-cigarette users are more likely to attempt to quit using combustibles than those who use traditional nicotine replacement therapy and are nearly twice as likely to sustain

2. Healthy Children, "Raising the Legal Age to Buy Tobacco," American Academy of Pediatrics, March 31, 2021. <https://www.healthychildren.org/English/ages-stages/teen/substance-abuse/Pages/Raise-the-Tobacco-Buying-Age-to-21.aspx>; "Youth Vaping Prevention & Resources to Quit," truth initiative, last accessed April 18, 2022. <https://truthinitiative.org/curriculum>.

3. Matt Richtel, "Youth Vaping Declined Sharply for Second Year, New Data Show," *The New York Times*, Sept. 30, 2021. <https://www.nytimes.com/2021/09/30/health/youth-vaping-decline.html>.

4. "Teen vaping study reveals how schools influence e-cigarette use, outlines prevention strategies," CU Denver News, Sept. 29, 2019. <https://news.ucdenver.edu/teen-vaping-study-reveals-how-schools-influence-e-cigarette-use-outlines-prevention-strategies>.

5. David Clement and Yaël Ossowski, "United States Vaping Index," Consumer Choice Center, September 2020. <https://consumerchoicecenter.org/wp-content/uploads/2020/09/US-Vaping-Index.pdf>.

6. "FDA announces comprehensive regulatory plan to shift trajectory of tobacco-related disease, death," U.S. Food & Drug Administration, July 27, 2017. <https://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm568923.htm>; See, e.g., Kathleen Stratton et al., eds. *The Public Health Consequences of E-Cigarettes*, (National Academies of Science, Engineering and Medicine, 2018). <http://nationalacademies.org/hmd/reports/2018/public-health-consequences-of-e-cigarettes.aspx>; See, e.g., Tobacco Advisory Group, "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>; Health & Wellbeing Directorate, "E-cigarettes: a new foundation for evidence-based policy and practice," Public Health England, August 2015. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/454517/E-cigarettes_a_firm_foundation_for_evidence_based_policy_and_practice.pdf.

7. "Using e-cigarettes to stop smoking," National Health Service, last accessed March 22, 2022. <https://www.nhs.uk/oneyou/for-your-body/quit-smoking/using-e-cigarettes-vapes-to-quit-smoking>.

8. Tobacco Advisory Group. <https://www.rcplondon.ac.uk/projects/outputs/nicotine-without-smoke-tobacco-harm-reduction-0>.

9. "Chemicals in Cigarettes: From Plant to Product to Puff," U.S. Food & Drug Administration, June 3, 2020. <https://www.fda.gov/tobacco-products/products-ingredients-components/chemicals-cigarettes-plant-product-puff>.

10. Geller. <https://www.reuters.com/article/us-ecigarettes-inventor/e-cigs-a-consumer-driven-revolution-born-from-a-bad-dream-idUSKBN0OPIYV20150609>.

their abstinence.¹¹ As the U.S. Centers for Disease Control and Prevention (CDC) acknowledges, studies suggest that among smokers, more frequent use of e-cigarettes is correlated with greater cessation of combustibles.¹² Additionally, study authors of a review on the use of e-cigarettes for smoking cessation reported moderate confidence that nicotine-containing e-cigarettes help more people stop smoking than nicotine replacement therapy or nicotine-free e-cigarettes.¹³

Since 2017, the FDA has recognized that nicotine products exist on a continuum of risk to public health, with combustible cigarettes being at the highest end and e-cigarettes being on the lower end.¹⁴ To rigorously assess these risks, especially given the relative novelty of these products, and to better protect public health, the FDA established two regulatory processes—the Premarket Tobacco Product Application (PMTA) and the Modified Risk Tobacco Product—to review and certify products as reduced risk compared to combustible cigarettes.¹⁵ Despite these certifications, policymakers continue to restrict these products.

E-CIGARETTE POLICY IN THE NORTHEAST

The principles of harm reduction recognize that because risky behaviors cannot be eliminated at the population level, policymakers should encourage alternative products or behaviors that result in fewer harms. When e-cigarettes are examined under this lens, it is clear that state policies and regulations should encourage adult smokers to transition from combustible cigarettes to e-cigarettes. However, since 2019, policymakers in the Northeast have imposed strict regulations on these products—sometimes stricter than those imposed on combustible cigarettes.¹⁶

Much of this regulatory push has been driven by concerns over youth uptake of e-cigarettes, which peaked in fall 2019 during an outbreak of lung illnesses initially linked to vaping but later attributed to counterfeit tetrahydrocannabinol (THC) vapes containing vitamin E acetate.¹⁷ Still, policymakers in the Northeast cited the lung illness when they advocated for urgency in passing stringent regulations on vaping products.¹⁸ Even after studies tied the lung injuries to illicit cannabis products rather than traditional e-cigarettes, Northeast legislators continued to use youth injury as the primary justification for a prohibitionist legislative and regulatory model for e-cigarettes.¹⁹

Flavor Bans

Currently, the most common strategy to decrease youth uptake of e-cigarettes is to ban products with any characterizing flavor other than tobacco, though the extent of the bans imposed varies slightly by type of e-cigarettes. E-cigarettes function by using one of two systems: open systems, which feature a large tank that users fill with e-liquid, and closed systems, which contain a pre-filled cartridge in a disposable device or a replaceable, pre-filled cartridge.²⁰ In late 2019 and early 2020, the federal government prohibited the sale of non-disposable, cartridge-based e-cigarettes with any flavoring except tobacco or menthol based on concerns that these products, more than others, appealed specifically to youth.²¹ Flavored, disposable e-cigarettes and flavored e-liquid for open-tank systems remain on the market federally, though any e-cigarette product that has not filed a PMTA with the FDA is being marketed illegally.²²

At the state level, however, Massachusetts, New Jersey, Rhode Island, and New York have all enacted flavor bans on both open and closed systems through either regulation

11. Shu-Hong Zhu et al., “E-cigarette use and associated changes in population smoking cessation: evidence from US current population surveys,” *The BMJ* 358 (July 26, 2017). <https://www.bmj.com/content/358/bmj.j3262>; Peter Hajek et al., “A Randomized Trial of E-Cigarettes versus Nicotine-Replacement Therapy,” *The New England Journal of Medicine* 380:7 (Feb. 14, 2019), pp. 629-637. <https://www.nejm.org/doi/full/10.1056/nejmoa1808779>.

12. “Adult Smoking Cessation—The Use of E-Cigarettes,” Centers for Disease Control and Prevention, Jan. 23, 2020. https://www.cdc.gov/tobacco/data_statistics/sgr/2020-smoking-cessation/fact-sheets/adult-smoking-cessation-e-cigarettes-use/index.html#:~:text=Some%20research%20suggests%20that%20using,cessation%20than%20less%20frequent%20use.

13. J. Hartmann-Boyce et al., “Can electronic cigarettes help people stop smoking, and do they have any unwanted effects when used for this purpose?,” *Cochrane*, Sept. 14, 2021. https://www.cochrane.org/CD010216/TOBACCO_can-electronic-cigarettes-help-people-stop-smoking-and-do-they-have-any-unwanted-effects-when-used.

14. “FDA announces comprehensive regulatory plan to shift trajectory of tobacco-related disease, death.” <https://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm568923.htm>.

15. Mazen Saleh and Pritika Kumar, “The Folly of the ‘Build Back Better’ Plan’s Nicotine Tax,” *National Review*, Nov. 15, 2021. <https://www.nationalreview.com/2021/11/the-folly-of-the-build-back-better-plans-nicotine-tax>.

16. Public Health Law Center, “U.S. E-Cigarette Regulation: A 50-State Review,” Mitchell Hamline School of Law, Dec. 15, 2021. <https://www.publichealthlawcenter.org/sites/default/files/inline-files/ECigarette-Legal-Landscape-Dec15-2021.pdf>.

17. “Outbreak of Lung Injury Associated with the Use of E-Cigarette, or Vaping, Products,” Centers for Disease Control and Prevention, Feb. 25, 2020. https://www.cdc.gov/tobacco/basic_information/e-cigarettes/severe-lung-disease.html.

18. Amanda Hoover, “A ban on flavored vapes devastated N.J. shops. New study shows it might make vaping riskier,” *NJ.com*, Sept. 11, 2020. <https://www.nj.com/healthfit/2020/09/a-ban-on-flavored-vaping-devastated-nj-shops-new-study-shows-it-might-be-for-nothing.html>.

19. Colin Poitras, “Rates of E-cigarette and Marijuana Use Not Associated With Larger Outbreaks of Vaping-Related Lung Injuries, YSPH Study Finds,” *Yale School of Public Health*, Aug. 25, 2020. <https://ysph.yale.edu/news-article/26879>; Nicole Leonard, “‘Time is running out’: Connecticut advocates push for ban on flavored vaping products,” *Connecticut Public Radio*, March 14, 2022. <https://www.ctpublic.org/news/2022-03-14/time-is-running-out-connecticut-advocates-push-for-ban-on-flavored-vaping-products>.

20. Caroline Chen et al., “E-Cigarette Design Preference and Smoking Cessation: A U.S. Population Study,” *American Journal of Preventive Medicine* 51:3 (September 2016), pp. 356-363. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4992632>.

21. “FDA finalizes enforcement policy on unauthorized flavored cartridge-based e-cigarettes that appeal to children, including fruit and mint,” U.S. Food & Drug Administration, Jan. 2, 2020. <https://www.fda.gov/news-events/press-announcements/fda-finalizes-enforcement-policy-unauthorized-flavored-cartridge-based-e-cigarettes-appeal-children>.

22. *Ibid.*

or legislation.²³ Massachusetts first banned these products temporarily in 2019, which was followed by a Department of Health order in December that year, before Gov. Charlie Baker signed legislation in June 2020 that permanently ended the sale of any flavored tobacco product, including e-cigarettes, in the state.²⁴ The flavor ban in Massachusetts, as of this writing, is considered to be the most comprehensive in the country. New Jersey signed legislation in January 2020 that banned flavored e-cigarettes but not menthol-flavored combustibles, which remain on the market despite legislation introduced in subsequent years to ban their sale as well.²⁵ Former Rhode Island Gov. Gina Raimondo used the Department of Health to enact an emergency e-cigarette flavor ban in March 2020 that still stands as of this writing.²⁶ New York followed with a legislative ban on flavored e-cigarettes effective May 2020, notably also leaving menthol-flavored tobacco products on the market.²⁷

Similarly, in 2020, Maryland Comptroller Peter Franchot banned the sale of any flavored disposable e-cigarette product to supplement the FDA's ban on replaceable, cartridge-based systems.²⁸ Flavored e-liquid for open-tank systems remains on the market in Maryland.²⁹

Although no new statewide bans have been enacted since 2020, other Northeast states and jurisdictions have continued to propose similar legislation. In 2020, the New Hampshire House passed a ban on all e-cigarette flavors except tobacco and menthol, but the bill did not advance after the legislature halted activity due to the COVID-19 pandemic.³⁰ When the bill was reintroduced in 2021, the New Hampshire

Senate determined it was “inexpedient to legislate,” ending its progression through the legislature.³¹

In the 2021 session, Maine's Joint Committee on Health and Human Services advanced legislation that would ban all flavored tobacco products, including e-cigarettes; while it was not voted on in the full legislature, it was carried over to 2022.³² Similarly, in Vermont, a ban on flavored e-cigarettes and menthol-flavored combustible cigarettes narrowly passed out of Committee in March 2021 on a 3-2 vote and was carried over into 2022, although it has not advanced any further in the legislative process.³³ The Vermont Senate President noted that he did not believe the legislation had the votes to pass but thought a flavored e-cigarette ban, without a menthol cigarette ban, would pass more easily.³⁴ In Connecticut, Gov. Ned Lamont included a flavored ban in his 2021 budget proposal, but amendments at the end of session resulted in the sponsors pulling support for it.³⁵ As of this writing, a new legislative proposal (Senate Bill 367) banning flavored e-cigarettes, notably without including combustible cigarettes, has been voted favorably out of Connecticut's Public Health Committee and referred to the Committee on Finance, Revenue and Bonding.³⁶

Of note, some of Maine's local jurisdictions, including the cities of Portland and Bangor, have passed flavored tobacco bans—impeding the sale of flavored e-cigarettes as well as menthol-flavored combustibles—that will go into effect in June 2022; the city of Brunswick is considering a similar ban.³⁷

23. Jim McDonald, “Vape Bans: E-Cigarette Restrictions in the U.S. and Worldwide,” Vaping360, Feb. 1, 2022. <https://vaping360.com/learn/countries-where-vaping-is-banned-illegal>.

24. Ibid.

25. Amanda Hoover, “Flavored vaping products will soon be banned in N.J. as Murphy signs law,” NJ.com, Jan. 21, 2020. <https://www.nj.com/politics/2020/01/flavored-vaping-products-will-soon-be-banned-in-nj-as-murphy-signs-law.html>.

26. Guy Bentley, “Rhode Island Should Focus on Tobacco Harm Reduction, Not E-Cigarette Flavor Bans,” Reason Foundation, April 27, 2021. <https://reason.org/commentary/rhode-island-should-focus-on-tobacco-harm-reduction-not-flavored-e-cigarette-bans>.

27. Geoff Herbert, “NY begins ban on flavored e-cigarettes, ends sale of all tobacco products in pharmacies,” Syracuse.com, May 18, 2020. <https://www.syracuse.com/state/2020/05/ny-begins-ban-on-flavored-e-cigarettes-ends-sale-of-all-tobacco-products-in-pharmacies.html>.

28. Mike Murillo, “Maryland bans many flavored disposable e-cigarettes,” WTOPNews, Feb. 10, 2020. <https://wtop.com/maryland/2020/02/maryland-bans-many-flavored-disposable-e-cigarettes>.

29. “E-Cigarette Regulations - Maryland,” Public Health Law Center, Dec. 15, 2021. <https://www.publichealthlawcenter.org/resources/us-e-cigarette-regulations-50-state-review/md>.

30. “Ban flavored tobacco in NH?” Citizens Count, May 14, 2020. <https://www.citizen-count.org/news/ban-flavored-tobacco-nh#>.

31. S.B. 62, General Court of New Hampshire, introduced Jan. 6, 2021. https://www.gencourt.state.nh.us/bill_status/legacy/bs2016/bill_status.aspx?sr=0515&sv=2021&xtsessionyear=2021&xtbillnumber=sb62&sortoption.

32. LD 1550, “An Act To End the Sale of Flavored Tobacco Products,” 130th Maine Legislature, First Special Session-2021, April 22, 2021. http://www.mainelegislature.org/legis/bills/display_ps.asp?id=1550&PID=1456&snum=130.

33. Xander Landen, “Flavored tobacco ban, unemployment benefits, pot market meet legislative deadline,” *VT Digger*, March 12, 2021. <https://vtdigger.org/2021/03/12/flavored-tobacco-ban-unemployment-benefits-pot-market-meet-legislative-deadline>.

34. Ibid.

35. Julia Bergman, “Bid for CT ban on flavored vape ends after jockeying by lawmakers,” *CT Post*, June 15, 2021. <https://www.ctpost.com/news/article/Flavored-vape-ban-quietly-gutted-in-in-11th-hour-16249551.php>.

36. Raised S.B. No. 367, Session Year 2022, Connecticut General Assembly, last accessed April 21, 2022. https://www.cga.ct.gov/asp/cgabillstatus/cgabillstatus.asp?selBillType=Bill&which_year=2022&bill_num=367.

37. Sean Stackhouse, “Portland City Council votes to ban sale of flavored tobacco products,” NEWS CENTER Maine, Feb. 7, 2022. <https://www.newscentermaine.com/article/news/local/portland/portland-city-council-votes-to-ban-sale-of-flavored-tobacco-products-business-shopping/97-f3730e4c-8b82-4317-b1e3-98977f17c0ef>; Renae Morgan, “Brunswick weighs ban on flavored tobacco products Monday,” *The Times Record*, March 31, 2022. <https://www.pressherald.com/2022/03/31/brunswick-weighs-ban-on-flavored-tobacco-products-next-week>.

Nicotine Caps

While flavored e-cigarette bans are the most common legislative mechanism being deployed across the Northeast to try to combat youth uptake, a burgeoning tactic is to place limits on the maximum concentration of nicotine that each device can legally contain. This strategy has been implemented in various countries over the past 10 years, including in the European Union, which set the nicotine cap at 20 milligrams per milliliter in 2014, and in Canada, which set the same cap in the summer of 2021.³⁸

In the United States, this policy first gained traction at the national level in 2019, when Rep. Raja Krishnamoorthi (D-Ill.) introduced legislation in Congress to cap nicotine levels in e-cigarette liquid at 20 milligrams per milliliter, or approximately 2 percent concentration.³⁹ While the legislation did not advance in Congress, some states in the Northeast have taken up the mantle. In Massachusetts, the 2019 Tobacco Control Law contained provisions prohibiting retailers, such as convenience stores or gas stations, from selling any nicotine-containing products with more than 35 milligrams of nicotine per milliliter of liquid; products containing higher levels must be sold at licensed tobacco stores.⁴⁰

Other bills have been proposed in the Northeast, but, as of this writing, none have passed. In Connecticut, the same 2022 legislation that contains a flavored e-cigarette ban, Senate Bill 367, also contains a nicotine cap of 35 milligrams per milliliter, with no exceptions for licensed tobacco stores.⁴¹ During the 2021-22 New York session, Assemblymember Linda Rosenthal, who represents part of Manhattan, introduced A. 646, which would require nicotine levels in e-cigarettes to taper off, with the specific amounts and intervals to be determined by the Department of Health.⁴² Although A. 646 was pre-filed in 2021, it has not received any action from the Committee.⁴³ In the 2018-19 New Jersey legislature session, Senate Bill 4224 was passed, which would have included a nicotine cap of 2 percent of total liquid; however, Gov. Phil Murphy vetoed this legislation, citing concerns over policies

that were also included in the legislation, including complicated tax structures.⁴⁴ In successive New Jersey sessions, no further bills to set a maximum nicotine concentration have advanced. Similarly, in Rhode Island, former Gov. Gina Raimondo proposed a nicotine content cap of 35 milligrams per milliliter in the fiscal year 2021 budget, but this proposal was not included in the final budget ultimately passed by the legislature.⁴⁵

Tax-Related Issues

Over the last several years, states have either raised or levied initial excise taxes on e-cigarettes. In 2015, only three states, in addition to Washington, D.C., levied any excise taxes on vapes or vaping liquid; today, 30 states do so, with additional proposals being considered.⁴⁶ Every state in the Northeast except Rhode Island levies excise taxes on e-cigarettes, many of which appear to be at parity with or higher than those levied on combustible cigarettes. However, it can be difficult to evaluate tax parity at face value because of mitigating factors, including varying nicotine concentrations and higher product prices related to more complicated technology.⁴⁷ Thus, it is illustrative to compare e-cigarette tax rates in different states and across different nicotine products (Table 1).

38. Michael Nedelman, "New bill aims to cap nicotine levels in e-cigarettes," CNN Health, Oct. 7, 2019. <https://www.cnn.com/2019/10/07/health/vaping-nicotine-cap-krishnamoorthi-bn/index.html>; "Electronic Cigarettes," European Commission, last accessed March 28, 2022. https://ec.europa.eu/health/tobacco/product-regulation/electronic-cigarettes_en; "Nicotine Concentration in Vaping Products Regulations: SOR/2021-123," *Canada Gazette*, Part II, 155:13, June 10, 2021. <https://gazette.gc.ca/rp-pr/p2/2021/2021-06-23/html/sor-dors123-eng.html>.

39. Nedelman. <https://www.cnn.com/2019/10/07/health/vaping-nicotine-cap-krishnamoorthi-bn/index.html>.

40. "2019 Tobacco Control Law," Mass.gov, last accessed March 28, 2022. <https://www.mass.gov/guides/2019-tobacco-control-law>.

41. Raised S.B. 367. https://www.cga.ct.gov/asp/cgabillstatus/cgabillstatus.asp?selBillType=Bill&which_year=2022&bill_num=367.

42. Assembly Bill 646, New York State Assembly, introduced Jan. 6, 2021. https://nyassembly.gov/leg/?default_fld=&leg_video=&bn=A00646&term=2021&Summary=Y&Actions=Y&Text=Y.

43. *Ibid.*

44. "Senate, No. 4224," State of New Jersey, 218th Legislature, introduced Nov. 14, 2019. <https://legiscan.com/NJ/text/S4224/2020>; Tom Davis, "NJ Gov. Murphy Signs 153 Bills Into Law, Including Major Vape Ban," Patch, Jan. 21, 2020. <https://patch.com/new-jersey/pointpleasant/nj-gov-murphy-signs-139-bills-law-including-major-vape-ban>.

45. "Article 21: Relating to Health and Safety," State of Rhode Island General Assembly, last accessed April 15, 2022. <https://webserver.rilegislature.gov/BillText20/HouseText20/Article-021.pdf>; "2020 -- H 7171 Substitute A," State of Rhode Island General Assembly, last accessed April 15, 2022. https://legiscan.com/RI/text/H7171/id/2221196/Rhode_Island-2020-H7171-Comm_Sub.pdf.

46. Bubba Lange, "Vape tax: Thirty states now levy excise taxes on e-cigarettes," Avalara, Feb. 25, 2022. <https://www.avalara.com/blog/en/north-america/2022/02/vape-tax-thirty-states-now-levy-excise-taxes-on-e-cigarettes.html>.

47. "E-Cigarette Taxation: Frequently Asked Questions," Tobacco Control Legal Consortium, March 2015. <https://www.publichealthlawcenter.org/sites/default/files/resources/tclc-fs-eciq-taxation-2015.pdf>.

TABLE I: COMPARISON OF CURRENT TAX RATES ON E-CIGARETTES, COMBUSTIBLE CIGARETTES AND NON-COMBUSTIBLE TOBACCO IN NORTHEAST STATES

State	E-Cigarette Tax Rate	Combustible Cigarette Tax Rate (on Pack of 20)	Non-Combustible Tobacco Tax Rate
MD	60 percent wholesale price (5 mL or greater) 12 percent wholesale price (less than 5 mL)	\$2.00	30 percent wholesale price
DE	5 cents/mL	\$1.60	15 percent wholesale price
NJ	30 percent wholesale price for distributors 10 cents/mL on retail price on closed systems 10 percent retail price on open systems	\$2.70	30 percent wholesale price
NY	20 percent retail price	\$4.35	75 percent wholesale price
CT	10 percent wholesale price on open systems 40 cents/mL on closed systems	\$3.90	50 percent wholesale price
RI	None	\$3.75	80 percent wholesale price
MA	75 percent wholesale price	\$3.51	40 percent wholesale price
NH	8 percent wholesale price on open system 30 cents/mL on closed systems	\$1.78	48 percent wholesale price
VT	92 percent wholesale price	\$3.08	\$2.57/ounce
ME	43 percent wholesale price	\$2.00	\$2.02/ounce

Source: This table compiles data from individual state and national tax information sources.⁴⁸

Since 2019, Vermont has levied the highest excise taxes on e-cigarettes in the region, and the second-highest in the

48. "LD 1423: An Act To Align Tobacco Use Prevention and Cessation Funding with Recommendations of the United States Centers for Disease Control and Prevention," 130th Maine Legislature, Second Regular Session. https://legislature.maine.gov/bills/display_ps.asp?snum=130&paper=HP1039&PID=1456#; Lange. <https://www.avalara.com/blog/en/north-america/2022/02/vape-tax-thirty-states-now-levy-excise-taxes-on-e-cigarettes.html>; "Delaware: Tobacco Excise Taxes," SalesTaxHandbook, last accessed April 12, 2022. <https://www.salestaxhandbook.com/delaware/tobacco>; "Article 21: Relating to Health and Safety," <https://webserver.rilegislature.gov/BillText20/HouseText20/Article-021.pdf>; "2020 -- H 7171 Substitute A." https://legiscan.com/RI/text/H7171/id/2221196/Rhode_Island-2020-H7171-Comm_Sub.pdf; "Rhode Island: Tobacco Excise Taxes," SalesTaxHandbook, last accessed March 29, 2022. <https://www.salestaxhandbook.com/rhode-island/tobacco>; "Taxation of E-Cigarettes/Vaping Products," Federation of Tax Administrators, January 2022. <https://www.taxadmin.org/assets/docs/Research/Rates/e-cigarettes.pdf>; "New York: Tobacco Excise Taxes," SalesTaxHandbook, last accessed March 29, 2022. <https://www.salestaxhandbook.com/new-york/tobacco>; "A 3514," New York State Assembly, introduced Jan. 27, 2021. https://nyassembly.gov/leg/?default_fld=&leg_video=&bn=A03514&term=2021&Summary=Y&Actions=Y&Text=Y; Lange. <https://www.avalara.com/blog/en/north-america/2022/02/vape-tax-thirty-states-now-levy-excise-taxes-on-e-cigarettes.html>; Division of Taxation, "Tobacco and Vapor Products Tax Overview," NJ Treasury, Nov. 25, 2019. https://www.state.nj.us/treasury/taxation/tobacco_over.shtml.

country after Minnesota: 92 percent of the wholesale price.⁴⁹ Meanwhile, a pack of 20 combustible cigarettes is taxed at \$3.08, which is the ninth-highest tax in the country.⁵⁰

Effective June 2020, Massachusetts imposed a 75 percent excise tax on the wholesale price of vaping products, in addition to the 6.75 percent state sales tax, in the same legislation that banned flavored e-cigarette products.⁵¹ In comparison, Massachusetts imposes a \$3.51 tax on a pack of combustible cigarettes and a 40 percent excise tax on smokeless tobacco.⁵²

Maine's e-cigarette excise tax is 43 percent of the wholesale price, compared to a \$2.00 tax on a pack of combustible cigarettes, and although legislation has been proposed in the 2021-22 session to double this tax, it has not advanced this session.⁵³

Delaware charges a tax of 5 cents per milliliter, one of the lowest rates in the country, compared to a \$1.60 tax per pack of cigarettes with no additional sales tax, which is the 19th-lowest rate in the country.⁵⁴

Although Rhode Island charges no excise tax on e-cigarettes, efforts to implement such a tax have been taken in the past: former Gov. Gina Raimondo proposed an 80 percent tax on the wholesale cost of e-liquid products in the fiscal year 2021 budget, but it was not included in the final version.⁵⁵ Rhode Island has the fifth-highest combustible cigarette tax rate in the country at \$3.75 per pack.⁵⁶

New York also imposes an excise tax on e-cigarettes but bases it on the retail price rather than the wholesale price, taxing

49. Department of Taxation, "Electronic Cigarettes: Frequently Asked Questions," Vermont Government, last accessed March 29, 2022. <https://tax.vermont.gov/business-and-corp/miscellaneous-taxes/e-cigarettes/faqs>.

50. Megan Cerullo, "Vermont imposes 92% tax on e-cigarettes," CBS News, July 1, 2019. <https://www.cbsnews.com/news/vermont-e-cigarette-tax-92-percent-tax-aims-to-dissuade-teens-from-vaping>; "Vermont—Tobacco Excise Taxes," SalesTaxHandbook, last accessed March 29, 2022. <https://www.salestaxhandbook.com/vermont/tobacco>.

51. Amanda Katchmar et al., "Effect of Massachusetts House Bill No. 4196 on electronic cigarette use: a mixed-methods study," *Harm Reduction Journal* 18:50 (May 5, 2021). <https://harmreductionjournal.biomedcentral.com/articles/10.1186/s12954-021-00498-0>.

52. "Massachusetts: Tobacco Excise Taxes," SalesTaxHandbook, last accessed March 29, 2022. <https://www.salestaxhandbook.com/massachusetts/tobacco>.

53. "LD 1423: An Act To Align Tobacco Use Prevention and Cessation Funding with Recommendations of the United States Centers for Disease Control and Prevention." https://legislature.maine.gov/bills/display_ps.asp?snum=130&paper=HP1039&PID=1456#.

54. Lange. <https://www.avalara.com/blog/en/north-america/2022/02/vape-tax-thirty-states-now-levy-excise-taxes-on-e-cigarettes.html>; "Delaware: Tobacco Excise Taxes." <https://www.salestaxhandbook.com/delaware/tobacco>.

55. "Article 21: Relating to Health and Safety." <https://webserver.rilegislature.gov/BillText20/HouseText20/Article-021.pdf>; "2020 -- H 7171 Substitute A." https://legiscan.com/RI/text/H7171/id/2221196/Rhode_Island-2020-H7171-Comm_Sub.pdf.

56. "Rhode Island: Tobacco Excise Taxes." <https://www.salestaxhandbook.com/rhode-island/tobacco>.

them at a rate of 20 percent.⁵⁷ New York’s other tobacco taxes are significantly higher, with a pack of combustible cigarettes taxed at \$4.35—the highest in the nation—and non-smoking tobacco, such as chewing tobacco, taxed at 75 percent of the wholesale price.⁵⁸ Legislation has been introduced in New York’s 2021-22 session to tax e-cigarettes at parity with non-cigarette tobacco products—effectively calling for a 75 percent tax rate—but, as of this writing, this legislation has not advanced.⁵⁹

Some Northeastern states employ different tax mechanisms depending on the device. In Maryland, if the e-cigarette cartridge can hold 5 milliliters or more of vaping liquid, the product is taxed at a rate of 60 percent the retail price; if it holds less than that, the excise tax rate is 12 percent of the retail price.⁶⁰ Other states vary the tax rate based on whether the device is an open or closed system. Connecticut imposes a 10 percent tax on the wholesale price of open-system devices and a tax of 40 cents per milliliter on closed-system devices.⁶¹ New Jersey has a three-tiered tax structure for e-cigarettes, taxing pod- and cartridge-based systems at 10 cents per milliliter on the retail price and 10 percent for liquid for open-system devices at the retail rate; distributors must also pay a 30 percent tax on the wholesale price to buy from manufacturers.⁶² New Hampshire imposes the lowest excise tax in the Northeast at 8 percent of the wholesale price on open-system devices, but a tax of 30 cents per milliliter on closed-system devices.⁶³

IMPACTS OF POLICY

In enacting these prohibitionist legislative and regulatory models, legislators in the Northeast are attempting to stem youth uptake of e-cigarettes, but their efforts have unintended, detrimental consequences on public health.

Consequences of Flavored E-cigarette Bans

Contrary to the supposition of many legislators, flavors are a critical aspect of e-cigarettes’ function as smoking-cessation devices. Multiple scientific studies have concluded as much,

with one study noting that non-tobacco-flavored e-cigarettes are preferred by most former smokers, which led researchers to conclude, in part, that restricting access to flavored e-cigarettes may discourage smokers from switching to less harmful nicotine-delivery devices.⁶⁴ Another study found that 52 percent of individuals who exclusively used e-cigarettes used fruit-flavored e-cigarette pods, whereas only 24 percent used tobacco-flavored e-cigarette pods.⁶⁵ In fact, of those who had tried e-cigarettes but switched back to combustibles, only 35 percent had used fruit-flavored pods; 59 percent had used tobacco flavoring.⁶⁶ These results led researchers to conclude that flavors mimicking combustibles may inhibit smoking cessation.⁶⁷

Flavoring agents in e-cigarettes are an important way that smokers of combustible cigarettes disassociate the flavor of tobacco with the effects of nicotine. Furthermore, flavoring agents are not the primary driver of e-cigarettes’ uptake among youth. In 2021, a CDC study found that 47.5 percent of youth who used e-cigarettes cited “curiosity” as the primary reason they used them, whereas only 13.5 percent cited flavors.⁶⁸ By removing flavored e-cigarettes as an option for adults transitioning away from combustible cigarettes, Northeast legislators fail to address the root cause of youth uptake while also discouraging a valuable alternative supported by a public health lens.

Finally, the evidence of state flavor bans enacted thus far suggests that they have been ineffective in decreasing use of flavored e-cigarette products among residents. Although Massachusetts instituted a complete flavor ban and subsequently experienced a decrease in menthol tobacco sales, New Hampshire and Rhode Island saw increases at nearly equivalent rates, suggesting that consumer purchase behavior simply crossed state lines.⁶⁹ These results confirm survey data suggesting that users will “find a way” to access their preferred product in the event of a ban, as reported by 50 percent of respondents in one study.⁷⁰

57. “Taxation of E-Cigarettes/Vaping Products.” <https://www.taxadmin.org/assets/docs/Research/Rates/e-cigarettes.pdf>.

58. “New York: Tobacco Excise Taxes.” <https://www.salestaxhandbook.com/new-york/tobacco>.

59. “A 3514.” https://nyassembly.gov/leg/?default_fld=&leg_video=&bn=A03514&term=2021&Summary=Y&Actions=Y&Text=Y.

60. Lange. <https://www.avalara.com/blog/en/north-america/2022/02/vape-tax-thirty-states-now-levy-excise-taxes-on-e-cigarettes.html>.

61. “Taxation of E-Cigarettes/Vaping Products.” <https://www.taxadmin.org/assets/docs/Research/Rates/e-cigarettes.pdf>.

62. Division of Taxation. https://www.state.nj.us/treasury/taxation/tobacco_over.shtml.

63. “Taxation of E-Cigarettes/Vaping Products.” <https://www.taxadmin.org/assets/docs/Research/Rates/e-cigarettes.pdf>.

64. Christopher Russell et al., “Changing patterns of first e-cigarette flavor used and current flavors used by 20,836 adult frequent e-cigarette users in the USA,” *Harm Reduction Journal* 15:33 (June 28, 2018). <https://harmreductionjournal.biomedcentral.com/articles/10.1186/s12954-018-0238-6#Abs1>.

65. Dina M. Jones et al., “Flavored ENDS Use among Adults Who Have Used Cigarettes and ENDS, 2016–2017,” *Tobacco Regulatory Science* 5:6 (2019), pp. 518–531. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6834350>.

66. Ibid.

67. Ibid.

68. Andrea S. Gentzke et al., “Tobacco Product Use and Associated Factors Among Middle and High School Students — National Youth Tobacco Survey, United States, 2021,” *Morbidity and Mortality Weekly Report (MMWR)* 71:5 (March 11, 2022), pp. 1–29. <https://www.cdc.gov/mmwr/volumes/71/ss/ss7105a1.htm>.

69. Ulrik Boesen, “Massachusetts Flavored Tobacco Ban: No Impact on New England Sales,” Tax Foundation, Feb. 3, 2022. <https://taxfoundation.org/massachusetts-flavored-tobacco-ban-sales-jama-study>.

70. Ping Du et al., “Changes in Flavor Preference in a Cohort of Long-Term Electronic Cigarette Users,” *Annals of the American Thoracic Society* 17:5 (May 2020), pp. 573–581. <https://pubmed.ncbi.nlm.nih.gov/31978316>.

Effects of Nicotine Caps

Although nicotine caps for e-cigarettes are in place only in Massachusetts, proposals continue to be introduced across the region, necessitating further analysis on their impacts. The nicotine content of e-cigarettes varies greatly between manufacturer brands and open versus closed systems.⁷¹ Open systems can deliver customizable levels of nicotine, meaning their nicotine content can be higher or lower depending on the user's preference; in most closed systems, one pod amounts to approximately the same amount of nicotine as a pack of cigarettes, which is about 40 milligrams, though this can vary substantially.⁷² However, studies show that nicotine content in e-liquid or in a cartridge does not correlate to nicotine absorption in the user; device characteristics, such as design and battery wattage, result in highly variable nicotine transmission even across e-liquid with the same nicotine content.⁷³ Furthermore, because the delivery mechanisms between e-cigarettes and combustible cigarettes differ, a 2014 study concluded that e-liquids would need a nicotine concentration of approximately 50 milligrams per milliliter to match the profile of a combustible cigarette.⁷⁴

A British tobacco researcher once said, “people smoke for the nicotine but die from the tar.”⁷⁵ By targeting the nicotine content in e-cigarettes, which are designed to eliminate the harmful and often deadly tar and leave only the nicotine craved by smokers, Northeast legislators are focusing on the wrong set of products. Constituents across the region who use nicotine products would be better served by policies that aim to transition users away from combustible cigarettes and toward e-cigarettes. Mandates to limit the nicotine content of e-cigarettes naturally drive users away: At the extreme end, one study found that of those who used e-cigarettes with very low nicotine content (between 6 and 10 milligrams per milliliter), only 19 percent were able to sustain abstinence from combustible cigarettes.⁷⁶

71. Stratton et al., pp. 89-153. <http://nationalacademies.org/hmd/reports/2018/public-health-consequences-of-e-cigarettes.aspx>

72. Chen, et al. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4992632>; Judith J. Prochaska et al., “Nicotine delivery and cigarette equivalents from vaping a JUUL-pod,” *Tobacco Control* (March 24, 2021). <https://pubmed.ncbi.nlm.nih.gov/33762429>.

73. Eric Soule, et al., “Electronic cigarette use intensity measurement challenges and regulatory implications,” *Tobacco Control* (May 31, 2021). <https://tobaccocontrol.bmj.com/content/early/2021/05/30/tobaccocontrol-2021-056483.citation-tools>.

74. Konstantinos E. Farsalinos et al., “Nicotine absorption from electronic cigarette use: comparison between first and new-generation devices,” *Scientific Reports* 4:4133 (Feb. 26, 2014). <https://www.ncbi.nlm.nih.gov/pubmed/24569565>.

75. Michael C. Fiore and Timothy B. Baker, “Reduced nicotine cigarettes – a promising regulatory pathway,” *New England Journal of Medicine* 373:14 (October 2015), pp. 1289-1291. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4593068>.

76. Konstantinos E. Farsalinos et al., “Evaluating Nicotine Levels Selection and Patterns of Electronic Cigarette Use in a Group of ‘Vapers’ Who Had Achieved Complete Substitution of Smoking,” *Substance Abuse* 7 (Sept. 3, 2013), pp. 139-146. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3772898>.

Repercussions of High Excise Taxes on E-cigarettes

Excise taxes on e-cigarettes that are approximately as high or higher than those levied on combustible cigarettes and other forms of tobacco also negatively impact public health. Excise taxes should be imposed relative to risk: Higher-risk products should bear higher excise taxes, and vice versa.

Many states in the Northeast do not follow this principle, instead levying high excise taxes on e-cigarette and vape products despite their lower risk than combustibles. This tax structure deters smokers from replacing combustible cigarettes with e-cigarettes, as borne out by a study on Minnesota's e-cigarette excise tax of 95 percent of the wholesale price, which is the highest in the country.⁷⁷ Researchers concluded that if this excise tax were applied at the national level, nearly 2 million combustible cigarette users would be deterred from smoking cessation over a 10-year period.⁷⁸

In Vermont, which levies the country's second-highest excise tax (92 percent) after Minnesota, conversations during the passage of the new tax in 2019 revolved around whether the tax would drive higher uptake of combustible cigarettes.⁷⁹ With the cost of e-cigarette pods effectively more than doubling, from \$20 for a package of pods to approximately \$45, one vaper who described himself as “short on funds” shared that he would use whatever nicotine product satisfied his addiction at the lowest cost; health officials said they would be “watching” to see if the implication materialized across Vermont.⁸⁰ Indeed, a study funded by the National Institutes of Health (NIH) found that for every 10-percent hike in prices on e-cigarettes, sales dropped by 26 percent—but sales of combustible cigarettes rose by 11 percent.⁸¹ The researchers estimated that for every e-cigarette pod no longer purchased due to rising taxes, 6.2 extra packs of cigarettes are purchased instead.⁸²

From a public health perspective, this is a worst-case scenario. Switching from less harmful e-cigarettes to substantially more dangerous and toxic combustible cigarettes is a move in the wrong direction. Rather than imposing punitive excise taxes on reduced-risk nicotine products that broadly inhibit

77. Henry Saffer et al., “E-cigarettes and adult smoking: Evidence from Minnesota,” *Journal of Risk and Uncertainty* 60:3 (June 2020), pp. 207-228. https://ideas.repec.org/a/kap/jrisku/v60y2020i3d10.1007_s11166-020-09326-5.html.

78. Ibid.

79. Kiernan Brisson, “Will Vermont's new vaping laws drive more people to smoke?” WCAX3, July 8, 2019. <https://www.wcax.com/content/news/Will-Vermonts-new-e-cig-laws-drive-more-people-to-smoke-512423822.html>.

80. Ibid.

81. Kelly Phillips Erb, “New Study Suggests Raising Taxes On E-Cigarettes Could Encourage Traditional Smoking,” *Forbes*, Feb. 10, 2020. <https://www.forbes.com/sites/kellyphillipserb/2020/02/10/new-study-suggests-raising-taxes-on-e-cigarettes-could-encourage-traditional-smoking/?sh=450e7e7a57bf>.

82. Ibid.

uptake by former combustible cigarette users, state officials should instead enact more focused policies that specifically target youth uptake of these products, for example, through expanded educational programs on their addictive quality and through better enforcement of age restrictions.

CONCLUSION

Generally, the U.S. mindset—at least within much of the public health community—is one of prohibition, which some attribute to anti-tobacco advocates modernizing their efforts and successfully peeling back the normalcy and even glamour that once dominated social perceptions of cigarette smoking.⁸³ It is therefore understandable that Northeast legislators would focus on this type of approach for e-cigarette policies.

But it is worth noting that the American prohibitionist treatment of e-cigarettes is not the only avenue. The United Kingdom has adopted an entirely different approach to these products—one that embraces harm reduction over prohibition. To further their goal of bringing down smoking rates, officials in the United Kingdom have endorsed e-cigarettes as smoking-cessation devices, and, in 2021, they even extended the opportunity for them to be licensed for doctors to prescribe.⁸⁴ Since 2019, vape retailers have even sold their products in two NHS-run hospitals.⁸⁵

As a result, smoking rates continue to decline across the United Kingdom, just as health officials intended. The 2020 report from the U.K. Office for National Statistics, in partnership with Public Health England, showed that smoking rates continued their downward trajectory from 14.7 percent of the population in 2018 to 14.1 percent in 2020.⁸⁶ Vaping rates among former smokers stood at 5.7 percent of the population, increasing by 2 percentage points since data collection began in 2014 and remaining statistically the same from 2018 figures.⁸⁷ At the same time, vaping rates among British youth who have never smoked combustible cigarettes is exceedingly rare: One survey of 60,000 British youth in which data were collected between 2015 and 2017 found that between 0.1 percent and 0.5 percent of regular e-cigarette users were

youth who had not smoked combustible cigarettes before taking up vaping.⁸⁸

So far, legislators across the Northeast United States have rejected the U.K. approach. Their objective is no doubt admirable as they try to keep e-cigarettes out of the hands of youth. The means, however, are haphazardly applied and unintentionally prevent these products from being used by adult cigarette smokers whose health and lifespan would benefit from a complete transition to e-cigarettes. Before pursuing further legislative and regulatory models that discourage this transition—or worse, encourage the re-uptake of combustibles—elected officials across the Northeast region should carefully balance the potential public health benefits of limiting access to e-cigarettes against the unintended adverse consequences of inhibiting smoking cessation.

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83. Sarah Boseley, "The great vape debate: are e-cigarettes saving smokers or creating new addicts?" *The Guardian*, Feb. 18, 2020. <https://www.theguardian.com/society/2020/feb/18/the-great-vape-debate-are-e-cigarettes-saving-smokers-or-creating-new-addicts>.

84. Amy Woodyatt, "England could prescribe e-cigarettes on National Health Service," CNN, Oct. 29, 2021. <https://www.cnn.com/2021/10/29/uk/e-cigarette-england-intl-scli-gbr/index.html>.

85. Michael McGrady, "How the British Approach to Vaping Puts the US to Shame," *Filter*, Nov. 27, 2019. <https://filtermag.org/vaping-us-uk>.

86. Ben Windsor-Shellard et al., "Adult smoking habits in the UK: 2019," Office for National Statistics, July 7, 2020. <https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandlifeexpectancies/bulletins/adultsmokinghabitsingreatbritain/2019>.

87. *Ibid.*

88. Linda Bauld et al., "Young People's Use of E-Cigarettes across the United Kingdom: Findings from Five Surveys 2015–2017," *International Journal of Environmental Research and Public Health* 14:9 (Aug. 29, 2017), p. 973. <https://www.mdpi.com/1660-4601/14/9/973>.