

**Health Impact Review of SB 5183
Prohibiting the sale of certain tobacco and nicotine products (2025 Legislative Session)**

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Full review

The full Health Impact Review report is available at:

<https://sboh.wa.gov/sites/default/files/2025-02/HIR-2025-02-SB5183.pdf>

Acknowledgements

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Executive Summary
SB 5183, Prohibiting the sale of certain tobacco and nicotine products
(2025 Legislative Session)

Evidence indicates that SB 5183 would likely decrease access to and initiation and use of flavored tobacco and nicotine products, entertainment vapor products, and other tobacco and nicotine products, thereby improving health outcomes and improving equity for some youth and young adults and communities disproportionately targeted for sale, marketing, and advertising of flavored tobacco or nicotine products or entertainment vapor products. There is unclear evidence how SB 5183 may impact equity for people who access flavored tobacco and nicotine products on Tribal lands and federal lands.

BILL INFORMATION

Sponsors: Nobles, Lovick, Harris, Wellman, Dhingra, Trudeau, Valdez, Lias, Stanford, Orwall, Robinson, Frame, Pedersen, Riccelli, Salomon, Shewmake, Wilson, C.

Summary of Bill

- Prohibits any retailer from selling, offering for sale, displaying, marketing, or advertising for sale any flavored tobacco or nicotine product or entertainment vapor product beginning January 1, 2026.
- Requires the Washington State Department of Health (DOH) to develop, implement, and maintain a statewide prevention and awareness campaign for both youth and adults to address the use of flavored tobacco and nicotine products and entertainment vapor products, and report to the Legislature on the status of the education program by January 1, 2026.
- Requires the Washington State Liquor and Cannabis Board (LCB) to adopt rules to implement SB 5183 and for compliance education for licensed retailers, distributors, and manufacturers and their employees.
- Establishes requirements for retailers to display and post a sign concerning the prohibition of the sale of any flavored tobacco or nicotine product or any entertainment vapor product.
- Allows LCB to impose monetary penalties as authorized under [RCW 70.345.180](#) or suspend or revoke a retailer's license as authorized under [RCW 70.155.100](#) for violation of SB 5183 Section (3).
- Establishes under the Consumer Protection Act ([Chapter 19.86 RCW](#)) that it is an unfair or deceptive practice for any retailer to sell, offer for sale, display, market, or advertise for sale any flavored tobacco or nicotine product or any entertainment vapor product.
- Allows the Governor to seek government-to-government consultations with federally-recognized Tribes regarding prohibiting the sale or offer for sale of any flavored tobacco or nicotine product or any entertainment vapor product.

HEALTH IMPACT REVIEW

Summary of Findings:

This Health Impact Review found the following evidence for provisions in SB 5183:

- **A fair amount of evidence** that prohibiting the sale of flavored tobacco and nicotine products and entertainment vapor products^a would likely result in retailers complying and no longer selling, offering for sale, displaying, marketing, or advertising for sale any flavored tobacco or nicotine product or entertainment vapor product.
- **Very strong evidence** that retailers complying and no longer selling, offering for sale, displaying, marketing, or advertising for sale any flavored tobacco or nicotine product or entertainment vapor product would likely decrease access to and initiation and use of flavored tobacco and nicotine products.
- **Very strong evidence** that decreasing access to and initiation and use of flavored tobacco and nicotine products would likely decrease initiation and use of other tobacco and nicotine products.
- **Very strong evidence** that decreasing use of other tobacco and nicotine products would likely improve health outcomes.
- **Very strong evidence** that decreasing use of flavored tobacco and nicotine products would likely improve health outcomes.
- **Very strong evidence** that improving health outcomes would likely improve equity for some youth and young adults and communities disproportionately targeted^b for sale, marketing, and advertising of flavored tobacco or nicotine products or smart vapor products.
- **Unclear evidence** how SB 5183 may impact equity for people who access flavored tobacco and nicotine products on Tribal lands and federal lands.

Additional Considerations includes discussion of cessation.

^a Key informants and researchers refer to entertainment vapor products as smart vapor products or “smart vapes” because some devices have features found in smart devices (e.g., “find my device”, Bluetooth). This Health Impact Review uses “entertainment vapor products” when discussing bill provisions and “smart vapor products” more generally.

^b It is well documented that the tobacco industry has target-marketed specific flavors and flavored products to certain groups, including to youth, women, Black people, and LGBTQIA+ communities.⁴³ Therefore, this Health Impact Review uses the term “targeted” to indicate this intentional marketing practice.

Introduction and Methods

A Health Impact Review is an analysis of how a proposed legislative or budgetary change will likely impact health and health disparities in Washington State ([RCW 43.20.285](#)). For the purpose of this review “health disparities” have been defined as differences in disease, death, and other adverse health conditions that exist between populations ([RCW 43.20.025](#)). Differences in health conditions are not intrinsic to a population; rather, inequities are related to social determinants (access to healthcare, economic stability, racism, etc.). This document provides summaries of the evidence analyzed by State Board of Health staff during the Health Impact Review of Senate Bill 5183 ([SB 5183](#)).

Health Impact Review staff analyzed the content of SB 5183 and created a logic model visually depicting the pathway between bill provisions, social determinants, and health outcomes and equity. The logic model reflects the pathway with the greatest amount and strongest quality of evidence. The logic model is presented both in text and through a flowchart (Figure 1).

We conducted an objective review of published literature for each step in the logic model pathway using databases including PubMed, Google Scholar, and University of Washington Libraries. The annotated references are only a representation of the evidence and provide examples of current research. In some cases, only a few review articles or meta-analyses are referenced. One article may cite or provide analysis of dozens of other articles. Therefore, the number of references included in the bibliography does not necessarily reflect the strength-of-evidence. In addition, some articles provide evidence for more than one research question and are referenced multiple times.

We consulted with people who have content and context expertise about the provisions and potential impacts of the bill. The primary intent of key informant interviews is to ensure staff interpret the bill correctly, accurately portray the pathway to health and equity, and understand different viewpoints, challenges, and impacts of the bill. In some instances, we retained relevant information from key informants we spoke with during previous Health Impact Reviews related to tobacco and vapor products. For this Health Impact Review, we spoke with 11 key informant interviewees, including: 6 state agency staff with expertise in tobacco and vapor product use prevention, policy, or enforcement; 4 people working in community organizations or schools on tobacco and vapor product use prevention; and 1 person with expertise in national tobacco and vapor product prevention and policy.

We evaluated evidence using set criteria and determined a strength-of-evidence for each step in the pathway. The logic model includes information on the strength-of-evidence. The strength-of-evidence ratings are summarized as:

- **Very strong evidence:** There is a very large body of robust, published evidence and some qualitative primary research with all or almost all evidence supporting the association. There is consensus between all data sources and types, indicating that the premise is well accepted by the scientific community.
- **Strong evidence:** There is a large body of published evidence and some qualitative primary research with the majority of evidence supporting the association, though some sources may

have less robust study design or execution. There is consensus between data sources and types.

- **A fair amount of evidence:** There is some published evidence and some qualitative primary research with the majority of evidence supporting the association. The body of evidence may include sources with less robust design and execution and there may be some level of disagreement between data sources and types.
- **Expert opinion:** There is limited or no published evidence; however, rigorous qualitative primary research is available supporting the association, with an attempt to include viewpoints from multiple types of informants. There is consensus among the majority of informants.
- **Informed assumption:** There is limited or no published evidence; however, some qualitative primary research is available. Rigorous qualitative primary research was not possible due to time or other constraints. There is consensus among the majority of informants.
- **No association:** There is some published evidence and some qualitative primary research with the majority of evidence supporting no association or no relationship. The body of evidence may include sources with less robust design and execution and there may be some level of disagreement between data sources and types.
- **Not well researched:** There is limited or no published evidence and limited or no qualitative primary research and the body of evidence was primarily descriptive in nature and unable to assess association or has inconsistent or mixed findings, with some supporting the association, some disagreeing, and some finding no connection. There is a lack of consensus between data sources and types.
- **Unclear:** There is a lack of consensus between data sources and types, and the directionality of the association is ambiguous due to potential unintended consequences or other variables.

This review was requested during legislative session and was therefore subject to the 10-day turnaround required by law. This review was subject to time constraints, which influenced the scope of work for this review.

Analysis of SB 5183 and the Scientific Evidence

Summary of relevant background information

Federal actions and policies

- In June 2009, the Family Smoking Prevention and Tobacco Control Act (2009 Tobacco Control Act) was signed into law in part to reduce smoking rates among youth^c.¹ This Act:
 - Gave the U.S. Food and Drug Administration (FDA) authority to regulate the manufacture, distribution, and marketing of tobacco products.²
 - Banned flavors, except menthol and tobacco, in cigarettes² specifically as one strategy to reduce the use of cigarettes among youth.
- In May 2016, the FDA finalized a rule to extend its authority over all tobacco products, known as the ‘Deeming Rule.’³ Newly regulated products, including electronic nicotine delivery systems (ENDS), such as electronic cigarettes (e-cigarettes) and e-liquids, are required to comply with all Federal Food, Drug, and Cosmetic Act (FD&C Act) and FDA regulations specific to tobacco products.³ Specifically, Section 910 of the FD&C Act imposes certain premarket-review requirements for “new tobacco products” (i.e., those that were not commercially marketed in the U.S. as of February 15, 2007).⁴
 - In January 2020 the FDA reported, “to date, no ENDS products have been authorized by the FDA – meaning that all ENDS products currently on the market are considered illegally marketed and are subject to enforcement, at any time, in the FDA’s discretion.”⁵
 - As of January 2025, FDA has authorized 30 tobacco and 4 menthol-flavored e-cigarette products and devices.⁶
- In 2018, the FDA took action to reduce youth access to e-cigarettes. The FDA:
 - Issued 1,300 warning letters and fines to “retailers who illegally sold JUUL and other e-cigarette products to minors,” marking the “largest coordinated enforcement effort in the FDA’s history.”⁷ As of September 11, 2019, FDA had issued more than 8,600 warning letters and more than 1,000 fines to retailers (both online and brick-and-mortar stores) for sales of ENDS and their components to minors.⁸
 - Issued letters to the top five-selling e-cigarette brands (which compromised 97% of the U.S. e-cigarette market) requiring each company to submit plans detailing how they would limit marketing and youth access to their product.⁷
 - Launched “The Real Cost” youth e-cigarette prevention campaign.⁹
 - Issued a directive that all “flavored ENDS products (other than tobacco, mint, and menthol flavors or non-flavored products) must be sold in age-restricted, in-person locations and, if sold online, under heightened practices for age verification.”⁹
- In November 2018, JUUL Labs announced that it would suspend sales of most of its flavored e-cigarette pods in retail stores and would discontinue its media promotions.¹⁰

^c In research and datasets, information related to the use of tobacco and nicotine products is presented across multiple age ranges. Where possible, this Health Impact Review notes the specific age range included in research and data. More generally, this Health Impact Review uses “youth” to refer to people aged 18 years or younger; “young adult” to refer to people aged 19 through 30 years; and “adult” to refer to people aged 31 years or older.

By early 2019, competitors quickly filled the market demand with similar flavored products or JUUL-compatible flavored nicotine cartridges.¹¹

- In December 2018, the Office of the Surgeon General issued an advisory about e-cigarette use among youth.¹² The statement noted that, “any e-cigarette use among young people is unsafe, even if they do not progress to future cigarette smoking.”¹²
- In July 2019, FDA launched its first youth e-cigarette prevention TV ads educating youth about the dangers of e-cigarette use.¹³
- In July 2019, the Centers for Disease Control and Prevention (CDC), FDA, state and local health departments, and other clinical and public health partners began investigating outbreaks of lung injury associated with e-cigarette use.¹⁴ CDC stated that, “laboratory data show that vitamin E acetate, an additive in some [Tetrahydrocannabinol (THC)]-containing e-cigarette, or vaping, products, is strongly linked to the [e-cigarette or vaping product use-associated lung injury (EVALI)] outbreak.”¹⁴
- On September 9, 2019, FDA issued a warning letter to JUUL Labs Inc. for marketing unauthorized modified risk tobacco products to consumers, including statements made by a JUUL representative to youth in a school.¹⁵ The Acting FDA Commissioner stated, “before marketing tobacco products for reduced risk, companies must demonstrate with scientific evidence that their specific product does in fact pose less risk or is less harmful [than cigarettes].”¹⁵
- On September 11, 2019, the Federal administration announced that FDA would “outline a plan within the coming weeks for removing flavored e-cigarettes and nicotine pods from the market, excluding tobacco flavors.”¹⁶ Early reports stated that prohibited flavors would include mint and menthol.
- On December 20, 2019, the 2009 Tobacco Control Act was modified to raise the federal minimum age for sale of tobacco products in all U.S. states, territories, and on all Tribal lands, from age 18 to 21 years.^{17,18} The change applied to all tobacco products, including cigarettes, cigars, and e-cigarettes, and was effective immediately.^{17,18}
- On January 2, 2020, FDA issued “Enforcement Priorities for [ENDS] and Other Deemed Products on the Market Without Premarket Authorization” as guidance for industry.⁴ The policy:
 - prioritizes enforcement against certain unauthorized flavored e-cigarette products that appeal to kids, including fruit and mint flavors. Under this policy, companies that do not cease manufacture, distribution and sale of unauthorized flavored cartridge-based e-cigarettes (other than tobacco or menthol) within 30 days risk FDA enforcement actions. [The FDA’s enforcement priorities are] not a ‘ban’ on flavored or cartridge-based ENDS [...] If a company can demonstrate to the FDA that a specific product meets the applicable standard set forth by Congress, including considering how the marketing of the product may affect youth initiation and use, then the FDA could authorize that product for sale.⁵
- In April 2022, the U.S. FDA proposed rules to prohibit menthol cigarettes and flavored cigars at the national level.¹⁹ The intent of the prohibition was to “prevent youth initiation [and] significantly reduce tobacco-related disease and death.”¹⁹
 - On January 21, 2025, a regulatory filing by the Executive Office of the President of the United States indicated that the rule (“Tobacco Product Standard for Menthol in Cigarettes”) had been withdrawn.²⁰
- In June 2022, the FDA launched a youth e-cigarette prevention campaign, “Next Legends” with specific messaging toward American Indian and Alaska Native youth.²¹

- In December 2024, the U.S. Supreme Court (SCOTUS) heard arguments in the case of *Food and Drug Administration v. Wages and White Lion Investments LLC*.²² In this case, 2 e-cigarette companies filed suit after the FDA rejected their applications to sell flavored vapor products.²² The FDA rejected the applications on the basis that “fruit- and candy-flavored e-cigarettes are more attractive to children, and the companies presented no evidence that flavored e-cigarettes benefitted current adult smokers by enticing them to switch to the less toxic e-cigarettes.”²² SCOTUS is expected to reach a decision on the case in June 2025.²²

Washington State actions and policies

- In March 2019, the Washington State Legislature passed Engrossed House Bill (EHB) 1074 ([Chapter 15, Laws of 2019](#)), Protecting youth from tobacco products and vapor products.²³ The law increased the legal age of sale of tobacco and vapor products from 18 to 21 years of age and permitted the Governor to seek government-to-government consultations with Tribes about raising the minimum legal age of sale in cigarette tax compacts. The law became effective January 1, 2020.
 - [RCW 43.06.455](#) allows the Governor to enter into cigarette tax compacts with Tribes and applies to the sale of all tobacco and vapor products sold on Tribal lands. Statute states, “a cigarette tax contract with a [T]ribe shall provide for a [T]ribal cigarette tax in lieu of all state cigarette taxes and state and local sales and use taxes on sales of cigarettes in Indian [C]ountry by [Tribal] retailers.”
- On September 27, 2019, in response to the EVALI outbreak, the Governor of Washington State issued Executive Order 19-03, Addressing the Vaping Use Public Health Crisis (Executive Order).²⁴
 - The Washington State Board of Health (SBOH) has the authority under [RCW 43.20.050\(2\)\(f\)](#) to adopt rules for the prevention and control of infectious and noninfectious diseases.²⁵
 - On October 9, 2019, SBOH adopted the emergency rulemaking order to create chapter 246-80 Washington Administrative Code (WAC),²⁶ which banned the sale of flavored vapor products.²⁷ The ban became effective October 10, 2019, and was effective for 120 days.²⁸
 - On November 18, 2019, SBOH adopted a second emergency rule prohibiting the sale of vapor products containing vitamin E acetate.²⁷ The emergency rule became effective November 20, 2019, and was effective for 120 days.²⁹
 - On November 15, 2020, SBOH adopted a permanent rule ([WAC 246-80-021](#)), prohibiting the sale of vapor products containing vitamin E acetate.

Other jurisdictions

- As of January 2025, 6 states restrict the sale of flavored tobacco products.³⁰
 - Massachusetts became the first state to restrict the sale of all flavored tobacco products (effective June 1, 2020), except flavored e-cigarettes sold for on-site consumption at licensed smoking bars.³¹
 - California restricts the sale of all flavored products except flavored premium cigars with a wholesale price of \$12 or more and flavored loose-leaf pipe tobacco.³² Flavored shisha/hookah tobacco may only be sold in licensed stores that only allow people ages 21 years or older on the premises at any time.³²
 - New Jersey restricts the sale of all flavored e-cigarettes.³³

- New York restricts the sale of all flavored e-cigarettes, except flavored e-cigarettes that have received a marketing authorization from the FDA (to date, 4 menthol-flavored e-cigarettes have received such authorization).³⁴
- Rhode Island restricts the sale of all flavored e-cigarettes, except menthol-flavored e-cigarettes.³⁵
- Utah restricts the sale of all flavored e-cigarettes, except menthol-flavored e-cigarettes.³⁶
- In states that have implemented bans on the sale of flavored commercial tobacco products, the tobacco industry has filed lawsuits challenging many of these bans.³⁷
 - For example, in 2022, the U.S. Court of Appeals for the Ninth Circuit upheld the Los Angeles County ordinance banning the sale of all flavored tobacco products, which was challenged by R.J. Reynolds.³⁸ The court ruled that the Tobacco Control Act does not preempt state and local governments from banning the sale of flavored tobacco products.³⁸
- As of January 2025, nearly 400 U.S. localities have passed restrictions on the sale of flavored tobacco products.³⁰ However, laws differ in their application to specific products and store types.³⁰ Additionally, more than 200 of these communities restrict the sale of menthol cigarettes, in addition to other flavored tobacco products.³⁰
- During the 2023-2024 New York State Legislative Session, the New York State Senate proposed [Assembly Bill A10713](#) prohibiting the sale of entertainment vapor products.³⁹
- Washington State is one of only 2 states in the U.S. with preemption policy related to commercial tobacco control, which prevents “most local government action to prevent and control use of commercial tobacco.”⁴⁰ Public health organizations have stated that, “restricting local policymaking through state-level preemption perpetuates health [inequities] and leads to increased nicotine addiction among Washington’s youth.”⁴⁰

Summary of SB 5183

- Prohibits any retailer from selling, offering for sale, displaying, marketing, or advertising for sale any flavored tobacco or nicotine product or entertainment vapor product beginning January 1, 2026.
 - Defines:
 - “Tobacco or nicotine product” as any “(i) product containing, made of, or derived from tobacco or nicotine that is intended for human consumption or is likely to be consumed, whether inhaled, absorbed, or ingested by any other means, including, but not limited to, a cigarette, a cigar, pipe tobacco, chewing tobacco, snuff, or snus; (ii) vapor products and any substance that may be aerosolized or vaporized by such product, whether or not the substance contains nicotine; or (iii) component, part, or accessory of a product described in this subsection [...], regardless of whether such component, part, or accessory contains tobacco or nicotine including, but not limited to, filters, rolling papers, blunt or hemp wraps, hookahs, flavor enhancers, mouthpieces, or pipes.”
 - “Flavored tobacco or nicotine product” as “any tobacco or nicotine product that imparts (a) a taste or smell, other than the taste or smell of tobacco, distinguishable by an ordinary consumer either before or during the consumption of such tobacco product including, but not limited to, the

- taste or smell of fruit, chocolate, vanilla, honey, candy, cocoa, dessert, alcoholic beverage, mint, wintergreen, menthol, herb, or spice; or (b) a cooling or numbing sensation distinguishable by an ordinary consumer either before or during the consumption of such tobacco product.”
- “Entertainment vapor product” as “any vapor product that has interactive gaming or entertainment features including, but not limited to, allowing a user to play music or audio, display photos or video, play virtual games, or display other animations on the device.”
- Requires the Washington State Department of Health (DOH) to develop, implement, and maintain a statewide prevention and awareness campaign for both youth and adults to address the use of flavored tobacco and nicotine products and entertainment vapor products, and report to the Legislature on the status of the education program by January 1, 2026.
 - Allows DOH to consult with Health Care Authority (HCA) to include messaging focused on tobacco and nicotine addiction and prevention and resources for addiction treatment services.
 - Requires the Washington State Liquor and Cannabis Board (LCB) to adopt rules to implement SB 5183 and for compliance education for licensed retailers, distributors, and manufacturers and their employees.
 - Establishes requirements for retailers to display and post a sign concerning the prohibition of the sale of any flavored tobacco or nicotine product or any entertainment vapor product.
 - Requires DOH to design and produce the sign, and LCB to provide the sign to retailers free of charge.
 - Allows LCB to impose monetary penalties as authorized under [RCW 70.345.180](#) or suspend or revoke a retailer's license as authorized under [RCW 70.155.100](#) for violation of SB 5183 Section (3).
 - Establishes under the Consumer Protection Act ([Chapter 19.86 RCW](#)) that it is an unfair or deceptive practice for any retailer to sell, offer for sale, display, market, or advertise for sale any flavored tobacco or nicotine product or any entertainment vapor product.
 - Allows the Governor to seek government-to-government consultations with federally-recognized Tribes regarding prohibiting the sale or offer for sale of any flavored tobacco or nicotine product or any entertainment vapor product.

Health impact of SB 5183

Evidence indicates that SB 5183 would likely decrease access to and initiation and use of flavored tobacco and nicotine products, entertainment vapor products^d, and other tobacco and nicotine products, thereby improving health outcomes and improving equity for some youth and young adults and communities disproportionately targeted^e for sale, marketing, and advertising

^d Key informants and researchers refer to entertainment vapor products as smart vapor products or “smart vapes” because some devices have features found in smart devices (e.g., “find my device”, Bluetooth). This Health Impact Review uses “entertainment vapor products” when discussing bill provisions and “smart vapor products” more generally.

^e It is well documented that the tobacco industry has target-marketed specific flavors and flavored products to certain groups, including to youth, women, Black people, and LGBTQIA+ communities.⁴³ Therefore, this Health Impact Review uses the term “targeted” to indicate this intentional marketing practice.

of flavored tobacco or nicotine products or entertainment vapor products. There is unclear evidence how SB 5183 may impact equity for people who access flavored tobacco and nicotine products on Tribal lands and federal lands.

Pathway to health impacts

The potential pathway leading from the provisions of SB 5183 to health and equity is depicted in Figure 1. There is a fair amount of evidence that prohibiting the sale of flavored tobacco and nicotine products and entertainment vapor products would likely result in retailers complying and no longer selling, offering for sale, displaying, marketing, or advertising for sale any flavored tobacco or nicotine product or entertainment vapor product.^{41,42} There is very strong evidence that retailers complying and no longer selling, offering for sale, displaying, marketing, or advertising for sale any flavored tobacco or nicotine product or entertainment vapor product would likely decrease access to and initiation and use of flavored tobacco and nicotine products.⁴²⁻⁶⁸ There is very strong evidence that decreasing access to and initiation and use of flavored tobacco and nicotine products would likely decrease initiation and use of other tobacco and nicotine products.^{9,53,66,69-81} There is very strong evidence that decreasing use of flavored tobacco and nicotine products^{43,44,69,82-89} and decreasing use of other tobacco and nicotine products^{2,7,9,12,14,42,43,70-74,82,84,90-109} would likely improve health outcomes. There is very strong evidence that improving health outcomes would likely improve equity for some youth and young adults and communities disproportionately targeted for sale, marketing, and advertising of flavored tobacco or nicotine products or smart vapor products.^{43,45,46,110-121} It is unclear how SB 5183 may impact equity for people who access flavored tobacco and nicotine products on Tribal lands and federal lands.

Scope

Due to time limitations, we only researched the most linear connections between provisions of the bill and health and equity and did not explore the evidence for all possible pathways. For example, we did not evaluate potential impacts related to:

- Tobacco, nicotine, and vapor product access and use prevention programming. There are various program implementation efforts across Washington State aimed at preventing youth access to and use of tobacco, nicotine, and vapor products. These efforts include but are not limited to health promotion campaigns, compliance checks (i.e., sending a youth into a retailer to attempt to purchase tobacco or vapor), retailer education, and grassroots and community coalition programming. SB 5183 would require DOH to develop, implement, and maintain a statewide prevention and awareness campaign for both youth and adults to address the use of flavored tobacco and nicotine products and smart vapor products. DOH has indicated that they would likely integrate educational campaign requirements outlined in SB 5183 into existing DOH campaigns related to commercial tobacco and vaping prevention and cessation.¹²² This Health Impact Review did not evaluate the potential impacts of current or future efforts, including the campaigns specified by SB 5183, to prevent access to and use of tobacco, nicotine, and vapor products in Washington State.
- The economic impacts of prohibiting the sale of flavored tobacco and nicotine products. SB 5183 may have economic impacts for retailers, for state and local revenue, for governmental public health funding, and for prevention funding. The 2019 ban on flavored vapor products in Washington State impacted retailers in the state. In September

2019, an estimated 4,650 vapor product licenses (non-THC) were in effect in Washington State, of which approximately 4,300 were retailer licenses (unpublished data, Washington State Liquor and Cannabis Board [LCB], personal communication, January 2020). As of January 10, 2020 (i.e., following the statewide ban on flavored vapor products), there were 677 (15%) fewer vapor product licenses in the state (unpublished data, LCB, personal communication, January 2020). Retailer licenses represented the majority of the decrease in licenses (LCB, personal communication, January 2020). Key informants stated that SB 5183 would likely decrease retailer revenue from tobacco and nicotine products given the popularity of flavored products (personal communications, January 2025).

In addition to potential economic impacts for retailers, Washington State places taxes on cigarettes, vapor products, and other tobacco products (e.g., cigars, pipe tobacco, chewing tobacco).¹²² Prohibiting the sale of any flavored tobacco or nicotine product, including vapor products, or smart vapor products in the state would decrease tax revenue for the state.¹²² In a fiscal note for HB 1203 (direct companion legislation to SB 5183), the Washington State Department of Revenue (DOR) estimated state tax revenue would decrease by more than \$164.6 million in State Fiscal Year (SFY) 2027 (the first full year of bill implementation).¹²² DOR also estimated that local revenues would decrease by \$12 million in the first full year of bill implementation.¹²² Menthol cigarettes account for 36% of cigarette sales in the state and DOR anticipates that, if sale of flavored tobacco and nicotine products were prohibited, some people who use menthol cigarettes may quit tobacco, some people may switch to (non-flavored) cigarettes, and some people may purchase un-taxed menthol cigarettes.¹²² Therefore, DOR estimates that reduced sales of menthol cigarettes would also decrease state tax revenue.¹²²

Under [RCW 82.25.015](#), half of the revenue collected from the Washington State vapor product tax goes into the Foundational Public Health Services (FPHS) account to fund FPHS in the state. FPHS are core services the governmental public health system is responsible for providing consistently and uniformly in every community in Washington State ([RCW 43.70.512](#)). The governmental public health system includes DOH, SBOH, 35 Local Health Jurisdictions, Sovereign Tribal Nations, and Indian Health Programs. For the 2023-2025 biennium, FPHS received approximately \$28,050,000 from the Vape Tax Account (VTA) (personal communications, January 2025). The VTA is currently the only dedicated funding source for FPHS (personal communications, January 2025). Banning the sale of flavored tobacco and nicotine products, including flavored vapor products, will likely reduce the revenue and funding the FPHS account will receive from this funding source.

Lastly, [RCW 70.155.120](#) established the youth tobacco and vapor products prevention account in the state treasury.¹²³ Fees and funds, including monetary penalties from retailer, wholesaler, and distributor violations, collected by LCB are deposited into this account, except that 10% of such fees and penalties are deposited in the state general fund.¹²³ SB 5183 would allow LCB to impose monetary penalties for retailers as authorized under [RCW 70.345.180](#). Key informants stated that SB 5183 may impact funding available in the account; any potential increase in funding would be made available for community-based prevention work and media campaigns related to tobacco and nicotine product prevention (personal communication, DOH, February 2025).

Overall, this Health Impact Review did not evaluate potential economic impacts of SB 5183 on retailers, state or local tax revenue, the governmental public health system, or prevention efforts in Washington State.

Magnitude of impact

SB 5183 has the potential to affect youth and young adults and communities disproportionately targeted for sale, marketing, and advertising of flavored tobacco or nicotine products or smart vapor products. Nationally, approximately 36 million U.S. adults (as of 2022) and 760,000 middle and high school students (as of 2024) smoke combustible tobacco products.⁴³

Youth

Effective January 1, 2020, the legal age of sale of tobacco and vapor products in Washington State increased from 18 to 21 years of age ([Chapter 15, Laws of 2019](#)). On December 20, 2019, the U.S. Congress passed legislation to increase the minimum legal sales age from 18 years to 21 years for all commercial tobacco products in all U.S. states and territories, and on all Tribal lands.¹⁸ The law took effect immediately and applies to all commercial tobacco products made or derived from tobacco, including combustible tobacco products and electronic tobacco products.¹⁸

The National Youth Tobacco Survey (NYTS) is a representative sample of U.S. middle and high school students^f and provides national data on commercial tobacco use and related risk factors among U.S. youth.¹²⁴ Based on 2024 NYTS results, an estimated 19.0% of middle and high school students (representing 5.28 million students) reported ever having used any tobacco product, and an estimated 8.1% (representing 2.25 million students) reported current use of any tobacco product.¹¹⁰ From 2023 to 2024, current use of any tobacco product significantly declined among all students (from 10.0% to 8.1%).¹¹⁰ Similarly, there were significant declines among all students in current use of e-cigarettes (from 7.7% to 5.9%) and hookahs (from 1.1% to 0.7%).¹¹⁰ Furthermore, 2024 saw the lowest prevalence of reported current cigarette smoking ever recorded by NYTS (1.7% of high school students and 1.1% of middle school students).¹¹⁰ However, youth continue to use other tobacco products, and the use of tobacco products differs across groups of youth.¹¹⁰

Contrary to declines in cigarette smoking, e-cigarette use increased dramatically among middle and high school students from 2011 through 2018.^{9,12,70,125} E-cigarettes have remained the most commonly used tobacco product among youth since 2014.¹¹⁰ However, current e-cigarette use among U.S. youth has declined since 2019.⁴⁵ In 2024, 7.8% of U.S. high school students and 3.5% of U.S. middle school students reported current e-cigarette use.⁴⁵ From 2023 to 2024, current e-cigarette use declined among students overall (middle and high school) as well as among high school students; however, no significant changes were observed for current e-cigarette use among middle school students.⁴⁵ In 2024, an estimated 1.63 million U.S. middle and high school students currently used e-cigarettes (a decline from 2.13 million students in 2023).⁴⁵ Among students who had ever used e-cigarettes, 43.6% reported current e-cigarette use.¹¹⁰ Among students who currently used e-cigarettes, 38.4% reported frequent use (i.e., on

^f As NYTS is a school-based, self-administered, Internet survey of U.S. middle school and high school students, findings may not be generalizable to youth who are home-schooled, have dropped out of school, are in detention centers, or are enrolled in alternative schools.⁴⁵

20+ days during the previous 30 days) and 26.3% reported daily use.⁴⁵ Moreover, 87.6% of students used a flavored product.⁴⁵ The most frequently reported flavors included: fruit (62.8%), candy (33.3%), and mint (25.1%).⁴⁵ More than half (54.6%) of students currently using e-cigarettes reported using flavors with “ice” or “iced” in the name.⁴⁵ The 2024 Monitoring the Future (MTF) study similarly shows the prevalence of nicotine vaping decreased among 8th, 10th, and 12th grade students.¹²⁶ Despite recent declines in use, past 12-month prevalence of nicotine vaping remains one of the highest among all substances reported (10% of 8th graders, 15% of 10th graders, 21% of 12th graders, in 2024).¹²⁶

Results of the 2024 NYTS show nicotine pouches were the second most commonly used tobacco product among U.S. youth (1.8%, representing 890,000 students).¹¹⁰ Nicotine pouches are “small, flavored pouches that contain nicotine. Users place them in their mouth between the lip and gum. Unlike other smokeless tobacco products [...] nicotine pouches do not contain any tobacco leaf.”¹¹⁰ Among students reporting current nicotine pouch use, 85.6% used a flavored product.⁴⁵ The most frequently reported flavors used were mint (53.3%), fruit (22.4%), and menthol (19.3%).⁴⁵ No significant changes were seen in the 2024 NYTS for current nicotine pouch use among high school students or among students overall (middle and high school) (2.4% of high school students and 1.0% of middle school students).⁴⁵ However, “the wide availability of and growing sales of nicotine pouches has also raised concerns about potential use of these products among youths.”⁴⁵ Meanwhile, from 2023 to 2024 the MTF study saw prevalence significantly double for past 12-month use of nicotine pouches among 12th grade students (from 3% to 6%).¹²⁶ Additionally, prevalence of nicotine pouch use significantly increased from 2% to 3% among 10th grade students.¹²⁶ Among 8th grade students, prevalence remained at less than 1%.¹²⁶

While current use of any tobacco product reported in the 2024 NYTS was similar among male and female^g students (8.5% and 7.7%, respectively), male students were more likely to report current use of multiple tobacco products.¹¹⁰ Current use of any tobacco product was reported by 16.3% of non-Hispanic American Indian or Alaska Native students, 10.0% of Black students, 9.0% of multiracial students, 7.8% of white students, and 3.3% of Asian students.¹¹⁰ About 8% of Hispanic students reported current use.¹¹⁰ Authors noted, “[e]stimates for non-Hispanic Native Hawaiian or Pacific Islander students, overall and by school level, were statistically unreliable for all current use measures and were not reported.”¹¹⁰ American Indian or Alaska Native students reported the highest prevalence of current use of any tobacco product (16.3%), of e-cigarettes (11.5%), and of multiple tobacco products (6.9%).¹¹⁰ Moreover, while any tobacco product use declined for Hispanic students and remained stable for all other racial and ethnic groups from 2023 to 2024, it increased among American Indian or Alaska Native students.¹¹⁰ A limitation of NYTS is that the survey does not distinguish between use of ceremonial^h and

^g The data use the options “female” and “male” to describe gender; however, these terms are associated with sex assigned at birth. We acknowledge that these terms may not align with the gender of people and that binary options are not inclusive of transgender, gender non-binary, and gender diverse people.

^h Traditional and commercial tobacco are different in the ways they are planted, grown, harvested, and used. Traditional tobacco “is tobacco and/or other plant mixtures grown or harvested and used by some American Indian communities for ceremonial or religious purposes.”⁴³ In contrast, “[c]ommercial tobacco is manufactured tobacco sold by tobacco companies for personal use. Commercial tobacco use is the most prevalent form of tobacco use in the United States and is responsible for impacts on the health of historically disadvantaged groups, including among

commercial tobacco.¹¹⁰ As some American Indian or Alaska Native communities “use traditional tobacco in cultural ceremonies of medicinal and spiritual importance”, estimates among American Indian or Alaska Native students may also include ceremonial tobacco use.¹¹⁰

In Washington State, vapor products (or e-cigarettes) are the most common nicotine product used by youth.¹²⁷ Results of the 2023 Washington State Healthy Youth Survey (HYS) show that 2% of 6th grade students, 5% of 8th grade students, 8% of 10th grade students, and 14% of 12th grade students reported current (i.e., past 30-day) use of e-cigarettes or vape pens.¹²⁸ HYS data indicate that 2% of 6th graders, 4% of 8th graders, 6% of 10th graders, and 10% of 12th graders currently use e-cigarettes only.¹²⁷ Meanwhile, current cigarette only use is lower among 6th graders (>1%), 8th graders (>1%), 10th graders (>1%), and 12th graders (1%).¹²⁷ Data show greater statewide prevalence of past 30-day use of both e-cigarettes and cigarettes as grade level increases (6th grade: <1%, 12th grade: 4%).¹²⁷ HYS data indicate that the most commonly reported substances “vaped” among youth who currently use tobacco and vapor products across grade levels contain nicotine (69% of products vaped among 8th graders; 75% among 10th and 12th graders).¹²⁷ However, it is likely that youth may not realize that products they use contain nicotine, as some reported vaping a substance not known (reported by 24% of 8th graders, 14% of 10th graders, and 9% of 12th graders).¹²⁷ Some students also reported vaping a flavor only (7% of 8th graders, 5% of 10th graders, and 3% of 12th graders).¹²⁷ An analysis of convenience store and mass market sales data from 2013-2018 found that zero-nicotine products accounted for less than 1% of the dollar market share across all years analyzed.¹²⁹

Young adults

The Monitoring the Future (MTF) study presents prevalence of substance use trends among young adults ages 19 to 30 years.¹¹¹ In 2023, measures of nicotine use in the past 12 months were expanded; 40.6% of young adults reported any nicotine use (including vaping nicotine, cigarettes, large cigars, small cigars, tobacco using a hookah, and smokeless tobacco) in the past year.¹¹¹ Nicotine vaping reached the highest levels ever recorded in 2023 with 25.3% of young adults vaping nicotine in the past 12 months and 18.7% vaping nicotine in the past 30 days.¹¹¹ Prevalence of nicotine vaping in the past month tripled since it was first recorded in 2017.¹¹¹ Data show “across young adulthood, prevalence was highest at ages 25-26 [years], with nearly half (47.6%) reporting nicotine use in the past year.”¹¹¹ Meanwhile, cigarette smoking among young adults has steadily declined since 2004.¹¹¹ Cigarette use in the past 12 months was reported by 18.8% of young adults in 2023.¹¹¹ Cigarette smoking in the past 30 days decreased from 21.2% in 2011 to 8.8% in 2023 among young adults.¹¹¹ Prevalence of cigarette use in the past 30 days generally increased across age, with 10.6% of people aged 29 to 30 years using cigarettes.¹¹¹ Similarly, daily smoking was reported by 3.6% of young adults in 2023 (rising across ages from 1.7% at ages 19 to 20 years to 6.1% at ages 29 to 30 years).¹¹¹

MTF study data also presents cigarette smoking and nicotine vaping prevalence rates for young adults (ages 19 to 22) who are college students (i.e., full-time students attending 2- and 4-year colleges) compared to young adults who are not college students (i.e., high school graduates who were not attending college full-time).¹¹¹ In 2023, young adults not attending college had higher prevalence of smoking cigarettes (20.3% in the past 12 months; 8.3% in the past 30 days; and

American Indian and Alaska Native populations.”⁴³ Throughout this Health Impact Review, “tobacco” is used within a commercial context.

2.2% daily) compared to college students (13.7%, 4.0%, and 0.6%, respectively).¹¹¹ Similarly, in 2023 the prevalence of nicotine vaping was significantly higher among young adults not attending college than college students over the past 12 months (35.6% vs. 25.8%, respectively) and past 30 days (28.8% vs. 18.0%, respectively).¹¹¹ Trends show increases in vaping nicotine since it was first reported in 2017, with significant increases from 2018 (13.4%) to 2023 (28.8%) among young adults who are not attending college full-time.¹¹¹ In contrast, there were no significant increases among college students over the same period.¹¹¹ Meanwhile, there were no significant differences between young adults attending college and those not attending college for specific measures of tobacco use, including large cigars, small cigars, tobacco using a hookah, smokeless tobacco, snus, and nicotine pouches.¹¹¹

Adults

The 2024 MTF study also presented prevalence data for adults ages 35 to 50 years (early midlife adults) and ages 55 to 65 (midlife adults).¹¹¹ Any nicotine use (including vaping nicotine, cigarettes, large cigars, small cigars, tobacco using a hookah, and smokeless tobacco) in the past 12 months was a new measure added in 2023.¹¹¹ In 2023, 29.6% of early midlife adults and 22.1% of midlife adults reported any nicotine use.¹¹¹ In 2023, 5.4% of early midlife adults and 2.1% of midlife adults reported vaping nicotine.¹¹¹ Reports of vaping nicotine among early midlife adults did not significantly increase from 2022 to 2023 or over the past 5 years.¹¹¹ The study also found that cigarette smoking among midlife adults has continued to decrease, including declines in smoking in the past 12 months (21.3% in 2013 to 16.2% in 2023) and past 30 days (16.9% in 2013 to 10.2% in 2023).¹¹¹

Additionally, results of the 2021 National Health Interview Survey (NHIS) indicate an estimated 18.7% (46 million) of U.S. adults (aged 18 years and older) currently use any tobacco product, including cigarettes (11.5% or 28.3 million adults), e-cigarettes (4.5% or 11.1 million adults), cigars (3.5% or 8.6 million adults), smokeless tobacco (2.1% or 5.2 million adults), and pipes (including hookah) (0.9% or 2.3 million adults).¹³⁰ Among those who used tobacco products, 77.5% reported using combustible products (cigarettes, cigars, or pipes) and 18.1% reported using 2 or more tobacco products.¹³⁰ Among adults who reported using 2 or more tobacco products, the most prevalent tobacco product combination was cigarettes and e-cigarettes (31.4%).¹³⁰ During 2020-2021, the prevalence of cigarette smoking decreased from 12.5% to 11.5%; however, the prevalence of e-cigarette use increased from 3.7% to 4.5%.¹³⁰ The increase in e-cigarette use was largely driven by higher prevalence in use among people aged 18-24 years.¹³⁰ No other statistically significant changes in use occurred for other tobacco products.¹³⁰ A previous NHIS sample identified primary reasons for e-cigarette use among adults include “curiosity, flavoring, cost, consideration of others, convenience, and simulation of cigarettes, as well as to attempt to quit smoking.”¹³¹

Results of the 2021 NHIS showed the prevalence of current use of any tobacco product was higher among the following groups: men; people younger than age 65 years; people of non-Hispanic other racesⁱ; non-Hispanic white persons; residents of rural (nonmetropolitan) areas; people who were financially disadvantaged; lesbian, gay, or bisexual (LGB) people; people who were uninsured or enrolled in Medicaid; adults whose highest level of education was a general

ⁱ The 2021 NHIS classified “non-Hispanic, other” to include adults who identified as “non-Hispanic American Indian or Alaska Native and any other group” or “other single and multiple races”.¹³⁰

educational development (GED) certificate; adults with a disability; and adults with serious psychological distress.¹³⁰

Retailers

As of January 2025, there were 5,193 licensed tobacco product retailers and 4,043 licensed vapor product retailers in Washington State (unpublished data, LCB, January 2025). Some retailers are licensed as both a tobacco product retailer and a vapor product retailer (personal communication, LCB, January 2025).

Sales of flavored tobacco and nicotine products, including vapor products, make up a large percentage of the market. Nationally, “non-tobacco flavors like fruit, candy, mint, menthol and desserts made up 80.6% of all e-cigarette sales in 2023.”⁴² In Washington State, flavored products may account for as much as 66.3% of sales of small vapor products (i.e., containers with 5 milliliters [mL] or less of solution); 76.7% of sales of large vapor products (i.e., containers with greater than 5 mL of solution); and 79.2% of sales of other tobacco products (e.g., cigars, pipe tobacco, chewing tobacco).¹²² Menthol cigarettes account for 36% of cigarette sales in the state.¹²²

Overall, SB 5183 has the potential to impact youth and young adults and communities disproportionately targeted for sale, marketing, and advertising of flavored tobacco or nicotine products or smart vapor products.

Logic Model

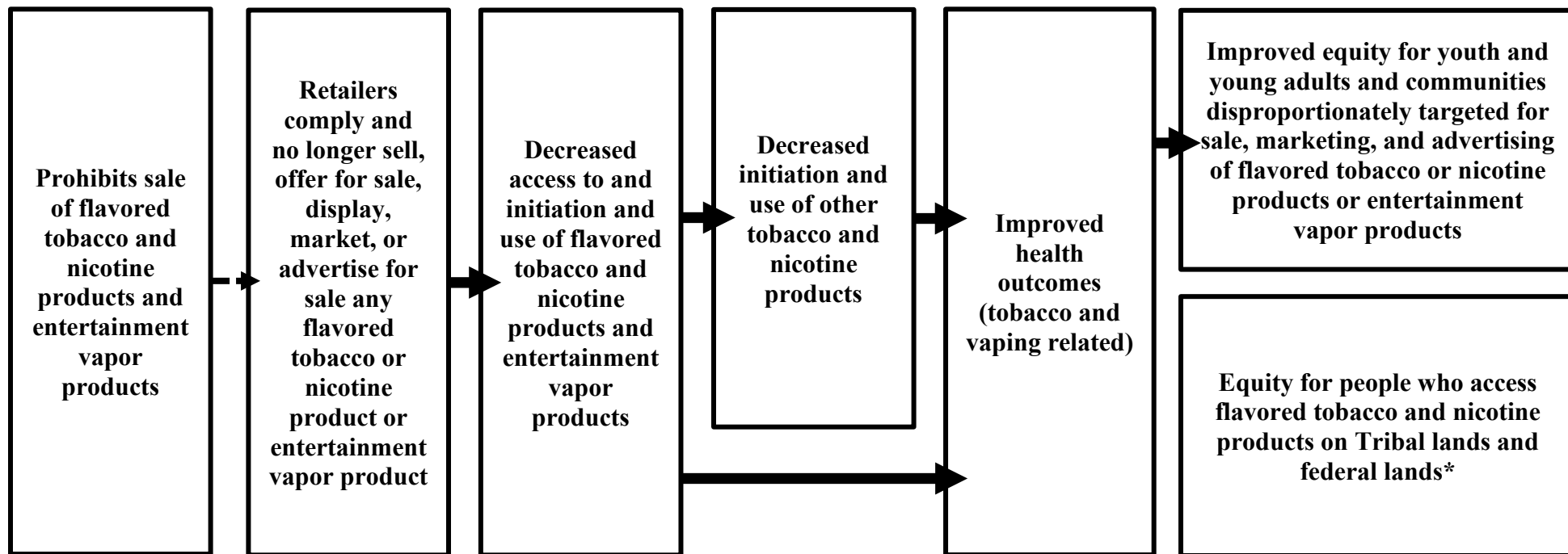
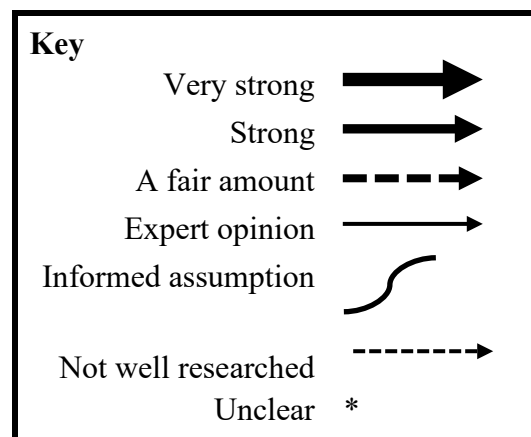


Figure 1:
Prohibiting the sale of certain tobacco and nicotine products
SB 5183



Summaries of Findings

Will prohibiting the sale of flavored tobacco and nicotine products and entertainment vapor products result in retailers complying and no longer selling, offering for sale, displaying, marketing, or advertising for sale any flavored tobacco or nicotine product or entertainment vapor product?

There is a fair amount of evidence that prohibiting the sale of flavored tobacco and nicotine products and entertainment vapor products would likely result in retailers complying and no longer selling, offering for sale, displaying, marketing, or advertising for sale any flavored tobacco or nicotine product, including vapor product, or entertainment vapor product.

SB 5183 would prohibit any retailer from selling, offering for sale, displaying, marketing, or advertising for sale any flavored tobacco or nicotine product or entertainment vapor product beginning January 1, 2026. The bill broadly defines “tobacco or nicotine product” to include 1) products containing, made of, or derived from tobacco or nicotine (e.g., cigarette, cigar, pipe tobacco, chewing tobacco, snuff, snus); 2) vapor products (whether or not they contain nicotine); and 3) components, parts, or accessories of products (e.g., filters, rolling papers, blunt or hemp wraps, hookahs, flavor enhancers, mouthpieces, pipes). Flavored tobacco and nicotine products are “any tobacco or nicotine product that imparts (a) a taste or smell, other than the taste or smell of tobacco, distinguishable by an ordinary consumer either before or during the consumption of such tobacco product including, but not limited to, the taste or smell of fruit, chocolate, vanilla, honey, candy, cocoa, dessert, alcoholic beverage, mint, wintergreen, menthol, herb, or spice; or (b) a cooling or numbing sensation distinguishable by an ordinary consumer either before or during the consumption of such tobacco product.”

SB 5183 would also address entertainment vapor products^j, which include “any vapor product that has interactive gaming or entertainment features including, but not limited to, allowing a user to play music or audio, display photos or video, play virtual games, or display other animations on the device.”

Previous restrictions of flavored vapor products in California, Massachusetts, New York, and Washington State suggest that retailers would comply with SB 5183 if passed. In June 2018, voters in San Francisco, California, passed Proposition E, which prohibited the sale or distribution of flavored tobacco products (including e-cigarettes).^{132,133} Following its passage, the San Francisco Department of Public Health (SFDPH) and partners visited 801 retail sites to conduct education and outreach efforts with retailers to support compliance with the new ordinance.⁴¹ Site visitors distributed posters, offered to supply written materials in additional languages, and collected questions regarding potentially flavored tobacco products.⁴¹ From December 2018 to March 2019, 13 SFDPH inspectors conducted 693 tobacco compliance inspections (out of 761 locations).⁴¹ Of the inspections conducted in 2018 (n=360), flavored tobacco products were present at 284 locations (versus 58 with no flavored tobacco products present).⁴¹ Of the inspections conducted from January through March of 2019 (n=362), flavored

^j Key informants and researchers refer to entertainment vapor products as smart vapor products or “smart vapes” because some devices have features found in smart devices (e.g., “find my device”, Bluetooth). This Health Impact Review uses “entertainment vapor products” when discussing bill provisions and “smart vapor products” more generally.

tobacco products were identified at just 50 locations (versus 279 with no flavored tobacco products present).⁴¹

Massachusetts became the first state to restrict the sale of all flavored tobacco products with the exception of flavored e-cigarettes sold for on-site consumption at licensed smoking bars (effective June 1, 2020).⁴² Prior to the statewide policy, local jurisdictions had enacted 179 policies covering 66.3% of the state's population by March 2020.⁴² However, the majority of local policies exempted menthol cigarettes and other mint, menthol, and wintergreen flavored tobacco products.⁴² The statewide policy led to an immediate decrease in e-cigarette sales as well as sustained decrease in the sales of flavored products.⁴² Between 2019 and 2023, overall e-cigarette sales declined by 86.2% and flavored e-cigarette sales decreased 98.2%.⁴² In December 2023, following implementation of the statewide restrictions, 10.1% of total e-cigarette sales were flavored, indicating compliance with the regulation is high.⁴² Massachusetts' enforcement efforts (e.g., local permit systems, inspections, technical assistance, and dedicated funding for tobacco retailer education and enforcement) are credited for the sustained decrease in sales.⁴²

In May 2020, New York State prohibited the sale of all flavored e-cigarettes.⁴² Three jurisdictions already restricted the sale of some flavored tobacco products (Nassau County, New York City, and Yonkers), thereby limiting access to some flavored tobacco products for 51% of the state's population prior to the statewide policy.⁴² Following implementation of the statewide policy, e-cigarette unit sales decreased for all devices and flavors except for tobacco flavored products.⁴⁶ Between May 2020 and December 2023, unit sales declined by 56.8% for all e-cigarettes and by 79.1% for flavored e-cigarettes.⁴² However, in December 2023, 31.3% of total e-cigarette units sold in New York were of prohibited flavors, and 89.2% of those were disposable e-cigarettes.⁴² Such evidence suggests that prohibiting flavored products does not automatically eliminate all availability of prohibited products.

Like New York State, California saw sales of flavored products decrease but some prohibited flavored products remained available following implementation of its flavor restrictions. In August 2020, California passed a law prohibiting the sale of most flavored tobacco products (flavored e-cigarettes, menthol cigarettes, and flavored cigars) with exemptions for loose leaf pipe tobacco, hookah sold in licensed stores that only permit people ages 21 years or older and premium cigars with a wholesale price of \$12 or more.⁴² However, implementation was delayed until Californians voted to uphold the law, which went into effect December 21, 2022.⁴² As the law did not name an enforcing agency until October 2023, the first 10 months of enforcement was limited to local efforts.⁴² Restrictions reduced sales of both disposable e-cigarettes (down 52.2%) and prefilled cartridges (by 32.1%) between December 2022 and December 2023.⁴² During this period, flavored e-cigarettes sales decreased by 67.7%, and monthly sales of all e-cigarette sales decreased by 42.7%.⁴² The decrease in flavored e-cigarette sales (67.7%) was largely the result of declining sales of e-cigarettes in mint (82.4%), menthol (85.3%) and all other flavors (72.7%).⁴² However, more than 40% of total e-cigarettes sales in December 2023 were of prohibited flavors; with disposable e-cigarettes comprising 93.3% of e-cigarettes sold in prohibited flavors.⁴² Effective January 1, 2024, the California Department of Public Health is authorized to enforce the state law.⁴²

Following the implementation of Chapter 246-80 WAC prohibiting the sale of flavored vapor products, the Washington State Liquor and Cannabis Board (LCB) conducted 3,783 educational compliance visits to non-Tetrahydrocannabinol (THC) vapor product and cannabis retailers from October 24 to December 19, 2019 (personal communication, LCB, January 2025). Of the non-THC vapor product retailers, 3,534 retailers (93.4%) were in compliance with the ban (unpublished data, LCB, January 2025). Of cannabis retailers, 98% were in compliance with the ban (unpublished data, LCB, January 2025). Results suggest prohibiting the sale and distribution of flavored tobacco and nicotine products can result in compliance among retailers, thereby limiting access to flavored products.

SB 5183 would also require retailer compliance education and would create enforcement mechanisms, which may help increase retailer compliance if the bill were to pass. SB 5183 would require LCB to adopt rules to implement the bill and for compliance education for licensed retailers, distributors, and manufacturers and their employees. The bill would also allow LCB to impose monetary penalties as authorized under [RCW 70.345.180](#) or suspend or revoke a retailer's license as authorized under [RCW 70.155.100](#) for violation of SB 5183 Section (3).

LCB staff stated that the agency would work to let retailers know about the change in law by sending messages through their communication channels with retailers (e.g., email, listserv, bulletins); by working with staff at Washington State Department of Revenue (DOR) and Department of Health (DOH); and by sharing information during any premises checks completed before the bill's effective date (personal communication, LCB, January 2025). For example, after the 2019 statewide flavored vapor product ban, LCB staff completed 3,534 premises checks with tobacco and vapor product retailers to provide education (personal communication, LCB, January 2025). LCB staff anticipate that most education with retailers would occur in State Fiscal Year (SFY) 2026, with reduced education and enforcement needs in SFY 2027 and beyond to maintain the ban.¹²²

While LCB would retain enforcement authority, if passed, SB 5183 would also create an additional enforcement mechanism and allow the Attorney General's Office, Consumer Protection Division (AGO-CPD) and private parties to enforce the new law (personal communication, AGO-CPD, January 2025). SB 5183 would establish under the Consumer Protection Act (CPA) ([Chapter 19.86 RCW](#)) that it is an unfair or deceptive practice for any retailer to sell, offer for sale, display, market, or advertise for sale any flavored tobacco or nicotine product or any entertainment vapor product. Under the CPA, a violation of SB 5183 would constitute a per se violation, meaning that a violation would automatically be an unfair or deceptive act or practice under the CPA (personal communication, AGO-CPD, January 2025). CPA complaints to the AGO-CPD may be initiated through several channels, including through consumer online complaints, organizations voicing concerns, or news investigations about potential violations (personal communication, AGO-CPD, January 2025). However, the AGO-CPD staff noted that, for a private CPA action, a party must show financial injury, and it is unclear in this context which private parties may be able to demonstrate financial injury (personal communication, AGO-CPD, January 2025). Lastly, AGO-CPD staff stated that the office would likely not get involved in enforcement unless LCB had repeatedly fined a retailer and the agency's enforcement strategies had not prompted the retailer to come into compliance (personal communication, AGO-CPD, January 2025). Instead, AGO-CPD staff would likely

refer complaints about potential violations to LCB for enforcement (personal communication, AGO-CPD, January 2025).

Therefore, there is a fair amount of evidence that prohibiting the sale of flavored tobacco and nicotine products and entertainment vapor products would likely result in some retailers complying and no longer selling, offering for sale, displaying, marketing, or advertising for sale any flavored tobacco or nicotine product or entertainment vapor product.

Will retailers complying (i.e., no longer selling, offering for sale, displaying, marketing, or advertising for sale any flavored tobacco or nicotine product or entertainment vapor product) decrease access to and initiation and use of these products?

There is very strong evidence that retailers complying (i.e., no longer selling, offering for sale, displaying, marketing, or advertising for sale any flavored tobacco or nicotine product or entertainment vapor product) would likely result in decreased access to and initiation and use of these products.^{42,44-68}

Access to flavored products

Key informants stated that, generally, prohibiting the sale of flavored tobacco and nicotine products, including vapor products, would decrease accessibility of these products and related advertising (personal communications, January 2025). In the published literature, evidence of decreased access is partially documented by analyses showing reduced sales of flavored products by licensed retailers after restricting the sale of flavored tobacco and nicotine products.^{42,67,68}

In 2009, the Canadian government passed federal regulations restricting flavors (excluding menthol) in small cigars. To assess the policy's effect, researchers analyzed wholesale data (2001 through 2016) to estimate changes in sales of cigars with and without flavor descriptors and analyzed changes for each flavor type over time.⁴⁷ Results show the flavor regulations were "associated with a reduction in the sales of [flavored] cigars by 59 million units."⁴⁷ While increases in sales of cigars with descriptors other than flavors (e.g., color) were observed (9.6 million increase), the overall level (decline of 49.6 million units) and trend of sales of cigars (6.9 million units per quarter) declined following the ban.⁴⁷ Authors concluded flavor regulations "have the potential to substantially impact tobacco sales. However, exemptions for certain [flavors] and product types may have reduced the effectiveness of the ban, indicating the need for comprehensive, well-designed regulations."⁴⁷

In January 2013, the city of Providence, Rhode Island, began enforcing a restriction on the retail sale of all non-cigarette tobacco products with a characterizing flavor other than tobacco, menthol, mint, or wintergreen. Researchers assessed the policy impact (January 2012-December 2016) on cigar sales, which represented 95% of flavored non-cigarette tobacco product sales in the city.⁴⁹ Results showed, "policy implementation was associated with a five-times greater decrease in average weekly sales of all cigars ([flavored] and otherwise) from prepolicy to postpolicy periods in Providence as compared with the more modest decrease observed in the [rest of the state]."⁴⁹ However, researchers found increases in sales of several brands of cigars labelled with concept-flavor names (e.g., Jazz) rather than explicit-flavor names (e.g., Watermelon Mist).⁴⁹ They also identified some evidence of product substitution and cross-border

purchasing.⁴⁹ Despite these challenges, sales of all cigars decreased significantly (31%) in Providence following the flavor restriction policy compared to the rest of the state.⁴⁹

Following implementation of the statewide restrictions in Massachusetts, overall e-cigarette sales declined by 86.2% (from 549,000 to 75,910 units) and flavored e-cigarette sales declined by 98.2% (from 413,000 to 7,640 units) between September 2019 and December 2023.⁴² Sales decreased for both prefilled cartridges (decreased by 87.1%) and disposable e-cigarettes (decreased by 74.1%) between September 2019 and December 2023.⁴² While sales of flavored e-cigarettes decreased for menthol (99%), mint (100%), and other flavors (98.9%), a new category of “clear or other cooling” flavors emerged following restrictions.⁴² While unflavored, the new category contains non-menthol synthetic cooling agents without the aroma or taste of menthol.⁴²

In California, restrictions reduced sales of both disposable e-cigarettes (down 52.2%) and prefilled cartridges (by 32.1%) between December 2022 and December 2023.⁴² During this period, flavored e-cigarettes sales decreased by 67.7%, and monthly sales of all e-cigarette sales decreased by 42.7%.⁴² The decrease in flavored e-cigarette sales (67.7%) was largely the result of declining sales of e-cigarettes in mint (82.4%), menthol (85.3%) and all other flavors (72.7%).⁴² Like Massachusetts, California saw an increase in sales of “clear and cooling” e-cigarettes (from 7,530 units to 66,390 units, representing an increase of 782.1%) between December 2022 and December 2023.⁴²

Additionally, in a fiscal note for HB 1203 (direct companion legislation to SB 5183), DOR estimated that, if the bill were to pass, taxable sales of small vapor products (i.e., containers with 5 milliliters [mL] or less of solution) would decrease by 66.3%; taxable sales of large vapor products (i.e., containers with greater than 5 mL of solution) would decrease by 76.7%; and taxable sales of other tobacco products (e.g., cigars, pipe tobacco, chewing tobacco) would decrease by 79.2%.¹²² DOR estimated that sales of menthol products would also decrease.¹²²

However, there may continue to be some access to flavored tobacco and nicotine products, including vapor products, and smart vapor products (personal communication, LCB, January 2025). Staff from LCB stated that products may still be accessible if licensed retailers do not come into compliance and through retailers on Tribal lands and federal lands; retailers in border jurisdictions (e.g., Oregon and Idaho); online retailers; and the illicit market (personal communications, LCB, January 2025).

LCB staff stated that flavored tobacco and nicotine products, including vapor products, may remain in licensed retailers if a licensee is not in compliance with the law or if retailers market products differently because of SB 5183 (personal communication, LCB, January 2025). While evidence suggests that most retailers would come into compliance with SB 5183 if passed, some retailers may not come into compliance with the law. Following the 2019 ban on flavored vapor products in Washington State, LCB completed 3,783 educational visits with retailers, and 249 retailers (7.1%) were not in compliance with the ban (unpublished data, LCB, January 2025). LCB enforcement officers took action with 34 retailers and temporarily suspended the license of 3 retailers (unpublished data, LCB, January 2025). LCB staff stated that they observed the most noticeable changes in retailer behavior between the 2nd and 3rd violation—after the retailer has been issued several lesser monetary penalties and before a greater monetary penalty is

accompanied by a 6-month license suspension (personal communication, LCB, January 2025) – indicating license suspension and higher fines may be a stronger deterrent than monetary penalties alone. In addition, tobacco product sales comprise large proportions of retailer sales revenue, particularly for small retailers (personal communications, March 2023), which may also indicate that license suspension may be a stronger deterrent than monetary penalties alone. SB 5183 does not provide LCB authority to seize or confiscate flavored products (personal communication, LCB, January 2025). Therefore, if LCB enforcement officers found flavored products during a premises check, they would not have authority to remove the products and some flavored products may remain in retail stores while LCB staff worked with a licensee through compliance education and enforcement (personal communication, LCB, 2025). Lastly, SB 5183 states that “tobacco and nicotine product” does not include drugs, devices, or combination products authorized for sale by the U.S. Food and Drug Administration (FDA). As of January 2025, FDA has authorized 30 tobacco and 4 menthol-flavored e-cigarette products and devices.⁶ Based on bill provisions, these products and any future products authorized for sale by the FDA may remain on the market and available in retail stores.

In addition, a key informant previously shared that, since Canada implemented restrictions on some flavored tobacco products (e.g., cigars, cigarettes, and hookah), the tobacco industry adopted new tactics to appeal to former flavor buying customers. For example, companies introduced ‘add on’ flavor products (dry or liquid options) which customers can purchase and add to tobacco products (personal communication, 2019). Currently, these add on flavors have not gained the same traction that flavored products showed. This is likely due to inertia—it takes more effort for customers to purchase and use the flavor add on than it did to buy the ready-made flavored product (personal communication, August 2019). Companies also found loopholes in the regulations that allowed them to create product descriptors other than flavor. For example, companies provided retailers with sales materials to guide customers to the new brand product (e.g., color) which most closely matches the previous product’s flavor descriptor (personal communication, August 2019). Following the 2019 flavor ban in Washington State, LCB staff stated that some retailers began selling flavoring separate from the vapor product (personal communication, LCB, January 2025). LCB staff stated that, depending on how flavoring is displayed, marketed, or advertised, enforcement officers may not be able to take action related to those products based on bill provisions of SB 5183 (personal communication, LCB, January 2025). For example, if retailers sold flavored packets separate from vapor products and without indication of use or specific advertising, LCB may not be able to take enforcement action (personal communication, LCB, January 2025).

SB 5183 would prohibit the sale of flavored tobacco and nicotine products and entertainment vapor products in Washington State; however, the bill would not prohibit retailers on Tribal lands and federal lands from selling these products. Tribal retail stores are not required to be licensed by LCB, and LCB enforcement officers do not have jurisdiction over Tribal tobacco retailers located on Tribal land (personal communication, LCB, January 2025). We did not find any research on how statewide bans on flavored tobacco and nicotine products, including flavored vapor products, may impact access or sales on Tribal lands and federal lands. See “Inequities due to settler colonialism” on page 37 for further discussion.

SB 5183 does not address online sales of flavored tobacco and nicotine products, including vapor products, and smart vapor products; therefore, people may continue to access flavored products through online retailers. Similarly, California’s policy did not explicitly include online sales of flavored tobacco products.⁴² Surveys have indicated that youth primarily used online sales to purchase e-cigarettes during the COVID-19 pandemic.⁴² Moreover, research indicates online searches for e-cigarettes were 160.0% higher in California the week the law went into effect and remained elevated for 6 weeks.⁴² Following bans on menthol cigarettes in 7 Canadian provinces, researchers found that 7.5% of people who purchased menthol cigarettes after the ban purchased the products online.⁶⁷ Key informants in Washington State stated that youth currently access some products through online sales (e.g., hemp-derived THC products), and youth may also access flavored tobacco and nicotine products through online retailers (personal communications, January 2025). Washington’s 2023 Healthy Youth Survey (HYS) data show that 4% of 8th grade students, 5% of 10th grade students, and 7% of 12 grade students reported accessing tobacco or e-cigarette/vapor products online.¹²⁸

People may also access flavored tobacco and nicotine products in border jurisdictions (e.g., Idaho and Oregon) (personal communication, LCB, January 2025). Previous research has found some evidence that statewide flavor bans may increase product sales in neighboring jurisdictions. Following Massachusetts’s ban on menthol flavors, cigarette sales decreased in the state “while disproportionately increasing [cigarette] sales in border states.”⁶⁸ However, other analyses have indicated no sustained or significant impact in bordering states. A separate analysis of Massachusetts law found that increased sales in border-states were similar to those in non-border states.⁴² A follow-up study found that sales decreased in Massachusetts by about 350 packs per 1,000 people while sales in bordering states increased by about 10 packs per 1,000 people, representing a net reduction in packs sold.⁴² Additionally, while sales of menthol cigarettes initially increased in New Hampshire, the increase in sales was not sustained.⁴²

LCB staff also provided context that some untaxed products enter Washington State through the illicit market (personal communication, LCB, January 2025). LCB staff stated that Washington State has one of the highest tobacco taxes in the U.S. and untaxed cigarettes come into the state illegally (personal communications, LCB, January 2025). They stated that, if the bill were to pass, some flavored tobacco and nicotine products may enter the state illegally (personal communications, LCB, January 2025). In a fiscal note for HB 1203 (direct companion legislation to SB 5183), DOR anticipates that, if the sale of flavored tobacco and nicotine products were prohibited, some people who use menthol cigarettes may purchase un-taxed menthol cigarettes,¹²² suggesting the illicit market may be an access point for flavored products if the bill were to pass. Some key informants have expressed concern about the contents of products purchased through the illicit market. Key informants noted that people may be unaware of nicotine levels or ingredients, and that some vapor products have been reported to be laced with fentanyl (personal communications, January 2025).

Overall, while some access to flavored tobacco and nicotine products, including vapor products, and smart vapor products may remain if SB 5183 were to pass, prohibiting the sale of flavored tobacco and nicotine products, including vapor products, would generally decrease accessibility of these products and related advertising (personal communications, January 2025).

Initiation and use of flavored products

Research consistently shows that flavors, and associated advertising, contribute to the appeal, initiation, and use of tobacco products, including vapor products, particularly among youth^k and young adults.⁴⁴⁻⁶⁶

Tobacco products

Flavored tobacco products (e.g., cigarettes [allowed flavors menthol/mint], cigars, cigarillos/little cigars, blunt wraps, smokeless tobacco, hookah) disproportionately appeal to young people and serve as an entry point to the tobacco market.

The 2009 Tobacco Control Act banned flavored cigarettes (except menthol and tobacco) as a result of evidence that flavored products attract youth.^{44,48} Research evaluating adolescent tobacco use before and after the ban found that banning flavored cigarettes was associated with a 17% decrease in cigarette smoking.⁴⁸ However, use of menthol cigarettes, cigars, and pipe tobacco increased significantly “implying substitution toward the remaining legal flavored tobacco products.”⁴⁸ Even with an overall 14% increase in the use of other flavored tobacco products, banning flavored cigarettes resulted in a net 6% decrease in the probability of youth using any tobacco product.⁴⁸ Study authors concluded that, “the results suggest the 2009 flavored cigarette ban did achieve its objective of reducing adolescent tobacco use, but effects were likely diminished by the continued availability of menthol cigarettes and other flavored tobacco products.”⁴⁸ For example, an analysis of national data from 2004 to 2014 found that adolescents aged 12 to 17 years old who used cigarettes were the most likely group to use menthol cigarettes compared to all other age groups.¹³⁴ Moreover:

children and adolescents exhibit stronger preferences for sweet tastes compared with adults, considering sweetness as a flavor and eliminating all sweeteners in tobacco products would be expected to reduce the likelihood of youth initiation and transition to tobacco dependence, protect certain population groups from tobacco-related health disparities, prevent potential chronic metabolic effects of artificial sweeteners, and limit exposure to sweeteners at potentially adverse effect levels.⁴⁶

Nearly 90% of high school and middle school students who currently use commercial tobacco report using a flavored product.⁴⁵ Additionally, over 80% of teens aged 12-17 years who have ever tried tobacco used a flavored product first.⁴²

The 2024 Surgeon General’s Report found that restrictions on flavored products in the U.S. and Canada have been shown to reduce the odds of youth trying flavored tobacco products, the odds of youth ever using tobacco products, and youth current use of tobacco products, particularly when the restrictions apply to all flavors in all tobacco products.⁴⁶

Vapor products

Monitoring the Future (MTF) 2019 Survey results show that, when youth were asked why they vaped, 41.7% reported “because it tastes good” (2nd most common answer).⁵² Flavors have been shown to increase “positive” (e.g., euphoria, relaxation) and decrease “negative” (e.g., nausea, coughing) subjective experiences among novice users.^{46,53} Among youth (12-17 years old) in

^k In research and datasets, information related to the use of tobacco and nicotine products is presented across multiple age ranges. Where possible, this Health Impact Review notes the specific age range included in research and data. More generally, this Health Impact Review uses “youth” to refer to people aged 18 years or younger; “young adult” to refer to people aged 19 through 30 years; and “adult” to refer to people aged 31 years or older.

Texas who used e-cigarettes, 72.9% reported using e-cigarettes because they “come in flavors I like.”⁵⁰ More recently, MTF 2024 survey results show the most commonly cited reason for vaping nicotine among youth (i.e., students in 8th, 10th, and 12th grades) who vape was to “relax” (48.7% of those who vaped in the past 12 months and 71.1% of those vaping near daily).⁵⁴ Other commonly reported reasons include “boredom,” “experiment,” and “hooked.”⁵⁴ “Taste” was the 4th most cited reason for vaping nicotine across all groups (i.e., use in the past 12 months, past 30 days, and near daily).⁵⁴ These types of subjective experiences are associated with initiation and sustained cigarette smoking, whereas experiences viewed as negative may be associated with reduced odds of sustained cigarette use.⁵³

Sweet and fruit flavors, in particular, strongly appeal to youth and young adults.^{56,59,60} Evidence from a small (n=20) double-blind laboratory study of young adults and adults aged 19 to 34 who vape indicated that e-cigarette solutions that “stimulate orosensory perceptions of sweetness (in and of themselves) may be primary drivers of appeal.”⁵⁹ After controlling for flavor and nicotine, perceived sweetness was significantly positively associated with appeal ratings.⁵⁹ Specifically, “each [1] point increase in sweetness rating (0–100) was associated with an estimated 0.51 increase in ‘liking,’ a 0.51 increase in ‘willingness to use again,’ and a \$0.04 increase in ‘amount willing to pay for a day’s worth of the solution.’”⁵⁹ Meanwhile, “throat hit” (from nicotine) ratings were not positively associated with appeal and were inversely associated with liking.⁵⁹ Researchers re-analyzed data from those who reported non-sweet flavor preferences to determine if pre-existing flavor preferences influenced study outcomes. Findings from the overall sample held true for the sub-sample that preferred non-sweet flavors.⁵⁹

Preferences for specific flavors (i.e., fruit, dessert, and alcohol) and the total number of flavors preferred have also been associated with more days of e-cigarette use among youth, “indicating that flavor preferences may play an important role in [youth] e-cigarette use.”⁵⁶ A 2019 study found youth (12-17 years) and young adults (18-24 years) were more likely (4.58 times and 2.28 times, respectively) than adults 25 years of age and older to concurrently use multiple flavors.⁵⁷ Results of a study of 3,878 U.S. adults showed 8% of e-cigarette users reported flavors as a reason for first trying e-cigarettes.⁵⁸ Meanwhile, 53% of respondents reported first using e-cigarettes out of curiosity and 30% reported first using them because they wanted to quit or reduce smoking.⁵⁸

Evidence also suggests that advertisements for flavored vapor products, particularly for fruit and sweet flavors, are attractive to youth and young adults and are perceived as targeted toward them. For example, a majority of youth and young adults (14-21 years) surveyed believed advertisements for flavored e-liquids “target individuals about their age, not older adults.”⁶¹ A 2018 study assessed whether nonsmoking young adults (ages 18-25 years) perceive sweet/fruit flavor e-cigarette advertisements more like sweets and fruits and less like tobacco, despite being equivalent to tobacco flavored e-cigarettes.⁶⁰ Results showed “a significant impact of advertising for sweet/fruit flavors on increased neural cue-reactivity” compared to tobacco flavor e-cigarette advertisements.⁶⁰ Sweet/fruit flavor advertising was also associated with “poorer memory for health warnings, increased visual attention to advertising content and decreased visual attention to warning labels, and relatively increased liking and intent to try these products.”⁶⁰ This increased brain response to sweet/fruit versus tobacco flavored e-cigarette advertisements

provides evidence of a relative product preference for sweet/fruit flavor e-cigarettes in nonsmoking young people.⁶⁰

Additionally, study authors found that participating young adults who spent more time viewing the advertising content and less time viewing the warning label “reported greater liking and intentions to use e-cigarettes.”⁶⁰ Authors concluded that advertising for sweet/fruit flavors “may increase positive associations with e-cigarettes and/or override negative associations with tobacco, and interfere with health warnings.”⁶⁰ This evidence aligns with findings of a 2018 systematic review in which evidence from 5 studies show flavored tobacco products, including e-cigarettes, are perceived as less harmful than non-flavored products by younger participants.⁶²

Evidence also indicates that restricting flavors in e-cigarettes and other tobacco products has the potential to substantially reduce use of these products by youth (12-17 years)⁵¹ and young adults and adults (18-29 years).^{51,63} While more than 90% of youth and young adults aged 12 through 29 years who use e-cigarettes surveyed in Texas reported using flavored products, approximately 75% of those who used a “flavored e-cigarette [...] said that they would *not* use an e-cigarette if it was not available in a flavored form (e.g., candy, fruit, mint/menthol, etc.).”⁵¹ While reported discontinued use was highest among those who used e-cigarette and those who used hookah, results suggest eliminating flavors in other tobacco products (i.e., cigars, smokeless tobacco) would also decrease the use of these products among youth.⁵¹ Another analysis of cross-sectional surveys of youth (12-17 years old), young adults (18-29 years old), and adults (30 years and older) found that fruit and candy flavors predominated for all age groups.⁵⁰ Authors concluded, “restricting the range of e-cigarette flavors (e.g., eliminating sweet flavors, like fruit and candy) may benefit youth and young adult prevention efforts.⁵⁰ However, it is unclear what impact this change would have on adult smoking cessation.”⁵⁰ See “Additional Considerations” on page 39 for discussion of cessation.

Removing availability of flavored products in retail stores may also decrease initiation and use. The 2023 HYS found that, accessing products through non-social sources (e.g., buying from a store, the internet, or a vending machine) was most common among 12th graders (24%) compared to 10th (12%) and 8th graders (8%).¹³⁵ A separate survey of over 1,700 youth aged 15 to 17 years who reported vaping in the past 30 days found that 78.2% owned their own vaping device, with 32.2% purchasing their device online and 22.3% purchasing it in a vapor shop or lounge.¹³⁶ A survey with 9th and 12th grade students in California found that 9.3% reported buying tobacco products (including hookah, e-cigarettes, and cigarettes) from retailers directly.¹³⁷ Evidence from the Massachusetts Youth Health Survey showed significant declines in current (past 30-day) rates of e-cigarette (32.0% to 17.6%), cigarette (4.3% to 2.9%) and cigar (4.7% to 2.0%) use among high school students following implementation of the statewide law restricting the sale of flavored tobacco products.⁴² Additionally, fewer high school students who reported using tobacco products reported accessing products from stores (16.7% to 11.9%) and vape shops (17.4% to 13.0%).⁴²

Social availability was also a large access point, with 72.8% of youth reporting using someone else’s vaping device in the past 30 days, and 80.5% who borrowed stating that they borrowed from a friend.¹³⁶ In Washington State, results of the 2023 HYS found 82% of 8th grade, 68% of 10th grade, and 71% of 12th grade students currently using tobacco and vapor products reported

accessing them through social sources (e.g., giving money to someone, “bumming”, from a person 21 years or older, and taking from a store or family).¹³⁵ A survey with 9th and 12th grade students in California found that 55% reported getting tobacco products (including hookah, e-cigarettes, and cigarettes) from peers.¹³⁷ One researcher suggested that, “social sources might be even more important for vaping than for smoking cigarettes; cigarette smokers likely get cigarettes from other people only when they do not possess their own, but vapers use others’ devices even when they have their own.”¹³⁶ Therefore, decreasing access to flavored products in retailers and across all age groups may further decrease youth access to tobacco and nicotine products.

Smart vapor products

Lastly, SB 5183 would also prohibit entertainment vapor products. Key informants stated that these products are relatively new to the market and are target-marketed to youth (personal communications, January 2025). Some products are “currently illegally marketed in the U.S. without [FDA] authorization.”⁶⁴ Entertainment vaping devices may include high-definition displays with built-in digital games (e.g., Pac-Man, Tetris, virtual pets, slot machine-like games, and “puff count competitions”).^{65,138} Some devices also have features found in smart devices, including touchscreens; photo wallpapers; customizable displays (e.g., puffing animation); “find my device” location services; Bluetooth; speakers; wireless charging; and voice recognition.⁶⁵ Some games and features on these devices are designed to increase vaping.^{65,138} For example, on some products, users must vape or vape more frequently to progress or earn points in some games, “which would likely accelerate nicotine addiction.”⁶⁵ Some products offer multiple flavor options.⁶⁵

Researchers have noted that smart vapor products may be particularly addicting because the devices act on 3 “potential addictions: nicotine dependence, gaming disorder, and screen time obsession.”⁶⁵ Moreover, the devices may be particularly addicting for youth as “coupling nicotine to existing youth behaviors, such as video gaming and screen time use, will broaden the smart [e-cigarette] market to include youth with no prior interest in nicotine products, while simultaneously reinforcing nicotine addiction among [youth who currently use tobacco and nicotine products].”⁶⁵ Researchers have suggested that, “products could also mislead children and adolescents by obscuring the product’s true purpose, potentially leading to accidental exposures to vaping.”¹³⁸

Information about the prevalence and use of smart vapor products in Washington State is not available (personal communications, January 2025). Key informants stated the products are new to the market, information about the products is still emerging, and data about use of the products has not been formally collected (personal communications, January 2025). However, national trends suggest that smart vapor products “are gaining popularity among youth.”⁶⁴ Based on national retailer scanner data, “the smart vape brands Geek Bar Pulse and Raz, which debuted in October 2023, emerged as the [3rd] and [6th] top-selling e-cigarettes as of June 2024.”⁶⁴ Among middle and high school students who reported e-cigarette use, “5.8%- an estimated 90,000 youth-wrote in that they use Geek Bar. As a write-in response, this is likely an underestimate”.⁶⁴ Researchers have noted that additional research is needed to assess youth access to and perception and use of smart vapor products.¹³⁸ Key informants stated that restricting smart vapor

products from licensed retailers would also likely limit access and use (personal communication, LCB, January 2025).

Lastly, a study examining local restrictions on flavored products concluded that “flavor restriction policies [are] associated with lower odds of any tobacco and flavored use among youth and young adults.”⁶⁶ A study examining hypothetical bans on flavored products found that bans that include more products and more flavors “would secure more certain net reductions to public health harms from e-cigarette use and smoking.”¹³⁹ The 2024 Surgeon General’s report concluded that there is sufficient evidence (inferring a causal relationship) that: 1) policies prohibiting “the sale of flavored tobacco products reduce sales of tobacco products and can reduce tobacco use” and “should also reduce tobacco use among groups experiencing disparities in tobacco use”; and 2) policies prohibiting “the sale of menthol cigarettes reduce the sale of cigarettes and increase smoking cessation.”⁴³ Furthermore:

Given the disproportionate burden of menthol cigarette use among some population groups, removing menthol cigarettes from the marketplace should also reduce disparities in tobacco initiation, nicotine dependence, cessation success, and tobacco-related health outcomes, especially if policies are comprehensive and equitably implemented.⁴³

Overall, there is very strong evidence that prohibiting the sale and distribution of flavored nicotine and tobacco products, including vapor products, and smart vapor products would likely decrease initiation and use of these products.

Will decreasing access to and initiation and use of flavored tobacco and nicotine products and entertainment vapor products decrease initiation and use of other tobacco and nicotine products?

There is very strong evidence that decreasing access to and initiation and use of flavored tobacco and nicotine products would likely result in decreased initiation and use of other tobacco products.^{9,53,66,69-81} It is well-documented that “[y]outh are more likely to initiate tobacco use with flavored tobacco products than non-flavored products and those who use flavored products are more likely to progress to regular tobacco use.”⁶⁶

According to the FDA’s scientific evaluation, “menthol has a physiological impact on smoking that increases initiation and progression to regular cigarette smoking, increases nicotine dependence and decreases smoking cessation success.”¹⁴⁰ Findings are consistent with results of a 2017 systematic review in which “longitudinal studies demonstrate initiation with menthol cigarettes facilitates progression to established use in young smokers.”¹⁴¹

The use of flavored tobacco products by youth has also been associated with increased risk of multiple tobacco product use (dual and poly tobacco use).⁵³ An analysis of 2017 National Youth Tobacco Survey (NYTS) results found, after controlling for covariates, “[f]lavored tobacco use [among adolescent respondents] was significantly correlated with a greater risk of dual and poly tobacco use (2.09 times greater risk and 5.54 times greater risk, respectively), relative to single product use.”⁵³ Among those who reported dual and poly tobacco use, the most commonly used flavored tobacco products were e-cigarettes followed by cigars and conventional cigarettes.⁵³ Evidence from California suggests that young adults (18-24 years of age) “who use more tobacco products [i.e., e-cigarettes, hookah, cigars/cigarillos, and smokeless tobacco] are at greater risk

for increased cigarette smoking and maintaining multiple product use pattern.”⁷⁸ These findings are consistent with previous research.

Evidence suggests that youth and young adults who start using e-cigarettes may be more likely than their peers to begin using combustible cigarettes and other tobacco products.⁶⁹⁻⁷⁷ In a national survey of 12 to 17 year olds, researchers found that ever-using e-cigarettes was associated with 2.53 times greater odds of subsequently smoking cigarettes.⁷¹ Data from the 2014 NYTS showed “the use of flavored e-cigarettes was associated with [significantly] higher odds of intention to initiate cigarette use compared with not using e-cigarettes.”⁷⁶ Similarly, a longitudinal cohort study of high school students found that, after controlling for other variables (e.g., peer and family e-cigarette use, sensation-seeking, and combustible cigarette smoking), “[youth] who initially vaped a flavored e-cigarette progressed to current and more frequent e-cigarette use more rapidly than [youth] who initially vaped an unflavored e-cigarette.”⁵⁵ Another study found that using e-cigarettes was strongly and consistently associated with greater risk of cigarette smoking initiation among youth and young adults, and e-cigarette use was an independent risk factor for cigarette smoking, even after controlling for multiple additional risk factors.⁷² Results of a 2018 analysis of a pooled sample of U.S. youth found the risk of past-30-day smoking and of more frequent smoking after initiation was higher among those who at baseline had ever used e-cigarettes compared to those who had never used e-cigarettes.⁶⁹

Finally, research has also indicated that 95% of adult smokers begin smoking before they turn age 21 years⁷⁹ and early smoking onset is associated with greater likelihood of addiction and decreased likelihood of cessation.^{9,80} Evidence shows that U.S. youth are initiating e-cigarette use at younger ages in recent years.⁸¹ In 2018, 28.6% of those reporting lifetime e-cigarette use initiated use at 14 years or younger (versus 8.8% in 2014).⁸¹ An analysis of 2015 Monitoring the Future (MTF) data found that among participating 12th graders (2,299 students) approximately 69.6% of those who initiated e-cigarette use in 9th grade or earlier reported any cigarette smoking as compared to 46.5% of the respondents who initiated e-cigarettes in 12th grade and 14.8% of those respondents who never used e-cigarettes.⁷⁵ Associations were significant for both those reporting experimental and frequent e-cigarette use, and the effects of early onset were stronger among those reporting frequent e-cigarette use.⁷⁵

Overall, there is very strong evidence that reducing access to and initiation and use of flavored tobacco and nicotine products, especially among youth and young adults, would likely result in decreased initiation and use of other tobacco products.

Will decreasing use of other tobacco and nicotine products improve health outcomes?

There is very strong evidence that decreased use of other tobacco and nicotine products, including vapor products, improves health outcomes.^{2,7,9,12,14,42,43,70-74,82,84,90-109}

Tobacco products

It is well-established and widely accepted that decreased use of cigarette and tobacco products improves health outcomes.^{43,90-92} Tobacco use is the leading cause of preventable disease and death in the U.S.⁹¹ Nearly 1 in 5 deaths in the U.S. is attributable to cigarette smoking and exposure to secondhand smoke, and the leading cause of cancer deaths in the U.S. is attributable to smoking.⁴³ In Washington State, commercial tobacco products are the leading cause of

preventable diseases, disabilities, and deaths, with tobacco-related illnesses responsible for 1 in 5 deaths annually.¹⁴² Each year, approximately 8,300 Washington residents die from smoking, not including deaths from secondhand smoke.¹⁴² Smoking-related healthcare expenses in Washington total \$2.8 billion annually.¹⁴²

A large body of evidence has shown a causal link between combustible cigarette smoking and diseases in nearly every organ, diminished health status, exacerbation of asthma, inflammation, impaired immune function, age-related macular degeneration, harms to the fetus, diabetes, erectile dysfunction, arthritis, cancer, and premature death.⁹⁰ The Centers for Disease Control and Prevention (CDC) has found that tobacco use is causally associated with at least 12 types of cancer, including cancer of the oral cavity and pharynx; esophagus; stomach; colon and rectum; liver; pancreas; larynx; lung, bronchus, and trachea; kidney and renal pelvis; urinary bladder; cervix; and acute myeloid leukemia.⁹¹ Additional research has found that higher average cigarette use during adolescence was associated with poorer academic performance, mental health, physical health, and social functioning as well as with greater academic unpreparedness, physical ailments, and potential involvement with the legal system.⁹² Lastly, the World Health Organization (WHO) concluded that, “available evidence suggests that smoking is associated with increased severity of disease and death in hospitalized COVID-19 patients.”⁹³ In a review of 34 peer-reviewed journal articles, WHO identified studies that found a statistically significant association between smoking status and COVID-19 disease severity, admission to an Intensive Care Unit, ventilator use, and death.⁹³

Vapor products

Evidence has also shown that use of e-cigarette and vapor products has negative impacts on health,^{7,9,12,70,94} and decreasing use of vapor products has been shown to improve health outcomes.^{2,70-74,82,94-103} Generally, research has shown that use of vapor products has numerous negative health impacts, including respiratory, cardiac, and digestive system effects; unintentional and intentional poisonings; and injuries due to explosion.⁸⁴

In a 2018 report about the public health consequences of e-cigarettes, the National Academy of Sciences (Academy) stated that there is conclusive evidence that use of e-cigarettes has multiple adverse impacts on health.⁷⁰ The Academy found substantial evidence that e-cigarette use results in symptoms of dependence on e-cigarettes, formation of reactive oxygen species/oxidative stress, increased heart rate shortly after nicotine intake, and exposure to chemicals capable of causing DNA damage and mutagenesis, suggesting the possibility that long-term exposure could increase risk of cancer and adverse reproductive health outcomes.^{70,84} Overall, the report concluded that e-cigarettes contain and emit numerous potentially toxic substances (e.g., metals, mercury, formaldehyde, and other cancer-causing nitrosamines)^{70,85,104} and that nicotine intake among adults who use e-cigarettes is comparable to intake from combustible tobacco cigarettes.^{70,105} In addition, a study of JUUL products found levels of menthol at concentrations known to increase nicotine intake.¹⁰⁵ Lastly, a study of youth aged 13-18 years old found that youth who use e-cigarettes had 3 times greater levels of 5 volatile organic compounds in their urine and saliva, most of which are known carcinogens, compared to peers who did not use e-cigarettes.⁹⁸

Additionally, e-cigarette use has been shown to be independently and significantly associated with increased odds of heart attack.² Data from 96,467 respondents to the 2014, 2016, and 2017 National Health Interview Survey (NHIS) found that adults who used e-cigarettes were 34% more likely to have a heart attack and 25% more likely to have coronary artery disease compared to adults who did not use e-cigarettes.¹⁰⁶ Those who used e-cigarettes were at increased risk of heart attack and coronary artery disease regardless of whether they vaped occasionally or daily.¹⁰⁶

Other studies have found that e-cigarette devices emit particulate matter and that passive or secondhand exposure to vaping products could impact health.^{103,107} For example, a study among youth in Florida found that secondhand exposure to aerosol from electronic nicotine delivery systems (ENDS) was associated with higher odds of asthma attacks among youth with asthma.¹⁰⁷ In July 2019, CDC, FDA, state and local health departments, and other clinical and public health partners began investigating outbreaks of lung injury associated with e-cigarette use.¹⁴ CDC stated that, “laboratory data show that vitamin E acetate, an additive in some [Tetrahydrocannabinol (THC)]-containing e-cigarette, or vaping, products, is strongly linked to the [e-cigarette or vaping product use-associated lung injury (EVALI)] outbreak.”¹⁴

The Academy also found evidence that e-cigarettes can explode and cause burns and injuries; intentional or accidental exposure to e-liquids can result in seizures, anoxic brain injury, vomiting, lactic acidosis, and other effects; and intentionally or unintentionally drinking or injecting e-liquids can be fatal.⁷⁰ From 2011 to 2017, the Washington Poison Center received 2,966 total cases related to nicotine exposure among children 0 to 12 years of age.¹⁰⁸ The majority of cases were in children younger than age 5 years, and 22% (653) of cases were related to e-cigarettes.¹⁰⁸ In 2018, the Washington Poison Center received 136 cases specific to e-cigarettes, including 79 cases among children 0 to 12 years of age.¹⁰⁹ Children were primarily exposed through ingestion, and experienced symptoms like vomiting, coughing/choking, drowsiness/lethargy, and pallor.¹⁰⁸

Lastly, evidence shows that most youth do not use e-cigarettes to quit smoking.^{69,77} Data from the National Youth Tobacco Survey (2016) showed only 7.8% of respondents who used e-cigarettes cited cessation as a reason for e-cigarette use.⁶⁹ See Additional Considerations for discussion of cessation.

Overall, there is very strong evidence that decreasing use of tobacco and nicotine products, including vapor products, would likely improve health outcomes.

Will decreasing use of flavored tobacco and nicotine products and entertainment vapor products improve health outcomes?

There is also very strong evidence that decreasing use of flavored tobacco and nicotine products would likely improve health outcomes.

In addition to the health impacts of tobacco and nicotine products more generally, a large body of research also found that solvents and flavor chemicals in e-cigarettes cause harm at the cellular level and are cytotoxic.^{50,57,43,84} Propylene glycol and glycerin are the most common solvents used in vapor products. While both are ‘generally recognized as safe’ for ingestion,

propylene glycol and glycerin have been found to be cytotoxic when aerosolized through vaping.^{84,85} One study found that e-liquid refills containing glycerin were the most cytotoxic, and 91% of glycerin-based refill fluids were cytotoxic when aerosolized.⁸⁴

There is also research showing that flavor chemicals are cytotoxic in both e-liquid and aerosol form. While many flavor chemicals used in vaping products have been approved for ingestion, they have not been tested for inhalation safety or toxicity.^{44,84,86,87} Flavor chemicals are not typically listed on e-cigarette packaging,⁴⁴ and most e-liquids contain multiple flavor chemicals. Many have been shown to contain harmful aerosol components and aldehydes, which impair lung function.^{44,86} One study found that nicotine and flavoring chemicals were equally responsible for compromising lung function.⁸⁶ A study evaluating 36 e-cigarette refill fluids representing a range of brands and flavors found that 54% were cytotoxic in both the fluid and aerosol form, and 23% were cytotoxic in the aerosol but not the fluid form.⁸⁴ Another study looking specifically at flavor chemical concentrations in the 8 pre-filled JUUL e-cigarette pods available on the market found that all e-liquids and corresponding aerosols were cytotoxic to human lung epithelial cells.⁸⁸ One study demonstrated that a single exposure to cinnamaldehyde flavoring in e-cigarettes impairs lung function, potentially resulting in the development or exacerbation of respiratory disease.^{82,83} Other studies have also shown that cherry-flavored products (benzaldehyde)⁸⁷ and chocolate-flavored products (2,5-dimethylpyrazine)⁸⁹ are potentially harmful.⁸⁴ Flavor chemical concentrations have also been found in some e-cigarette products at levels that exceed daily occupational exposure limits from inhalation.⁴⁴

Lastly, the 2024 Surgeon General’s report cited research suggesting that prohibiting the sale and marketing of menthol-flavored cigarettes could avert 654,000 deaths over the next 40 years.⁴³

Therefore, there is also very strong evidence that decreasing use of flavored tobacco and nicotine products would likely improve health outcomes.

Will improving health outcomes impact equity for some youth and young adults and communities disproportionately targeted for sale, marketing, and advertising of flavored tobacco or nicotine products or entertainment vapor products?

There is very strong evidence that SB 5183 would likely improve equity for some youth and young adults and communities disproportionately targeted¹ for sale, marketing, and advertising of flavored tobacco or nicotine products or entertainment vapor products. There is unclear evidence how SB 5183 may impact equity for people who access flavored tobacco and nicotine products on Tribal lands and federal lands, including for American Indians and Alaska Natives and military personnel.

Inequities in tobacco and nicotine product use and inequities in tobacco and nicotine-related health outcomes are due to “social, structural, and commercial determinants of health.”⁴³ The 2024 Surgeon General’s report states that determinants:

such as persistent [financial] poverty and inequitable economic and social conditions—lead to inequitable opportunities for living a life free from tobacco-related death and disease. Racism,

¹ It is well documented that the tobacco industry has target-marketed specific flavors and flavored products to certain groups, including to youth, women, Black people, and LGBTQIA+ communities.⁴³ Therefore, this Health Impact Review uses the term “targeted” to indicate this intentional marketing practice.

discrimination, and targeted marketing by the tobacco industry; geographic disparities in evidence-based policy protections; preemptive laws that thwart communities from protecting their residents' health and safety; and financial and other structural barriers to accessing cessation treatments also drive tobacco-related health disparities.⁴³

Evidence shows that youth, communities of color, LGBTQ+ people, people living in urban areas, and people with lower socioeconomic status are more likely to be exposed to cigarette, tobacco, and vapor product advertising.^{112-115,143}

Inequities for youth and young adults

The American Academy of Pediatrics (AAP) states that structural factors contribute to youth tobacco and vapor product use, including: 1) Targeted marketing by the tobacco industry; 2) Geographic distribution of tobacco retail outlets; 3) Industry development of novel tobacco products that appeal to youth; 4) Lack of enforcement of age-of-sale laws; 5) Inequities in health insurance, care, and cessation services; and 6) Socioeconomic stressors.¹¹⁶ They noted that:

[t]he tobacco industry has a long history of targeted marketing to specific populations including (but not limited to) racial/ethnic groups, LGBTQ+ communities, and young people ([e.g.], promoting menthol cigarettes to Black communities, making tobacco seem cool or attractive to youth, and promoting products through direct marketing and social media promotion).¹¹⁶

Based on 2024 NYTS results, an estimated 19.0% of middle and high school students (representing 5.28 million students) reported ever having used any tobacco product, and an estimated 8.1% (representing 2.25 million students) reported current use of any tobacco product.¹¹⁰ From 2023 to 2024, current use of any tobacco product significantly declined among all students (from 10.0% to 8.1%).¹¹⁰ However, youth continue to use other tobacco products, and the use of tobacco products differs across groups of youth.¹¹⁰ E-cigarettes have remained the most commonly used tobacco product among youth since 2014.¹¹⁰ In 2024, 7.8% of U.S. high school students and 3.5% of U.S. middle school students reported current e-cigarette use.⁴⁵ Results of the 2024 NYTS show nicotine pouches were the second most commonly used tobacco product among U.S. youth (1.8%; representing 890,000 students).¹¹⁰ Use of flavored products remains high among youth. Among students who reported current use of e-cigarettes or nicotine pouches, 87.6% and 85.6% (respectively) reported using a flavored product.⁴⁵ In 2023, 40.6% of U.S. young adults (ages 19 to 30 years) reported any nicotine use (including vaping nicotine, cigarettes, large cigars, small cigars, tobacco using a hookah, and smokeless tobacco) in the past year.¹¹¹ Nicotine vaping reached the highest levels ever recorded in 2023 with 25.3% of young adults vaping nicotine in the past 12 months and 18.7% vaping nicotine in the past 30 days.¹¹¹

In Washington State, Results of the 2023 Washington State HYS show greater statewide prevalence of past 30-day use of both e-cigarettes and cigarettes as grade level increases (6th grade: <1%, 12th grade: 4%).¹²⁷ HYS data indicate that 2% of 6th graders, 4% of 8th graders, 6% of 10th graders, and 10% of 12th graders currently (i.e., past 30-day) use e-cigarettes only.¹²⁷ Meanwhile, current (i.e., past 30-day) cigarette only use is lower among 6th graders (>1%), 8th graders (>1%), 10th graders (>1%), and 12th graders (1%).¹²⁷

Tobacco use “takes a substantial toll on children’s and adolescent’s health, including harms because of prenatal exposure during childhood, secondhand and thirdhand exposure during infancy and childhood, and/or direct use during adolescence.”¹¹⁷ AAP summarized evidence that Tobacco Use Disorder almost always develops before 18 years of age as youth and young adults

“are developmentally vulnerable to social and environmental influences to use tobacco. This includes pervasive tobacco product marketing that targets youth and has been shown to ‘cause the onset and continuation of smoking among adolescents and young adults’”.¹¹⁷ Among adults who smoke cigarettes daily, 90% first started using cigarettes before 18 years of age and 99% first started using cigarettes before 26 years of age.¹¹⁷ Moreover, “nicotine is a highly addictive drug that can have lasting damaging effects on adolescent brain development and has been linked to a variety of adverse health outcomes” including impacts on brain cell activity; attention, learning and memory; impulse control; decision-making; cognition; increased risk of attention-deficit/hyperactivity disorder (ADHD); mood disorders; anxiety; and depression.¹¹⁷ Nicotine “may also increase the risk of other substance use disorders”.¹¹⁷ Key informants stated that nicotine products and vapor products may contain high nicotine concentrations, and youth may not be aware of the contents of the product, increasing the risk of addiction and health impacts (personal communications, February 2025).

Inequities for communities disproportionately targeted for sale, marketing, and advertising of flavored tobacco or nicotine products or entertainment vapor products

The tobacco industry has a long, well-established history of marketing products (including flavors) to people in low-income communities, communities of color,^{46,118,144} and LGBTQIA communities.¹¹⁹ For example:

menthol-flavored tobacco products increase the likelihood of tobacco initiation, addiction, and sustained use; are target marketed to certain population groups; and are disproportionately used by Black people, Native Hawaiian and Pacific Islander people, women, and people who identify as lesbian, gay, or bisexual.⁴³

Tobacco companies used targeted advertisements in community press, cigarette giveaways, philanthropy, and sponsorship of cultural activities (e.g., Black History Month events; Pride events) to appeal to specific communities and develop a market for products.^{118,119} Targeted advertising for menthol cigarettes has contributed to their wide use among Black/African American (89%), Native Hawaiian (80%), Puerto Rican (62%), Filipino (58%), and Latino smokers (47%).¹⁴⁴ Smokers who identify as LGBT are also significantly more likely to smoke menthol cigarettes (more than 36%) than those who identify as heterosexual.¹¹⁹ Disproportionate use of menthol cigarettes contributes to inequities experienced by these populations as menthol makes cigarettes easier to smoke and harder to quit.^{118,119,144}

The impact of disproportionate rates of marketing to marginalized communities is apparent in rates of Washington State youth cigarette, tobacco, and vapor product use, and inequities in tobacco and vapor product use are documented.^{115,120,135,145-147} According to 2023 Behavioral Risk Factor Surveillance (BRFSS) data, prevalence of both cigarette use and vaping product use is highest among American Indian and Alaska Native communities, Native Hawaiian and Pacific Islander communities, and multiracial communities in Washington State.¹⁴⁸ In addition, people who identify as male, have low incomes, have less education, or experience poor mental health are more likely to smoke and use vapor products compared to other Washingtonians.¹⁴⁸ Smoking is also more prevalent among people who live in rural communities compared to those in urban and suburban areas.¹⁴⁸ Lastly, vapor product use is higher among those who identify as lesbian, gay, or bisexual when compared to people who identify as heterosexual.¹⁴⁸

Inequities due to racism

Nationally, about 18.1% of Black adults (age 18 years and older) currently use any tobacco product, 11.8% of Black adults use cigarettes, and 5.1% of Black adults use cigars.¹²¹ Black adults have the highest prevalence of cigar use of all racial/ethnic groups.¹²¹ Use of menthol cigarettes is highest among Black adults in the U.S., with 88.8% of Black young adults (18 through 24 years) and 88.1% of Black adults 26 years and older who smoked during the last month using menthol cigarettes.⁴³

Data from the 2023 Washington State HYS show current use of e-cigarettes was significantly higher than current use of cigarettes for all grade levels and all races/ethnicities.^{127,128} In 2023, results indicated current (i.e., past 30 days) vaping varies by race and ethnicity and rates for some race/ethnicity subgroups vary widely.¹²⁷ The highest rate of vaping among 8th grade students was reported among students identifying as Hispanic/Latino (6.7%) and non-Hispanic Native Hawaiian/Pacific Islander students (6.6%).¹²⁷ Among 10th grade students, the highest rate of vaping was reported among non-Hispanic Middle Eastern or North African students (19%).¹²⁷ Among 12 grade students, the highest rate of vaping was reported among non-Hispanic American Indian/Alaska Native students (24%).¹²⁸ Survey results indicate that current use of e-cigarettes/vapor products among 10th and 12th graders is higher among American Indian/Alaska Native (AI/AN), multi-racial, and white students than their peers.¹⁴⁵ Among 8th graders, current use of e-cigarettes/vapor products was higher among Hispanic/Latino, AI/AN, multi-racial, and Black/African American students than other racial/ethnic groups.¹⁴⁵

The 2024 Surgeon General’s report states that “[s]moking causes about 1 in 5 deaths among non-Hispanic [w]hite and non-Hispanic Black people”⁴³ and smoking-related illnesses are the leading cause of death among Black people.¹²¹ Smoking is the leading cause of lung and bronchus cancer, which is the leading cause of all cancer deaths in the U.S.⁴³ Among all racial/ethnic groups, Black men have the highest rate of lung and bronchus cancer deaths (54 per 100,000 people).⁴³ Black men and Black women also have the highest prevalence of cardiovascular disease compared to other groups.⁴³

Inequities by gender identity and sexual orientation

Analysis of 2023 NHIS data show that “14.1% of gay or lesbian adults and 13.2% of bisexual adults [currently use cigarettes], compared to 10.7% of heterosexual adults.”¹²¹ Gay, lesbian, or bisexual adults are also more likely to use e-cigarettes.¹²¹ As much as 51% of lesbian or gay adults and 46% of bisexual adults who use cigarettes use menthol cigarettes, compared to 39% of heterosexual adults.¹²¹ Analysis of the 2015-2016 Population Assessment of Tobacco and Health (PATH) study suggests that transgender adults have higher prevalence of tobacco product use compared to cisgender adults.¹²¹ About 35% of transgender adults currently use cigarettes, 12.4% currently use e-cigarettes (12.4%), and 11.6% currently use cigars.¹²¹

Nationally, students identifying as gay, lesbian, and bisexual were more likely to use e-cigarettes than students who identify as heterosexual (17.5% versus 13.2%, respectively).¹⁴⁶ Washington State HYS data from 2023 also show higher rates of lifetime cigarette and e-cigarette/vapor product use among 8th, 10th, and 12th grade students identifying as gay and lesbian, compared to students identifying as straight.¹²⁷ In general, students identifying as bisexual report higher rates of lifetime use for e-cigarettes compared to students identifying as gay or lesbian for all grade

levels.¹²⁷ This is also true for lifetime cigarette use with the exception of 10th grade where the rates are similar for students identifying as gay or lesbian (19.9%) and students identifying as bisexual (19.8%) (personal communication, DOH, February 2025). Also, female students in grades 8, 10, and 12 reported higher rates of lifetime cigarette and e-cigarette use, compared to their male counterparts.¹²⁸ Among 10th graders, 13.6% of student identifying as bisexual report currently using e-cigarettes, followed by 11% of students identifying as gay or lesbian, 10.7% of students who felt something else fits better, 8.9% of questioning students, and 6.4% of straight students.¹²⁸

Additionally, results of the 2023 HYS show that current e-cigarette use among 10th graders varied by gender identity. Transgender students reported the greatest current use of e-cigarettes (16%) followed by cisgender female students (9%), students who felt something else fits better (6.0%), and cis-gender male students (6%).¹²⁸ Among 8th graders, by gender identity, transgender students also reported greater current use of e-cigarettes (11%).¹²⁸

Researchers and advocates have noted that measures related to sexual orientation and gender identity were excluded from tobacco and nicotine-related research until recently.¹²¹ Additional research is needed to understand tobacco-related morbidity and mortality by sexual orientation and gender identity.¹²¹

Inequities by geography

Living near tobacco retailers is associated with higher rates of tobacco use, lower rates of quitting tobacco products, and higher rates of youth initiation of tobacco product use.¹¹⁴ Tobacco retailers are concentrated in areas near youth, areas with high population density, in low income neighborhoods, and in counties with a higher proportion of Black residents.¹¹⁴ A study that examined tobacco retailers across 30 U.S. cities found that:

on average, 63% of public schools were located within 1,000 feet of a tobacco retailer, the lowest-income neighborhoods had nearly [5] times more tobacco retailers than the highest-income neighborhoods, and 70% of residents across the 30 cities lived within a half mile of a tobacco retailer.¹¹⁴

Further, national-level data show that approximately 70% of tobacco retailers are located within 1,000 feet of one another.¹¹⁴ Studies show similar density patterns of e-cigarette retailers.¹¹⁴

Historically, counties with the highest rates of poverty and lowest levels of educational attainment have had a greater concentration of tobacco retailers and higher rates of tobacco-related cancer incidence and death rates.¹²¹ People with lower income levels and fewer years of education are significantly more likely to use tobacco products.¹²¹ For example, adults with lower income levels are nearly twice as likely to report using cigarettes compared to the overall prevalence rate for U.S. adults (19.4% compared to 10.8%).¹²¹ Adults who did not graduate high school and adults with a high school diploma or GED are 4 times as likely to report using cigarettes compared to adults with a college degree or higher (20.0% and 16.8%, respectively compared to 4.5%).¹²¹ People with lower incomes and lower educational attainment are also more likely to experience limited access to healthcare.¹²¹

Overall, there is very strong evidence that SB 5183 would likely improve equity for some youth and young adults and communities disproportionately targeted for sale, marketing, and advertising of flavored tobacco or nicotine products or entertainment vapor products.

Inequities for people who access flavored tobacco and nicotine products on Tribal lands and federal lands

There is unclear evidence how the bill may impact equity for people who continue to access flavored tobacco and nicotine products on Tribal lands and federal lands, including for American Indians and Alaska Natives and military personnel.

It is unclear how the bill may impact equity for 4 reasons: 1) SB 5183 would prohibit the sale of flavored tobacco and nicotine products and entertainment vapor products in Washington State; however, the bill would not prohibit retailers on Tribal lands and federal lands from selling these products; 2) we did not find any research on how statewide bans on flavored tobacco and nicotine products, including flavored vapor products, may impact sales on Tribal lands and federal lands; 3) we did not find any research on who may access flavored tobacco and nicotine products on Tribal lands; 4) there are existing inequities in commercial tobacco use and tobacco and nicotine-related health outcomes due to settler colonialism and by military status.

Inequities due to settler colonialism

Traditional and commercial tobacco are different in the ways they are planted, grown, harvested, and used. Traditional tobacco “is tobacco and/or other plant mixtures grown or harvested and used by some American Indian communities for ceremonial or religious purposes.”⁴³ In contrast: [c]ommercial tobacco is manufactured tobacco sold by tobacco companies for personal use. Commercial tobacco use is the most prevalent form of tobacco use in the [U.S.] and is responsible for impacts on the health of historically disadvantaged groups, including among American Indian and Alaska Native populations.⁴³

The tobacco industry has also target-marketed American Indian and Alaska Native communities. A 2020 study found that American Indian and Alaska Native communities and Black communities were more likely to receive email marketing from tobacco companies than other communities.⁴³ The tobacco industry has also sponsored community events to appeal to specific communities and develop a market for products,^{118,119} including through sponsorships and charitable contributions to American Indian and Alaska Native communities.⁴³ For example, in 2006 and 2007 Reynolds American, Inc donated “nearly \$500,000 to American Indian and Alaska Native educational, cultural, arts, and civil rights organizations.”⁴³ The tobacco industry has also “misappropriated American Indian imagery in its marketing tactics since at least the 1930s” and has “incorporated the cultural significance of ceremonial tobacco to ‘validate’ commercial tobacco.”⁴³

Current law ([RCW 43.06.455](#)) allows the Governor to enter into cigarette tax compacts with Tribes and applies to the sale of all commercial tobacco and vape products sold on Tribal lands. SB 5183 would allow the Governor to seek government-to-government consultations with federally-recognized Tribes regarding prohibiting the sale or offer for sale of any flavored tobacco or nicotine product or any entertainment vapor product. However, the bill would not prohibit retailers on Tribal lands from selling flavored tobacco and nicotine products, including flavored vapor products, and smart vapor products.

Tribes could act to prohibit the sale of flavored tobacco and nicotine products. However, it is not possible to predict which Tribes may take action to ban flavored tobacco and nicotine products.

Therefore, if Tribal retailers continue to sell flavored tobacco and nicotine products, it is possible that use and initiation rates among people living on or accessing products on Tribal lands will not be as effected by SB 5183. If this leads to a greater decline in tobacco and nicotine product use among other subpopulations, this could exacerbate existing inequities for American Indian and Alaska Native communities in Washington.

We did not find any research on how statewide bans on flavored tobacco and nicotine products, including flavored vapor products, may impact sales on Tribal lands. There is some research about how menthol bans in Canada have impacted sales on First Nation reserves.^{67,140} However, Canadian “provincial and federal menthol cigarette bans apply to First Nation reserves”,⁶⁷ and so the research findings are less generalizable to Washington State as a statewide ban would not apply to Tribal lands. Following a menthol cigarette ban in Ontario, Canada, “22% of the daily menthol cigarette users reported purchasing menthol cigarettes after the ban” compared to 5% of those who use menthol occasionally and 0.3% of the non-menthol smokers.¹⁴⁰ The primary source for purchasing menthol cigarettes was on First Nation reserves.¹⁴⁰ This purchasing pattern did not increase over time among prior daily menthol smokers (21% at both short-term and long-term follow-up).¹⁴⁰ Results were consistent with previous research findings that “25% of menthol smokers claim that they would find some way to purchase menthol cigarettes despite a ban.”¹⁴⁰ Another evaluation of the impact of menthol cigarette bans in 7 Canadian provinces found that only 10.5% of people who used menthol cigarettes before the ban continued use of menthol cigarettes after the ban.⁶⁷ There was no change in the number of people who purchased non-menthol cigarettes, menthol cigarettes, or both non-menthol and menthol cigarettes from First Nation reserves pre- and post-ban.⁶⁷ Of people who purchased menthol cigarettes pre- and post-ban, 51.2% of people pre-ban and post-ban reported their last purchase of menthol cigarettes was from a First Nation reserve.⁶⁷ Moreover, the authors found no difference pre- versus post-ban between the percentage of Indigenous and non-Indigenous people purchasing cigarettes from First Nation reserves.⁶⁷

American Indian and Alaska Native people have the highest prevalence of smoking of any group.⁴³ Moreover, NYTS data show that, while any tobacco product use declined for Hispanic students and remained stable for all other racial and ethnic groups from 2023 to 2024, it increased among American Indian or Alaska Native students.¹¹⁰ A limitation of NYTS is that the survey does not distinguish between use of ceremonial and commercial tobacco.¹¹⁰ As some American Indian or Alaska Native communities “use traditional tobacco in cultural ceremonies of medicinal and spiritual importance”, estimates among American Indian or Alaska Native students may also include ceremonial tobacco use.¹¹⁰ In 2023, 8th and 10th grade students identifying as American Indian or Alaska Native and Native Hawaiian/Pacific Islander reported higher lifetime cigarette and e-cigarette use compared to their peers.¹⁴⁹ American Indian and Alaska Native people have the highest overall prevalence of COPD.⁴³ After white women, American Indian and Alaska Native women have the highest rate of lung and bronchus cancer deaths.⁴³

It is unclear how the bill would impact American Indian and Alaska Native communities and people living on Tribal land as well as people who access flavored tobacco and nicotine products on Tribal land.

Inequities by military status

National data indicate that active duty military members are more likely than the general population to report currently smoking or currently using e-cigarettes.¹²⁰ In 2015, 35.7% of military personnel reported ever trying e-cigarettes compared to 12.6% of the civilian population and 11.1% reported using e-cigarette daily compared to 3.7% of the civilian population.¹²⁰ While purchase data for e-cigarettes specifically on military bases is not available, the Health Related Behavior Survey for Active Duty Service Members found that, of military personnel that purchased cigarettes, 80.7% reported buying cigarettes on a military base.¹²⁰ Since SB 5183 would not affect tobacco and nicotine products sold on military bases in Washington State, it is possible that this bill could have a smaller impact on decreasing use of flavored tobacco and nicotine products among active duty military personnel, thereby potentially creating or exacerbating inequities that already exist at the national level.

Overall, it is unclear how SB 5183 may impact inequities for people who access flavored tobacco and nicotine products on Tribal lands and federal lands, including for American Indians and Alaska Natives and military personnel.

Additional considerations

This Health Impact Review focused on the most linear pathway between provisions in the bill and health outcomes and equity. Evidence for how prohibiting the sale of flavored tobacco and nicotine products and entertainment vapor products may impact cessation is discussed below.

Cessation

SB 5183 states that “tobacco and nicotine product” does not include drugs, devices, or combination products authorized for sale by the U.S. Food and Drug Administration (FDA). As of January 2025, FDA has authorized 30 tobacco and 4 menthol-flavored e-cigarette products and devices.⁶ Based on bill provisions, these products and any future products authorized for sale by the FDA may remain on the market.

E-cigarettes are not approved by the FDA as an aid to quit smoking.¹⁵⁰ However, the FDA has approved several smoking cessation products designed to help users gradually withdraw from smoking (i.e., nicotine replacement therapy) in which flavors are approved, including nicotine chewing gum and nicotine lozenges.¹⁵¹ Vapor product manufacturers may apply to have their product reviewed by the FDA for approval as a cessation option, which could include flavors. Due to confidentiality laws, the Division of Drug Information in the FDA’s Center for Drug Evaluation and Research (CDER) cannot provide information related to drug applications that may have been submitted to the agency (CDER, personal communication, September 2019), and analysts were unable to determine whether any vapor product manufacturers have applied to have their product reviewed as a cessation device.

Overall, there is mixed evidence that e-cigarettes provide opportunity for cessation for adult combustible cigarette smokers.^{9,70} While some studies suggest that e-cigarettes may be useful cessation tools or may help smokers decrease their use of combustible cigarettes, other studies have found that e-cigarette use is associated with a decreased likelihood of quitting combustible cigarettes and increased consumption of combustible cigarettes.⁹⁹⁻¹⁰² The U.S. Department of Health and Human Services stated that, “so far, the research shows there is limited evidence that

e-cigarettes are effective for helping smokers quit.”¹⁵⁰ A 2016 meta-analysis concluded that e-cigarettes, as they are currently being used, are actually associated with lower quit rates among adult combustible cigarette smokers.¹⁰² NHIS data (2014 to 2016) indicate the dominant pattern of e-cigarette use in adults is dual use of both combustible cigarettes and e-cigarettes.⁷⁷ As part of the interim guidance issued by CDC to address the outbreak of severe pulmonary illness associated with e-cigarette use, CDC recommended that, “adult smokers who are attempting to quit should use evidence-based smoking cessation treatments, including counseling and FDA-approved medications.”¹⁵² In sum, the National Academy of Sciences stated that, “the net public health effect, harm or benefit, of e-cigarettes depends on three factors: their effect on youth initiation of combustible tobacco products, their effect on adult cessation of combustible tobacco products, and their intrinsic toxicity.”⁷⁰ They concluded that “there would be net public health harm in the short and long terms if the products do not increase combustible tobacco cessation in adults.”⁷⁰

However, evidence suggests that restrictions on flavored tobacco and nicotine products may increase cessation. In the U.S., “modeling studies have estimated a 15[%] reduction in smoking within 40 years if menthol cigarettes were no longer available.”¹⁹ Massachusetts’s ban on menthol flavors was associated with an 8.1% relative reduction in smoking prevalence.⁶⁸ Moreover, “the Massachusetts comprehensive menthol flavor ban was followed by a greater reduction in current cigarette smoking in the state than comparison states overall”.⁶⁸ Similarly, research found that enacted bans on menthol cigarettes in Canada “were associated with a significantly greater percentage of quit attempts and quitting among [people who use menthol cigarettes] compared to [people who use non-menthol cigarettes].”⁶⁷

Another Canadian study assessed the impact of Ontario’s menthol cigarette ban on smoking behavior of participants who reported current smoking (i.e., daily, occasional, and non-menthol cigarette smokers) at baseline prior to the ban.¹⁴⁰ At follow-up, “20% of occasional menthol smokers and 24% of daily menthol smokers reported quitting in the long term, which exceeded what was predicted by smokers at baseline.”¹⁴⁰ Overall, daily menthol smokers had significantly higher rate of reporting having quit smoking and were more likely to have tried to quit after the ban compared with non-menthol smokers, controlling for smoking and demographic characteristics.¹⁴⁰ Findings suggested an increased rate of quitting 1 year following Ontario’s ban on the sale of menthol tobacco products.¹⁴⁰ However, the impact was observed in older adults but not youth and young adults (ages 16 to 29 years).¹⁴⁰ Authors noted, “[t]he difference may be due to younger adults not having a brand preference and switching to other tobacco or nicotine products.”¹⁴⁰ Authors also noted a combustible tobacco menthol ban would be more impactful for at-risk subpopulations of youth and young adults if there was less availability of other flavored tobacco or nicotine products.¹⁴⁰

SB 5183 would require DOH to develop, implement, and maintain a statewide prevention and awareness campaign for both youth and adults to address the use of flavored tobacco and nicotine products and entertainment vapor products. Key informants stated that information about smoking cessation and resources to quit tobacco should be included in a statewide prevention and awareness campaign for both youth and adults to address the use of flavored tobacco and nicotine products and smart vapor products (personal communications, January 2025). DOH indicated that they would likely integrate educational campaign requirements

outlined in SB 5183 into existing DOH campaigns related to commercial tobacco and vaping prevention and cessation.¹²²

Historically, Washington State's Commercial Tobacco Prevention and Control Program, including cessation programming, has been underfunded and under-resourced (personal communications, March 2023). While Washington State receives approximately \$510 million each year from tobacco taxes and Master Settlement Agreement payments, much of that revenue is not received for preventing tobacco or vapor product use (personal communication, DOH, March 2023). For example, for federal grant Fiscal Years 2012 through 2022, the Commercial Tobacco Prevention and Control Program received approximately \$1.6 million annually for prevention (personal communication, DOH, March 2023). In 2023, CDC recommended Washington State invest approximately \$72.5 million annually to effectively prevent tobacco and vapor product use (personal communication, DOH, March 2023).

Based on 2023 HYS data, about 5.9% of 8th graders, 8.2% of 10th graders, and 9.9% of 12th graders reported that within the past 12 months, they tried to quit using all products that contain nicotine.¹²⁸ There are limited smoking cessation resources or programming available to support youth younger than age 18 years in Washington State (personal communication, DOH, February 2025). While young adults older than age 18 years have access to and may purchase over-the-counter smoking cessation products, youth younger than 18 years must receive a prescription from a healthcare provider to access any smoking cessation medications, including medications that are available over-the-counter.¹¹⁶ Lack of health insurance or access to a healthcare provider may result in barriers in accessing smoking cessation medications for some youth.¹¹⁶

Youth may access behavioral support and counseling through: an anonymous texting program (Live Vape Free); an app (2Morrow Health); or, for youth over 13 years old, the Washington State Quitline via phone or digital counseling (personal communication, DOH, February 2025). Youth who access these programs may receive lessons, counseling, or coaching to support their efforts to quit tobacco or vapor products (personal communication, DOH, March 2023). Key informants representing DOH shared that some youth have experienced barriers to accessing these resources, including language barriers/use of third-party translators, discomfort with sharing private information, and cultural differences (personal communication, DOH, March 2023). Limited programmatic funding is connected to the limited availability of culturally and linguistically appropriate youth smoking cessation programming (personal communication, DOH, March 2023).

DOH contracts with regional and priority population partners to prevent youth tobacco and vapor product use. These partners may offer direct services and counseling to support smoking cessation locally or regionally (personal communication, DOH, March 2023). However, these partners receive little funding dedicated to tobacco cessation and primarily work with healthcare providers to talk with youth and parents/guardians (personal communication, DOH, March 2023).

Overall, there is limited evidence for effective youth smoking cessation programming. The AAP stated that tobacco dependence is a severe addiction and “youth are uniquely susceptible to nicotine because their brains are still developing” and “nicotine can harm parts of the brain that

control attention, learning, mood, and impulse control.”¹¹⁶ Research has also indicated that 95% of adult smokers begin smoking before they turn age 21 years,⁷⁹ and early smoking onset is associated with greater likelihood of addiction and decreased likelihood of cessation.^{7,80}

Since SB 5183 does not specifically address or dedicate resources for cessation, we did not include this pathway in the logic model on page 16.

Annotated References

1. **Family Smoking Prevention and Tobacco Control Act, 123 (2009).**

The 111th U.S. Congress found that "virtually all new users of tobacco products are under the minimum legal age to purchase such products" and that "tobacco advertising and marketing contribute significantly to the use of nicotine-containing tobacco products by adolescents." For this and other reasons, "It is in the public interest for Congress to enact legislation that provides the Food and Drug Administration with the authority to regulate tobacco products and the advertising and promotion of such products." Section Chapter IX--Tobacco Products, Section 907. Tobacco Product Standards (a)(1)(A) specifically bans the use of artificial or natural flavor (other than tobacco or menthol) or an herb or spice that is a characterizing flavor of the tobacco product or tobacco smoke in cigarettes. The full text of the Tobacco Control Act is available at <https://www.govinfo.gov/content/pkg/PLAW-111publ31/pdf/PLAW-111publ31.pdf>.

2. **Alzahrani T., Pena I., Temesgen N., et al. Association Between Electronic Cigarette Use and Myocardial Infarction. *American Journal of Preventive Medicine*. 2018;55(4):455-461.**

Alzahrani et al. evaluated 2014 and 2016 National Health Interview Survey data to determine whether electronic cigarette use could increase the risk of myocardial infarction. This was the first study to examine the relationship between e-cigarette use and heart attack. E-cigarette use has been shown to stimulate similar reactions as traditional cigarette use in otherwise healthy individuals, including endothelial dysfunction, oxidative stress, inflammation, platelet activation, and activation of the sympathetic nervous system. Interviewees were classified as never, former, and current e-cigarette and cigarette users. However, the definition of former use was not consistent between e-cigarette users and cigarette users. Based on NHIS responses, 25.8% of current e-cigarette users were former smokers and 66.2% of current e-cigarette users were also current cigarette smokers. Overall, the authors found that daily e-cigarette use was independently associated with increased odds of myocardial infarction (OR= 1.79, 95% CI= 1.20, 2.66, p-value= 0.004). Former and some day e-cigarette use were not associated with increased risk of heart attack. Former, some day, and current cigarette use were all associated with increased risk of heart attack. The authors also found that, "dual use of e-cigarettes and conventional cigarettes appears to be more dangerous than using either product alone." The authors state that their study likely underestimates the increased risk of heart attack from using e-cigarettes, and that more research is needed to fully understand the health impacts of former or some day e-cigarette use. They state that, "it is not known when the [myocardial infarctions] occurred relative to e-cigarette use, and it is likely that some of the heart attacks subjects reported occurred before e-cigarettes became available in the U.S. (around 2009). This situation will bias the [odds ratio] estimates toward the null, meaning that the study results likely underestimate the true risks associated with e-cigarette use."

3. **Administration U.S. Food and Drug. Summary of the Deeming Final Rule. Silver Spring, Maryland: U.S. Food and Drug Administration.**

In this document the U.S. Food and Drug Administration (FDA) summarizes the Deeming Tobacco Products to be Subject to the Federal Food, Drug, and Cosmetic Act, as Amended by the Family Smoking Prevention and Tobacco Control Act; Restrictions on the Sale and Distribution of Tobacco Products and Required Warning Statements for Tobacco Products

('Deeming Rule'). The final rule was published on May 10, 2016. It extends the FDA's "tobacco product" authorities to "all other categories of tobacco products meeting the statutory definition of 'tobacco product' in the Federal Food, Drug, and Cosmetic Act (FD&C Act), except accessories of such products." The newly regulated products include currently marketed products (e.g., electronic cigarettes, cigars, waterpipe (hookah) tobacco) and future tobacco products. The Deeming Rule requires these tobacco products to comply with all provisions regarding "tobacco products" found in the FD&C Act and FDA regulations. The full text of the rule is available at <https://www.federalregister.gov/documents/2016/05/10/2016-10685/deeming-tobacco-products-to-be-subject-to-the-federal-food-drug-and-cosmetic-act-as-amended-by-the>.

4. Services U.S. Department of Health and Human, Food and Drug Administration Center for Tobacco Products. Administration USFaD.Enforcement Priorities for Electronic Nicotine Delivery Systems (ENDS) and Other Deemed Products on the Market Without Premarket Authorization.Silver Spring, Maryland: U.S. Food and Drug Administration; January 2020 2020.

This U.S. FDA document outlines the agency's enforcement priorities for electronic nicotine delivery systems (ENDS) and other deemed products on the market without premarket authorization. The document is intended to serve as guidance for industry and represents the current thinking of the FDA on the topic. However, "FDA's guidance documents, including this guidance, do not establish legally enforceable responsibilities." It states, "For ENDS products marketed without FDA authorization, FDA intends to prioritize enforcement against: Any flavored, cartridge-based ENDS product (other than a tobacco- or menthol-flavored ENDS product); all other ENDS products for which the manufacturer has failed to take (or is failing to take) adequate measures to prevent minors' access; and any ENDS product that is targeted to minors or whose marketing is likely to promote use of ENDS by minors." Moreover, "FDA intends to prioritize enforcement of any ENDS product that is offered for sale after May 12, 2020, and for which the manufacturer has not submitted a premarket application (or after a negative action by FDA on a timely submitted application)." FDA intends to prioritize enforcement of the premarket review requirements for certain ENDS products, including against retailers selling such products beginning 30 days after issuance of this Final Guidance. FDA Guidance was informed by data showing substantial increases in youth use of ENDS products; substantive information received via public comment; and "health and safety issues connected to ENDS products [...] particularly given that these products have been marketed without premarket evaluation." In its review of premarket tobacco product applications, "FDA will consider, among other things: the product's components, ingredients, additives, and properties; manufacturing practices; and any studies or investigations into the health risks of the tobacco product."

5. FDA News Release -- FDA finalizes enforcement policy on unauthorized flavored cartridge-based e-cigarettes that appeal to children, including fruit and mint [press release]. Silver Springs, Maryland: U.S. Food & Drug Administration, 2 January 2020 2020.

This FDA News Release announces that the FDA finalized its enforcement policy on unauthorized flavored cartridge-based e-cigarettes that appeal to children, including fruit and mint. "Companies that do not cease manufacture, distribution and sale of unauthorized flavored cartridge-based e-cigarettes (other than tobacco or menthol) within 30 days risk FDA enforcement actions." Health & Human Services (HHS) Secretary Alex Azar states, "HHS is

taking a comprehensive, aggressive approach to enforcing the law passed by Congress, under which no e-cigarettes are currently on the market legally." According to the announcement, "For purposes of this policy, a cartridge or pod is any small, enclosed unit (sealed or unsealed) designed to fit within or operate as part of an ENDS product." Data show that cartridge-based ENDS products are most commonly used among youth. "By not prioritizing enforcement against other flavored ENDS products in the same way as flavored cartridge-based ENDS products, the FDA has attempted to balance the public health concerns related to youth use of ENDS products with considerations regarding addicted adult cigarette smokers who may try to use ENDS products to transition away from combustible tobacco products." In addition, "For all other products (cartridge-based or otherwise), including menthol-, tobacco-, and non-flavored ENDS products, the FDA will also prioritize enforcement where the manufacturer fails to take adequate measures to prevent youth access." The statement highlights, "the FDA's enforcement priorities are not a "ban" on flavored or cartridge-based ENDS [...] Manufacturers that wish to market any ENDS product – including flavored e-cigarettes or e-liquids – are required by law to submit an application to the FDA that demonstrates that the product meets the applicable standard in the law." Furthermore, "If a company can demonstrate to the FDA that a specific product meets the applicable standard set forth by Congress, including considering how the marketing of the product may affect youth initiation and use, then the FDA could authorize that product for sale." Finally, "The guidance also states that, after May 12, 2020, the FDA intends to also prioritize enforcement against any ENDS products that continue to be sold and for which the manufacturers have not submitted a premarket application."

6. E-Cigarettes Authorized by the FDA. 2025.

As of January 2025, there are 34 e-cigarettes authorized by the FDA to be sold in the U.S. The list notes that "while these products are authorized to be sold in the U.S., it does not mean these products are safe nor are they 'FDA approved.'" It underscores that people who do not currently use tobacco products should not start.

7. FDA News Release -- FDA takes new steps to address epidemic of youth e-cigarette use, including a historic action against more than 1,300 retailers and 5 major manufacturers for their roles perpetuating youth access [press release]. 2018.

In September 2018, the U.S. Food and Drug Administration issued 1300 warning letters and fines to retailers who illegally sold JUUL and other e-cigarette products to minors. The FDA news release stated that this was the "largest coordinated enforcement effort in the FDA's history." FDA Commissioner Scott Gottlieb stated, "we see clear signs that youth use of electronic cigarettes has reached an epidemic proportion, and we must adjust certain aspects of our comprehensive strategy to stem this clear and present danger. This starts with the actions we're taking today to crack down on retail sales of e-cigarettes to minors." The FDA also issued letters to the top five-selling e-cigarette brands (which comprise 97% of the U.S. e-cigarette market), including JUUL, Vuse, MarkTen XL, blu e-cigs, and Logic requiring each company "to submit to FDA within 60 days plans describing how they will address the widespread youth access and use of their product." The FDA also committed to increasing enforcement efforts for e-cigarette manufacturers and retailers.

8. FDA News Release -- Trump Administration Combating Epidemic of Youth E-Cigarette Use with Plan to Clear Market of Unauthorized, Non-Tobacco-Flavored E-

Cigarette Products [press release]. Silver Spring, MD: U.S. Food and Drug Administration, 11 September 2019 2019.

This news release from the U.S. Food and Drug Administration (FDA) outlines the Trump Administration's announcement that as part of its ongoing work to address the epidemic of youth e-cigarette use, the agency will finalize a compliance policy that prioritizes enforcement of the premarket authorization requirements for non-tobacco-flavored e-cigarettes. Preliminary data from the National Youth Tobacco Survey show "that more than a quarter of high school students were current (past 30 day) e-cigarette users in 2019 and the overwhelming majority of youth e-cigarette users cited the use of popular fruit [65.9%] and menthol or mint [63.9%] flavors." Effective August 8, 2016, "all electronic nicotine delivery system (ENDS) products were expected to file premarket tobacco product applications with the FDA within two years. ENDS products currently on the market are not being legally marketed and are subject to government action. The compliance policy the FDA anticipates announcing in the coming weeks will outline enforcement policy addressing non-tobacco-flavored e-cigarette products that lack premarket authorization moving forward." FDA has issued more than 8,600 warning letters and more than 1,000 fines to retailers for sales of ENDS and their components to minors. Many e-liquid products resembling kid-friendly juice boxes, cereal, and candy have been removed from the market as the result of FDA warning letters--many written in collaboration with the Federal Trade Commission (FTC). On September 9, 2019, FDA issued a warning letter to JUUL Labs Inc. for "marketing unauthorized modified risk tobacco products by engaging in labeling, advertising, and/or other activities directed to consumers, including a presentation given to youth at a school."

9. FDA Statement--Statement from FDA Commissioner Scott Gottlieb, M.D., on proposed new steps to protect youth by preventing access to flavored tobacco products and banning menthol in cigarettes [press release]. 2018.

FDA Commissioner Scott Gottlieb outlines a "policy framework [that] reflects a re-doubling of the FDA's efforts to protect kids from all nicotine-containing products." He states that, "if we're to break the cycle of addiction to nicotine, preventing youth initiation on nicotine is a paramount imperative." He cites research showing that 90% of current adult smokers started smoking before 18 years of age, 95% started smoking before 21 years of age, and only 1% started smoking after 26 years of age. Research with the Centers for Disease Control and Prevention found that e-cigarette use among high school students increased 78% from 2017 to 2018, and 48% among middle school students- reversing prior trends from 2015 to 2017 suggesting that use was declining. To address these trends, FDA has taken a number of recent actions as part of their Youth Tobacco Prevention Plan, including increasing enforcement against retailers, targeting e-liquid manufacturers marketing to youth, working with eBay to remove products from their website, and launching "The Real Cost" Youth E-Cigarette Prevention Campaign. Dr. Gottlieb stated, "I repeatedly said that, although we continue to believe that non-combustible tobacco products may provide an important opportunity to migrate adult smokers away from more harmful forms of nicotine delivery, these opportunities couldn't come at the expense of addicting a generation of kids to nicotine." This statement includes two directives from the FDA. First, FDA requires that all "flavored [electronic nicotine delivery systems] products (other than tobacco, mint, and menthol flavors or non-flavored products) must be sold in age-restricted, in-person locations and, if sold online, under heightened practices for age verification." Second, FDA issued a "Notice of Proposed Rulemaking that would seek to ban menthol in combustible

tobacco products, including cigarettes and cigars." Data indicate that youth are more likely to use menthol cigarettes than any other group and that, "more than half (54 percent) of youth smokers ages 12-17 use menthol cigarettes, compared to less than one-third of smokers ages 35 and older." In addition, approximately 70% of African American youth use menthol cigarettes. In response, FDA is proposing a policy to ban flavors in cigars. Dr. Gottlieb emphasized that, "If youth trends don't move in the right direction, we will revisit all of these issues."

10. Kaplan Sheila, Hoffman Jan. Juul Suspends Selling Most E-Cigarette Flavors in Stores. *The New York Times*. 13 November 2018, 2018;Health.

This article from The New York Times reported on the decision by Juul Labs to suspend sales of most of its flavored e-cigarette pods in retail stores and to discontinue its social media promotions. Juul said it would "keep mint, tobacco and menthol flavors for its devices in retail stores" to prevent some users from reverting to menthol cigarettes. The announcement came before the FDA's unveiled a series of measures to curb teenage vaping. "More than three million middle and high school students reported using e-cigarettes, according to preliminary, unpublished government data, with about one-third of them saying the flavors were a big factor in their choice." Juul's announcement also stated it would renew sales of suspended flavored products "at retail outlets that invested in age-verification technology."

11. Kaplan Sheila. 'Juul-alikes' Are Filling Shelves With Sweet, Teen-friendly Nicotine Flavors. *The New York Times*. 13 August 2019, 2019;Health.

The New York Times reported that after Juul Labs, under pressure from the FDA, suspended sales of most of its popular flavored nicotine pods in stores in fall 2018, upstart competitors began producing their own fruity and candy-flavored versions. The proliferation of 'Juul-alikes' "shows just how entrenched the youth vaping problem became and that voluntary measures are unlikely to solve it." Juul "has filed patent infringement claims against 21 manufacturers and seller of copycat devices and pods." According to Juul, three companies have not agreed to stop selling their similar products. One of these competitors, Eonsmoke generated an estimated \$5.3 million in revenue in 2018. In 2019, the company's business has an estimated \$43.6 million in tracked sales as of mid-July. According to a 16-year-old quoted in the story, adolescents are attracted to the wide range of flavors. Additionally, he noted, "[s]ome of my friends use Eon pods because they have a higher nicotine percentage, because they want a bigger head rush." Eonsmoke is under investigation by both the F.D.A. and the attorney general of Massachusetts.

12. Surgeon General's Advisory on E-cigarette Use Among Youth [press release]. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2018.

In December 2018, the Office of the Surgeon General issued a statement "emphasizing the importance of protecting our children from a lifetime of nicotine addiction and associated health risks by immediately addressing the epidemic of youth e-cigarette use. The recent surge in e-cigarette use among youth, which has been fueled by new types of e-cigarettes that have recently entered the market, is a cause for great concern. We must take action now to protect the health of our nation's young people." The statement included background information that e-cigarette use increased dramatically from 2017 to 2018, and that e-cigarette aerosol can negatively impact health. The Surgeon General noted that e-cigarette aerosol and flavorings can expose users and bystanders to metals, volatile organic compounds, and ultrafine particles that can be inhaled

deeply into the lungs. The statement also includes information about JUUL. The sale of JUUL increased 600% from 2016 to 2017, and the Surgeon General stated that "all JUUL e-cigarettes have a high level of nicotine. A typical JUUL cartridge or 'pod' contains about as much nicotine as a pack of 20 regular cigarettes." In addition, JUUL uses nicotine salts which allow nicotine to be inhaled more easily and with less irritation than tobacco products and other e-cigarettes. The statement noted that, "any e-cigarette use among young people is unsafe, even if they do not progress to future cigarette smoking."

13. FDA News Release -- FDA launches its first youth e-cigarette prevention TV ads, plans new educational resources as agency approaches one-year anniversary of public education campaign [press release]. Silver Spring, MD, 22 July 2019 2019.

On July 22, 2019, the U.S. Food and Drug Administration announced the launch of its first e-cigarette prevention TV ads educating kids about the dangers of e-cigarette use. Part of FDA's "The Real Cost" Youth E-Cigarette Prevention Campaign, a \$60 million effort, the new ads highlight emerging science which indicates that "teens who vape are more likely to start smoking cigarettes, putting them at risk of a lifetime of addiction to smoking and related disease." Specifically, "compared with non-users, youth who use e-cigarettes are more likely to try conventional cigarettes in the future. This was also a conclusion reached in a National Academies of Sciences, Engineering, and Medicine report in 2018 on the Public Health Consequences of E-Cigarettes." The ads will run on television networks aimed at youth (e.g., TeenNick, CW, MTV), as well as on music streaming sites, social media networks, and other teen-focused media channels. Highlighted messages include, that e-cigarettes, like cigarettes, put youth at risk for addiction and other health consequences; nicotine can rewire the brain to crave more nicotine; and that e-cigarettes can contain dangerous chemicals.

14. Outbreak of Lung Injury Associated with E-cigarette Use, or Vaping, 2020; Available at: https://www.cdc.gov/tobacco/basic_information/e-cigarettes/severe-lung-disease.html. Accessed 20 January 2020.

In 2019, CDC, U.S. Food and Drug Administration, state and local health departments, and other clinical and public health partners began investigating outbreaks of severe pulmonary disease associated with e-cigarette use--i.e., E-cigarette, or Vaping, Associated Lung Injury (EVALI). "As of January 14, 2020, a total of 2,668 hospitalized EVALI cases or deaths have been reported to CDC from all 50 states, the District of Columbia, and two U.S. territories (Puerto Rico and U.S. Virgin Islands)." Sixty deaths have been confirmed in 27 states and the District of Columbia (as of January 14, 2020); Washington State is not among the states that have reported EVALI patient death(s). "The median age of deceased patients was 51 years and ranged from 15-75 years (as of January 14, 2020)." Of the total number of EVALI cases with available data (as of January 14, 2020): 66% were male; 15% were under 18 years old; 37% were 18 to 24 years old; 24% were 25 to 34 years old; and 24% were 35 years or older. The median age of patients was 24 years (range from 12-85 years). "Data from emergency department (ED) visits suggest that the EVALI outbreak began in June 2019, and cases have been declining since a peak in September. Overall, data suggest a period of gradual increase in ED visits associated with e-cigarette use since 2017, followed by a sharp rise in June 2019. The CDC notes, "While ED visits associated with possible EVALI have declined [since a peak in September 2019], they have not returned to levels before June 2019 and EVALI remains a concern." National data show that certain groups of EVALI patients (i.e., those with cardiac disease, chronic pulmonary

disease, and diabetes as well as older adults) are more likely to be rehospitalized or die. CDC reported, "2,022 hospitalized patients had data on substance use, of whom (as of January 14, 2020): 82% reported using THC-containing products; 33% reported exclusive use of THC-containing products." Meanwhile, "57% reported using nicotine-containing products; 14% reported exclusive use of nicotine containing products." Of those EVALI patients who reported using nicotine-containing products, 54% provided data on product source (as of January 7, 2020): 69% reported acquiring products only from commercial sources; 17% reported acquiring products only from informal sources; and 15% reported acquiring products from both commercial and informal sources." Among younger EVALI patients (aged 13 to 17 years), 94% of acquired THC-containing products only from informal sources (versus 62% of those aged 45 years or older) and 42% acquired nicotine-containing products only from informal sources (versus 12% of those aged 45 years or older) (as of January 7, 2020). Patient exposure data indicate: "Vitamin E acetate has been identified as a chemical of concern among people with EVALI," and "THC is present in most of the samples tested by FDA to date, and most patients report a history of using THC-containing products." As of January 7, 2020, "The latest national and state findings suggest THC-containing e-cigarette, or vaping, products, particularly from informal sources like friends, family, or in-person or online dealers, are linked to most of the cases and play a major role in the outbreak. Among other recommendations, CDC recommends that youth and young adults, women who are pregnant, and adults who do not currently use tobacco products not use e-cigarette products.

15. FDA News Release -- FDA warns JUUL Labs for marketing unauthorized modified risk tobacco products, including in outreach to youth [press release]. Silver Springs, MD: U.S. Food and Drug Administration, 9 September 2019, 2019.

This U.S. Food and Drug Administration news release the agency details the warning letter issued to JUUL Labs Inc. requesting more information on concerning outreach and marketing practices (targeting students, tribes, health insurers, and employers) raised during a Congressional hearing in July 2019. The letter underscores that law requires "companies must demonstrate with scientific evidence that their specific product does in fact pose less risk or is less harmful [than cigarettes]. JUUL has ignored the law, and very concerningly, has made some of these statements in school to our nation's youth," stated Acting FDA Commissioner Ned Sharpless, M.D. According to testimony, "a JUUL representative speaking with students at his presentation in a school stated that: JUUL 'was much safer than cigarettes' and that 'FDA would approve it any day.'" FDA has requested JUUL provide a written response describing its corrective actions and its plan for maintaining compliance.

16. Kaplan Sheila. Trump Administration Plans to Ban Flavored E-Cigarettes. *The New York Times*. 11 September 2019, 2019.

This article reported the Trump administration's announcement on Wednesday, September 11, 2019, that it would ban the sale of most flavored e-cigarettes. The announcement is in response to the outbreak of severe pulmonary disease associated with vaping. Michigan became the first state to prohibit the sale of flavored e-cigarettes. New York, Massachusetts, and California are also considering similar measures. The Secretary of Health and Human Services (HHS), Alex Azar II, stated that JUUL's removal of fruit flavor from stores simply prompted youths to shift to using menthol and mint flavors rather than to stop vaping altogether.

17. **Tobacco 21. 2021**; Available at: <https://www.fda.gov/tobacco-products/retail-sales-tobacco-products/tobacco-21>. Accessed 3/25/2021.

The Federal Food, Drug, and Cosmetic Act was modified on December 20, 2019 to raise the federal minimum age for sale of tobacco products from 18 years old to 21 years old. The change applied to all tobacco products, including cigarettes, cigars, and e-cigarettes, and was effective immediately.

18. **FEDERAL TOBACCO 21: Considerations for Tribal Communities. American Indian Cancer Foundation; Public Health Law Center; Minnesota Department of Health.**

This document provides an overview of changes to U.S. federal law (the Family Smoking Prevention and Tobacco Control Act of 2009) to increase the minimum legal sales age from age 18 to 21 years for all commercial tobacco products in all U.S. states and territories, and on all Tribal lands. It offers considerations for Tribal communities regarding vending machine sales, compliance checks, detrimental effects of commercial tobacco penalties on youth, supplemental Tribal policies, neighboring jurisdictions, as well as available resources.

19. **FDA Proposes Rules Prohibiting Menthol Cigarettes and Flavored Cigars to Prevent Youth Initiation, Significantly Reduce Tobacco-Related Disease and Death [press release]. 2022.**

In April 2022, the U.S. FDA proposed rules to prohibit menthol cigarettes and flavored cigars at the national level. The intent of the prohibition was to “prevent youth initiation [and] significantly reduce tobacco-related disease and death.”

20. **States Executive Office of the President of the United. OIRA Conclusion of EO 12866 Regulatory Review: Tobacco Product Standard for Menthol in Cigarettes (withdrawn). In: Office of Management and Budget OoIaRA, Executive Office of the President of the United States, ed2025.**

On January 21, 2025, a regulatory filing by the Executive Office of the President of the United States indicated that the rule (“Tobacco Product Standard for Menthol in Cigarettes”) had been withdrawn.

21. **FDA Launches Campaign Aimed at Preventing E-Cigarette Use Among American Indian/Alaska Native Youth [press release]. 2022.**

In June 2022, the FDA launched a youth e-cigarette prevention campaign, “Next Legends” with specific messaging toward American Indian and Alaska Native youth.

22. **Supreme Court hears dispute over FDA denial of flavored vapes: Two e-cigarette companies argue the agency's rejection of their fruit- and candy-flavored products was unwarranted. 2024**; Available at: <https://www.ncsl.org/state-legislatures-news/details/supreme-court-hears-dispute-over-fda-denial-of-flavored-vapes>. Accessed 1/29/2025.

The National Conference of State Legislatures provided a summary of the status of the case *Food and Drug Administration v. Wages and White Lion Investments LLC*.

23. ACT Relating to protecting youth from tobacco products and vapor products by increasing the minimum legal age of sale of tobacco and vapor products, Revised Code of Washington(2019).

In 2019, Washington State legislators passed Engrossed House Bill 1074, An act relating to protecting youth from tobacco products and vapor products by increasing the minimum legal age of sale of tobacco and vapor products. The legislation prohibits selling or giving tobacco or vapor products to a person under the age of 21 and permits the Governor to seek government-to-government consultations with tribes about raising the minimum legal age of sale in cigarette tax compacts. The law is effective January 1, 2020.

24. Inslee Jay. Executive Order 19-03 Addressing the Vaping Use Public Health Crisis. In: Governor WSOot, ed. 27 September 2019 ed. Olympia, Washington2019.

Governor Inslee issued Executive Order 19-03, Addressing the Vaping Use Public Health Crisis [EO] on September 27, 2019. The text acknowledges that vapor products containing nicotine are the most commonly used nicotine products in Washington among youth and that the appeal of flavors, and associated advertising targeting youth, are contributing to the dramatic increase in youth vaping. The EO highlights "in 2019, an outbreak of a lung injury emerged in previously health individuals who had recently vaped THC and/or nicotine vapor products, and the cause of the injury is not yet known." In response, the Governor directed the Washington State Department of Health and Washington State Liquor and Cannabis Board to each take actions to address the this public health crisis. See full list of action items in the EO text.

25. Powers and duties of state board of health--Rule making--Delegation of authority--Enforcement of rules, 43.20.050 Revised Code of Washington.

RCW 43.20.050(2)(f) gives the State Board of Health authority to adopt rules for the prevention and control of infectious and noninfectious diseases.

26. Vapor Products and Flavors, Washington Administrative Code(2019).

Chapter 246-80 WAC Vapor Products and Flavors documents the Washington State Board of Health's emergency rules. The rules will be in effect from October 10, 2019 for 120 days.

27. Vapor Products and Flavors. Rulemaking 2019; Available at: <https://sboh.wa.gov/Rulemaking/CurrentRulesandActivity/VaporProductsandFlavors>. Accessed January 2020, 2020.

This Washington State Board of Health (SBOH) webpage provides an overview of SBOH's emergency rulemaking related to vapor products and flavors. It provides links to emergency rules.

28. Health Washington State Board of. WSR 19-21-050 Emergency Rules In: Health WSBo, ed. Olympia, Washington2019.

Washington State Register (WSR) 19-21-050 announces the creation of Chapter 246-80 WAC, Vapor products and flavors.

29. Health Washington State Board of. WSR 19-24-001 Emergency Rules In: Health WSBo, ed. 20 November 2019 ed. Olympia, Washington2019.

Washington State Register (WSR) 19-24-001 announces the creation of WAC 246-80-021, which bans the sale of vapor products containing vitamin E acetate.

30. States & Localities that have Restricted the Sale of Flavored Tobacco Products. Washington, D.C.: Campaign for Tobacco-Free Kids; 2025.

The Campaign for Tobacco-Free Kids created a fact sheet detailing actions states and localities have take to restrict flavored tobacco products locally. It was last updated January 8, 2025.

31. Massachusetts Department of Public Health. 2019 Tobacco Control Law. 2019; Available at: <https://www.mass.gov/guides/2019-tobacco-control-law>. Accessed 1/30/2025. This webpage provides an overview of Massachusetts 2019 Tobacco Control Law.

32. California Department of Public Health. California Prohibits Retailers from Selling Flavored Tobacco Products. 2024; Available at: <https://www.cdph.ca.gov/Programs/CCDPHP/DCDIC/CTCB/Pages/CAFlavorTobaccoLaw.aspx>. Accessed 1/30/2025.

This website provides an overview of California's law prohibiting retailers from selling flavored tobacco products.

33. State of New Jersey. Governor Murphy Signs Legislation to Make New Jersey First State in the Nation to Impose Permanent Ban on Flavored Vape Products. 2020; Available at: https://nj.gov/governor/news/news/562020/approved/20200121i.shtml?_gl=1*z31j0z*_ga*MTM1NDkzNC4xNzQzMzA5MjA3*_ga_5PWJJG6642*MTczODMwOTIwNy4wLjAuMTczODMwOTIwNy4wLjAuMA.. Accessed 1/30/2025.

This webpage announces the Governor of New Jersey's signing of S3265, legislation prohibiting the sale and distribution of flavored vape products, including menthol.

34. New York State Department of Health. New York State Department of Health Announces Statewide Ban of Flavored Nicotine Vapor Products Takes Effect Today. 2020; Available at: https://www.health.ny.gov/press/releases/2020/2020-05-18_fl_nicotine_vapor_products_ban.htm. Accessed 1/30/2025.

This webpage announced New York's statewide ban of flavored nicotine vapor products.

35. Rhode Island Regulations Prohibit the Sale of Flavored Electronic Nicotine Delivery System (ENDS) Products: What Rhode Island Businesses and Consumers Need to Know. Rhode Island Department of Health; 2022.

This educational brochure from the Rhode Island Department of Health provides an overview of state regulations prohibiting the sale of flavored electronic nicotine delivery system (ENDS) products and details the new law.

36. Utah Department of Health & Human Services. Tobacco Legislation Updates. Utah Tobacco Laws 2024; Available at: <https://tobaccolaws.utah.gov/new-tobacco-legislation-and-updates/>. Accessed 1/30/2025.

This webpage provides an overview of recently passed legislation and how it affects Utah tobacco retailers. It includes informatoin about SB 61 S5: Electronic Cigarette Amendments

which includes provisions prohibiting the sale of flavored e-cigarettes (not including menthol or tobacco) in both general retailers and retail tobacco specialty businesses.

37. Center Public Health Law. U.S. Sales Restrictions on Flavored Tobacco Products. July 2024 2024.

In this report, the Public Health Law Center summarizes examples of U.S. states, cities, and counties that restrict the sale of flavored vapor products.

38. Federal Court Upholds County's Ban on Flavored Tobacco. 2022; Available at: <https://www.networkforphl.org/news-insights/federal-court-upholds-countys-ban-on-flavored-tobacco/>. Accessed 1/29/2025.

The Network for Public Health Law provides a summary of a federal court ruling on Los Angeles County's ban on flavored tobacco products.

39. Assembly Bill A10713, Prohibits the sale of entertainment vapor products. 2023-2024.

During the 2023-2024 New York State Legislative Session, the New York State Senate proposed Assembly Bill A10713 prohibiting the sale of entertainment vapor products.

40. Health Washington State Department of. State Preemption of Commercial Tobacco Regulations: Impact in Washington State.no date.

This 2-page report from Washington State Department of Health discusses local control and preemption laws related to commercial tobacco products.

41. Smith Derek. San Francisco vs. Goliath: how communities of color fought to protect our youth against Big Tobacco *Step 2 - Implementing Innovation. San Francisco, California: San Francisco Department of Public Health; 2019.

This presentation from the San Francisco Department of Public Health provides an overview of how it implemented the city ordinance prohibiting the sale and distribution of flavored tobacco products and cigarettes. It discusses outreach and education efforts as well as results of initial compliance inspections. Overall, inspections indicate that the majority of retailers are in compliance with the law. Based on prior non-compliance, 150 locations were prioritized for inspections. Those found to be selling received a Notice of Correction. In 2019, SFDPH's annual mailing shared details on how to comply with state and local laws. It has also expanded its quitting offerings to support the flavor restrictions. For example, it has funded and supported community contracts to meet African American youth needs as well as trans folks and Spanish-speaking smokers. The next round of priority populations include Chinese speaking men, African American adults, youth who use Juul, and Pacific Islander folks. In fall 2019, it will launch its Connect to Quit media campaign.

42. Monitoring E-Cigarette Trends in the United States. Truth Initiative; CDC Foundation;2024.

Additionally, this report examined "sales data on e-cigarettes sold at traditional retail outlets from January 2019 through December 2023" as well as "state flavor policies in Massachusetts, California and New York as case studies that highlight the successes and challenges of these state laws." Key findings include: 1) e-cigarettes in non-tobacco flavors (e.g., fruit, candy, mint,

menthol and desserts) comprised 80.6% of all e-cigarette sales in 2023; 2) sales of menthol-flavored e-cigarettes rose 175.8% for all e-cigarettes and 207.4% for menthol-flavored prefilled cartridges not covered by the 2020 flavor policy; 3) sales of e-cigarettes with “clear” or other cooling flavor names increased 872.1% between 2020 to 2023; 4) state flavor policies can effectively reduce flavored e-cigarette sales.

43. General Office of the Surgeon. Eliminating Tobacco-Related Disease and Death: Addressing Disparities, A Report of the Surgeon General. U.S. Department of Health and Human Services;2024.

This 2024 report is the 35th Surgeon General’s report on smoking and health. The report includes 8 chapters and draws conclusions about the history of tobacco-related health disparities; disparities in tobacco use and exposure to secondhand smoke; the influences of flavors and menthol in tobacco products; social and environmental influences on tobacco-related health disparities; tobacco industry influences on tobacco-related health disparities; disparities in smoking-caused disease outcomes and mortality; and promising practices to reduce tobacco-related health disparities. Approximately 36 million U.S. adults (as of 2022) and 760,000 middle and high school students (as of 2024) smoke combustible tobacco products. Nearly 1 in 5 deaths in the U.S. is attributable to cigarette smoking and exposure to secondhand smoke. The leading cause of cancer deaths in the U.S. is attributable to smoking. In the U.S., “income, race and ethnicity, level of education, sexual orientation and gender identity, geography, and mental health play a significant role in determining who uses tobacco and who suffers from its harmful health consequences.” For example, American Indian and Alaska Native people have the highest prevalence of smoking of any group. Although “overall youth tobacco product use declined between 2023 and 2024, use among American Indian and Alaska Native youth increased.” The Surgeon General stated, “[s]ocial, structural, and commercial determinants of health—such as persistent poverty and inequitable economic and social conditions—lead to inequitable opportunities for living a life free from tobacco-related death and disease. Racism, discrimination, and targeted marketing by the tobacco industry; geographic disparities in evidence-based policy protections; preemptive laws that thwart communities from protecting their residents’ health and safety; and financial and other structural barriers to accessing cessation treatments also drive tobacco-related health disparities.” Specific to flavored products, research shows that “menthol-flavored tobacco products increase the likelihood of tobacco initiation, addiction, and sustain use; are target marketed to certain population groups; and are disproportionately used by Black people, Native Hawaiian and Pacific Islander people, women, and people who identify as lesbian, gay, or bisexual.” The report states that prohibiting the sale and marketing of menthol-flavored cigarettes could avert 654,000 deaths over the next 40 years. In 2024, 2 “states and nearly 200 U.S. communities prohibit the sale of menthol cigarettes and other flavored tobacco products.” The Surgeon General concludes that there is sufficient evidence to infer a causal relationship that policies prohibiting 1) “the sale of flavored tobacco products reduce sales of tobacco products and can reduce tobacco use” and “should also reduce tobacco use among groups experiencing disparities in tobacco use”; and 2) “the sale of menthol cigarettes reduce the sale of cigarettes and increase smoking cessation. Given the disproportionate burden of menthol cigarette use among some population groups, removing menthol cigarettes from the marketplace should also reduce disparities in tobacco initiation, nicotine dependence, cessation success, and tobacco-related health outcomes, especially if policies are comprehensive and equitably implemented.” The Surgeon General noted that

policies that restrict the availability of menthol cigarettes can reduce smoking initiation and prevalence among youth, emerging adults, Black people, and additional groups that disproportionately use menthol cigarettes. More specific to flavors, the report states, “a consumer’s use of flavored tobacco products, including menthol, is not arbitrary. Instead, use of flavored tobacco products can be explained by a range of factors, including prior conditioning to prefer certain flavors, differences in taster status [i.e., sex, age, race/ethnicity] and genetics, and targeted marketing.” The report explains that “children and adolescents exhibit stronger preferences for sweet tastes compared with adults, considering sweetness as a flavor and eliminating all sweeteners in tobacco products would be expected to reduce the likelihood of youth initiation and transition to tobacco dependence, protect certain population groups from tobacco-related health disparities, prevent potential chronic metabolic effects of artificial sweeteners, and limit exposure to sweeteners at potentially adverse effect levels.”

44. **Tierney P. A., Karpinski C. D., Brown J. E., et al. Flavour chemicals in electronic cigarette fluids. *Tobacco Control*. 2016;25(e1):e10-15.**

Tierney et al. measured the flavor chemical components of 30 e-cigarette fluids from two brands: BLU and NJOY. The authors noted that, "adoption of e-cigarettes has far out-paced our understanding of their implications for health, including the initial composition of the e-cigarette fluids as well as presence of harmful by-products formed during 'vaping.'" Flavor compounds are not typically listed on e-cigarette packaging. However, flavoring has been a focus of e-cigarette marketing strategies despite the fact that flavored cigarettes were banned in 2009 based on evidence that flavors attract youth. The authors also quote the Flavor Extracts Manufacturers Association that, "the Flavor Extracts Manufacturers Association Expert Panel does not evaluate flavor ingredients for use in tobacco products including e-cigarettes or other products that are not human food, or products that result in exposures other than ingestion...E-cigarette manufacturers should not represent or suggest that the flavor ingredients used in their products are safe because they have [Flavor Extracts Manufacturers Association 'generally recognized as safe' status for use in food because such statements are false and misleading." Tierney et al. found that flavor chemicals comprised 1-4% of the total fluid, and that six of the 24 isolated chemicals were aldehydes. Aldehydes are "a compound class recognized as 'primary irritants' of mucosal tissue of the respiratory tract." They also found that the majority of tobacco flavored e-cigarettes were found to contain confectionary flavor chemicals, rather than tobacco extracts. Overall, they concluded that, "the concentrations of some flavour chemicals in e-cigarette fluids are sufficiently high for inhalation exposure by vaping to be of toxicological concern." In 13 of the 30 e-liquids tested, flavor chemicals comprised more than 1% by weight. Based on these concentrations, the authors concluded that e-liquid consumption rates may be twice the recommended daily occupational exposure limits by inhalation for benzaldehyde and vanillin flavor chemicals.

45. **Park-Lee E, Jamal A, Cowan H, et al. E-Cigarette and Nicotine Pouch Use Among Middle and High School Students -- United States, 2024. *Morbidity and Mortality Weekly Report*. 2024;73(35).**

This Morbidity and Mortality Weekly Report discussed e-cigarette and nicotine pouch use among middle and high school youth in 2024. The National Youth Tobacco Survey (NYTS), a cross-sectional, school-based, self-administered web-based survey of U.S. students in middle school (grades 6–8) and high school (grades 9–12), was conducted among 29,861 students from

283 schools during January 22–May 22, 2024. In 2024, 5.9% of middle and high school students reported current e-cigarette use, including 7.8% of high school students and 3.5% of middle school students. Among students who currently used e-cigarettes, 38.4% reported frequent use (i.e., on 20+ days during the previous 30 days), and 26.3% reported daily use. Among youth who currently used e-cigarettes, 87.6% used a flavored product; fruit (62.8%), candy (33.3%), and mint (25.1%) were the most frequently reported flavors. Additionally, 1.8% of middle and high school students reported current nicotine pouch use (2.4% of high school students and 1.0% of middle school students). Among students reporting current nicotine pouch use, 85.6% used a flavored product, and the most frequently reported flavors were mint (53.3%), fruit (22.4%), and menthol (19.3%). In 2024, an estimated 1.63 million U.S. middle and high school students currently used e-cigarettes (a significant decline from 2.13 million in 2023). From 2023 to 2024, current e-cigarette use declined among middle and high school students overall and high school students; however, no significant changes were observed for current e-cigarette use among middle school students or for current nicotine pouch use among high school students or middle and high school students overall. While e-cigarettes remain the most used tobacco product among U.S. youth, “the wide availability and growing sales of nicotine pouches has also raised concerns about potential use of these products among youths.”

46. Achieving Health Equity in Tobacco Control 8 December 2015 2015.

This report was a joint publication of a consortium of organizations coordinating efforts around the 50th anniversary of the U.S. Surgeon General's report on smoking and health. Organizations endorsing this report are the African American Tobacco Control Leadership Council; the American Cancer Society; American Heart Association; American Lung Association; Asian Pacific Partners for Empowerment, Advocacy and Leadership (APPEAL); Campaign for TobaccoFree Kids; the Intercultural Cancer Council; LGBT Healthlink at CenterLink: The Community of LGBT Centers; NAATPN, Inc.; National Latino Alliance for Health Equity; the Smoking Cessation Leadership Center; Truth Initiative; and the University of Southern California Keck School of Medicine. While authors acknowledge and celebrate the advancements made since the Surgeon General's initial report, they highlight the persistent gaps in health equity. Authors note that smoking disproportionately affects those most in need including those living in financial poverty, people experiencing homelessness, racial/ethnic minorities, LBGT persons, and those suffering from mental illness and substance use disorders. Authors state, "We need to continue the population based policies and programs that have produced such dramatic results, including results that have benefited many racial and ethnic populations, but also expand efforts that incorporate and embrace fundamental principles of health equity that afford equal treatment of all individuals/groups (horizontal) and provide supplementary support for individuals/groups that are marginalized (vertical)." The report summarized key facts on prevalence, cessation, health effects, and marketing among demographic groups more severely impacted by the tobacco epidemic. Disparities are discussed by socioeconomic status; education level; race/ethnicity; LGBT; mental illness and substance use disorders; and homelessness status.

47. Chaiton M. O., Schwartz R., Tremblay G., et al. Association of flavoured cigar regulations with wholesale tobacco volumes in Canada: an interrupted time series analysis. *Tob Control*. 2019;28(4):457-461.

Chaiton et al. examined the association of Federal Canadian regulations passed in 2009 addressing flavors (excluding menthol) in small cigars with changes in cigar sales. Researchers analyzed quarterly wholesale unit data as reported to Health Canada (2001 through 2016) using an interrupted time series analysis. They estimated changes in sales of cigars with and without flavor descriptors, adjusted data by seasonal, and assessed changes for each flavor type over time. Results show the Federal flavor regulations were "associated with a reduction in the sales of flavoured cigars by 59 million units (95% CI -86.0 to -32.4)." While increases in sales of cigars with descriptors other than flavors (e.g., color or other ambiguous terms) were observed (9.6 million increase (95% CI -1.3 to 20.5)), "the overall level (decline of 49.6 million units (95% CI -73.5 to -25.8) and trend of sales of cigars (6.9 million units per quarter (95% CI -8.1 to -5.7)) declined following the ban." Moreover, sensitivity analysis showed that "there was no substantial difference in effect over time comparing Ontario and British Columbia, suggesting that other provincial tobacco control legislation [enacted in Ontario] was not associated with the changes in levels." Finally, "analyses suggested that the level change was sensitive to the specification of the date." Authors conclude, results demonstrate that flavor regulations "have the potential to substantially impact tobacco sales. However, exemptions for certain [flavors] and product types may have reduced the effectiveness of the ban, indicating the need for comprehensive, well-designed regulations."

48. **Courtemanche C.J., Palmer M.K., Pesko M.F. Influence of the Flavored Cigarette Ban on Adolescent Tobacco Use. *American Journal of Preventive Medicine*. 2017;52(5):e139-e146.**

Courtemanche et al. cite previous research findings that 17 year olds were three times as likely to use flavored cigarettes than smokers older than 25 years of age. In addition, the majority of tobacco users state that the first product they tried was a flavored product, "supporting the concern that these products may serve as a gateway to tobacco addiction." The 2009 Family Smoking Prevention and Tobacco Control Act banned all flavored cigarettes (except menthol) as a step to limit youth tobacco use and initiation. Courtemanche et al. evaluated the impact of the 2009 ban on flavored cigarette products on adolescent tobacco use. They used data from the National Youth Tobacco Survey (NYTS) from 1999 to 2013 to look at a number of variables before and after the ban, including: past 30-day cigarette use, number of cigarettes smoked in the past 30 days, use of menthol cigarettes among smokers, and past 30-day use of any other tobacco product besides cigarettes. Control variables included age, gender, race/ethnicity, price indices for cigarettes and other tobacco products, inflation, and youth unemployment rates. Their sample included 197,834 youth aged 11 to 19 years of age. Overall, the authors found that banning flavored cigarettes was associated with a 17% decrease in the likelihood of being a cigarette smoker ($p < 0.001$) and a 58% decrease in cigarettes smoked ($p = 0.005$). However, use of menthol cigarettes increased by 45% among smokers ($p < 0.001$), use of cigars increased by 34% ($p < 0.001$), and use of pipe tobacco increased by 55% ($p < 0.001$). The authors stated these findings imply "substitution toward the remaining legal flavored tobacco products." The likelihood of using at least one non-cigarette tobacco product increased 14%. However, after taking into account these increases in other forms of tobacco, the authors found an overall net 6% decrease in the probability of using any tobacco product (including cigarettes) (< 0.001). They concluded, "the results suggest the 2009 flavored cigarette ban did achieve its objective of reducing adolescent tobacco use, but effects were likely diminished by the continued availability of menthol cigarettes and other flavored tobacco products." This study did not account for

hookah and e-cigarette use, as questions about these products were not included in the NYTS until 2011. However, the authors noted that 89% of adolescents that use hookah and 85% of adolescents that use e-cigarettes use flavors.

49. Rogers Todd , Feld Ashley , Gammon Doris G , et al. Changes in cigar sales following implementation of a local policy restricting sales of flavoured noncigarette tobacco products. *Tobacco Control*. 2019:1-8.

Rogers et al. used non-cigarette tobacco sales data obtained from the Nielsen Company to assess the impact of Providence, Rhode Island's restriction on the retail sale of all non-cigarette tobacco products with a characterizing flavor other than tobacco, menthol, mint or wintergreen. Researchers focused on cigar sales, which comprised 95% of flavored non-cigarette tobacco products sold through conventional tobacco retail outlets (e.g., convenience stores, supermarkets) in Providence. Authors used weekly retail scanner sales data (January 2012 to December 2016). They categorized cigar sales into "products labelled with explicit-flavour (eg, Cherry) or concept-flavour (eg, Jazz) names." Researchers ran regression models to assess changes in sales in Providence and the rest of the state (ROS) before and after policy implementation. Overall, "Average weekly unit sales of flavoured cigars decreased prepolicy to postpolicy by 51% in Providence, while sales increased by 10% in ROS (both $p < 0.01$). The Providence results are due to a 93% reduction in sales of cigars labelled with explicit-flavour names ($p < 0.01$), which did not change significantly in ROS." Meanwhile, "sales of cigars labelled with concept-flavour names increased by 74% in Providence and 119% in ROS (both $p < 0.01$)." In sum, sales of all cigars (flavored and otherwise) decreased by 31% in Providence ($p < 0.01$). Authors detected "some evidence of product substitution and cross-border purchasing." Despite limitations, "the Providence policy had a city-specific impact on retail sales of flavoured cigars, which was attenuated by an increase in sales of concept-flavour named cigars." Authors concluded, "Products with concept-flavour names may avoid enforcement agency detection, and their continued sale undermines the intent of the policy."

50. Harrell M. B., Weaver S. R., Loukas A., et al. Flavored e-cigarette use: Characterizing youth, young adult, and adult users. *Prev Med Rep*. 2017;5:33-40.

Harrell et al. investigated how the use of flavored e-cigarettes varies between youth (12-17 years old), young adults (18-29 years old), and older adults (30 + years old). Cross-sectional surveys of school-going youth ($n = 3907$; Texas Adolescent Tobacco and Marketing Surveillance System [TATAMS]) and young adult college students ($n = 5482$; Marketing and Promotions Across Colleges in Texas Project [M-PACT]) in Texas, and young adults and older adults ($n = 6051$; Tobacco Products and Risk Perceptions Survey [TPRPS]) nationwide were administered in 2014-2015. "Most e-cigarette users said their first and 'usual' e-cigarettes were flavored." Results show that "at initiation, the majority of Texas school-going youth (98%), Texas young adult college students (95%), and young adults (71.2%) nationwide said their first e-cigarettes were flavored to taste like something other than tobacco, compared to 44.1% of older adults nationwide." Most youth, young adult, and adult e-cigarette users reported the "'usual' e-cigarette they used in the past 30 days were flavored, with the majority reporting that it was flavored to taste like something other than tobacco." Fruit and candy flavors predominated for all groups (Texas youth: 76% endorsed fruit and 57% endorsed candy; Texas young adult college students 83% and 52%, respectively; young adults nationwide: 74% and 50%, respectively; and older adults nationwide: 47% and 27%, respectively). Tobacco was the least commonly reported usual

flavor among all age groups. Flavors were particularly important for Texas youth as a reason to use e-cigarettes; 72.9% reported using e-cigarettes because they "come in flavors I like" compared to 57.4% of young adult college students in Texas and 64.8% of young adults nationwide. "Among adults, the use of tobacco flavor at initiation was common among dual users (e-cigarettes + combustible tobacco), while other flavors were more common among former cigarette smokers ($P = 0.03$)." Authors conclude, "restricting the range of e-cigarette flavors (e.g., eliminating sweet flavors, like fruit and candy) may benefit youth and young adult prevention efforts. However, it is unclear what impact this change would have on adult smoking cessation."

51. Harrell Melissa B., Loukas Alexandra, Jackson Christain D., et al. Flavored Tobacco Product Use among Youth and Young Adults: What if Flavors Didn't Exist? *Tobacco Regulation Science*. 2017;April(2):168-173.

Harrell et al. conducted a study to determine "the potential for reductions in the prevalence of young people's e-cigarette and tobacco use if characterizing flavors were not present." Authors used two parallel cross-sectional surveys of 2,483 youth aged 12-17 years (TATAMS: Texas Adolescent Tobacco and Marketing Surveillance System) and 4,326 young adults aged 18-29 years (M-PACT: Marketing and Promotions across Colleges in Texas) in Texas (Houston, Dallas/Ft. Worth, San Antonio, Austin), which included questions related to current use of e-cigarettes and other tobacco (cigarettes, cigar products, hookah, smokeless tobacco). Those who used e-cigarettes and other tobacco products were asked: "When you use [product], do you usually use any of the following flavors?" Those who used flavored products were asked: "Would you continue using [product] if it were not flavored?" Results showed "[f]lavored tobacco use was high for both youth (89%) and young adults (83%)" and "use of flavored e-cigarettes and hookah was most common (>90% of past 30-day users)." However, if characterizing flavors were not present three-quarters of flavored tobacco users reported they would discontinue using the product. Furthermore, reported discontinued use was highest for e-cigarettes and hookah and lowest for cigarettes. Findings show, "[s]ignificantly more young adult females than males reported they would not use the product if it were not flavored [e-cigarettes: 77% vs. 69%, $p=.03$]." Results indicate that "these reductions would be expected to impact adolescent boys and girls across middle school and high school in Texas about equally. However, restricting or removing flavors may have a larger impact on young adult female than male e-cigarette and other tobacco product use." Authors noted, "[a]lthough youth often start their tobacco use with flavored products, this study reinforces that use of flavored tobacco products among current users after initiation and experimentation is also high." Authors concluded that "[r]estricting flavors in tobacco products would not eradicate e-cigarette or other tobacco use among young people, but the potential for substantial reductions in the prevalence of young people's e-cigarette and other tobacco use seems high if flavors were removed." Limitations of the study include: data are from school-going participants and may not be generalizable to out-of-school youth or young adults; cross-sectional data do not allow for direct estimation of flavors influence on initiation or cessation among young people. Authors cite menthol cigarette specific research which "suggests many menthol smokers, including young adults, support a ban on the use of this characterizing flavor in this product and would try to quit if such a ban were put into place."

52. Abuse National Institute on Drug. Teen Drug Use Monitoring the Future 2020 - Vaping. Washington, D.C. : National Institutes of Health 2019.

This infographic is based on results of the 2019 Monitoring the Future (MTF) Survey, "an annual survey of 8th, 10th, and 12th graders conducted by researchers at the Institute for Social Research at the University of Michigan, Ann Arbor, under a grant from the National Institute on Drug Abuse, part of the National Institutes of Health." Conducted since 1975, "the survey has measured how teens report their drug, alcohol, and cigarette use and related attitudes in 12th graders nationwide; 8th and 10th graders were added to the survey in 1991." Results of the 2019 survey are based on 42,531 participating students from 396 public and private schools. 2019 Past Month Nicotine Vaping Equates to: 1 in 4 – 12th graders; 1 in 5 – 10th graders; and 1 in 10 – 8th graders. The 2017-2018 increase in nicotine vaping was the largest one-year jump ever tracked for any substance in the 45-year survey history. The 2018-2019 increase in THC vaping is the second largest one-year jump tracked. When asked why they vape, 41.7% reported vaping "because it tastes good" (2nd most common reason). The most common reason was "to experiment - to see what it's like" (60.9%). Additionally, 37.4% reported vaping "to relax or relieve tension" (a significant increase [nearly 1/3] since 2018), and 8.1% reported vaping "because I'm 'hooked' - I have to have it" (a significant increase, more than doubled from 2018).

53. Mantey D. S., Omega-Njemnobi O., Montgomery L. Flavored tobacco use is associated with dual and poly tobacco use among adolescents. *Addict Behav.* 2019;93:269-273.

Mantey et al. examined the relationships between flavored tobacco use and single, dual, and poly tobacco product use, among adolescents. Researchers obtained cross-sectional data from the 2017 National Youth Tobacco Survey (NYTS). Participating adolescents (N=2,042) were past 30-day tobacco users. Tobacco use was assessed for 9 products (cigarettes, e-cigarettes, hookah, cigar products (i.e., cigars, little cigars, cigarillos), smokeless tobacco, snus, pip tobacco, bidis, and dissolvable tobacco. "Multivariable multinomial logistic regression models were used to assess the relationship between flavored tobacco use and past 30-day single, dual, and poly (three or more) tobacco product use." Data were weighted to be representative of U.S. middle and high school students, adjusting for nonresponse and probability of selection. Researchers conducted two analyses using different categories as referent groups "to allow for a comprehensive examination of the relationship between all groups. Covariates included sex, grade level, race/ethnicity and exposure to tobacco marketing." Data showed flavored tobacco use prevalence differed significantly by race/ethnicity ($p < 0.001$); non-Hispanic whites had the greatest prevalence (74.7%) followed by Hispanic/Latinos (66.5%). Additionally, "[s]ingle, dual, and poly tobacco use prevalence differed significantly by race ($p = .035$). Single product use prevalence was greatest among non-Hispanic blacks (66.5%). Dual product use was greatest among non-Hispanic whites (21.3%). Poly tobacco use was greatest among Hispanic/ Latinians (28.9%)." Approximately half of all participating adolescent tobacco users (45.7%) reported use of more than one product, and most adolescent tobacco users reported using flavors (69.4%). Specifically, analysis of 2017 National Youth Tobacco Survey results found that among dual and poly tobacco users, the most commonly used flavored tobacco products were e-cigarettes (34.3% and 44.6%, respectively), cigars (23.8% and 41.5%, respectively), and convention cigarettes (21.9% and 33.9%, respectively). After controlling for covariates, "[f]lavored tobacco use was significantly correlated with a greater risk of dual (RRR: 2.09) and poly (RRR: 5.54) tobacco use, relative to single product use." Moreover, "flavored tobacco use was significantly correlated

with a greater risk of poly (RRR: 2.66) tobacco use, relative to dual tobacco use, controlling for covariates." Overall, authors noted a positive relationship for flavored tobacco use and multiple tobacco product use. Authors conclude, "[f]indings suggest the need to consider stronger regulations of flavored tobacco products [...] [and] the need to emphasize flavored tobacco use in prevention and education programs."

54. Patrick M. E., Terry-McElrath Y. M., Arterberry B. , et al. Reasons for Vaping Among US Adolescents. *Pediatrics*. 2024;154.

Patrick et al. examined the reasons 8th-, 10th-, and 12th-grade students reported vaping. Authors analyzed Monitoring the Future (MTF) study data collected from 2021 to 2023. Questions were asked of a randomly selected one-third of respondents (N = 28,522; average response rate 79%). Students were asked if they vaped nicotine in the past 12 months (yes / no) and how many days they vaped in the past 30 days (recorded as any/none, and near-daily [20+ occasions] / not). Analyses of near-daily use were limited to 12th graders (n = 637) due to low prevalence among younger students. Those who vaped (n = 5,082) were asked about their most important reasons for vaping nicotine (i.e., select all that apply from a list of 13 responses). Authors estimated, "[p]revalence levels for near-daily vaping in the past 30 days were 1.7%, 4.2%, and 7.8% for 8-, 10th-, and 12th-grade students, respectively." The most commonly cited reason for vaping nicotine was to relax (48.7% of those vaping in the past 12 months and 71.1% of those vaping near daily). Among respondents who vaped in the past 12 months or 30 days, the second and third most commonly cited reasons were "experiment" and "boredom". Among those vaping near-daily, the second and third most common reasons were "boredom" and "hooked". "Taste" was the 4th most commonly cited reason for vaping across all groups (34.0% of those who vaped in the last 12 months; 38.5% of those who vaped in the past 30-days; and 41.4% of those who vaped near-daily). Vaping for smoking cessation was rare (8.9% among those reporting near-daily vaping). Authors concluded, "Vaping to relax was the most commonly cited reason among all frequency groups; boredom was in the top 3 reasons for all use categories. Nearly half of adolescents who vaped nicotine in the past year or month (and >70% who vaped near-daily) reported doing so to relax or relieve tension."

55. Audrain-McGovern Janet , Rodriguez Daniel , Pianin Stephen , et al. Initial e-cigarette flavoring and nicotine exposure and e-cigarette uptake among adolescents. *Drug and Alcohol Dependence*. 2019;202(2019):149-155.

Audrain-McGovern et al. examined "whether the presence of flavoring and/or the presence of nicotine at first e-cigarette exposure predicted progression to current e-cigarette use (use in past 30 days) as well as escalation in use (number of days in the past 30 days) among adolescents." Of 2,017 eligible 9th grade students enrolled in one of four public high schools in suburban Philadelphia, Pennsylvania, 2,000 received parental consent to participate in the prospective longitudinal cohort study. In total, 1,835 students chose to participate in a baseline survey conducted in November and December of 2016. "Adolescents completed three paper and pencil follow-up surveys at 6-month intervals with 92% completing a survey at wave 2 (N=1687, May/June 2017), 90% completing a survey at wave 3 (N=1658, November/December of 2017), 89% completing a survey at wave 4 (N=1637, May/June 2018), and 87% completing a survey at wave 5 (N=1601, November/December of 2018)." Potential covariates (variables that potentially overlapped with the risk for e-cigarette use; e.g., (e.g., peer and family e-cigarette use, sensation-seeking, combustible cigarette smoking) were selected based on previous studies and were

measured and incorporated into the statistical model. "Adolescents who reported ever having used e-cigarettes at baseline (N=354) comprised the analytical sample." Authors used a two-part Latent Growth Curve Model including flavor, nicotine, and other covariates. "Initial use of a flavored (vs unflavored) e-cigarette was associated with progression to current e-cigarette use ($\beta=0.54$, $z=2.09$, $p=0.04$) and escalation in the number of days of e-cigarette use ($\beta=0.35$, $z=2.58$, $p=0.01$) across the following 18 months." Additionally, "Initial use of an e-cigarette with nicotine (vs without nicotine) was associated with a greater number of days of e-cigarette use at baseline ($\beta=0.49$, $z=2.16$, $p=0.03$)." Results show, "Adolescents who initially vaped a flavored e-cigarette progressed to current and more frequent e-cigarette use more rapidly than adolescents who initially vaped an unflavored e-cigarette." Authors concluded, "After controlling for these variables, we can conclude that flavoring and nicotine have independent effects on e-cigarette uptake." Authors recommend future research with larger samples to "delineate further synergistic effects of nicotine and flavoring on e-cigarette uptake."

56. Morean M. E., Butler E. R., Bold K. W., et al. Preferring more e-cigarette flavors is associated with e-cigarette use frequency among adolescents but not adults. *PLoS One*. 2018;13(1):e0189015.

Morean et al. examined whether: 1) "preferences for e-liquid flavors and the total number of flavors preferred differed between samples of adolescent and adult e-cigarette users" and 2) "preferences were associated with e-cigarette use frequency for adolescents or adults, respectively." The study's adolescent sample consisted of past-month e-cigarette users ($n=396$) from "5 Connecticut high schools who completed an anonymous, school-based survey in Fall 2014 (56.1% male; 16.18 [1.18] years; 42.2% past-month smokers)." The adult sample included past-month e-cigarette users ($n=590$) who "completed an anonymous, MTurk survey in Fall 2014 (53.7% male; 34.25 [9.89] years; 51.2% past-month smokers)." Researchers assessed preferences for "10 e-liquid flavors (i.e., tobacco, menthol, mint, fruit, coffee, vanilla, dessert/candy, spices, alcohol, and other) and the total number of flavors preferred by each group." The analysis found that compared to adults, "a larger proportion of adolescents preferred fruit, alcohol, and 'other'-flavored e-liquids, whereas adults disproportionately preferred tobacco, menthol, mint, coffee, and spice-flavored e-liquids (p -values $< .05$). Adults also preferred a greater total number of flavors compared to adolescents and used e-cigarettes more frequently (p -values $< .001$)." However, flavor preferences were associated with frequency of e-cigarette use within the adolescent sample. Specifically, "the total number of flavors preferred was associated with more days of e-cigarette use [$p<0.001$], as were preferences for fruit [$p<0.01$], dessert [$p<0.01$], and alcohol-flavored [$p<0.01$] e-liquids." Authors concluded, "[f]lavor preferences differed between adolescent and adult samples. While youth reported less frequent e-cigarette use overall, their preferences for specific flavors and the total number of flavors preferred were associated with more days of e-cigarette use, indicating that flavor preferences may play an important role in adolescent e-cigarette use."

57. Soneji S. S., Knutzen K. E., Villanti A. C. Use of Flavored E-Cigarettes Among Adolescents, Young Adults, and Older Adults: Findings From the Population Assessment for Tobacco and Health Study. *Public Health Rep*. 2019;134(3):282-292.

Soneji et al. examined the types of e-cigarette flavors used by adolescent (aged 12-17), young adult (aged 18-24), and older adult (aged ≥ 25) e-cigarette users. Researchers "assessed the prevalence of flavored e-cigarette use within the past month by flavor types and concurrent use

of multiple flavor types among past-month e-cigarette users sampled during Wave 2 (2014-2015) of the Population Assessment for Tobacco and Health Study among 414 adolescents, 961 young adults, and 1711 older adults." Weighted logistic regression models were used for the use of fruit-, candy-, mint/menthol-, tobacco-, or other-flavored e-cigarettes and concurrent use of multiple flavor types. Authors considered covariates including "demographic characteristics, e-cigarette use frequency, cigarette smoking status, current use of other tobacco products, and reasons for e-cigarette use." For example, cigarette smoking status varied by age with 35.8% of adolescent e-cigarette users, 14.1% of young adults users, and 3.6% of older adult users reporting having never smoked cigarettes. Additionally, 14.7% of adolescent users, 37.4% of young adult users, and 48.5% of adult users were current cigarette smokers who had tried to quit smoking in the past year. The number one reason for e-cigarette use among both adolescent (77.9%) and young adult users (90.3%) was the availability of appealing flavors. Meanwhile, appealing flavors was the 7th most commonly reported reason among older adult users (first - beliefs may be less harmful than cigarettes to themselves and others; 2 - acceptability of e-cigarette use in places where cigarettes are not allowed. Overall, "the leading e-cigarette flavor types among adolescents were fruit, candy, and other flavors; among young adults were fruit, candy, and mint/menthol; and among older adults were tobacco or other flavors, fruit, and mint/menthol." Compared with older adults, adolescents and young adults were more likely to use fruit-flavored e-cigarettes (adjusted odds ratio [aOR] = 3.35; 95% confidence interval [CI], 2.56-4.38; and aOR = 2.31; 95% CI, 1.77-3.01, respectively) and candy-flavored e-cigarettes (aOR = 3.81; 95% CI, 2.74-5.28; and aOR = 2.95; 95% CI, 2.29-3.80, respectively) and concurrently use multiple flavor types (aOR = 4.58; 95% CI, 3.39-6.17; and aOR = 2.28; 95% CI, 1.78-2.91, respectively)." Analysis by race/ethnicity found "the odds of mint/menthol-flavored e-cigarette use were higher among non-Hispanic black users (aOR = 3.81; 95% CI, 2.78-5.22) and Hispanic users (aOR = 1.60; 95% CI, 1.18-2.18) than among non-Hispanic white users." Authors concluded, "Regulation of sweet e-cigarette flavors (eg, fruit and candy) may help reduce the use of e-cigarettes among young persons without substantially burdening adult e-cigarette users."

58. Pepper Jessica K. , Ribisl Kurt M. , Emery Sherry L. , et al. Reasons for Starting and Stopping Electronic Cigarette Use *Int J Environ Res Public Health*. 2014;11(2014):10345-10361.

Pepper et al. assessed reasons cited by adult e-cigarette users for starting and then stopping electronic cigarette (e-cigarette) use. "Among a national sample of 3878 U.S. adults who reported ever trying e-cigarettes, the most common reasons for trying were curiosity (53%); because a friend or family member used, gave, or offered e-cigarettes (34%); and quitting or reducing smoking (30%)." Researchers found nearly two-thirds (65%) of those who started using e-cigarettes later stopped using them. "Discontinuation was more common among those whose main reason for trying was not goal-oriented (e.g., curiosity) than goal-oriented (e.g., quitting smoking) (81% vs. 45%, $p < 0.001$). The most common reasons for stopping e-cigarette use were that respondents were just experimenting (49%), using e-cigarettes did not feel like smoking cigarettes (15%), and users did not like the taste (14%)." Results suggest there are "two categories of e-cigarette users: those who try for goal-oriented reasons and typically continue using and those who try for non-goal-oriented reasons and then typically stop using." Authors recommend additional research focus on distinguishing "e-cigarette experimenters from motivated users whose decisions to discontinue relate to the utility or experience of use. Depending on whether e-cigarettes prove to be effective smoking cessation tools or whether they

deter cessation, public health programs may need distinct strategies to reach and influence different types of users."

59. Goldenson N. I., Kirkpatrick M. G., Barrington-Trimis J. L., et al. Effects of sweet flavorings and nicotine on the appeal and sensory properties of e-cigarettes among young adult vapers: Application of a novel methodology. *Drug Alcohol Depend.* 2016;168:176-180.

Goldenson et al. used a double-blind, cross-over design laboratory protocol to assess whether: "(1) sweet flavorings and nicotine affect e-cigarette appeal; (2) sweet flavorings increase perceived sweetness; (3) nicotine increases throat hit; and (4) perceived sweetness and throat hit are associated with appeal." Double-blind laboratory conditions help control for exogenous factors (e.g., marketing strategies, cultural trends, pre-existing expectations about product effects, and social influences) that can influence the perceived appeal of certain e-cigarette products. Eligible participants were young adult vapers (N=20) ages 19-34 years who used e-cigarettes one or more times per day/week for one or more months; smoked 15 or fewer conventional cigarettes per day; were not using smoking cessation medication; and were not pregnant or breastfeeding. The study sample was 55% male; average age 26.3 years; 45% white, 35% African American, and 20% Other race/ethnicity. On average, participants reported low to medium e-cigarette dependence (based on PSECD) and vaping for 3 years. Eleven participants reported regularly vaping a sweet flavor, and 9 reported usually using a non-sweet flavor. Participants self-administered "20 different e-cigarette solutions (10 flavors × 2 nicotine concentrations) that were separated into two counterbalanced blocks (nicotine and placebo). Within each block, 10 different e-cigarette solutions (6 sweet, 3 non-sweet and 1 flavorless) were presented in random order—constituting a Flavor (sweet vs. non-sweet vs. flavorless) × Nicotine (nicotine vs. placebo) within-participant full factorial design." Evidence indicates that participants remained blind to the characterizing flavor they received (average accuracy rate in identifying administered flavor 9.7%; did not differ by Flavor condition). Participants followed a prescribed standardized puff sequence to test each solution. They then rated appeal (liking, willingness to use again and perceived monetary value), perceived sweetness and throat hit strength after each administration." Results showed sweet-flavored solutions produced greater appeal and perceived sweetness ratings compared to non-sweet and flavorless solutions ($p < 0.0001$). Secondly, nicotine produced greater throat hit ratings than the placebo. However, presence of nicotine did not significantly increase appeal ($p = 0.25-0.59$) nor interact with flavor effects on appeal ($p = 0.76-0.99$). "Controlling for flavor and nicotine, perceived sweetness was positively associated with appeal ratings ($p < 0.0001$)." Specifically, "each one point increase in sweetness rating (0–100) was associated with an estimated 0.51 increase in 'liking,' a 0.51 increase in 'willingness to use again,' and a \$0.04 increase in 'amount willing to pay for a day's worth of the solution.'" Meanwhile, throat hit ratings were not positively associated with appeal, and were inversely associated with liking ($p = 0.01$). To assess whether pre-existing flavor preferences influenced study outcomes, researchers re-analyzed data from those who reported non-sweet flavor preferences separately. "As in the overall sample, all appeal outcomes were positively associated with sweetness ratings ($p < 0.0001$); willingness to use again and subjective value were not associated with throat hit [...] and liking was *inversely* associated with throat hit ($p = 0.02$)." Findings suggest that "e-cigarette solutions that stimulate orosensory perceptions of sweetness (in and of themselves) may be primary drivers of appeal." Authors concluded, "[f]urther identification of compounds in e-cigarette solutions that enhance sensory perceptions

of sweetness, appeal, and utilization of e-cigarettes are warranted to inform evidence-based regulatory policies."

60. Garrison K. A., O'Malley S. S., Gueorguieva R., et al. A fMRI study on the impact of advertising for flavored e-cigarettes on susceptible young adults. *Drug Alcohol Depend.* 2018;186:233-241.

Garrison et al. tested a brain biomarker of product preference for sweet/fruit versus tobacco flavor e-cigarettes, and whether advertising for flavors interfered with warning labels. The study included college-age young adult participants (N=26; aged 18-25 years) who had tried an e-cigarette and were susceptible to future e-cigarette use but were nonsmokers. The study sample was 54% male; 65% white, 15% black, 8% Asian, 8% white Hispanic, and 4% black Hispanic. Participants viewed advertisements in functional magnetic resonance imaging (fMRI), which has been used to objectively measure the effects of advertising (beyond self-report) by "testing whether the neural signal in response to advertisements can predict product preferences and purchasing." Participants viewed advertisements (taken from online media) for sweet (i.e., candy/desserts and fruit flavor and tobacco flavor e-cigarettes, menthol and regular cigarettes, and control images of sweets/fruits/mints with no tobacco product. "Cue-reactivity was measured in the nucleus accumbens, a brain biomarker of product preference. Advertisements randomly contained warning labels [formatted to meet current FDA requirements, FDA 2016b], and recognition of health warnings was tested post-scan. Visual attention was measured using eye-tracking." Immediately following scanning, participants performed an unannounced recognition memory test of health messages. Results showed "a significant effect of e-cigarette condition (sweet/tobacco/control) on nucleus accumbens activity, that was not found for cigarette condition (menthol/regular/control)." Specifically, "[n]ucleus accumbens activity was greater for sweet/fruit versus tobacco flavor e-cigarette advertisements and did not differ compared with control images of sweets and fruits." Additionally, "[g]reater nucleus accumbens activity was correlated with poorer memory for health warnings." Overall, authors concluded results of this study and other exploratory eye-tracking findings suggest that "advertising for sweet/fruit flavors may increase positive associations with e-cigarettes and/or override negative associations with tobacco, and interfere with health warnings, suggesting that one way to reduce the appeal of e-cigarettes to youth and educate youth about e-cigarette health risks is to regulate advertising for flavors."

61. McKelvey K., Baiocchi M., Ramamurthi D., et al. Youth say ads for flavored e-liquids are for them. *Addict Behav.* 2019;91:164-170.

McKelvey et al. showed adolescents and young adults (ages 14 to 21 years) advertisements for flavored e-liquids and asked which age group they thought advertisements targeted. Data were collected in 2016 (June through September) as part of a larger survey, a random sample of 255 youth from across California. The sample was 62.4% female; mean age=17.5, SD=1.7 [range 14-21]; 25.6% ever-used e-cigarettes; 24% white, 27% Asian/Pacific Islander, 36% Latino, and 12% Other. Participants viewed "eight ads, presented in randomized order, for fruit-, dessert-, alcohol-, and coffee-flavored e-liquids and indicated the age group they thought the ads targeted: younger, same age, a little older [18-24 years], or much older than them." Respondents could choose anywhere from 0 to 4 age groups as target age groups for each flavor ad. Researchers estimated population means and 95% confidence intervals using bootstrapping (100,000 replicate samples). Results show 93.7% of participants indicated "the cupcake man flavor ad targeted an

audience of people younger than they." More than half of respondents believed ads for smoothie (68.2%), cherry (63.9%), vanilla cupcake (58%), and caramel cappuccino (50.4%) flavors targeted their age group. Overall, "for no flavor ad did most feel the primary target age group was much older." Results indicate "youth believe ads for flavored e-liquids target individuals about their age, not older adults." Authors conclude, "findings support the need to regulate flavored e-liquids and associated ads to reduce youth appeal, which ultimately could reduce youth use of e-cigarettes."

62. Huang L. L., Baker H. M., Meernik C., et al. Impact of non-menthol flavours in tobacco products on perceptions and use among youth, young adults and adults: a systematic review. *Tob Control*. 2017;26(6):709-719.

Huang et al. conducted a systematic review examining the impact of non-menthol flavors in tobacco products on tobacco use perceptions and behaviors among youth, young adults, and adults. Four databases were searched through April 2016. Of 1688 articles identified, authors excluded articles that were not English-language, were not peer-reviewed, were qualitative, assessed menthol-flavored tobacco products only and did not contain original data on outcomes that assessed the impact of flavors in tobacco products on perceptions and use behavior. "[Two] researchers extracted the data independently and used a validated quality assessment tool to assess study quality." Overall, 40 studies met the inclusion criteria (0% published between 2010 and 2016), and 17 of those studies examined e-cigarettes (10 U.S. based studies, 7 Non-U.S. based studies). Results showed that "tobacco product packaging with [flavor] descriptors tended to be rated as more appealing [6 studies] and as less harmful by tobacco users and non-users [5 studies]. Many tobacco product users, especially adolescents, reported experimenting, initiating [7 studies] and continuing to use [flavored] products [7 studies] because of the taste and variety of the [flavors]." For example, a U.S. study of 13,651 adolescents found "product flavoring was consistently reported as the most common reason for use across all product types, including e-cigarettes (81.5%), hookah (78%), cigars (73.8%), smokeless tobacco (69%) and snus pouches (67.2%)." The systematic review found, those who used many flavored tobacco products also showed "decreased likelihood of intentions to quit compared with non-[flavored] tobacco product users." Authors concluded, flavors in most tobacco products "appear to play a key role in how users and non-users, especially youth, perceive, initiate, progress and continue using tobacco products. Banning non-menthol [flavors] from tobacco products may ultimately protect public health by reducing tobacco use, particularly among youth."

63. Pesko M. F., Kenkel D. S., Wang H., et al. The effect of potential electronic nicotine delivery system regulations on nicotine product selection. *Addiction*. 2016;111(4):734-744.

Pesko et al. estimated the "effect of potential regulations of electronic nicotine delivery systems (ENDS) among adult smokers, including increasing taxes, reducing flavor availability and adding warning labels communicating various levels of risk." Researchers performed a discrete choice experiment (DCE) among a national sample of 1200 adult smokers. A total of 1200 adult smokers from the United States were recruited to participate in the study. Participants were presented with hypothetical purchase choice of cigarettes, nicotine replacement therapy and a disposable ENDS. Results showed restricting flavor availability in ENDS to tobacco and menthol was associated with a 2.1 percentage point reduction in ENDS selection ($P < 0.001$) among participating adults. Young adult smokers were 3.7 percentage points more likely to

choose ENDS when multiple flavors were available than older adults ($P < 0.001$). Findings suggest reducing flavor availability may reduce ENDS use by young adult smokers.

64. Marynak K., Crane E., VanFrank B. Letters, Comment & Response: Vaping. *JAMA*. 2025.

In this letter, Marynak et al. provided some evidence of the prevalence of entertainment vapor products in the U.S. They stated that some entertainment vapor products are “currently illegally marketed in the U.S. without [FDA] authorization.” Entertainment vapor products are gaining popularity. Based on retailer scanner data, “the smart vape brands Geek Bar Pulse and Raz, which debuted in October 2023, emerged as the [3rd] and [6th] top-selling e-cigarettes as of June 2024.” Among middle and high school students who reported e-cigarette use, “5.8%- an estimated 90,000 youth- wrote in that they use Geek Bar. As a write-in response, this is likely an underestimate”.

65. Wong M., Talbot P. Pac-Man on a vape: electronic cigarettes that target youth as handheld multimedia and gaming devices. *Tobacco Control*. 2024;0:1-3.

Wong and Talbot present information about entertainment vaping devices. Entertainment vaping devices may include high-definition displays with built-in digital games (e.g., Pac-Man, Tetris, virtual pets, slot machine-like games, and “puff count competitions”). Some devices also have features found in smart devices, including touchscreens; photo wallpapers; customizable displays (e.g., puffing animation); “find my device” location services; Bluetooth; speakers; wireless charging; and voice recognition. The authors noted that these devices “are of particular concern, as they are user-friendly, attractive to youth and may couple nicotine addiction with gaming disorders.” Devices may be appealing to youth because they resemble mobile devices, are available online, and cost the same amount as other vaping products. Some products also feature multiple flavor options. Lastly, the authors noted that some games and features are designed to increase vaping. For example, on some products, users must vape or vape more frequently to progress or earn points in some games and “it is especially concerning that vaping is required to progress in these games, which would likely accelerate nicotine addiction.” On other products, features only operate or become interactive when a user vapes and “[t]hese features may reinforce vaping habits by associating puffing and high power to animations and flashing lights.” Lastly, the authors state that the devices act on 3 “potential addictions: nicotine dependence, gaming disorder and screen time obsession” and “coupling nicotine to existing youth behaviors, such as video gaming and screen time use, will broaden the smart [e-cigarette] market to include youth with no prior interest in nicotine products, while simultaneously reinforcing nicotine addiction among current users.”

66. Patel M., Kierstead E.C., Liu M., et al. Examining the relationship of flavored tobacco product policy restrictions and flavored tobacco product use, among adolescents and young adults in the U.S. *Preventive Medicine*. 2024;182.

Patel et al. examined the impact of local restrictions on flavored tobacco products on product use among youth and young adults. Overall, the authors found that “flavor restriction policies [are] associated with lower odds of any tobacco and flavored use among youth and young adults.”

67. **Chung-Hall J., Fong G.T., Meng G., et al. Illicit cigarette purchasing after implementation of menthol cigarette bans in Canada: Findings from the 2016-2018 ITC Four Country Smoking and Vaping Surveys. *BMJ Open*. 2023;E-pub:1-4.**

Chung-Hall et al. evaluated the impact of bans on menthol cigarettes in 7 Canadian provinces. The study authors surveyed 1,098 people who used (non-menthol) cigarettes and 138 people who used menthol cigarettes. Surveys were conducted in 2016 before the ban on menthol cigarettes and in 2018 after the ban. The authors conducted 2 pre-ban/post-ban comparisons: 1) changes in self-reported use of menthol cigarettes; and 2) changes in purchase of menthol cigarettes from First Nation reserves. Among 138 people who used menthol cigarettes before the ban, only 17 (10.5%) used menthol cigarettes after the ban. There was no change in the number of people who purchased non-menthol cigarettes, menthol cigarettes, or both non-menthol and menthol cigarettes from First Nation reserves. Moreover, the authors found no difference pre- versus post-ban between the number of Indigenous and non-Indigenous people purchasing cigarettes from First Nation reserves. Of people who purchased menthol cigarettes pre- and post-ban, 51.2% of people pre-ban and post-ban reported their last purchase of menthol cigarettes was from a First Nation reserve. The authors concluded that, “[t]his evaluation study of Canada’s menthol cigarette ban provides no support for the contention that a menthol ban increases illicit purchasing.” The authors state that these results are similar to previous research in Canada, England, and the Netherlands, and “findings from these three jurisdictions provide significant converging evidence that a menthol cigarette ban does not increase illicit trade. This converging evidence also lends greater confidence that the US FDA’s proposed rule to prohibit menthol in cigarettes, which would apply nationwide, including on Tribal lands, will not significantly increase illicit cigarette trade.” However, the results from this study may be less generalizable to U.S. statewide bans as it is illegal for First Nation reserves to sell tax-exempt cigarettes to non-First Nation individuals and Canadian “provincial and federal menthol cigarette bans apply to First Nation reserves”. The authors also present prior research suggesting that bans on menthol cigarettes in Canada “were associated with a significantly greater percentage of quit attempts and quitting among menthol smokers compared to non-menthol smokers.”

68. **Asare S., Majmundar A., Xue Z., et al. Association of Comprehensive Menthol Flavor Ban with Current Cigarette Smoking in Massachusetts from 2017 to 2021. *JAMA*. 2023.**

In 2020, Massachusetts became the first state to implement a state ban on menthol flavoring. Previous research has shown that the ban “decreased cigarette sales in Massachusetts while disproportionately increasing sales in border states.” Asare et al. sought to determine the association between the ban and current cigarette smoking among adults 25 years and older. The authors evaluated current cigarette smoking rates in Massachusetts before and after the ban and also compared current smoking rates in Massachusetts with current smoking rates in 42 other states and Washington D.C. (i.e., states that did not have a local level menthol flavor ban). The authors found that “the ban was associated with a decline in current cigarette smoking in Massachusetts by 1.0 percentage point [...] or 8.1% relative reduction in smoking prevalence.” Moreover, “the Massachusetts comprehensive menthol flavor ban was followed by a greater reduction in current cigarette smoking in the state than comparison states overall”.

69. **Barrington-Trimis Jessica L. , Kong Grace , Leventhal Adam M. , et al. E-cigarette Use and Subsequent Smoking Frequency Among Adolescents. *Pediatrics*. 2018;142(6).**

E-cigarette use is associated with cigarette initiation. Barrington-Trimis et al. pooled data from 3 prospective cohort studies in California and Connecticut (baseline: 2013-2014; follow-up: 2014-2016; N = 6,258) to assess whether e-cigarette use is associated with more frequent cigarette use after initiation or whether adolescent cigarette or dual product users transition to e-cigarette use or nonuse. Authors found that fewer never e-cigarette users (at baseline) began smoking (7%) compared to those who had used e-cigarettes at baseline (21% reported smoking cigarettes at follow-up). "Baseline exclusive e-cigarette users had higher odds of reporting exclusive e-cigarette use at follow-up (OR = 7.28; 95% CI: 4.86–10.9), exclusive cigarette use at follow-up (OR = 3.84; 95% CI: 1.80– 8.19), or dual product use at follow-up (OR = 8.86; 95% CI: 5.08– 15.4)." Once youth began smoking cigarettes (either never e-cigarette users or e-cigarette users at baseline) the amount that they smoked was similar. Researchers found, "Among baseline never smokers, e-cigarette users had greater odds of subsequent experimental (odds ratio [OR] = 4.58; 95% confidence interval [CI]: 3.56–5.88), infrequent (OR = 4.27; 95% CI: 2.75–6.62) or frequent (OR = 3.51; 95% CI: 1.97–6.24) cigarette use; the 3 OR estimates were not significantly different." Whereas, "[b]aseline past-30-day exclusive cigarette use was associated with higher odds at follow-up of exclusive cigarette or dual product use than of exclusive e-cigarette use."

70. Sciences National Academy of. *Public Health Consequences of E-Cigarettes.* Washington, D.C.: The National Academies Press; 2018.

The U.S. Food and Drug Administration requested the National Academy of Sciences complete a report about the health impacts of e-cigarettes. As part of this white paper, the National Academy of Sciences evaluated existing published literature to determine whether there was conclusive, substantial, moderate, limited, insufficient, or no available evidence to determine the link between e-cigarette use and health outcomes. They stated that, "the net public health effect, harm or benefit, or e-cigarettes depends on three factors: their effect on youth initiation of combustible tobacco products, their effect on adult cessation of combustible tobacco products, and their intrinsic toxicity." E-cigarette use among youth and young adults has increased, and in 2016, e-cigarette use was higher than cigarette smoking or use of any other tobacco product. Use was also higher among boys and Hispanic and non-Hispanic whites. They reached 9 conclusions about the make-up of e-cigarettes. They found conclusive evidence that: 1) E-cigarette use increases airborne concentrations of particulate matter and nicotine in indoor environments. 2) Exposure to nicotine from e-cigarette use is variable and depends on product characteristics and operation. 3) E-cigarettes contain and emit numerous potentially toxic substances in addition to nicotine. 4) The number, quantity, and characteristics of potentially toxic substances in e-cigarettes are highly variable and depend on product characteristics and operation. They found substantial evidence that: 5) Nicotine intake from e-cigarettes among experienced adult e-cigarette users is comparable to that from combustible tobacco cigarettes. 6) Under typical use, except for nicotine, there is lower exposure to potentially toxic substances from e-cigarettes compared to combustible tobacco cigarettes. 7) E-cigarettes contain metals. They found limited evidence that: 8) E-cigarette use increases levels of nicotine and other chemicals on indoor surfaces. 9) the number of metals in e-cigarettes could be greater than the number of metals in combustible cigarettes. The National Academy of Sciences also made 26 conclusions about the impact of e-cigarettes on health outcomes. They concluded that, "the implications for long-term effects on morbidity and mortality are not yet clear. Use of e-cigarettes instead of combustible tobacco cigarettes by those with existing respiratory disease might be less harmful." They found conclusive evidence that: 1) E-cigarette devices can explode and cause burns and injuries. 2)

Intentional or accidental exposure to e-liquids can result in seizures, anoxic brain injury, vomiting, and lactic acidosis, among other effects. 3) Intentionally or unintentionally drinking or injecting e-liquids can be fatal. They found substantial evidence that: 4) Components of e-cigarettes can promote formation of reactive oxygen species/oxidative stress. 4) E-cigarette use results in symptoms of dependence on e-cigarettes. 5) E-cigarette use increases heart rate shortly after nicotine intake. 6) Chemicals in e-cigarettes are capable of causing DNA damage and mutagenesis, suggesting the possibility that long-term exposure could increase risk of cancer and adverse reproductive outcomes. Related to initiation and cessation, they found 7 conclusions. They found mixed evidence that, "while e-cigarettes might cause youth who use them to transition to use of combustible tobacco products, they might increase adult cessation of combustible tobacco products." They found substantial evidence that "e-cigarette use increases risk of ever using combustible tobacco cigarettes among youth and young adults." Overall, the National Academy of Sciences found that the evidence across a range of outcomes suggests that, "e-cigarettes pose less risk to an individual than combustible tobacco cigarettes." They also concluded that "there would be net public health harm in the short and long terms if the products do not increase combustible tobacco cessation in adults."

71. **Watkins S. L., Glantz S. A., Chaffee B. W. Association of Noncigarette Tobacco Product Use With Future Cigarette Smoking Among Youth in the Population Assessment of Tobacco and Health (PATH) Study, 2013-2015. *JAMA Pediatrics*. 2018;172(2):181-187.** Watkins et al. used data from the national Population Assessment of Tobacco and Health (PATH) survey to determine whether adolescents use of electronic cigarettes, hookah, noncigarette combustible tobacco, or smokeless tobacco led to cigarette smoking initiation. The authors stated that, "in addition to their direct health effects, how these products affect youth cigarette smoking is a major consideration in determining their net influence on public health." PATH is a nationally representative survey of 12 to 17 year olds, and the authors completed a longitudinal evaluation of survey responses for 10,384 youth from 2013 and 2015. At baseline, approximately 9% of youth had never tried a cigarette and had tried at least one non-cigarette tobacco product. They found that cigarette imitation was higher among youth that had used e-cigarettes, hookah, noncigarette combustible tobacco, or smokeless tobacco. Overall, "the odds of past 30-day cigarette use at follow-up were approximately twice as high among baseline ever users of e-cigarettes (odds ratio [OR], 1.87; 95% CI, 1.15-3.05), hookah (OR, 1.92; 95% CI, 1.17-3.17), noncigarette combustible tobacco (OR, 1.78, 95% CI, 1.00-3.19), and smokeless tobacco (OR< 2.07; 95% CI, 1.10-3.87)." The authors found that "ever use of e-cigarettes was associated with 2.53 times greater odds of subsequent cigarette use." Using two or more types of non-cigarette tobacco products was associated with 4 times greater odds of past 30-day cigarette smoking at follow-up (OR, 3.95, 95% CI, 2.65-5.90, P<.001). The authors cite previous research showing that "approximately 90% of adult smokers first tried a cigarette by 18 years of age, and even infrequent smoking in adolescence is associated with established adult smoking."

72. **Soneji S., Barrington-Trimis J.L., Wills T.A., et al. Association Between Initial Use of e-Cigarettes and Subsequent Cigarette Smoking Among Adolescents and Young Adults-- A Systematic Review and Meta-analysis. *JAMA Pediatrics*. 2017;171(8):788-797.** Soneji et al. conducted a systematic review and meta-analysis of longitudinal studies to determine whether initial use of e-cigarettes leads to subsequent cigarette smoking among youth and young adults. They included 9 studies in their analysis. Overall, they found that e-cigarette

use was strongly and consistently associated with greater risk for cigarette smoking initiation (OR 3.50, 95% CI 2.38-5.16) and past 30-day cigarette smoking (OR 4.28, 95% CI 2.52-7.27) among youth and young adults. In addition, their analysis found that e-cigarette use is an independent risk factor for cigarette smoking, after controlling for multiple additional risk factors.

73. Leventhal Adam M., Strong David R., Kirkpatrick Matthew G., et al. Association of electronic cigarette use with initiation of combustible tobacco product smoking in early adolescence.(Report). 2015;314(7):700.

Leventhal et al. cite evidence that electronic cigarettes are being used among teens who have never used combustible cigarettes. They cite a 2014 estimate that in the United States 43% of 10th graders who reported using e-cigarettes in the previous 30 days reported never having tried combustible cigarettes. Leventhal et al. analyze data from a longitudinal survey of high school students from a convenience sample of 10 public high schools in the Los Angeles, California area. They collected data in three waves: baseline (fall 2013; 9th grade), 6-month follow-up (spring 2014), and 12-month follow-up (fall 2014; 10th grade). The final sample included students who completed all three waves of the survey (n=2,530). They found that students who reported e-cigarette use at baseline were also more likely to report use of combustible tobacco products in the previous 6 months. After adjusting for potential confounding factors, the authors found that baseline e-cigarette use was also associated with a higher likelihood of using combustible tobacco products (cigarettes, cigars, or hookah) at follow-up (averaged across the two follow-up periods OR 2.73 [95% CI 2.00-3.73]). This trend was also true for combustible cigarettes specifically (OR 3.25 [95% CI 2.29-4.62]).

74. Thomas A Wills, Rebecca Knight, James D Sargent, et al. Longitudinal study of e-cigarette use and onset of cigarette smoking among high school students in Hawaii. *Tobacco Control*. 2016.

Wills et al. analyzed 2013 and 2014 longitudinal school-based survey data from Hawaii. The baseline sample included 2,338 9th and 10th graders. Students who were not smokers at baseline but who had used e-cigarettes were significantly more likely to have smoked combustible cigarettes at the one-year follow-up than their non-smoking peers who had never tried e-cigarettes (OR 2.87 [95% CI 2.03-4.05]). Among students who had tried combustible cigarettes at baseline, using e-cigarettes was not significantly related to changes in their frequency of smoking traditional cigarettes at follow-up.

75. McCabe Sean Esteban , West Brady T. , McCabe Vita V. . Associations Between Early Onset of E-cigarette Use and Cigarette Smoking and Other Substance Use Among US Adolescents: A National Study. *Nicotine & tobacco research : official journal of the Society for Research on Nicotine and Tobacco*. 2017;20(8):923-930.

McCabe et al. examined the associations between early onset of e-cigarette use and cigarette smoking and other substance use behaviors among US adolescents. Researchers analyzed data collected as part of the 2015 Monitoring the Future study. A nationally representative sample of 2,299 US high school seniors attending public and private high schools completed a self-administered questionnaire during the spring of their senior year. Results showed, "A higher percentage of adolescents who began using e-cigarettes in ninth grade or earlier (early onset) were found to report current and lifetime cigarette smoking and other substance use relative to

those individuals who never used e-cigarettes or those who began using e-cigarettes later in the 12th grade." Specifically, "approximately 69.6% (SE = 8.1) of those who initiated e-cigarette use at grade 9 or earlier reported any cigarette smoking as compared to 46.5% (SE = 6.4) of the respondents who initiated e-cigarettes in 12th grade and 14.8% (SE = 1.5) of those respondents who never used e-cigarettes." Moreover, "Multivariate logistic regression analyses indicated that the adjusted odds of alcohol use, cigarette smoking, marijuana use, nonmedical prescription drug use, and other illicit drug use among early onset e-cigarette users were significantly greater than those for individuals never having used e-cigarettes (adjusted odds ratios [AORs] ranged 9.5–70.6, $p < .001$)." Researchers note that although "these associations were significant for both experimental and frequent e-cigarette users, the effects of early onset were stronger among frequent e-cigarette users." Additionally, "the odds of these substance use behaviors (except alcohol) among early onset e-cigarette users were also significantly greater than the odds for later onset e-cigarette users (AORs ranged 2.8–4.1, $p < .05$)." Authors conclude, "In the present study, early onset of e-cigarette use was significantly associated with increased odds of cigarette smoking and other substance use behaviors."

76. Dai H, Hoa J. Flavored Electronic Cigarette Use and Smoking Among Youth. *Pediatrics*. 2016;138(6).

Dai and Hao applied a logistic regression model to 2014 National Youth Tobacco survey estimates flavored e-cigarette use to assess whether flavored e-cigarette use was associated with "(1) intention to initiate cigarette use among never smoking youth ($n=16,471$), (2) intention to quit tobacco use among current-smoking youth ($n=1,338$), and (3) perception of tobacco's danger among all respondents ($n=21,491$)." Among the 2,017 respondents reported using e-cigarettes in the last 30 days, 1,228 (60.9%) reported using flavored e-cigarettes. "Among never-smoking youth, 55.6% (288) of current e-cigarette users reported using flavored e-cigarettes. Among current smokers, 68.4% (495) of current e-cigarette users reported using flavored e-cigarettes." Results of the analysis show, "Compared with not using e-cigarettes in the past 30 days, using flavored e-cigarettes was associated with higher odds of intention to initiate cigarette use among never-smoking youth (adjusted odds ratio [aOR] = 5.7; $P < .0001$), lower odds of intention to quit tobacco use among current-smoking youth (aOR = 0.6; $P = .006$), and a lower prevalence of perception of tobacco's danger among all respondents (aOR = 0.5; $P < .0001$)." Specifically, "Compared with users of nonflavored e-cigarettes, users of flavored e-cigarettes also had higher odds of intention to initiate cigarette use (aOR = 1.7; $P = .02$." Authors concluded, "Flavored e-cigarette use is associated with increased risks of smoking among youth." Since this analysis was released use of e-cigarettes has increased significantly among U.S. youth and young adults. Therefore, analysts assessed study results as moderately generalizable to the current Washington context.

77. Bhatnagar A., Whitsel L. P., Blaha M. J., et al. New and Emerging Tobacco Products and the Nicotine Endgame: The Role of Robust Regulation and Comprehensive Tobacco Control and Prevention: A Presidential Advisory From the American Heart Association. *Circulation*. 2019;139(19):e937-e958.

In its Presidential Advisory on New and Emerging Tobacco Products, the American Heart Association (AHA) highlighted the dramatic increase in use of electronic cigarettes (e-cigarettes), particularly among adolescents and young adults, as a significant health concern. AHA stated, "[a]lthough these products may benefit by helping some smokers to quit or to move

to a less harmful product, the long-term health effects of these products and the net public health effect associated with their use remain unclear and widely debated.” Evidence indicates that use of e-cigarettes by youth “seems to be nearly exclusively for recreational purposes because youth use does not seem to be associated with quit attempts or quit contemplation.” The National Academies of Sciences, Engineering, and Medical summary of the latest research on e-cigarettes indicates that these products “contain fewer numbers and lower levels of toxicants than combustible tobacco cigarettes and that exposure to nicotine and toxicants from aerosolization of e-cigarette constituents depended on the characteristics of the device and its use.” Upon review of the evidence, the committee found that “e-cigarettes likely pose less risk than continuing to smoke cigarettes”, but that e-cigarettes are “not without adverse biological effects in humans.” Population dynamic modeling conducted before the rise in JUUL use indicated that, “assuming that the use of e-cigarettes increases the net cessation rate of combustible cigarettes among adults, the use of these products could generate a net public health benefit, despite the increased use of combustible tobacco products by young adults.” However, the modeling also showed that “in some scenarios in which e-cigarette toxicity was much higher or the gateway effects from e-cigarette use to combustible cigarette use were much stronger, the public health benefit was substantially less or e-cigarette use was even associated with net harm. Moreover, if e-cigarettes do not promote cessation of combustible tobacco products in adults, the policy model projected that there would be net public harm in both the short and long terms.” The committee therefore “prioritized research to determine whether e-cigarettes promote smoking cessation.” AHA noted that data documenting the increasing use of e-cigarettes among adolescents and young adults may underestimate the true prevalence because evidence indicates that “some youth self-report that they are not using e-cigarettes when they are using electronic hookah, JUUL, and other similar products.” A growing body of evidence shows that young people who use e-cigarettes, particularly products with higher nicotine content, “are more likely than those not using these products to try and to continue cigarette smoking.” Evidence also indicates that e-cigarettes may contribute to former smokers reinitiating tobacco use and sustaining nicotine use. A population-based, prospective cohort study found “no evidence that e-cigarette use helps adult smokers quit at rates higher than when these products are not used.” Moreover, while dual users may smoke fewer cigarettes, they tend to compensate with more e-cigarette use, which increases their overall exposure to nicotine. “Therefore, even though e-cigarettes might help maintain smoking reduction and lower withdrawal symptoms, the long-term health impact of dual use remains largely unknown.” AHA noted that, to date, “there is no experimental evidence to support the view that flavors help adults switch from combustible tobacco products or to quit tobacco altogether.” However, evidence suggests restricting flavoring in all tobacco can reduce the appeal of these products to adolescents and young adults.

78. Petersen Angela, Myers Mark G. , Tully Lyric, et al. Poly tobacco use among young adult smokers: prospective association with cigarette consumption. *Tobacco Control*. 2020;2020(29):43-48.

Petersen et al. conducted this prospective study to examine changes in multiple tobacco product use over time and associations with cigarette smoking quantity. Authors cite evidence that "While other tobacco products, such as e-cigarettes and hookah, may not lead to nicotine dependence as readily as regular cigarette consumption, there is substantial evidence that repeated exposure induces dependence." Study participants (n=335; 55% male; with a racial/ethnic composition of 39% non-Hispanic white, 25% Asian American, 24%

Hispanic/Latino and 11% from other or multiple backgrounds) were 18-24 years old non-daily cigarette smokers living in California. Participants were compensated for their participation. Researchers assessed participants' polytobacco use patterns quarterly for 2 years. "A longitudinal negative binomial regression model indicated that those who used more non-cigarette products also reported greater cigarette quantity. The strength of this relationship increased over time." Additionally, "The pattern held whether or not cigarettes were included in the PTU predictor." The study found, "Participants who used 3+ products reported significantly more cigarettes over time compared with those who used two products ($z=-4.57$, $p<0.001$), one product ($z=-8.40$, $p<0.001$) and no products ($z=21.74$, $p<0.001$)." Similarly, "Refitting the model with two products as the reference indicated that this group smoked significantly more than single product users ($z=-5.26$, $P<0.001$)." Authors conclude, "Findings suggest that individuals who use more tobacco products are at greater risk for increased cigarette smoking and maintaining a multiple product use pattern."

79. Knox B. Increasing the Minimum Legal Sale Age for Tobacco Products to 21.: Campaign for Tobacco-Free Kids;2016.

In this report, the author presents an overview of the issues surrounding tobacco use among youth in the United States and outlines potential benefits to increasing the tobacco purchasing age to 21. Key points discussed include the modeling predictions from the 2015 Institute of Medicine report, tobacco company marketing towards youth, the success of raising the minimum drinking age to 21 and lessons learned, as well as the overall benefits to a Tobacco 21 approach.

80. Lydon David M., Wilson Stephen J., Child Amanda, et al. Adolescent brain maturation and smoking: What we know and where we're headed. *Neuroscience and Biobehavioral Reviews*. 2014;45:323-342.

Lydon et al. conducted a review of the literature on adolescent brain development and nicotine dependence. They cite evidence that smoking is most likely to be initiated during adolescence and that most adults who smoke daily initiate smoking by 18 years of age. The authors also note that once adolescents begin smoking, they are more likely than adults to continue smoking because they experience heightened positive effects from nicotine and are more susceptible to developing nicotine addiction than adults. Research also indicates that individuals who smoked their first cigarette at a younger age and who had a more pleasant experience are more likely to smoke additional cigarettes. Early-initiation smokers also tend to develop nicotine dependence faster and have higher daily cigarette consumption rates than later-initiation smokers. The authors cite a 1996 study by Breslau and Pettersson which found that early smoking onset is associated with decreased likelihood of cessation. The likelihood of quitting was lowest for youth who initiated smoking at 13 or younger, with likelihood of quitting increasing with each year that initiation was delayed for adolescents.

81. Evans-Polce Rebecca , Veliz Phil , Boyd Carol J. , et al. Trends in E-Cigarette, Cigarette, Cigar, and Smokeless Tobacco Use Among US Adolescent Cohorts, 2014–2018. *AJPH*. 2019;110(2).

Evans-Polce et al. examined changes in age of initiation of e-cigarette, cigar, and smokeless tobacco use among adolescents in the U.S. Researchers used data from 5 cohorts of the National Youth Tobacco Survey (2014-2018; $n=26,662$). Results show, "In 2014, 8.8% of lifetime e-cigarette users initiated use at 14 years or younger, as compared with 28.6% of lifetime e-

cigarette users in 2018." Meanwhile, the age of initiation for cigarettes, cigars, and smokeless tobacco did not change significantly among lifetime users of each of these products. Authors conclude, "U.S. adolescents are initiating e-cigarette use at younger ages in recent years."

82. Clapp P., Lavrich K., Reidel B., et al. The E-Cigarette Flavoring Cinnamaldehyde Suppresses Mitochondrial Function and Transiently Impairs Cilia Beat Frequency in Human Bronchial Epithelial Cells. Paper presented at: Epithelial Function in Health and Disease- Poster Discussion Session; May 23, 2018, 2018; San Diego, California.

In this abstract, Clapp et al. explain that compounds in cigarettes impair mitochondrial function and reduce cilia beat frequency, impairing lung function. They note that cinnamaldehyde, which is commonly used to flavor e-cigarette products, has similar structural properties to compounds in cigarettes. They determined the content of cinnamaldehyde in e-cigarette products and exposed human bronchial epithelial cells to various levels to evaluate a dose-response relationship. Overall, the authors concluded, "data suggest that cinnamaldehyde, a ubiquitous flavoring agent commonly used in e-cigarettes, adducts to mitochondrial proteins, disrupts mitochondrial function, and significantly reduces intracellular ATP levels, which correlates with impaired [cilia beat frequency] in airway epithelial cells...inhalational exposures of cinnamaldehyde may increase the risk of respiratory infections in e-cigarette users."

83. Widely used e-cigarette flavoring impairs lung function [press release]. 2018.

In this press release, the American Thoracic Society summarizes recent research by Clapp et al. entitled, "The E-cigarette Flavoring Cinnamaldehyde Suppresses Mitochondrial Function and Transiently Impairs Cilia Beat Frequency in Human Bronchial Epithelial Cells." The study found that a single exposure to cinnamaldehyde in e-cigarettes impairs lung function. In the press release, the authors state that, "our data suggest that when used in e-cigarettes cinnamaldehyde, like toxic aldehydes in cigarette smoke, significantly disrupts normal cell physiology in ways that may have implications for the development and exacerbation of respiratory disease...our finding that cinnamaldehyde impairs normal airway cilia motility is significant because it demonstrates that a common, food-safe flavoring agent, in the context of e-cigarette use, is capable of dysregulating a critical anti-bacterial defense system in the lungs." The authors note that flavoring agents, while safe for ingestion, may not be safe for inhalation. In addition, since flavoring agents are used in high concentrations in e-cigarettes, individuals may be exposed to higher doses of the agent. Authors state, "'The two principles of toxicology- 'The Dose Makes the Poison' and 'The Route of Exposure Affects Toxicity'- clearly apply here."

84. Behar R. Z., Wang Y., Talbot P. Comparing the cytotoxicity of electronic cigarette fluids, aerosols and solvents. *Tob Control*. 2017;27(3):325-333.

Behar et al. evaluated the cytotoxicity of e-cigarette refill fluids and corresponding aerosol as well as propylene glycol and glycerin (common solvents) using three different types of human cells. Overall, they found that various brands and flavors of e-cigarette fluids are cytotoxic. The authors conducted a previous study evaluating the cytotoxicity of chemicals used to flavor e-cigarette refill fluids. That study found that, "cinnamon-flavoured products were particularly cytotoxic, and cinnamaldehyde was identified as the most potent additive in these fluids. We also reported that cinnamaldehyde is widely used in refill fluids, including popular fruity and sweet flavours, and that it produces adverse effects on cells at doses that do not cause cell death." Other studies have also shown that cherry-flavored products (benzaldehyde) and chocolate-flavored

products (2,5-dimethylpyrazine) are potentially harmful. They also cite other research showing that e-cigarette use has numerous health effects, including respiratory, cardiac, and digestive system effects, unintentional and intentional poisonings, and injuries due to explosion. They also stated that in vitro studies have found that e-cigarettes can cause cell inflammation, apoptosis, and DNA damage. In this study, the authors evaluated 36 e-cigarette refill fluids representing a range of brands and flavors. Fluids tested included tobacco-flavored, propylene glycol, vegetable glycerin, and pure nicotine liquid. In addition, the authors produced corresponding aerosols using a smoking machine. The fluids and aerosols were tested using three types of cells. Human pulmonary fibroblasts are a cell type that is first exposed to inhaled aerosol and are involved in the development of lung diseases. Lung epithelial cells are cells commonly used in toxicological inhalation testing. Pluripotent human embryonic stem cells were also used to approximate potential impacts to human embryos. All of the tests included dose-response experiments. The authors found that 34 of the 35 products were significantly more toxic at high concentrations than at low concentrations. Creamy/buttery, mint/menthol, tobacco, and fruit flavoring categories were the most potent. The six most potent flavorings were in the creamy/buttery category and included flavorings like Swiss Dark, Butterfinger, Caramel, and Butterscotch. In general, the embryonic stem cells were more sensitive to e-cigarette fluids and aerosols than adult lung cells. Overall, 54% (19 products) were cytotoxic in both the fluid and aerosol form; 23% (8 products) were cytotoxic in the aerosol form but not the fluid form; and 3% (1 product) were cytotoxic in the fluid form but not the aerosol form. Twenty percent (7 products) were found to be non-cytotoxic in both the fluid and aerosol form. In addition, refills containing glycerin were the most cytotoxic, and 91% of glycerin-based refill fluids were cytotoxic when aerosolized. Vegetable glycerin alone was also cytotoxic when aerosolized, and was found to be more cytotoxic than propylene glycol alone. The authors noted that many flavoring liquids may be approved for ingestion, but have not been tested for safety of inhalation.

85. Caporale A., Langham M.C., Guo W., et al. Acute Effects of Electronic Cigarette Aerosol Inhalation on Vascular Function Detected at Quantitative MRI. *Radiology*. 2019;00:1-10.

Caporale et al. provided background research about each component of e-cigarettes, including the solvents, metals generated by the heating elements, and flavorants. They noted that, “the basic constituents of e-liquids, primarily propylene glycol and glycerol, can form irritant acetals even at room temperature and carcinogens at typical working device temperatures.” The heating elements produce fine and ultrafine metal particles that have been shown to cause nose, throat, and respiratory irritation, lung inflammation, and nervous system damage. Caporale et al. conducted a prospective study with 31 healthy, adult non-smokers (aged 18 to 35) to determine the impact of smoking nicotine-free e-cigarettes. Participants had healthy BMI ranges, no history of smoking, and no obvious cardiovascular or neurovascular disease. Participants underwent an MRI before and after smoking 16 inhalations of nicotine-free e-cigarettes containing propylene glycol, glycerol, and flavor. They measured, “peripheral hyperemia in response to cuff-induced ischemia, cerebrovascular reactivity in response to breath hold, aortic pulse wave velocity, and an indicator of aortic stiffness.” Overall, after vaping, they found, “reductions after vaping in luminal flow-mediated dilation (-3.2 of 9.4; -34%; P<.001), reactive hyperemia peak velocity (-9.9 of 56.6 cm/sec; -18%; P<.001), and acceleration (-3.9 of 15.1 cm/sec²; -26%; P<.001) as representative of macrovascular alterations; a reduction in precuff occlusion Svo₂ (-13 OF 65 %hBO₂; -20%, P<0.001), which indicated transient microvascular impairment; a marginal

increase in aortic pulse wave velocity (0.19 of 6.05 m/sec/ 3%; P=.05), which suggested aortic stiffening; and no statistically significant alterations in cerebrovascular reactivity measured by breath-hold index.” The authors noted that they did not determine whether the effects were due to the solvent, flavor, or thermal degradation.

86. **Gerloff J., Sundar I. K., Freter R., et al. Inflammatory Response and Barrier Dysfunction by Different e-Cigarette Flavoring Chemicals Identified by Gas Chromatography-Mass Spectrometry in e-Liquids and e-Vapors on Human Lung Epithelial Cells and Fibroblasts. *Appl In Vitro Toxicol.* 2017;3(1):28-40.**

There are over 8,000 flavors of e-cigarettes on the market. Gerloff et al. looked at the impact of e-cigarette flavoring chemicals on lung function. Specifically, they looked at impact of various chemicals on the release of proinflammatory cytokine (interleukin-8) in human lung epithelial cells and human lung fibroblasts in vitro, and on barrier dysfunction in human bronchial epithelial cells. They looked at the impact of various e-liquids at three different concentrations to evaluate dose-response impacts after 24 hours of exposure. The authors stated that, “flavored e-cigs are a public health concern not just because they attract youth for experimentation (gateway for initiating tobacco products) but also due to the presence of chemicals that serve as flavorings that may lead to their own health hazards. Flavoring chemicals contain harmful aerosol constituents, such as maltol, vanillin, acetoin, and diacetyl apart from nicotine, vegetable glycerin, and propylene glycol/glycerol.” In addition, “recent studies have shown that cytotoxic effects posed by e-liquids are mainly due to increasing concentrations of the flavoring agents.” The authors noted that there is a lack of data about potential short and long-term health impacts and toxicity from inhaling flavored chemicals. This study found that acetoin, diacetyl, maltol, and ortho-vanillin significantly induced the release of interleukin-8 in human bronchial epithelial cells. Acetoin, pentanedione, maltol, and ortho-vanillin also induced release of interleukin-8 among human primary lung fibroblast cells. None of the flavorings produced a significant proinflammatory response in lung epithelial cells. E-cigarette flavoring chemicals had a dose-dependent impact on lung epithelial cells and fibroblasts. The authors also found that flavoring chemicals impact barrier dysfunction in human bronchial epithelial cells, which can increase access of pollutants, bacteria, and viruses into the lungs. They authors stated, “previously, it has been shown that soluble components of e-cig, including nicotine exposure, caused a dose-dependent loss of lung endothelial barrier function associated with oxidative stress and inflammatory response. Our data show that nicotine and e-cig flavoring agents...differentially affect epithelial barrier function time dependently. This suggests that both nicotine and flavoring chemicals in e-cigs are equally responsible for compromising epithelial integrity/[tight junctions], which allows particles to cross the epithelial barrier.” The authors noted that “food flavoring chemicals approved and evaluated as safe by FEMA for ingestion are now widely being used in [electronic nicotine delivery systems] without knowing their safety and inhalation toxicity.” This study confirmed that inhaling diacetyl can cause damage to lung cells. They also cited a previous study that found that cytotoxicity was correlated with the total number and concentration of chemicals present in flavored e-cigarettes. Another study found that 30 puffs from cherry-flavored e-cigarettes contained higher levels of benzaldehyde than combustible cigarettes. The authors concluded that, “our finds suggest that flavoring chemicals are present in e-liquid/e-cigar aerosols, which are proinflammatory and long-term exposure to flavoring chemicals may lead to lung injurious responses.”

87. **Kosmider L., Sobczak A., Prokopowicz A., et al. Cherry-flavoured electronic cigarettes expose users to the inhalation irritant, benzaldehyde. *Thorax*. 2016;71(4):376-377.**

Kosmider et al. tested 145 e-cigarette products for the presence of benzaldehyde, a common ingredient in fruit flavored e-cigarettes and a chemical known to cause respiratory irritation in animal and occupational studies. They tested e-liquid aerosols for the presence of benzaldehyde and compared levels from 30 puffs with levels from one combustible cigarette as well as with levels predicted to be inhaled occupationally during an 8 hour work shift. The authors detected benzaldehyde in 108 out of 145 e-cigarette products, most commonly in cherry-flavored products. At levels found, 30 puffs of e-cigarettes flavored with benzaldehyde were higher than doses inhaled from conventional cigarettes and more than 1000 times lower than occupational exposures. The authors noted, “although many flavourings used in e-cigarettes are generally recognized as safe when used in food products, concerns have been raised about the potential inhalation toxicity of these chemicals.” There is a lack of data about the long-term health impacts of inhaling chemicals used in e-cigarette flavorings.

88. **Omaiye E. E., McWhirter K. J., Luo W., et al. High-Nicotine Electronic Cigarette Products: Toxicity of JUUL Fluids and Aerosols Correlates Strongly with Nicotine and Some Flavor Chemical Concentrations. *Chem Res Toxicol*. 2019;32(6):1058-1069.**

Omaiye et al. evaluated the flavor chemical concentrations and nicotine concentrations of the eight pre-filled JUUL e-cigarette pods available on the market (i.e., Cool Mint, Classic Menthol, Mango, Fruit Medley, Cool Cucumber, Crème Brulee, Classic Tobacco, and Virginia Tobacco). The authors tested concentrations in the vape fluid before puffing, after puffing, and in the corresponding aerosol. Overall, JUUL pods contain solvents, flavor chemicals, and varying concentrations of nicotine. Among the eight flavored pods, the authors identified 59 different flavor chemicals. The concentration of flavor chemicals in JUUL pods ranged from 0.2-15.6 mg/mL, with the highest concentrations of menthol, vanillin, and ethyl maltol. The nicotine concentration of JUUL pods was significantly higher than other e-cigarette products. Most products had nicotine concentrations between 1.6-34.3 mg/mL; JUUL pods had nicotine concentrations between 59.2-66.7 mg/mL. This concentration is also higher than in a pack of cigarettes (40 mg/pack). The transfer of flavor chemicals from the e-liquid to the corresponding aerosol was over 50%, and the transfer of nicotine was between 56%-75%. The authors also found that JUUL fluids were cytotoxic for all pod flavors. All of the pod fluids were found to be cytotoxic to lung epithelial cells. Most were cytotoxic at 0.2% to 1.8% concentration, with a maximum effect at 10% concentration. Corresponding aerosols were also cytotoxic, and were cytotoxic at levels lower than observed with fluids with maximum effect at 0.2%- 1.8%. Omaiye et al. also tried to determine the relative contribution of nicotine, total flavor chemicals, and individual flavor chemicals to cytotoxicity. They found that nicotine concentration most closely aligned with cytotoxicity. However, the correlation between cytotoxicity and all components was statistically significant. The authors concluded that, “our data clearly identify a [sic] concern related to the high nicotine concentration in JUUL products, i.e., the potential for high levels of nicotine, as well as flavor chemicals such as ethyl maltol, to damage or even kill cells at the concentrations used in JUUL pods.”

89. **Sherwood C. L., Boitano S. Airway epithelial cell exposure to distinct e-cigarette liquid flavorings reveals toxicity thresholds and activation of CFTR by the chocolate flavoring 2,5-dimethylpyrazine. *Respir Res.* 2016;17(1):57.**

Sherwood and Boitano evaluated the impact of e-liquid flavoring chemicals on bronchial epithelial cells, which “provide the first line of defense against inhaled particulates, pathogens, and toxicants.” They found that 5 out of 7 flavoring chemicals were cytotoxic and produced effects consistent with cell death. Vanillin and 2,5-dimethylpyrazine, used to provide chocolate flavoring, also compromised cell function at subcytotoxic levels. Very low concentrations (0.02%) of 2,5-dimethylpyrazine “induced distinct cellular impedance changes indicative of a cellular signaling event.” This type of reaction, “alters the capability of airway epithelial cells to respond to signaling molecules key in the proper functioning of airway cell physiology.”

90. **Centers for Disease Control and Prevention National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. *The Health Consequences of Smoking: 50 Years of Progress. A Report of the Surgeon General.* U.S. Department of Health and Human Services;2014.**

The analysts writing the Surgeon General’s reports on the health effects of smoking use a set of criteria to rank the strength of evidence that a causal relationship exists. For each health indicator, the analysts synthesize the evidence and then apply the criteria to the body of evidence. The report is then vetted by a series of external editors who are tasked with ensuring the accuracy of the report. This comprehensive analysis includes hundreds of references. The 2014 report concludes that since the 1964 Surgeon General’s report, a very strong body of evidence has shown a causal link between cigarette smoking and diseases in nearly every organ, cancer (e.g. lung, liver and colorectal cancer), diminished health status, exacerbation of asthma, inflammation, impaired immune function, age-related macular degeneration, harms to the fetus, diabetes, erectile dysfunction, arthritis, and premature death. Research also shows that secondhand smoke causes cancers, reparatory disease, cardiovascular disease, stroke, and harms to infant and child health. This report also summarizes the evidence indicating that tobacco use may have a different impact on adolescents than adults. The authors indicate that adolescence is a vulnerable stage of brain development, and that nicotine exposure during this age may have lasting adverse effects on brain development.

91. **Gallaway M.S., Henley S.J., Steele C.B., et al. *Surveillance for Cancers Associated with Tobacco Use--United States, 2010-2014. Morbidity and Mortality Weekly Report, Centers for Disease Control and Prevention.* 2018;67(12):1-42.**

In this Surveillance Summary, the Centers for Disease Control and Prevention evaluates tobacco-associated cancer incidence for 12 types of cancer associated with tobacco use from 2010 to 2014. They find that tobacco use contributes "to at least 12 types of cancer, including acute myeloid leukemia (AML) and cancers of the oral cavity and pharynx; esophagus; stomach; colon and rectum; liver; pancreas; larynx; lung, bronchus, and trachea; kidney and renal pelvis; urinary bladder; and cervix." They used cancer incidence data covering approximately 99% of the U.S. population from CDC's National Program of Cancer Registries and the National Cancer Institute's Surveillance, Epidemiology, and End Results program. Approximately 3.3 million new tobacco-associated cancer cases were reported from 2010 to 2014, or approximately 667,000 cases per year. They found that incidence remains high among whites, blacks, non-Hispanics, and individuals living in rural areas.

92. Dunbar M.S., Tucker J.S., Ewing B.A., et al. Ethnic Differences in Cigarette Use Trajectories and Health, Psychosocial, and Academic Outcomes. *Journal of Adolescent Health*. 2018;62:327-333.

Dunbar et al. presented previous research that, "youth who initiate smoking and continue to smoke demonstrate poorer academic and occupational outcomes, social difficulties, behavioral problems, and more physical and mental health problems in young adulthood relative to individuals who abstain entirely or desist after a period of experimentation." They also summarized previous research suggesting that youth alcohol and marijuana use may impact academic performance and physical health disproportionately for some racial/ethnic groups. In this study, they examined adolescent smoking trajectories and academic, health, and social outcomes by race/ethnicity for students at the end of high school. The authors followed students who were in sixth or seventh grade in 2008 through their completion of high school in 2016. Approximately 6500 students from 16 middle schools in Los Angeles, California completed annual surveys during physical education classes. Surveys asked about current cigarette smoking, sociodemographics and race/ethnicity, academic orientation, academic unpreparedness, physical ailments/symptoms, physical health, mental health, social functioning, and delinquency. Overall, they found that higher average cigarette use was associated with poorer academic performance, mental health, physical health, and social functioning as well as with greater academic unpreparedness, physical ailments, and delinquency. Controlling for cigarette use trajectories, "racial/ethnic minority youth showed poorer outcomes in multiple domains--notably physical health and physical impairments." The authors concluded, "after adjusting for similar use patterns over time, as well as an index of socioeconomic status (mother's education), cigarette smoking during adolescence is associated with poorer outcomes for racial/ethnic minority youth compared with white peers, and these disparities in health, academic, and other functional domains are evident as early as high school."

93. Organization World Health. Smoking and COVID-19: Scientific brief.2020.

The World Health Organization (WHO) conducted a review of literature to evaluate the association between smoking and COVID-19. They identified 34 peer-reviewed journal articles published before May 2020, including 26 observational studies, 8 meta-analyses, and qualitative primary research. Research has shown that 1.4% to 18.5% of individuals hospitalized for COVID-19 were smokers. A meta-analyses of 7 studies "found a statistically significant association between smoking and severity of COVID-19 outcomes amongst patients." Other studies found a statistically significant association between smoking status and COVID-19 disease severity, admission to an Intensive Care Unit, ventilator use, and death. WHO concluded that, "available evidence suggests that smoking is associated with increased severity of disease and death in hospitalized COVID-19 patients."

94. General Office of the Surgeon. E-Cigarette Use Among Youth and Young Adults: A Report of the Surgeon General. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office of Smoking and Health;2016.

This report was prepared by the Centers for Disease Control and Prevention's National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. It focused on examining the research around the epidemiology and health effects of e-cigarette use among

youth and young adults in the United States. They note that, "the initial drafts of the chapters were written by 27 experts who were selected for their knowledge of the topics addressed. These contributions are summarized in five chapters that were evaluated by approximately 30 peer reviewers. After peer review, the entire manuscript was sent to more than 20 scientists and other experts, who examined it for its scientific integrity." The chapters outline the following topic areas: (1) historical background, (2) patterns of e-cigarette use among U.S. youth and young adults, (3) health effects of e-cigarette use among U.S. youth and young adults, (4) activities of e-cigarette companies, and (5) e-cigarette policy and practice implications.

95. Pisinger Charlotta, Dossing Martin. A systematic review of health effects of electronic cigarettes. *Preventive Medicine*. 2014;69:248.

Pisinger and Døssing conducted a systematic review of the literature on the health consequences of vaping products published before August 14, 2014. The authors identified 76 studies which met their inclusion criteria. They found that 34% of the studies' authors had a conflict of interest (e.g. the study was funded or somehow influenced by electronic cigarette manufacturers or consultants for manufacturers of medicinal smoking cessation therapy). Many studies found that product labels did not show the concentrations of solvents and flavoring and that products labeled nicotine free were sometimes found to actually contain nicotine in high concentrations. There was also variability in product concentrations from cartridge-to-cartridge. The authors conclude that the studies had many methodological problems and that the body of evidence is inconsistent, lack long-term follow up, and don't allow any firm conclusion on the safety of vaping products. They conclude that these 76 studies indicate that electronic cigarettes cannot be regarded as safe. The available evidence does indicate that at least some vaping products are toxic to human cells and contain toxic compounds such as metals, traces of carcinogenic nitrosamines, formaldehyde, mercury, and other potentially harmful components. Vaping was associated with significant airway and lung obstruction in the short term and other adverse effects in the mouth/throat. Some studies indicate that vaping may have less adverse effects or result in less exposure to harmful substances than combustible cigarettes. Some studies suggest that electronic cigarettes may be useful as a smoking reduction/cessation aid, but the evidence on their efficacy is conflicting.

96. Hocharoen Chanalee. An evaluation of potential harm of electronic cigarette aerosol exposures and directions for research and regulation. In: Taft D, ed: ProQuest Dissertations Publishing; 2015.

Hocharoen conducted a systematic review of the literature on electronic cigarettes published between January 1, 2009 and January 31, 2015. Thirty-nine articles met the inclusion criteria. Three of these studies examined inflammatory markers, cytokines, and chemokines, all of which found that interleukins (cellular messengers for immune response) increased with electronic cigarette exposure. One study found that interleukin 6 decreased with e-cigarette exposure. Seven studies examined cytotoxicity (cell toxicity) or mutagenicity (ability to cause genetic mutations). These studies looked at the impacts of e-vapors of liquids on lung, throat, and mouth specific embryonic stem cells, and various fibroblasts. Six of these seven studies found cytotoxic effects, decreased cell viability, changes in cell morphology, reduced ATP detection, and cell mutagenicity for at least one of the measured flavors or e-liquid components. The seventh study found no cytotoxicity from e-liquids for epithelial carcinoma cells or Chinese Hamster ovary cells. The author concludes that cell viability is affected by e-cigarettes and that vapor products

sometimes contain “carcinogens, metals, and other potentially harmful constituents.” The author notes that while physiological effects of e-cigarettes have been found in the literature, potential adverse long-term effects have not been studied.

97. Smiley S. L., DeAtley T., Rubin L. F., et al. Early Subjective Sensory Experiences with "Cigalike" E-cigarettes Among African American Menthol Smokers: A Qualitative Study. *Nicotine Tob Res.* 2018;20(9):1069-1075.

Introduction: Despite smoker interest in e-cigarettes as a harm reduction or cessation aid, many smokers prematurely discontinue vaping after trying a product. This study explored the role of early subjective sensory experiences in vaping persistence and desistance. Methods: African American menthol cigarette smokers aged ≥ 18 years ($N = 15$; $M = 54.1$ years; $SD = 8.2$), motivated to quit smoking, and interested in trying e-cigarettes were recruited in Washington, DC. Participants were followed for 3 weeks and provided menthol cigalike e-cigarettes after Week 1. Participants completed three interviews about their vaping experiences. Thematic analysis of responses was designed to understand the sensory aspects of vaping. Results: During the first 2 weeks of vaping, four participants reported a positive vaping experience while 11 reported decreased satisfaction. Salient sensory attributes of dissatisfaction included poor taste, insufficient throat hit, difficulty pulling, and a lack of "whole body" satisfaction compared to their preferred cigarette brand. Conclusions: The sensory experiences with a specific cigalike e-cigarette were related to vaping persistence and desistance. Although this was a small volunteer sample of African American menthol smokers motivated to quit smoking, 27% ($N = 4$) of participants with a positive vaping experience continued using the product, while 73% ($N = 11$) of participants' vaping experience was unsatisfactory across several experiential categories. In future research of e-cigarettes' efficacy as a smoking cessation or reduction aid, both device characteristics and smokers' expectations for these devices should be considered, so vapers do not expect the same taste sensations, throat sensations, and "whole body" satisfaction as they experienced with their menthol cigarettes. Implications: The subjective sensory experiences associated with initial e-cigarette product use are associated with use patterns. Subjective sensory experiences may also help understand the differences in the appeal, satisfaction, and harm-reduction potential of the rapidly evolving diverse types of products emerging in the marketplace. How products meet the sensory needs of smokers wanting to switch or quit smoking may influence adherence and success rates.

98. Rubinstein M.L., Delucchi K., Benowitz N.L., et al. Adolescent Exposure to Toxic Volatile Organic Chemicals from E-Cigarettes. *Pediatrics.* 2018;141(4).

Rubinstein et al. analyzed urine and saliva samples from adolescents aged 13-18 years old who use electronic cigarettes to evaluate the presence of volatile organic compounds. More adolescents use e-cigarettes than cigarettes, and chemicals found in e-cigarettes are known to be harmful to human health. However, the authors noted that, "there are no data on toxicant exposure in adolescent e-cigarette users. However, there is great concern because exposure to toxicants during adolescence may result in greater harm than exposure in adulthood, given vulnerability to the acute and chronic effects of toxicants in general and from their cumulative exposure if started early." This study included adolescents participating in a larger longitudinal study of the effects of e-cigarettes on adolescents in the San Francisco Bay Area. Adolescents who used e-cigarettes were scheduled for a baseline appointment within 24 hours of use and provided saliva and urine samples for analysis. Saliva samples were analyzed for cotinine, a

metabolite of nicotine. Urine samples were analyzed for NNAL (a potent carcinogen) and eight volatile organic compounds that are toxic environmental or tobacco smoke constituents. They used use categories based on self-report as well as chemical levels so that, "conservative criteria for group definitions meant that the e-cigarette-only group was clearly differentiated from the dual user group, and any [volatile organic compounds] found in the e-cigarette-only group could be clearly attributed to e-cigarette use." Based on their criteria, samples were analyzed for 67 e-cigarette-only users, 16 dual users, and 20 controls. They found that the presence of 5 volatile organic compounds was significantly higher in e-cigarette-only users compared with controls ($p < .05$ for all compounds), but lower than in dual-users. For e-cigarette-only users, levels were statistically significantly higher for users that used e-cigarettes with nicotine all or some of the time and for users that reported more sessions of e-cigarette use per day. They also found that "levels of 3 other significant and likely toxic [volatile organic compounds] were just as high in users of nonnicotine products as in those using nicotine." The authors concluded, "Adolescent e-cigarette-only users had levels of 5 [volatile organic compound] toxicants detected in their urine in quantities up to 3 times greater than in matched controls...levels of toxicant exposure in dual users were up to 3 times higher than in those who used only e-cigarettes." Many of these compounds are known carcinogens.

99. Gmel Gerhard, Baggio Stéphanie, Mohler-Kuo Meichun, et al. E- cigarette use in young Swiss men: is vaping an effective way of reducing or quitting smoking? *Swiss medical weekly*. 2016;146:w14271.

Gmel et al. summarize the current evidence on the impact of e-cigarettes on combustible cigarette usage, noting that the literature is conflicting—with some studies finding that vaping is associated with using fewer cigarettes but with being less likely to completely quit smoking combustible cigarettes, and other studies finding an increase in combustible cigarette usage and decreased likelihood of quitting, and still other studies finding that e-cigarettes were associated with more quit attempts and continued abstinence than NRT or using no aid. The authors used data from the Cohort Study on Substance Use Risk Factors in Switzerland. While 7,556 participants (all young men) provided consent to participate, 79.2% ($n=5,987$) completed the baseline questionnaire and 79.7% ($n=6,020$) completed the follow-up questionnaire. A total of 91.5% of the baseline respondents ($n=5,476$) also completed the follow-up questionnaire. Among those who did not smoke at baseline, those who were vaping at follow-up were more likely to start smoking and to become occasional or daily smokers at follow-up than were non-vapers. Among those who were occasional smokers at baseline, non-vapers were more likely to become non-smokers and less likely to become daily smokers than vapers. Among those who did not smoke at baseline, vapers were 6 times more likely to be occasion smokers and 12 times more likely to be daily smokers at follow-up than non-vapers. Among non-smokers at baseline, vapors smoked significantly more (10 times more) cigarettes weekly at follow-up than did non-vapers. Weekly cigarette use increased between baseline and follow-up for occasional smokers and decreased for daily smokers but these changes were not significant between vapers and non-vapers.

100. Grace Randolph C., Kivell Bronwyn M., Laugesen Murray. Estimating cross- price elasticity of e- cigarettes using a simulated demand procedure. *Nicotine & tobacco research : official journal of the Society for Research on Nicotine and Tobacco*. 2015;17(5):592.

Grace et al. collected data from a convenience sample of 210 daily smokers in New Zealand who were 18 years of age or older and who had no intention to quit smoking before January 1, 2013. They excluded any smokers who had ever used e-cigarettes. They interviewed participants between February and March of 2013 (response rate not noted). The researchers had participants complete a written survey and three additional validated surveys, complete the Cigarette Purchase Task (CPT), sample an e-cigarette, and then answer questions about their intentions to purchase e-cigarettes and their regular tobacco product. The CPT is used to measure demand for tobacco products across a range of prices. The authors used the CPT completed before sampling the e-cigarette as a baseline to determine the demand for combustible cigarettes in the absence of e-cigarettes. The participants also indicated their intentions to purchase e-cigarettes and combustible cigarettes after trying the e-cigarette. The authors found that the simulated demand for e-cigarettes increased as the price of regular cigarettes increased, with an average cross-price elasticity of 0.16 (indicating that a 10% increase in the cost of combustible cigarettes was associated with a 1.6% increase in the demand for e-cigarettes). However, the simulation also found that the low-cost availability of e-cigarettes did not decrease the demand for regular cigarettes at a higher price and that a significantly lower proportion of participants said that they would quit smoking tobacco completely if e-cigarettes were available than if they were not. This finding suggests that the availability of low-priced e-cigarettes could actually encourage people who would otherwise have quit smoking completely as a result of raising tobacco prices to instead continue to use combustible cigarettes perhaps in tandem with lower-cost e-cigarettes. So, while the study found that smokers may substitute e-cigarettes for combustible cigarettes as the cost of the later increases (with the cost of the former staying low), low-cost e-cigarette availability may actually discourage combustible cigarette smokers from quitting entirely as combustible cigarette prices increase.

101. Rahman M. A., Hann N., Wilson A., et al. E- Cigarettes and Smoking Cessation: Evidence from a Systematic Review and Meta- Analysis. *PLoS One*. Vol 102015.

Rahman et al. conducted a systematic review of the literature on combustible cigarette consumption or cessation after the use of e-cigarettes. Six studies met their inclusion criteria. They found that e-cigarettes with nicotine were more effective as a cessation tool than those without nicotine. The authors pooled data from two randomized control trials and found a risk ratio of 2.29 (95% CI 1.05-4.97). They also found that use of e-cigarettes was associated with smoking cessation and reduction in the number of cigarettes used—though three of the six studies did not include a control group. The authors note that they were only able to consider the efficacy of nicotine vs. non-nicotine e-cigarettes and were not able to compare the efficacy of e-cigarettes to other cessation interventions.

102. Kalkhoran Sara, Glantz Stanton A. E-cigarettes and smoking cessation in real-world and clinical settings: a systematic review and meta-analysis. *The Lancet Respiratory Medicine*. 2016;4(2):116-128.

Kalkhoran et al. conducted a systematic review and meta-analysis to evaluate the association between e-cigarette use and combustible cigarette cessation among adults. Thirty-eight studies met their inclusion criteria for the systematic review, 20 of which had control groups and were included in the meta-analysis. They found that the odds of combustible cigarette cessation among those who used e-cigarettes was 28% lower than for those who did not use e-cigarettes (OR 0.72 [95% CI 0.57-0.91]). When the authors only included studies of smokers with an interest in

quitting, they did not find a significant difference from the overall findings. The authors conclude that e-cigarettes, as they are currently being used, are associated with lower quit rates among combustible cigarette smokers.

103. Protano C., Avino P., Manigrasso M., et al. Environmental Electronic Vape Exposure from Four Different Generations of Electronic Cigarettes: Airborne Particulate Matter Levels. *International Journal of Environmental Research and Public Health*. 2018;15(2172).

Protano et al. evaluated the levels of airborne particulate matter emitted by four generations of e-cigarette models in use in Italy. They found that all e-cigarette devices emitted particulate matter of a size that can be inhaled into the lungs (including PM10, PM4, PM2.5, and PM1). Newer models emitted greater levels of small particulate matter as a result of increased operating power. Overall, their findings suggest that passive vaping does occur, supporting "the need for legislative interventions to regulate e-cigs use in public places and other enclosed environments, in order to protect the health of any subject who is potentially exposed."

104. IOM. Public health implications of raising the minimum age of legal access to tobacco products. Washington D.C.: The National Academies Press;2015.

The Tobacco Control Act of 2009 directed the Food and Drug Administration (FDA) to convene a panel of experts to conduct a study on the health impacts of raising the minimum purchase age for tobacco products and submit a report to Congress. The FDA contracted with the Institute of Medicine (IOM) to convene a committee to examine the existing literature and use modeling to predict the likely impacts of increasing the minimum purchase age to 21 or 25 years of age. The committee concluded in their report that increasing the minimum purchase and possession age for tobacco products would likely prevent or delay initiation of tobacco use by adolescents and young adults and therefore also lead to a "substantial reduction in smoking-related mortality." The authors also concluded that while (for a purchase age of 21) 18 to 20 year olds would be affected, the largest reduction in tobacco initiation would likely be among 15 to 17 year olds. They note that increasing the purchase age to 19 would likely have a modest impact on decreasing tobacco access to minors compared to increasing the age to 21. The authors cite evidence that younger age of smoking initiation is associated with heavier smoking later in life, a higher likelihood of continuing to smoke through the lifespan, and increased risk of adverse health outcomes. The report also summarizes the literature on the effect of tobacco purchase, use, and possession (PUP) laws. A 2008 study conducted in California by Rogers et al. found that in the previous 12 months, across all 249 enforcement agencies statewide, an average of 24.1 citations were issued per agency. A study by Gottlieb et al. also found that African-American and Hispanic students were significantly more likely than their White counterparts to receive a PUP citation. Jason et al. (2007b) found that youth who were fined for PUP violations were more likely than youth in a tobacco prevention education program to reduce or quit tobacco use. However Gottlieb et al. (2004) found that receiving a PUP citation was only associated with reduced smoking intention in some of the sample schools. The committee conducted modeling (informed by the existing scientific literature) and estimated that raising the tobacco purchase age to 21 would lead to the following reductions in tobacco initiation: 15% (range: 12.5-18%) reduction for those under 15 years of age, 25% (range: 20.8-30%) reduction for those 15-17 years, 15% (range 12.5-18%) reduction for those 18-20 years. Their modeling predicts that with an age 21 minimum, by 2040-2059 there would be 0.2-0.8% reduction in deaths (8.2-9.9% by

2080-2099); 0.5% reduction in years of life lost (9.3% by 2080-2099); 0.3% reduction in lung cancer deaths (10.5% by 2080-2099); 12.2% reduction in low birth weight cases; 13% reduction in pre-term birth cases; and 18.5% reduction in sudden infant death syndrome (SIDS) cases.

105. Erythropel H.C., Davis L.M., de Winter T.M., et al. Flavorant-Solvent Reaction Products and Menthol in JUUL E-Cigarettes and Aerosol. *American Journal of Preventive Medicine*. 2019;57(3):425-427.

Erythropel et al. examined the composition of JUUL aerosol. They evaluated 8 flavors of JUUL brand e-cigarettes to evaluate the reaction between vanillin flavoring and propylene glycol, glycerol, menthol, and nicotine benzoate to understand how common JUUL components may interact. JUUL products contain higher concentrations of nicotine than other e-cigarette brands (5% versus 0.3%-2.4%) because they use nicotine benzoate salt that “is perceived as more satisfactory and less harsh” than other products. The authors analyzed e-liquids and used a vaping machine to capture aerosol for analysis. They found that JUUL aerosols include quantities of nicotine similar to cigarettes and levels of acetals known to cause irritation and contribute to inflammation. They explained that, “the average vanillin puff concentration was 101 mg/m³. In comparison, chronic inhalational exposure to vanillin in occupational environments is limited to 10 mg/m³, raising the question of what long-term effects regular inhalation of vanillin at such doses and frequency (200 puffs/pod) might have.” They also found levels of menthol in JUUL products (some of which are not labeled as containing menthol) at levels known to increase nicotine intake.

106. E-cigarettes linked to heart attacks, coronary artery disease and depression [press release]. 2019.

This American College of Cardiology press release summarizes results from a study by Vindhyal et al. presented at the ACC’s 68th Annual Scientific Session (2019). Vindhyal et al. reported that there are over 460 brands and 7,700 flavors of e-cigarettes. Vindhyal et al. analyzed data from 96,467 respondents to the National Health Interview Survey from 2014, 2016, and 2017. They found that adults who use vapor products are significantly more likely to have a heart attack, coronary artery disease, and depression compared to those that do not use vape products. For example, after controlling for age, sex, body mass index, high cholesterol, high blood pressure, and smoking combustible cigarettes, adults that used e-cigarettes were 34% more likely to have a heart attack and 25% more likely to have coronary artery disease compared to adults that do not use e-cigarettes. Users were at increased risk of heart attack and coronary artery disease regardless of whether they vaped daily or occasionally. The authors noted that further longitudinal data is needed to establish causation. However, the authors stated that the results “show a clear association between any kind of smoking and negative health outcomes.”

107. Bayly J.E., Bernat D., Porter L., et al. Secondhand Exposure to Aerosols from Electronic Nicotine Delivery Systems and Asthma Exacerbations Among Youth With Asthma. *CHEST*. 2018; Ahead of print.

Bayly et al. analyzed data from the 2016 Florida Youth Tobacco Survey to determine whether there was a relationship between secondhand exposure to aerosol from electronic nicotine delivery systems (ENDS) and asthma exacerbation among youth with asthma. They examined survey responses for youth aged 11 to 17 years old from middle and high schools in Florida. Overall, approximately one-third of youth reported secondhand exposure to ENDS aerosols. The

authors found that secondhand exposure to aerosol from ENDS was significantly associated with higher odds of asthma attacks among youth with asthma ($p < 0.01$; OR 1.27, 95% CI 1.11-1.47). The authors concluded that, "secondhand exposure to ENDS aerosols may be related to asthma symptoms in youth...future research is necessary to evaluate the longitudinal relationship between secondhand ENDS aerosol exposure and asthma control."

108. Center Washington Poison. 2017 Annual Toxic Trend Report: Nicotine and E-Cigarette. 2017.

This brief report from the Washington Poison Center provides summary data from calls about nicotine exposure among children 0 to 12 years of age. From 2011 to 2017, the Washington Poison Center received 2,966 total cases related to nicotine exposure. The most cases occurred in 2015, with 521 total cases of nicotine exposure. In 2017, the Center had 440 cases of nicotine exposure and 373 (84.8%) cases were among children 0-5 years of age. About half of nicotine exposures come from cigarette/cigar exposure, 22% are related to e-cigarettes, and 22% are related to chewing tobacco. Children are primarily exposed through ingestion (94.5% of cases are due to ingestion), and common symptoms of nicotine exposure include vomiting, coughing/choking, drowsiness/lethargy, and pallor. Washington Poison Center noted that exposure reporting is voluntary, and that these numbers likely underrepresent nicotine exposure.

109. Center Washington Poison. Washington Poison Center 2018 Annual Data Report: Nicotine. 2018.

In 2018, the Washington Poison Center addressed 483 cases of nicotine exposure, including 353 cases of nicotine exposure among 0-5 year olds. 87% of exposures were due to ingestion, and included gastrointestinal, neurological, respiratory, ocular, cardiovascular, and dermal symptoms. Washington Poison Center also addressed 136 cases specific to e-cigarettes, including 77 cases among 0-5 year olds, 2 cases among 6-12 year olds, 23 cases among 13-20 year olds, 26 cases among 21-59 year olds, and 1 case among 60 years and older.

110. Jamal A, Park-Lee E, Birdsey J, et al. Tobacco Product Use Among Middle and High School Students — National Youth Tobacco Survey, United States, 2024. *Morbidity and Mortality Weekly Report*. 2024;73(41):917-924.

This Morbidity and Mortality Weekly Report discussed tobacco product use among middle and high school youth in 2024. The National Youth Tobacco Survey (NYTS) is a cross-sectional, school-based, self-administered web-based survey of U.S. students in middle school (grades 6–8) and high school (grades 9–12). The survey was conducted among 29,861 students from 283 schools during January 22–May 22, 2024. In 2024, current (previous 30-day) use of any tobacco product was reported by 10.1% of high school students (representing 1.58 million students) and 5.4% of middle school students (representing 640,000 students). Among all students, “e-cigarettes were the most commonly reported tobacco product currently used (5.9%), followed by nicotine pouches (1.8%), cigarettes (1.4%), cigars (1.2%), smokeless tobacco (1.2%), other oral nicotine products (1.2%), heated tobacco products (0.8%), hookahs (0.7%), and pipe tobacco (0.5%).” During 2023–2024, among all students, “the estimated number who reported current use of any tobacco product decreased from 2.80 to 2.25 million students; e-cigarette use decreased (from 2.13 to 1.63 million students); and hookah use decreased (from 290,000 to 190,000 students).” Despite declines, approximately 1 in 10 high school students and approximately 1 in 20 middle school students reported current use of any tobacco product during

2024. Approximately 2 in 5 students who had ever used a tobacco product currently used them. Authors noted, “[t]he decline in high school student e-cigarette use is likely attributable to multiple factors, including ongoing activities at the national, state, and local levels to implement tobacco control strategies.”

111. Patrick M. E., Miech R. A., Johnston L. D., et al. Monitoring the Future Panel Study Annual Report: National data on substance use among adults ages 19 to 65, 1976–2023. Monitoring the Future Monograph Series. Ann Arbor, MI: Institute for Social Research, University of Michigan; July 2024 2024.

Monitoring the Future (MTF) is an ongoing research program conducted at the University of Michigan’s Institute for Social Research under a series of investigator-initiated research grants from the National Institute on Drug Abuse beginning in 1975. MTF is supported by research funding from the National Institute on Drug Abuse (R01DA001411 and R01DA016575). The MTF Panel Study now includes about 120,000 individuals who were first surveyed in 12th grade, with longitudinal data spanning ages 18 to 65. This annual report presents substance use prevalence and trends among: young adults (age 19 to 30 years); midlife adults (early midlife ages 35 to 50 and midlife ages 55 to 65); as well as for young adults attending college full-time; and young adults not attending college.

112. African American Tobacco Control Leadership Council the American Cancer Society, American Heart Association, American Lung Association; Asian Pacific Partners for Empowerment, Advocacy and Leadership (APPEAL), Campaign for Tobacco-Free Kids, the Intercultural Cancer Council; LGBT Healthlink at CenterLink: The Community of LGBT Centers, NAATPN, Inc.; National Latino Alliance for Health Equity, the Smoking Cessation Leadership Center; Truth Initiative, and the University of Southern California Keck School of Medicine. Achieving Health Equity in Tobacco Control. 2015.

A group of organizations endorsed a report on equity concerns related to smoking and tobacco use. The agencies included were the African American Tobacco Control Leadership Council; the American Cancer Society; American Heart Association; American Lung Association; Asian Pacific Partners for Empowerment, Advocacy and Leadership (APPEAL); Campaign for Tobacco-Free Kids; the Intercultural Cancer Council; LGBT Healthlink at CenterLink: The Community of LGBT Centers; NAATPN, Inc.; National Latino Alliance for Health Equity; the Smoking Cessation Leadership Center; Truth Initiative; and the University of Southern California Keck School of Medicine. The report includes tobacco related disparities by socioeconomic status, education level, race/ethnicity, LGBTQ status, mental illness, and homelessness. Advocacy and informational resources are also included. The report cites research to explain that exposure to cigarette, tobacco, and vapor product advertising is higher among communities of color, LGBT+ people, urban neighborhoods and neighborhoods with lower income.

113. Grilo G., Crespi E., Cohen J. E. A scoping review on disparities in exposure to advertising for e-cigarettes and heated tobacco products and implications for advancing a health equity research agenda. *Int J Equity Health*. 2021;20(1):238.

Grilo, Crespi, and Cohen conducted a scoping review to explore disparities in exposure to and density of e-cigarette and heated tobacco advertising. Literature was gathered from 5 databases, and 15 articles were included for data extraction. The studies included were from 2014 – 2020

and examined both individual and neighborhood levels of advertising exposure. Studies examined age, education, sex, gender identity and sexual orientation, race/ethnicity, socioeconomic status, and urban/rural exposure differences. Results of the review show that youth, those with more than a high school diploma, males, sexual and gender minorities, whites, and urban residents were more likely to be exposed to e-cigarettes, while at the neighborhood level, non-white neighborhoods were more likely to be exposed. The researchers connect the higher rates of exposure to use-related disparities.

114. Centers for Disease Control and Prevention Office on Smoking and Health. Summary of Scientific Evidence: Tobacco Retail Density, Location, and Licensure 2021.

The Centers for Disease Control and Prevention compiled a summary of scientific evidence regarding tobacco retail density, location, and licensure. Findings show that living near tobacco retailers is associated with higher rates of tobacco use, lower rates of quitting tobacco products, and higher rates of youth initiation of tobacco product use. Tobacco retailers are concentrated in areas near youth, areas with high population density, and in low income neighborhoods. A study that examined tobacco retailers across 30 U.S. cities found that “on average, 63% of public schools were located within 1,000 feet of a tobacco retailer, the lowest-income neighborhoods had nearly five times more tobacco retailers than the highest-income neighborhoods, and 70% of residents across the 30 cities lived within a half mile of a tobacco retailer.” Further, national-level data show that approximately 70% of tobacco retailers are located within 1,000 feet of one another. Studies show similar density patterns of e-cigarette retailers.

115. Simon Patricia , Camenga Deepa R. , Morean Meghan E. , et al. Socioeconomic status and adolescent e-cigarette use: The mediating role of e-cigarette advertisement exposure. *Preventive Medicine*. 2018;112(2018):193-198.

Simon et al. examined "exposure to e-cigarette advertisements as a mediator of the relationship between [socioeconomic status (SES)] and adolescent e-cigarette use." While low SES is associated with "greater exposure to tobacco cigarette advertising and cigarette use," associations among SES, e-cigarette advertising, and e-cigarette use are not yet well understood. Authors used anonymous survey data collected from adolescents (N = 3,473; 51% Female) attending 8 high schools in Connecticut in Spring 2015. "Mediation analysis was used to examine whether the total number of sources of recent e-cigarette advertising exposure (e.g., TV, radio, billboards, magazines, local stores [gas stations, convenience stores], vape shops, mall kiosks, tobacco shops, social media) mediated the association between SES (measured by the Family Affluence Scale) and past-month frequency of e-cigarette use." Researchers "clustered for school and controlled for other tobacco product use, age, sex, race/ethnicity and perceived social norms for e-cigarette use in the model." The sample had recently seen e-cigarette advertisements via 2.1 (SD = 2.8) advertising channels. "Mediation was supported (indirect effect: $\beta = 0.01$, SE = 0.00, 95% CI [0.001, 0.010], $p = 0.02$), such that higher SES was associated with greater recent advertising exposure, which, in turn, was associated with greater frequency of e-cigarette use." Results suggest that "regulations to reduce youth exposure to e-cigarette advertisement may be especially relevant to higher SES youth." Authors recommend future research "examine these associations longitudinally and evaluate which types of advertisements target different SES groups."

116. **Tobacco Use: Considerations for Clinicians. 2022; Available at: <https://www.aap.org/en/patient-care/tobacco-control-and-prevention/youth-tobacco-cessation/tobacco-use-considerations-for-clinicians/>. Accessed 3/14/2023.**

This American Academy of Pediatrics website provides “Considerations for Clinicians” related to youth commercial tobacco use and cessation. AAP stated that “youth are uniquely susceptible to nicotine because their brains are still developing” and nicotine can harm parts of the brain that control attention, learning, mood, and impulse control.” The AAP acknowledged that there are structural factors to youth smoking and the “tobacco industry has a long history of targeted marketing to specific populations including (but not limited to) racial/ethnic groups, LGBTQ+ communities, and young people ([e.g.], promoting menthol cigarettes to Black communities, making tobacco seem cool or attractive to youth, and promoting products through direct marketing and social media promotion).” The “evidence base for youth tobacco cessation is limited.” However, “[a]ppropriate behavioral and pharmacologic supports may increase the odds of quitting successfully” and “cessation treatment should be tailored to a patient’s level of tobacco use, dependence, and readiness for change.” One promising practice is counseling and treatment by a pediatric healthcare provider who can help to “[t]reat youth by linking them to appropriate behavioral resources, prescribing pharmacological support when indicated and following up to provide long-term support.” Moreover, “[c]essation treatments should be provided to youth confidentially, in the context of a trusting relationship between the patient and their pediatric health clinician.” AAP also acknowledges that clinical encounters cannot provide ongoing support that youth may need to help them quit tobacco and “[t]reatment extenders, such as web-based quit supports, text-message cessation programs, and telephone quitlines have the expertise and capacity to provide youth who use tobacco with ongoing support throughout their quit attempt. Pediatric health clinicians can connect youth with these resources, follow-up about youth’s progress and provide additional support as needed.” Youth under 18 years old require a prescription from a healthcare provider to access any smoking cessation medications, including medications that are available over-the-counter.

117. **Jenssen B.P., Walley S, C., Boykan R., et al. American Academy of Pediatrics Technical Report: Protecting Children and Adolescents from Tobacco and Nicotine. *Pediatrics*. 2023;151(5).**

In this technical report, the American Academy of Pediatrics (AAP) updated a 2015 summary of evidence by conducting a review of literature published from 2014 through 2021 evaluating tobacco-related health outcomes for youth and young adults (under 21 years). The report summarizes research related to tobacco product use; tobacco and nicotine use; tobacco use-related mortality and morbidity; public health burden; tobacco smoke and aerosol exposure-related morbidity (i.e., secondhand smoke and thirdhand smoke). AAP stated that tobacco use “takes a substantial toll on children’s and adolescent’s health, including harms because of prenatal exposure during childhood, secondhand and thirdhand exposure during infancy and childhood, and/or direct use during adolescence.” AAP found high quality of evidence that Tobacco Use Disorder almost always develops before 18 years of age and youth and young adults “are developmentally vulnerable to social and environmental influences to use tobacco. This includes pervasive tobacco product marketing that targets youth and has been shown to ‘cause the onset and continuation of smoking among adolescents and young adults’”. Among adults who smoke cigarettes daily, 90% first started using cigarettes before 18 years of age and 99% first started using cigarettes before 26 years of age. Moreover, “nicotine is a highly

addictive drug that can have lasting damaging effects on adolescent brain development and has been linked to a variety of adverse health outcomes” including impacts on brain cell activity; attention, learning and memory; impulse control; decision-making; cognition; increased risk of attention-deficit/hyperactivity disorder (ADHD); mood disorders; anxiety; and depression. Nicotine “may also increase the risk of other substance use disorders”. As of February 2020, there were 2800 hospitalizations and 68 deaths associated with EVALI; the median age of patients was 24 years.

118. Tobacco is a social justice issue: Racial and ethnic minorities. Washington, DC: Truth Initiative; 2017.

This article from the Truth Initiative provides an overview of how tobacco use disproportionately affects marginalized populations. In particular, the article focuses on how the tobacco industry has targeted communities of color by capitalizing on culture (e.g., community press and traditions) and establishing a clear presence in communities of color. For example, "a 2011 review concluded that *Ebony* magazine was almost 10 times more likely than *People* magazine to contain advertisements for menthol cigarettes." Moreover, a 2013 study found "black children were three times more likely to recognize advertisements for Newport, the most popular menthol brand among that group, than other children." Tobacco companies have also sponsored cultural activities (e.g., events related to Black History Month, Asian/Pacific American Heritage Month, and Hispanic Heritage Month). Point-of-sale promotions, density of tobacco display ads inside and outside of stores, and cheaper prices for menthol cigarettes in predominantly black communities, have all contributed to disparities.

119. Tobacco in LGBT Communities. Washington, DC: Truth Initiative; 2018.

This Truth Initiative fact sheet provides an overview of the disproportionate impact tobacco has on the LGBT community. Tobacco companies began advertising in gay press publications in the 1990s. For example, A 1997 industry document stated: "A large percent of Gays and Lesbians are smokers. In order to increase brand share and brand awareness [...] it is imperative to identify new markets with growth potential. Many Gay and Lesbian adult smokers also have a preference for menthol brands." Corporate philanthropy (e.g., donations from Philip Morris to AIDS research and programs) also facilitated access to the LGBT market. "R.J. Reynolds created a marketing strategy called 'Project SCUM' (Sub-Culture Urban Marketing) to boost cigarette sales by targeting gay men and homeless individuals with advertisements and displays placed in communities and stores." The industry also provided free giveaways and hosted "LGBT bar nights" featuring specific brands. These tactics contributed to the disproportionately high smoking rates seen today. For example, lesbian, gay, and bisexual adults smoke at rates up to 2.5 times higher than straight adults. Bisexual women are up to 3.5 times more likely to smoke. "LGBT smokers are significantly more likely to smoke menthol cigarettes: more than 36 percent of LGBT smokers report that they usually smoke menthols."

120. Defense Department of. 2015 Health Related Behavior Survey for Active Duty Service Members. 2015.

The Health Related Behavior Survey for Active Duty Service Members is a Department of Defense survey used to track health indicators for all branches of active-duty military personnel. Survey data from 2015 indicated that e-cigarette use has been increasing among military personnel. In 2015, 35.7% of military personnel reported ever trying e-cigarettes compared to

12.6% of the general population and 11.1% reported being daily e-cigarette users compared to 3.7% of the general population. The survey also found that 80.7% of military personnel reported buying cigarettes on a military base. Use also varied by branch and rank. All forms of tobacco use, including e-cigarette use, were highest among the Marine Corps (16.1%). E-cigarette use was also higher among lower ranking personnel. For example, 20% of junior enlisted personnel currently used e-cigarettes compared to 10.8% of mid-level enlisted personnel, 6.1% of senior enlisted personnel, 3.4% of warrant officers, 2.2% of junior officers, and 0.9 % of mid-grade or senior officers. Active-duty military members "aged 17-24 were almost ten times more likely to be a current e-cigarette smoker than service members aged 45 or older." By age, 22.8% of personnel aged 17-24 currently used e-cigarettes, 10.8% of personnel aged 25-34, 5.4% of personnel aged 35-44, and 2.5% of personnel older than age 45. Military personnel identifying as Hispanic and personnel having high school education or less also used e-cigarettes at a higher rate.

121. **Factsheets: Health Equity and Special Populations. 2025; Available at: <https://www.tobaccofreekids.org/fact-sheets/health-equity-and-special-populations>. Accessed 2/2/2025.**

On this webpage, Tobacco-Free Kids maintains factsheets related to tobacco and nicotine product use and related health outcomes for multiple populations.

122. **Management Washington State Office of Financial. Multiple Agency Fiscal Note Summary: HB 1203 (Tobacco & nicotine products). 2025.**

The Washington State Office of Financial Management (OFM) published a multi-agency fiscal note for HB 1203 on January 30, 2025. Fiscal Notes were submitted by the Office of the Governor, Office of the Attorney General, Department of Revenue, Liquor and Cannabis Board, and Department of Health.

123. **Youth tobacco and vapor products prevention account—Source and use of funds, RCW 70.155.120 RCW 70.155.120(2019).**

RCW 70.155.120 establishes the youth tobacco and vapor products account in the state treasury. Fees collected regarding retailer, wholesaler, distributor violations, and funds collected by LCB from monetary penalties are deposited into this account, except that 10% of such fees and penalties are deposited in the state general fund.

124. **U.S. Centers for Disease Control and Prevention. About National Youth Tobacco Survey (NYTS). 2025; Available at: <https://www.cdc.gov/tobacco/about-data/surveys/national-youth-tobacco-survey.html>. Accessed 1/29/2025.**

This CDC webpage provides an overview of the National Youth Tobacco Survey (NYTS) dataset.

125. **Wang T.W., Gentzke A., Sharapova S., et al. Tobacco Product Use Among Middle and High School Students--United States, 2011-2017. *Morbidity and Mortality Weekly Report, Centers for Disease Control and Prevention*. 2018;67(22):629-633.**

Centers for Disease Control and Prevention and the Food and Drug Administration evaluated data from the National Youth Tobacco Surveys from 2011 to 2017. They estimated nationwide current use of tobacco products for students in middle and high school. Overall, they found that

tobacco use decreased from 24.2% of high school students (grades 9-12) in 2011 to 19.6% of high school students in 2017, and from 7.5% of middle school students (grades 6-8) in 2011 to 5.6% of middle school students in 2017. E-cigarettes were the most commonly used tobacco product across all grades. Although use of tobacco products decreased overall, e-cigarette use increased from 1.5% of high school students in 2011 to 11.7% of high school students in 2017. E-cigarette and hookah use also increased from 2011 to 2017 for middle school students. Currently, "in 2017, approximately one in five high school students (2.95 million) and one in 18 middle school students (0.67 million) currently used a tobacco product." The authors note that, "several factors continue to promote and influence tobacco product use among youths, including exposure to tobacco product advertising and imagery through various media, as well as the availability of flavored tobacco products."

126. Miech R. A., Johnston L. D., Patrick M. E., et al. Monitoring the Future national survey results on drug use, 1975–2024: Overview and detailed results for secondary school students. Monitoring the Future Monograph Series. Ann Arbor, MI: Institute for Social Research, University of Michigan; December 2024 2024.

Monitoring the Future (MTF) incorporates several survey designs into one study: including cross-sectional studies, repeated cross-sectional studies, and panel studies of individual cohorts and sets of cohorts. The MTF includes a nationally representative, annually repeated cross-sectional studies of 8th, 10th, and 12th grade students. At the time of publication, Chapters 1-3 of the report were available. Content included an overview of Key Findings in 2024 as well as study design and procedures. Data include information on use of substances including cigarettes, nicotine vaping, nicotine pouches, etc.

127. Washington State Healthy Youth Survey Commercial Tobacco Product Use Fact Sheet (Grades 6, 8, 10, and 12). 24 February 2024 2023.

These fact sheets provide snapshots of data on student use of tobacco and vapor products including reported past 30-day use (vapor products, cigarette only, e-cigarette only), substance "vaped", source of tobacco and vapor products among students who use them.

128. Healthy Youth Survey 2023 Analytic Report. Washington State Health Care Authority, Department of Health, Office of Superintendent of Public Instruction, and Liquor and Cannabis Board; June 2024.

The Healthy Youth Survey 2023 Analytic Report provides insight into some of the topics assessed as part of the 2023 Washington State Healthy Youth Survey. Key findings presented related to mental health, substance use (including vaping and cigarette use), adverse childhood experiences, and risk and protective factors.

129. Romberg A. R., Miller Lo E. J., Cuccia A. F., et al. Patterns of nicotine concentrations in electronic cigarettes sold in the United States, 2013-2018. *Drug Alcohol Depend.* 2019;203:1-7.

Romberg et al. examined changes in nicotine concentrations of e-cigarette products sold from 2013 to 2018. Authors used sales data aggregated in 4-week periods from March 2, 2013 to September 8, 2018 (66 months) for convenience stores and mass market channels. Internet and vape shop sales were not available. "Internet searches were used to supplement information for nicotine concentration and flavor. Products were categorized by nicotine concentration, flavor,

type (disposable or rechargeable), and brand.” Authors assessed dollar sales, unit sales, and average nicotine concentration. Results show that “during 2013-2018, the average nicotine concentration in e-cigarettes sold increased overall, for all flavor categories, and for rechargeable e-cigarettes.” Furthermore, during that time period “the proportion of total dollar sales comprised of higher nicotine concentration e-cigarettes (>4% mg/mL) increased from 12.3% to 74.7%.” Authors found, “Zero-nicotine products accounted for less than 1% of dollar market share across all years analyzed.” Authors note that higher concentrations of nicotine may influence patterns of e-cigarette use.

130. Cornelius M, Loretan C.G., Jamal A, et al. Tobacco Product Use Among Adults -- United States 2021. *Morbidity and Mortality Weekly Report*. 2023;72(18).

This Morbidity and Mortality Weekly Report summarized results from the 2021 National Health Interview Survey (NHIS) data. NHIS is an annual, nationally representative, household survey of the noninstitutionalized U.S. civilian population. The survey assessed use of 5 tobacco products: cigarettes, cigars (cigars, cigarillos, or filtered little cigars), pipes (regular pipes, water pipes, or hookahs), e-cigarettes, and smokeless tobacco (chewing tobacco, snuff, dip, snus, or dissolvable tobacco). Tobacco use described in this report refers to commercial tobacco products and not to tobacco used for medicinal and spiritual purposes by some American Indian communities. Limitations of the survey include: findings are not generalizable to populations in institutionalized settings or persons in the military; responses were self-reported and not validated by biochemical testing; 2021 tobacco product estimates for American Indian and Alaska Native populations were not statistically reliable and therefore were not presented; survey administration changed from in-person to primarily telephone-based as may affect estimates; and data are cross-sectional, meaning trends in product use changes cannot be assessed for individuals.

131. Wang Teresa W., Asman Kat, Gentzke Andrea S., et al. Tobacco Product Use Among Adults -- United States, 2017. *Morbidity and Mortality Weekly Report*. 2018;67(44):1225-1232.

The National Health Interview Survey (NHIS) is an annual, nationally representative, in-person survey of the noninstitutionalized U.S. civilian population. In 2017, the adult sample included 26,742 adults aged 18 years and older. The response rate was 53.0%. The survey assessed adult use of five tobacco products: cigarettes; cigars (cigars, cigarillos, or filtered little cigars); pipes (regular pipes, water pipes, or hookahs); e-cigarettes; and smokeless tobacco (chewing tobacco, snuff, dip, snus, or dissolvable tobacco). Data were weighted to adjust for differences in selection probability and nonresponse and to provide nationally representative estimates. Overall, an estimated 2.8% (6.9 million) of U.S. adults currently used e-cigarettes in 2017. Among current tobacco product users, 40.5% were daily users of e-cigarettes. "Overall, 3.7% of U.S. adults (9.0 million; 19% of current tobacco product users) used [2 or more] tobacco products." The most prevalent tobacco product combination was cigarettes and e-cigarettes (30.1%). Young adults (i.e., aged 18-24 years) reported the highest use of e-cigarettes (5.2%) despite having lower use of any tobacco product than those 25-44 years of age and 45-64 years. Primary reasons for e-cigarette use among adults include curiosity, flavoring, cost, consideration of others, convenience, and simulation of cigarettes, as well as to attempt to quit smoking. Authors noted that "[d]ifferences in tobacco product use across population groups might be related to multiple factors, including targeted advertising, differing perceptions regarding the relative harm or social

acceptability of tobacco use, and differences in tobacco product prices and levels of access to cessation resources."

132. Article 19H: Permits for the Sale of Tobacco, San Francisco Health Code(2016).

Section 19H.2. of the San Francisco Health Code defines "Tobacco Product" as "(1) any product containing, made, or derived from tobacco or nicotine that is intended for human consumption, whether smoked, heated, chewed, absorbed, dissolved, inhaled, snorted, or sniffed, or ingested by any other means, including, but not limited to, cigarettes, cigars, little cigars, chewing tobacco, pipe tobacco, bidis or snuff; (2) any device or component, part, or accessory that delivers nicotine alone or combined with other substances to the person using the device including but not limited to electronic cigarettes, cigars, or pipes, whether or not the device or component is sold separately. "Tobacco Product" does not include any product that has been approved by the United States Food and Drug Administration for use as a tobacco cessation product where such product is marketed and sold solely for such an approved purpose."

133. Article 19Q: Prohibiting the Sale of Flavored Tobacco Products, San Francisco Health Code(2018).

Article 19Q.1-19Q.8 of the San Francisco Health Code was added by Ordinance 140-17, approved July 7, 2017. However the ordinance was suspended by the filing of a referendum petition. The law was adopted by the voters as part of Proposition E at the June 5, 2018 election and became effective 30 days after the election results were declared. Under 19Q.3 "(a) The sale or distribution by an Establishment of any Flavored Tobacco Product is prohibited." and "(b) There shall be a rebuttable presumption that a Tobacco Product, other than a Cigarette, is a Flavored Tobacco Product if a Manufacturer or any of the Manufacturer's agents or employees, in the course of their agency or employment, has made a statement or claim directed to consumers or to the public that the Tobacco Product has or produces a Characterizing Flavor, including, but not limited to, text, color, and/or images on the product's Labeling or Packaging that are used to explicitly or implicitly communicate that the Tobacco Product has a Characterizing Flavor." Section 19Q.4 applies the same statutory language to flavored cigarettes.

134. Villanti Andrea C , Mowery Paul D , Delnevo Cristine D , et al. Changes in the prevalence and correlates of menthol cigarette use in the USA, 2004–2014. *Tobacco Control*. 2016;25:ii14-ii20.

Villanti et al. analyzed National Survey on Drug Use and Health data from 2004 to 2014 to estimate the prevalence of menthol cigarette use among persons aged ≥ 12 years. Researchers used self-reported menthol status for selected brands that were either exclusively menthol or non-menthol were adjusted based on retail sales data. Data were then weighted to provide national estimates. The analysis found that "although overall smoking prevalence has decreased, the proportion of past 30-day cigarette smokers using menthol cigarettes was higher (39%) in 2012–2014 compared to 2008–2010 (35%). Youth smokers remain the most likely group to use menthol cigarettes compared to all other age groups." Moreover, "Menthol cigarette prevalence exceeded non-menthol cigarette prevalence in youth and young adult smokers in 2014." Estimates showed menthol cigarette prevalence increased in white, Asian, and Hispanic smokers since 2010. Authors concluded, "The youngest smokers are most likely to use menthol cigarettes."

135. Healthy Youth Survey Fact Sheets: Tobacco Use and Tobacco & Vapor Product Use. Healthy Youth Survey Fact Sheets. Looking Glass Analytics; 2018.

Analysts reviewed Washington State Healthy Youth Survey Fact Sheets for Tobacco and Tobacco & Vapor Product Use for grade levels 8, 10, and 12. These fact sheets provide current use trends for tobacco products (vapor products, cigarettes, and smokeless tobacco), statewide current use by race/ethnicity, single and dual use (cigarettes and vapor products), reported substance "vaped", and source. The most commonly reported substances "vaped" among current users across grade levels contain nicotine or flavor only (no nicotine or THC). The most commonly reported substance vaped among 8th graders is flavor only (44%), followed by nicotine in it (39%), THC (marijuana) in it (17%), and substance unknown (14%). Among 10th and 12th graders, the most commonly reported substance vaped contains nicotine (56% and 62%, respectively), followed by flavor only (33% and 26%), THC in it (21% and 24%), and substance unknown (10% and 8%).

136. Pepper J. K., Coats E. M., Nonnemaker J. M., et al. How Do Adolescents Get Their E-Cigarettes and Other Electronic Vaping Devices? *American Journal of Health Promotion*. 2018;890117118790366.

Pepper et al. conducted an online survey of 1,729 adolescents aged 15-17 who reported vaping in the past 30 days (using an e-cigarette or similar device) to determine how youth obtain or access vaping devices. Adolescent use of e-cigarettes increased significantly between 2011 and 2015, and in 2016 11% of U.S. 10th graders and 12% of U.S. 12 graders reported vaping. Minimum purchase age for e-cigarettes was established nationally as 18 years in 2016. While prior studies have found that social sources are the main way adolescents access cigarettes, little is known about how adolescents access e-cigarettes and other devices. Approximately half of respondents reported smoking cigarettes in the past 30 days, and one-third of respondents reported using other tobacco products in the past 30 days. They found that 78.2% of adolescents surveyed owned their own vaping device, with 32.2% purchasing their device online and 22.3% purchasing it in a vapor shop or lounge. Sources varied significantly by sex, race/ethnicity, and poly tobacco use. In addition, 72.8% reporting using someone else's vaping device in the past 30 days, with 80.5% who borrowed stating that they borrowed from a friend. Adolescents were more likely to borrow a vaping device if they vaped more often, did not own their own, vaped in social situations, or had been refused purchase. The authors suggested that, "social sources might be even more important for vaping than for smoking cigarettes; cigarette smokers likely get cigarettes from other people only when they do not possess their own, but vapers use others' devices even when they have their own."

137. Meyers M. J., Delucchi K., Halpern-Felsher B. Access to Tobacco Among California High School Students: The Role of Family Members, Peers, and Retail Venues. *Journal of Adolescent Health*. 2017;61(3):385-388.

Meyers et al. surveyed 772 adolescents in California to determine how they obtain cigarettes, e-cigarettes, and hookah. They recruited 9th and 12th grade students from 8 high schools in California to participate in a longitudinal study related to tobacco access, perceptions, social norms, marketing, and use. In general, 32.7% of students reported using hookah, 28.7% reported using e-cigarettes, and 19.2% reported using cigarettes. Approximately 55% of respondents reporting getting their tobacco products from peers, and "adolescents [were] significantly more likely to obtain hookah, e-cigarettes, and cigarettes from a friend than any of the other sources

addressed." Of students who purchased tobacco products, students were significantly more likely to purchase e-cigarettes or hookah from a smoke shop than any other retailer. The authors found that, "9.3% of participants under the age of 18 reported purchasing tobacco products themselves...thus, despite legislation banning the sale to minors, [adolescents and young adults] continue to directly purchase tobacco products at alarming rates." However, this survey was completed before California enacted their Tobacco 21 law.

138. Unger J.B., Vassey J., Soto D.W., et al. Vaping Devices with Video Games. *Substance Use & Misuse*. 2024;59(14):2149-2150.

Unger et al. summarize the current landscape of entertainment vapor products or “smart vapes”. The authors state, “products could also mislead children and adolescents by obscuring the products true purpose, potentially leading to accidental exposures to vaping.” They note that additional research is needed to assess youth access to and perception and use of smart vapor products.

139. Yang Y., Lindblom E.N., Ward K.D., et al. Reactions to hypothetical flavor bans among current users of flavored e-cigarettes. *Translational Behavioral Medicine*. 2023;13:533-538.

Yang et al. examined how people who currently use e-cigarettes may react to 4 hypothetical bans of flavored products: 1) ban of all flavored e-cigarettes except menthol; 2) ban of all flavored e-cigarettes (including menthol flavored e-cigarettes); 3) ban on all flavored e-cigarettes except menthol, and including menthol cigarettes and flavored cigars; 4) ban of all flavored-cigarettes (including menthol) and including menthol cigarettes and flavored cigars. In May 2022, Yang et al. conducted a national survey of 2,347 people who currently use flavored e-cigarettes. Survey questions about the hypothetical bans examined whether people who currently use flavored e-cigarettes would quit all tobacco products, continue to use e-cigarettes with no flavors, or switch to alternative products. The authors concluded that a ban including all flavored e-cigarettes (including menthol), menthol cigarettes, and flavored cigars “would secure more certain net reductions to public health harms from e-cigarette use and smoking.”

140. Chaiton M. O., Nicolau I., Schwartz R., et al. Ban on menthol-flavoured tobacco products predicts cigarette cessation at 1 year: a population cohort study. *Tob Control*. 2019.

Chaiton et al. conducted a population cohort study to analyze the long-term impact of a menthol ban in Ontario, Canada, on smoking behavior. Authors cited evidence from the FDA's scientific evaluation that "menthol has a physiological impact on smoking that increases initiation and progression to regular cigarette smoking, increases nicotine dependence and decreases smoking cessation success." Menthol sales account for 5% of the cigarette sale market in Canada, while in the U.S. menthol cigarettes account for 35% of the market. The FDA also noted younger populations, women, and black Americans were more likely to smoke menthol cigarettes--which "perfectly matched the targeted marketing strategies employed by the tobacco industry." Similar to the U.S., a considerable number of Canadian youth report smoking menthol cigarettes. "According to the 2010–2011 Canadian Youth Smoking Survey, as many as 32% of current cigarette smokers used menthol cigarettes, and in the 2012–2013 iteration, almost 15% of students from grades 10–12 reported using [flavored] tobacco (including menthol products)." Baseline survey results were collected before the menthol ban (September-December 2016) and

follow-up surveys were conducted 1 year after the implementation of the ban (January-August 2018). Participants included residents of Ontario, Canada, ages 16 years and older who reported current smoking (past 30 days) at baseline and completed a follow-up survey. Of participants, 58% were female; 84% were over age 30 years; 83% were white; 71% had more than a high school degree; 39% smoked from 11-20 cigarettes a day; and 10% were non-daily smokers. Researchers assessed past year use of menthol cigarettes prior to the ban and current use of menthol and non-menthol cigarettes following the ban. Researchers evaluated "quitting" as the primary outcome and "quit attempts" as a secondary outcome. Quit attempts were defined as "self-reporting making a serious quit attempt since the beginning of the menthol cigarette ban in January 2017." Additionally, all those who reported not smoking at follow-up were considered to have made a quit attempt. The use of e-cigarettes or cigars since the ban was also assessed. Of participants with complete data (n=913), 21% (187) reported smoking menthol cigarettes daily, 46% (420) reported smoking menthol cigarettes occasionally, and 34% (306) were non-menthol cigarette smokers. "Daily and occasional menthol smokers were more likely to be female, non-white and have more than a high school education than non-menthol smokers." The highest percentage of young adult (i.e., 16 to 29 years of age) smokers was seen among those who smoked menthol cigarettes occasionally. "At follow-up, 0.3% of the non-menthol smokers at baseline, 5% of the occasional menthol users and 22% of the daily menthol users reported purchasing menthol cigarettes after the ban ($p<0.001$). The primary source for purchasing menthol cigarettes was on First Nation Reserves, but this purchasing pattern did not increase over time among prior daily menthol smokers (short-term follow-up: 21%; long-term follow-up: 21%)." This is consistent with previous research findings that "25% of menthol smokers claim that they would find some way to purchase menthol cigarettes despite a ban." Among the overall study sample, 19% of baseline smokers reported successfully quitting smoking, and 56% reported making a quit attempt after the ban. Quit rates reported by non-menthol smokers were "consistent with a previous population-representative longitudinal studies of quit rates in Ontario (8.9% sustained self-reported quit rate)." Meanwhile, "[d]aily menthol smokers had significantly higher rate of reporting having quit smoking after the ban (adjusted rate ratio [AAR] 1.62; 95% CI 1.08 to 2.42) compared with non-menthol smokers, controlling for smoking and demographic characteristics." Daily menthol smokers were also more likely to have tried to quit than non-menthol smokers (AAR 1.25; 95% CI 1.03-1.50), after adjustment. Both findings were statistically significant ($p<0.05$). Sensitivity analyses, which included those who did not complete the follow-up survey (N=1,738) as having continued smoking did not change the significance of results "nor did it greatly alter the magnitude of estimates." Study results found that "menthol smokers who intended to substitute with other means had substantial levels of quitting behavior." Specifically, "20% of occasional menthol smokers and 24% of daily menthol smokers reported quitting in the long terms, which exceeded what was predicted by smokers at baseline." Moreover, findings suggested an increased rate of quitting 1 year following Ontario's ban on the sale of menthol tobacco products. However, the impact was observed in older but not younger adults. Authors postulated that "the difference may be due to younger adults not having a brand preference and switching to other tobacco or nicotine products." Authors noted a combustible tobacco menthol ban would be more impactful for at-risk subpopulations of youth and young adults if there was less availability of other flavored tobacco or nicotine products. Finally, there was no public education campaigns informing the public of the menthol ban, and the ban was implemented without noticeable controversy. Authors conclude that "[C]onsidering that menthol smokers may be more nicotine dependent and have reduced cessation success, our

findings that daily menthol smokers were significantly more likely to reporting smoking cessation relative to non-menthol smokers after the ban suggest that the menthol ban could have tremendous public health impact at the population level in Canada and in other jurisdictions as well from an overall reduced level of cigarette smoking."

141. Villanti A. C., Collins L. K., Niaura R. S., et al. Menthol cigarettes and the public health standard: a systematic review. *BMC Public Health*. 2017;17(1):983.

Villanti et al. conducted this systematic review to update the evidence synthesis regarding the role of menthol in initiation, dependence, and cessation. Researchers ran a search for peer-reviewed literature on menthol cigarettes (through May 9, 2017) using PubMed and reviewed the National Cancer Institute's Bibliography of Literature on Menthol and Tobacco and the FDA's 2011 report and 2013 addendum for additional publications. "Included articles addressing initiation, dependence, and cessation were synthesized based on study design and quality, consistency of evidence across populations and over time, coherence of findings across studies, and plausibility of the findings [...] Eighty-two studies on menthol cigarette initiation (n = 46), dependence (n = 14), and cessation (n = 34) were included." Authors found, "Large, representative studies show an association between menthol and youth smoking that is consistent in magnitude and direction." Additionally, "One longitudinal and eight cross-sectional studies demonstrate that menthol smokers report increased nicotine dependence compared to non-menthol smokers." Finally, "Ten studies support the temporal relationship between menthol and reduced smoking cessation, as they measure cessation success at follow-up." Overall, authors concluded "The strength and consistency of the associations in these studies support that the removal of menthol from cigarettes is likely to reduce youth smoking initiation, improve smoking cessation outcomes in adult smokers, and in turn, benefit public health."

142. Tobacco and Vapor Products Data and Reports. 2025; Available at. Accessed 1/29/2025.

This Washington State Department of Health webpage provides "quick facts about tobacco use in Washington State."

143. Christenson T., Weisser, J. Health of Washington State Report: Tobacco Use. Washington State Department of Health;2015.

Combined 2012-2014 Behavioral Risk Factor Surveillance System (BRFSS) data indicate that AI/AN adults in Washington have significantly higher rates of current cigarette use than their white, black, Hispanic/Latino, and Asian counterparts. Cigarette use also decreased significantly as educational attainment or income increased. This report also indicates that smoking rates among gay, lesbian, and bisexual respondents were significantly higher than for their straight counterparts. These BRFSS data and 2014 Healthy youth survey data also show that smoking prevalence is highest in late adolescence and early adulthood, peaking among 25-34 years old for men and women. Pregnancy Risk Assessment Monitoring System (PRAMS) data from 2010-2012 indicate that the smoking rates among pregnant women before and during pregnancy are highest among mothers younger than 20 (36% [95% CI 28-45%]). Thirty-two percent of mothers age 20-24 also reported smoking before and during pregnancy (95% CI 27-37%) compared to 9% (95% CI 6-12%) of mothers 35 years or older. These data also indicate that smoking before pregnancy is highest among AI/AN (50% [95% CI 45-55%]) and low-income mothers. Because women often are not aware that they are pregnant until several weeks into their pregnancy, the

smoking rates in the months leading up to pregnancy can have an important impact on fetal development and growth.

144. Gardiner Philip, McGruder Carol. Adopt Citywide Restriction on the Sale of Menthol and all Other Flavored Tobacco Products, Including Flavored E-Juices in the City of New York. In: Health NYCCCo, ed: The African American Tobacco Control Leadership Council; 2019.

This letter from the African American Tobacco Control Leadership Council (AATCLC) to the New York City Council Committee on Health highlights the rising use of menthol cigarettes in the face of decreasing non-flavored tobacco cigarettes. Co-chairs Gardiner and McGruder cite evidence which shows that menthol cigarettes are increasingly being used among Latino, Black, and White youth and adults. They present menthol smoking data by race/ethnicity to indicate the disproportionate use among communities of color. For example, 85% of African American adult smokers and 94% of Black youth who smoke use menthol products. Additionally, female smokers and smokers within the LGBTQ community are also more likely to use menthol cigarettes. Authors cite evidence that the presence of menthol makes cigarettes harder to quit compared to other cigarettes.

145. QxQ Analysis: E-Cigarette/Vapor Product Use by Race/Ethnicity, Sexual Orientation, and Gender Identity. Looking Glass Analytics; 2018. <http://www.askhys.net/Analyzer>. Accessed September 2019.

Washington State Healthy Youth Survey data from 2018 indicate that among 8th grade respondents the highest rate of vaping was reported among Hispanic students (15.4% [95% CI 12.0-18.8%]), followed by American Indian or Alaska Native (AI/AN) students (14.6% [95% CI 9.4-19.8%]) and black students (13.6% [95% CI 8.5-18.7%]). Among 10th grade respondents, AI/AN students (28.0% [95% CI 18.7-37.3%]) and multi-racial students (24.4% [95% CI 20.7-28.1%]) reported higher smoking rates than their peers. The percent of students who had reported using e-cigarette/vapor products at all in the past 30 days was highest among 12 grade respondents. AI/AN students (38.3% [95% CI 24.6-52.0%]) and multi-racial students (35.2% [95% CI 30.8-39.7%]) reported higher rates of using e-cigarettes/vapor products than their peers. Among 12th graders, the lowest rates of e-cigarette/vapor product use were reported by Asian and Black/African American students. These data suggest that in Washington State, AI/AN, and multi-racial, and Hispanic youth have disparately high rates of current e-cigarette/vapor product use. It is important to note that the current race/ethnicity categories aggregate diverse subpopulations into one category—so disparities within these categories may be masked. For example, API subpopulations likely have very different smoking rates but they are aggregated into one category so these differences may be missed. White respondents in 10th and 12th grade also report high e-cigarette/vapor product current use compared to cigarette use. Students from the subsample of schools who participate in the extended form version of the Healthy Youth Survey also answered questions about their sexual orientation. Eighth grade respondents who identified as lesbian, gay, or bisexual were more likely to report using e-cigarettes/vapor products at all in the last 30 days (16.5% [95% CI 10.8-22.2%]) than their peers who identified as straight (10.1% [95% CI 7.9-12.3%]). This disparity also existed among 10th graders (32.1% [95% CI 27.4-36.8%] vs. 20.8% [95% CI 17.7-23.9%]) and 12 graders (35.4% [95% CI 29.9-40.9%] vs. 28.1% [95% CI 24.3-31.9%]). Finally, the Healthy Youth Survey also asks students about their gender identity. Eighth grade and 12th grade data were suppressed due to fewer than

5 responses in at least one category. Among 10th grade respondents who identified as transgender were more likely to report using e-cigarettes/vapor products at all in the last 30 days (44.7% [95% CI 26.6-62.8%]) than their peers who identified as cisgender female (22.4% [95% CI 19.3-25.5%]) or cisgender male (20.8% [95% CI 17.5-24.1%]). Disparities also exist for students who report something else fits better (30.0% [95% CI 14.8-45.2%]), questioning/not sure of my gender identity (24.4% [95% CI 12.4-36.4%]), and who selected more than one response (28.0 [95% CI 14.0-42.0%]).

146. Kann L., McManus T., Harris W.A., et al. Youth Risk Behavior Surveillance--United States, 2017. *Morbidity and Mortality Weekly Report, Centers for Disease Control and Prevention*. 2018;67(8).

This MMWR Surveillance Report provides updated findings from the 2016-2017 Youth Risk Behavior Surveillance System (YRBSS) on the leading causes of morbidity and mortality among youth, including unintentional injuries and violence; tobacco use; alcohol and drug use; sexual behaviors; dietary behaviors; and physical inactivity. It presents data on health behaviors and health disparities by sex, race/ethnicity, grade in school, and sexual orientation. This is the first YRBSS survey that reports on questions added in 2015 related to sexual orientation. Washington State did not participate in the 2016-2017 YRBSS. Specific to tobacco use, this version of YRBSS either changed the wording of the question or response or asked a question for the first time related to the following measures: "having first tried cigarette smoking before age 13 years; having usually gotten their own electronic vapor products by buying them in a store; current, current frequent, and current daily smokeless tobacco uses; current cigarette, cigar, or smokeless tobacco use; current cigarette, cigar, smokeless tobacco, or electronic vapor produce use; having tried to quit using all tobacco products." From 1991 to 2017, the prevalence of ever trying cigarette smoking significantly decreased from 70.1% to 28.9% nationally. Male, white, and gay, lesbian, and bisexual students were more likely to have ever tried cigarette smoking compared to other students. In addition, this YRBSS asked for the first time about cigarette smoking before 13 years of age, and results indicated that 9.5% of students had tried cigarette smoking before 13 years of age. From 1991 to 2017, the prevalence of current cigarette use (smoked a cigarette at least once in the past 30 days) also significantly decreased from 27.5% to 8.8% nationally. Among students that currently used cigarettes, the prevalence was higher for males (9.8%) than females (7.8%), and whites (11.1%) compared to Hispanic (7.0%) or black (4.4%) students. Current cigarette use was almost twice as high among gay, lesbian, and bisexual students (16.2%) compared to heterosexual students (8.1%). Nationally, 2.6% of students had smoked cigarettes on 20 or more days in the past 30 days, and 2.0% of students had smoked cigarettes on all 30 days. Frequent cigarette use was higher among whites and gay, lesbian, and bisexual students. Nationally, 42.4% of students had every used an electronic vapor product (e.g. e-cigarettes, e-cigars, e-pipes, vape pipes, vaping pens, e-hookahs, hookah pens), and 13.2% of students currently used e-cigarettes (used an electronic vapor product at least once in the past 30 days). Among students that currently used e-cigarettes, the prevalence was higher for males (15.9%) than females (11.8%); whites (15.6%) compared to Hispanic (11.4%) or black (8.5%) students; and gay, lesbian, and bisexual students (17.5% compared to 13.2% of heterosexual students). Nationally, 3.3% of students had used an electronic vapor product on 20 or more days in the past 30 days, and 2.4% of students had used an electronic vapor product on all 30 days. Frequent vapor product use was higher among male, white, and gay, lesbian, and bisexual students. Among students that currently used electronic vapor products, 13.6% had gotten their

own electronic vapor products by buying them in a store. Nationally, 5.5% of students currently used a smokeless tobacco product (e.g. chewing tobacco, snuff, dip, snus, or a dissolvable tobacco product). Approximately 24% of students had used any tobacco product during the past 12 months. Of these students, 41.4% had tried to quit and females, whites and Hispanics, and gay, lesbian, and bisexual students were more likely to have tried to quit. Overall, males were more likely to have engaged in tobacco use risk behaviors than females. White students were more likely to have engaged in tobacco use risk behaviors than Hispanic or black students. Gay, lesbian, and bisexual students were more likely to have engaged in tobacco use risk behaviors than heterosexual students, and the prevalence for current, current frequent, and current daily cigarette use was twofold or greater for gay, lesbian, and bisexual students compared to heterosexual students. The prevalence for current frequent and current daily cigarette use, and current frequent and current daily cigar use was twofold or greater for students who had sexual contact with only the same sex or with both sexes compared to students who had sexual contact with only the opposite sex.

147. Zhu Shu-Hong, Zhuang Yue-Lin, Braden Katherine, et al. Results of the Statewide 2017-18 California Student Tobacco Survey. San Diego, California: Center for Research and Intervention in Tobacco Control (CRITC);2019.

This report summarized the main results from the 2017-18 California Student Tobacco Survey (CSTS), which was administered to 8th, 10th, and 12th grade students from September 2017 to June 2018. Random selection of California middle and high schools resulted in 333 schools and 151,404 students participating in the survey. Results show that students in San Mateo and San Francisco Counties reported current e-cigarette use at nearly double (20.8%) the use statewide (10.9%).

148. Health Washington State Department of. Behavior Risk Factor Surveillance System. 2023.

The Washington State Department of Health, Center for Epidemiology Practice, Equity, and Assessment, supported in part by the Centers for Disease Control and Prevention, publishes data from the Behavioral Risk Factor Surveillance System. This dataset includes results from the 2023 BRFSS survey.

149. Washington State Healthy Youth Survey. QxQ Analysis Tool. 2021.

The Washington State Healthy Youth Survey (HYS) is a bi-annual survey of Washington State youth to measure health risk behaviors that contribute to morbidity, mortality, and social problems. According to the 2021 Washington Healthy Youth Survey (HYS), lifetime use of both cigarettes and e-cigarettes/vapor products among 8th and 10th graders is higher among American Indian or Alaska Native and multi-racial students than their peers. Data also show higher rates of lifetime cigarette and e-cigarette/vapor product use among 8th, 10th, and 12th grade students identifying as gay and lesbian, compared to their straight counterparts. Finally, female students in grades 8, 10, and 12 reported higher rates of lifetime cigarette and e-cigarette use, compared to their male counterparts.

150. What we know about electronic cigarettes. 2019; Available at. Accessed 9/9/2019.

The smokefree.gov website outlines information about e-cigarettes and health risks. The site also explains that, "e-cigarettes are not approved by the FDA as a quit smoking aid. So far, the

research shows there is limited evidence that e-cigarettes are effective for helping smokers quit." The site states that e-cigarettes still contain nicotine and other harmful substances.

151. **Want to Quit Smoking? FDA-approved products can help. 2019; Available at: <https://www.fda.gov/consumers/consumer-updates/want-quit-smoking-fda-approved-products-can-help>. Accessed 9/13/2019.**

The U.S. Food and Drug Administration provides information about cessation devices.

152. **Schier J.G. et al. Severe Pulmonary Disease Associated with Electronic-Cigarette-Product Use-- Interim Guidance. *Morbidity and Mortality Weekly Report*. 2019;68:2-4.**

On September 6, 2019, Centers for Disease Control and Prevention issued interim guidance related to the outbreak of severe pulmonary disease associated with e-cigarette use. This *Morbidity and Mortality Weekly Report* states that, "based on available information, the disease is likely caused by an unknown chemical exposure; no single product or substance is conclusively linked to the disease...until a definitive cause is known, persons should consider not using e-cigarettes." In addition, "e-cigarette products should never be used by youths, young adults, pregnant women, or by adults who do not currently use tobacco products. Adult smokers who are attempting to quit should use evidence-based smoking cessation treatments, including counseling and FDA-approved medications." They note that most patients have presented with hypoxemia, which has progressed to acute or subacute respiratory failure, requiring some patients to receive oxygen, intubation, or mechanical ventilation. Case studies with 53 patients in Illinois and Wisconsin, 6 patients in Utah, and 5 patients in North Carolina, have found that all patients, "have had abnormal radiographic findings, including infiltrates on chest radiograph and ground glass opacities on chest computed tomography scan." Ground glass opacities refers to findings showing a filling of air spaces or a thickening or collapse of lung alveoli. The authors explained that, "no consistent e-cigarette product, substance, or additive has been identified in all cases, nor has any one product or substance been conclusively linked to pulmonary disease in patients." All patients have used vapor products containing THC, nicotine, or both.