

VAPING AWARENESS PUBLIC EDUCATION SOCIETY

SPEARHEADING THE FIGHT TO BREAK CIGARETTE ADDICTION



WWW.VAPESOCIETY.ORG

Scott Webber

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Written Testimony Regarding

HOUSE BILL 134

IN STRONG OPPOSITION

WRITTEN ORAL TESTIMONY

SUPPORTING EXHIBITS

▼	HB134 Supporting Docs
	1. Flavored Condoms.pdf
	2. Flavored Lubes.pdf
	3. Flavored Drinking.pdf
	4. 11 Facts Teens & STDs.pdf
	5. Alcohol Facts and Statistics National Institute on Alcohol Abuse and Alcoholism (NIAAA).pdf
	6. Alcohol-Related Deaths Have Doubled Since 1999, Here's Why.pdf
	7. CDC Maryland Smoking Facts 2020.pdf
	8. MD Annual_2018_Drug_Intox_Report.pdf
	9. MD Drug Overdose Data 2018.pdf
	10. Public Health Consequences Of E-Cig.pdf
	11. ACLU Flavor Ban h.r._2339_letter_of_concern_final_2-27.pdf
	12. Flavor Ban San Francisco Increased Smoking.pdf
	13. Polosa Quit Rates Vape Shops ijerph-12-03428-v2.pdf
	14. Cessation Via Vaping.pdf

HB134 Vaping Flavor Ban Hearing

Feb 10, 2021

Planned Testimony of Scott Webber

Chair Davis and fellow members of the Economic Matters Committee:

My name is Scott Webber, proud MD citizen since 1986, currently living in Bethesda.

I am the Founder, along with my son, of the **Vaping Awareness Public Education [V.A.P.E.] Society**, a Non-Profit health policy research and political advocacy organization formed in 2014 to address the scourge of smoking, focused on the benefits - and risks - of vaping.

On the topic of vaping, I do consider myself an expert. I likely know as much about vaping as anybody in the entire State. I make this claim, not to brag, but rather, to simply convey that I know what I am talking about because I have been doing the homework for more than 7 years. I've studied the data and I know the facts – the REAL facts.

Accordingly, I can comfortably say HB134 will have VERY bad outcomes for the State and its citizens, both from a public health perspective, and certainly from a fiscal perspective. It is based on extremely bad science, is facially dishonest, will result in the closing of many dozens of small businesses, actually reducing State revenues by the multiple hundreds of millions of dollars over the next decade, increasing healthcare costs by the hundreds of millions of dollars, while simply moving vaping sales out-of-state, to the Internet, and accordingly, to the black market, all while having relatively little impact on youth vaping [where it is already entirely illegal to purchase ANY vape product by anybody under the age of 21], and will likely lead to an increase of combustible smoking by the adult populations that have quit smoking by transitioning to flavored vaping products.

This afternoon, I would like to impress upon you the absurdity of HB134 from the perspective of myself as a **NON**-vaper, but concerned father, public health advocate and realist.

Teen Vaping is a lot like Teen Sex [Attachment #1, #2]

Teen Vaping is a lot like Teen Drinking [Attachment #3]

What do they have in common? Teens should NOT be engaging in such activity... but I hate to be the one to break it to you, but... lots are. ... Anyone so out of touch, and who denies this basic truth, is simply denying the reality of the target population. [Attachment #4, #5, #6]

Teenagers are – and always have been – a risk-taking population. This is just a FACT.

One way to deal with risky teenage behavior is to simply ignore it – that's just not responsible.

Another approach is to just make stuff up, lie, distort facts, and try to impart as much fear and confusion into the general public as possible, figuring the ends justify the means. This is the tactic of the likes of Stanton Glantz, Michael Bloomberg, Tobacco Free Kids, and similar entities that are willing to spout out and perpetuate any distortion or outright falsehood in their overzealous quest to wipe out vaping as an alternative to smoking. This is not responsible either.

A third approach is to stick to logic, reason, statistics, and facts, because especially here - truth matters. Let me share a few common-sense facts about vaping:

Let's start with some vaping basics:

- Smoking remains that #1 cause of preventable death. Every year, almost a half a million people die in the US from smoking and smoking-related illness. In Maryland, that number is about 7500 deaths annually. [Attachment #7]
- To put this into perspective, this is more than all COVID deaths, and 3 times the number of deaths from opioids. [Attachment #8, #9]
- The number of deaths from vaping is zero. Not one single person – Statewide, Nationwide, or Worldwide has died from regular vaping – EVER.
- Vaping is the most effective technology ever developed to get smokers to reduce or quit smoking.
- With the increase in vaping, there has been a steady and dramatic DECREASE in the smoking of combustible cigarettes, for both adults, AND youth.
- The number of vapers who use flavored vaping liquid is 95-99%.
- The number of vape shops that sell flavored vaping liquid is 100%.
- No vape shop in Maryland can survive selling only tobacco flavored liquid, so this bill will effectively shut down 100% of all vape shops in the State.
- While this is the unspoken goal of many who support such legislation, the unintended consequences are serious.
- When faced with total flavor bans, vapers end up either buying bootleg flavors... mixing their own recipes... or returning to smoking.
- Bootleg, blackmarket, and mix-your-own products are risky at best, and deadly at worst. And smoking is still the #1 cause of preventable death.
- Passing HB134 will be credited for one of these outcomes, leading to thousands of deaths.

VAPING FACTS:

By the laws of fundamental physics, Vaping is NOT smoking. ‘Smoke’ involves COMBUSTION. Vaping has NO combustion. They are entirely separate and distinct products, and to treat them with parity – as equals – is both dishonest and just wrong.

Vaping is NOT a ‘tobacco product’. Such a label is nothing short of flagrant disinformation, intended to associated two completely disassociated habits: Vaping, which has not killed a single person worldwide in 15 years¹ and Smoking, which kills nearly a half million every year.

Vaping is indeed 95-99% safer than smoking because there is no combustion.

There is NO such thing as a ‘naturally flavored’ vaping liquid. So called ‘Tobacco Flavored’ flavors have very sophisticated flavor profiles.

Adults like flavors just as much as teens, because – believe it or not - they are both from the same species, born with identical taste buds.

Banning all vaping ‘flavors’ for adults, because teens like flavors, makes as much sense as banning all ‘flavors’ of alcohol “because teens have been shown to likewise enjoy flavors.”

And the solution is just as logical – Just ban ALL flavored alcohol, and leave the entire alcoholic beverage field to EveryClear. Because teens have been proven to prefer flavored alcohol, the entire teen drinking problem will simply disappear when there are no more flavors... Right?

The same logic applies to teen sex. Teenage pregnancy, including death, and sexually transmitted diseases are a serious problem. Following the same HB134 logic, if the State harshly taxes, overregulates, or simply bans all candy-colored condoms, and flavored lubricants, teens will simply stop having sex and the problems will disappear. [Attachments #1, #2, #3, #4, #5, #6]

To anybody who actually understands vaping, HB134 is every bit as absurd. But if you REALLY understand vaping, you realize how dangerous and expensive legislation such as HB134 truly is, to the point of being deadly. And not at just the individual level, but at the population level – ie: all of society.

Anti-Vapers are kissing cousins to Anti-Vaxers. Both are founded in Fear instead of Fact. Anti-Vaxers don’t understand the science and they don’t want to hear real data. Despite years of evidence and proven success, Anti-Vaxers are brainwashed into believing unfounded conspiracy theories about vaccines being little more than mercury-filled vials of child-killing poison. Yet Anti-Vapers

¹ ‘Regular’, Vape Shop, legal, vaping. Does not include hobbyists who build their own devices out of pipes, etc., or any of the ‘EVALI’ deaths caused by illicit street drugs, THC, & Vitamin E Acetate injected counterfeit pods, sold in exactly the same black market that will be created if flavor bans shut down all the legal – regulated – vape shops.

have been even more brainwashed into believing that vaping is evil, primarily targets youth, and is dangerous to both the user AND bystandes, despite 15 years of hard, scientific, medical, observable evidence to the contrary [Attachment #10, #11, #12, #13, #14] and MILLIONS of former smokers who celebrate their smoking freedom every day; a Freedom that well-intentioned, but frightfully ignorant Anti-Vapers want to deny, forcing millions back toward combustible cigarettes, at GREAT HARM to themselves, their families – especially children – and society as a whole.

I would lastly point out per the Fiscal Note for this [or any] ill-conceived flavor ban is projected to COST MD taxpayers more than \$70 MILLION per year -- \$700 MILLION over the next decade, with industry estimates of lost economic activity of nearly \$400 MILLION per year. Thus, over the next decade, a flavor ban is likely to cost the State from \$700 Million up to \$4 BILLION just in lost economic activity currently associated with vaping.

But the actual cost over the next decade is going to be MUCH greater, because a complete flavor ban will wipe out every independent vape shops, eliminating many hundreds of millions of dollars in income taxes, employment taxes, real estate revenues, and all other associated revenues for about 200 businesses that will be destroyed as the result of a flavor ban on vaping products.

HB134 is a VERY destructive piece of legislation that will NOT achieve its intended outcome, will create a very dangerous black market, and will cost the State of Maryland BILLIONS of dollars that could otherwise be spent on other priority budget items, such as funding for the Kirwan Commission Blueprint, and the resultant return to combustible cigarettes would unquestionably lead to thousands of unnecessary deaths that could have been avoided by wisely steering smokers into vaping, and yes, by virtue of finding a pleasing, alluring flavor that keeps them from ever wanting to go back to tobacco.

Flavors are NOT the problem, and a BAN on flavors, is not the solution.

I strongly request that the Committee issue an **UNFAVORABLE** report on HB134.

Most Sincerely,

~Scott Webber

Banning Candy Colored Condoms will NOT Prevent Teens From Engaging In Teen Sex



But It Will Eliminate
Adult Choice

Banning Flavored Personal Lubricants will NOT Prevent Teens From Engaging In Teen Sex



But It Will Eliminate
Adult Choice

Banning Flavored Alcohol will NOT Prevent Teens From Engaging In Teen Drinking



But It Will Eliminate Adult Choice

11 FACTS ABOUT TEENS AND STDs

Welcome to [DoSomething.org](https://dosomething.org), a global movement of millions of young people making positive change, online and off! The 11 facts you want are below, and the sources for the facts are at the very bottom of the page. After you learn something, Do Something! Find out how to [take action here](#).

1. New estimates show that there are about 20 million new sexually transmitted infections in the United States each year.^[1]
2. Young people, between the ages of 15 to 24, account for 50% of all new STDs, although they represent just 25% of the sexually experienced population^[2]
3. 46% of American high school students have had sexual intercourse and potentially are at risk for human immunodeficiency virus (HIV) infection and other STDs. Get yourself tested for HIV -- and tell others you did! Sign up for [Update Your Status](#).^[3]
4. In 2012, gonorrhea rates were highest among adolescents and young adults. In 2012, the highest rates were observed among women aged 20–24 years (578.5) and 15–19 years (521.2).^[4]
5. The Centers for Disease Control and Prevention estimates that there are more than 110 million STIs among men and women in the US. This includes both new and existing infections.^[5]
6. The annual number of new infections is roughly equal among teen girls (51%) and teen guys (49%).^[6]
7. HPV (human papillomavirus) accounts for the majority of prevalent STIs in the US.^[7]
8. The US has the highest rate of STD infection in the industrialized world.^[8]
9. 6 in 10 sexually active high school teens reported using condoms during their most recent sexual intercourse.^[9]
10. 1 in 4 teens contract a sexually transmitted disease every year.^[10]
11. Less than half of adults age 18 to 44 have ever been tested for an STD other than HIV/AIDS.^[11]

Alcohol Use in the United States:

» **Prevalence of Drinking:** According to the 2019 National Survey on Drug Use and Health (NSDUH), 85.6 percent of people ages 18 or older reported that they drank alcohol at some point in their lifetime; 69.5 percent reported that they drank in the past year; 54.9 percent reported that they drank in the past month.¹



» **Prevalence of Binge Drinking and Heavy Alcohol Use:** In 2019, 25.8 percent of people ages 18 or older reported that they engaged in binge drinking in the past month; 6.3 percent reported that they engaged in heavy alcohol use in the past month.¹ (See sidebar on page 2 for definitions of binge drinking and heavy alcohol use.)

Alcohol Use Disorder (AUD) in the United States:

- » **Adults (ages 18+):** According to the 2019 NSDUH, 14.1 million adults ages 18 and older² (5.6 percent of this age group³) had AUD. This includes 8.9 million men² (7.3 percent of men in this age group³) and 5.2 million women² (4.0 percent of women in this age group³).
 - According to the 2018 NSDUH, the most recent year for which data are available, about 7.9 percent of adults who had AUD in the past year received treatment. This includes 8.0 percent of males and 7.7 percent of females with AUD in this age group.⁴
- » **Youth ages 12 to 17:** According to the 2019 NSDUH, an estimated 414,000 adolescents ages 12–17² (1.7 percent of this age group³) had AUD. This number includes 163,000 males² (1.3 percent of males in this age group³) and 251,000 females² (2.1 percent of females in this age group³).
 - According to the 2018 NSDUH, the most recent year for which data are available, about 5.0 percent of youth who had AUD in the past year received treatment. This includes 5.6 percent of males and 4.6 percent of females with AUD in this age group.⁴

Alcohol-Related Deaths:

- » An estimated 95,000⁵ people (approximately 68,000 men and 27,000 women⁵) die from alcohol-related causes annually, making alcohol the third leading preventable cause of death in the United States. The first is tobacco, and the second is poor diet and physical inactivity.⁶
- » In 2014, alcohol-impaired driving fatalities accounted for 9,967 deaths (31 percent of overall driving fatalities).⁷

Economic Burden:

- » In 2010, alcohol misuse cost the United States \$249.0 billion.⁸
- » Three-quarters of the total cost of alcohol misuse is related to binge drinking.⁸

Global Burden:

- » In 2012, 3.3 million deaths, or 5.9 percent of all global deaths (7.6 percent for men and 4.1 percent for women), were attributable to alcohol consumption.⁹
- » In 2014, the World Health Organization reported that alcohol contributed to more than 200 diseases and injury-related health conditions, most notably DSM–IV alcohol dependence (see sidebar), liver cirrhosis, cancers, and injuries.¹⁰ In 2012, 5.1 percent of the burden of disease and injury worldwide (139 million disability-adjusted life-years) was attributable to alcohol consumption.⁹
- » Globally, alcohol misuse was the fifth leading risk factor for premature death and disability in 2010. Among people between the ages of 15 and 49, it is the first.¹¹ In the age group 20–39 years, approximately 25 percent of the total deaths are alcohol attributable.¹²

Family Consequences:

- » More than 10 percent of U.S. children live with a parent with alcohol problems, according to a 2012 study.¹³

Underage Drinking:

- » **Prevalence of Underage Alcohol Use:**
 - **Prevalence of Drinking:** According to the 2019 NSDUH, 39.7 percent of people ages 12–20 report that they have had at least 1 drink in their lives.¹⁴ According to the 2019 NSDUH, about 7.0 million people ages 12–20¹⁵ (18.5 percent of this age group¹⁴) reported drinking alcohol in the past month (17.2 percent of males and 19.9 percent of females¹⁴).

Definitions

Alcohol Use Disorder (AUD): AUD is a chronic relapsing brain disease characterized by an impaired ability to stop or control alcohol use despite adverse social, occupational, or health consequences. AUD can range from mild to severe, and recovery is possible regardless of severity. The fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM–IV), published by the American Psychiatric Association, described two distinct disorders—alcohol abuse and alcohol dependence—with specific criteria for each. The fifth edition, DSM–5, integrates the two DSM–IV disorders, alcohol abuse and alcohol dependence, into a single disorder called alcohol use disorder, or AUD, with mild, moderate, and severe subclassifications.

Binge Drinking:

- » NIAAA defines binge drinking as a pattern of drinking that brings blood alcohol concentration (BAC) levels to 0.08 g/dL. This typically occurs after 4 drinks for women and 5 drinks for men—in about 2 hours.³⁰
- » The Substance Abuse and Mental Health Services Administration (SAMHSA), which conducts the annual National Survey on Drug Use and Health (NSDUH), defines binge drinking as 5 or more alcoholic drinks for males or 4 or more alcoholic drinks for females on the same occasion (i.e., at the same time or within a couple of hours of each other) on at least 1 day in the past month.³¹

Heavy Alcohol Use: SAMHSA defines heavy alcohol use as binge drinking on 5 or more days in the past month.

Patterns of Drinking Associated with AUD:

Binge drinking and heavy alcohol use can increase an individual's risk of AUD. The U.S. Dietary Guidelines recommend that if alcohol is consumed, it should be in moderation, defined as up to one drink per day for women and up to two drinks per day for men, and only by adults of legal drinking age. Some individuals should avoid alcohol completely.

Alcohol-Impaired-Driving Fatality: A fatality in a crash involving a driver or motorcycle rider (operator) with a BAC of 0.08 g/dL or greater.

Disability-Adjusted Life-Years (DALYs): A measure of years of life lost or lived in less than full health.

Underage Drinking: Alcohol use by anyone under the age of 21. In the United States, the legal drinking age is 21.

- **Prevalence of Binge Drinking:** According to the 2019 NSDUH, approximately 4.2 million people¹⁵ (about 11.1 percent¹⁴) ages 12–20 (10.4 percent of males and 11.8 percent of females¹⁴) reported binge drinking in the past month.
- **Prevalence of Heavy Alcohol Use:** According to the 2019 NSDUH, approximately 825,000 people¹⁵ (about 2.2 percent¹⁴) ages 12–20 (2.1 percent of males and 2.3 percent of females¹⁴) reported heavy alcohol use in the past month.

» **Consequences of Underage Alcohol Use:**

- Research indicates that alcohol use during the teenage years could interfere with normal adolescent brain development and increase the risk of developing AUD. In addition, underage drinking contributes to a range of acute consequences, including injuries, sexual assaults, and even deaths—including those from car crashes.^{16,17}

Alcohol and College Students:

» **Prevalence of Alcohol Use:**

- **Prevalence of Drinking:** According to the 2019 NSDUH, 52.5 percent of full-time college students ages 18–22 drank alcohol in the past month compared with 44.0 percent of other persons of the same age.¹⁸
- **Prevalence of Binge Drinking:** According to the 2019 NSDUH, 33.0 percent of college students ages 18–22 reported binge drinking in the past month compared with 27.7 percent of other persons of the same age.¹⁸
- **Prevalence of Heavy Alcohol Use:** According to the 2019 NSDUH, 8.2 percent of college students ages 18–22 reported heavy alcohol use in the past month compared with 6.4 percent of other persons of the same age.¹⁸

» **Consequences—Researchers estimate that each year:**

- 1,825 college students between the ages of 18 and 24 die from alcohol-related unintentional injuries, including motor-vehicle crashes.¹⁹
- 696,000 students between the ages of 18 and 24 are assaulted by another student who has been drinking.²⁰
- 97,000 students between the ages of 18 and 24 report experiencing alcohol-related sexual assault or date rape.²⁰
- Roughly 9 percent of college students meet the criteria for AUD.²¹
- About 1 in 4 college students report academic consequences from drinking, including missing class, falling behind in class, doing poorly on exams or papers, and receiving lower grades overall.²²

Alcohol and Pregnancy:

- » The prevalence of Fetal Alcohol Syndrome (FAS) in the United States was estimated by the Institute of Medicine in 1996 to be between 0.5 and 3.0 cases per 1,000.²³
- » More recent reports from specific U.S. sites report the prevalence of FAS to be 2 to 7 cases per 1,000, and the prevalence of Fetal Alcohol Spectrum Disorders (FASD) to be as high as 20 to 50 cases per 1,000.^{24,25}

Alcohol and the Human Body:

- » In 2018, of the 83,517 liver disease deaths among individuals ages 12 and older, 42.8 percent involved alcohol. Among males, 52,499 liver disease deaths occurred and 45.4 percent involved alcohol. Among females, 31,018 liver disease deaths occurred and 38.5 percent involved alcohol.²⁶
- » Among all cirrhosis deaths in 2013, 47.9 percent were alcohol related. The proportion of alcohol-related cirrhosis was highest (76.5 percent) among deaths of persons ages 25–34, followed by deaths of persons ages 35–44, at 70.0 percent.²⁷
- » In 2009, alcohol-related liver disease was the primary cause of almost 1 in 3 liver transplants in the United States.²⁸
- » Drinking alcohol increases the risk of cancers of the mouth, esophagus, pharynx, larynx, liver, and breast.²⁹

For more information, please visit: <https://www.niaaa.nih.gov>

¹ Substance Abuse and Mental Health Services Administration (SAMHSA). 2019 National Survey on Drug Use and Health (NSDUH). Table 2.1B—Tobacco Product and Alcohol Use in Lifetime, Past Year, and Past Month among Persons Aged 12 or Older, by Age Group: Percentages, 2018 and 2019. Available at: https://www.samhsa.gov/data/sites/default/files/reports/rpt29394/NSDUHDetailedTabs2019/NSDUHDetTabsSec_t2pe2019.htm#tab2-1b Accessed 9/15/20.

² SAMHSA. 2019 National Survey on Drug Use and Health (NSDUH). Table 5.4A—Alcohol Use Disorder in Past Year among Persons Aged 12 or Older, by Age Group and Demographic Characteristics: Numbers in Thousands, 2018 and 2019. Available at: https://www.samhsa.gov/data/sites/default/files/reports/rpt29394/NSDUHDetailedTabs2019/NSDUHDetTabsSec_t5pe2019.htm#tab5-4a. Accessed 9/15/20.

³ SAMHSA. 2019 National Survey on Drug Use and Health (NSDUH). Table 5.4B—Alcohol Use Disorder in Past Year among Persons Aged 12 or Older, by Age Group and Demographic Characteristics: Percentages, 2018 and 2019. Available at: https://www.samhsa.gov/data/sites/default/files/reports/rpt29394/NSDUHDetailedTabs2019/NSDUHDetTabsSec_t5pe2019.htm#tab5-4b. Accessed 9/15/20.

⁴ SAMHSA. Population prevalence estimates (%) are weighted by the person-level analysis weight and derived from the 2018 NSDUH public-use data file, defining “any treatment” as treatment or counseling designed to help reduce or stop alcohol use, including detoxification and any other treatment for medical problems associated with alcohol use, as well as defining AUD as alcohol abuse or alcohol dependence according to the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders*. National Survey on Drug Use and Health (NSDUH) 2018 (NSDUH-2019) Public-Use File Dataset. Available at: <https://www.datafiles.samhsa.gov/study/national-survey-drug-use-and-health-nsduh-2018-nid18757>. Accessed 11/15/19.

⁵ Centers for Disease Control and Prevention (CDC). Alcohol and Public Health: Alcohol-Related Disease Impact (ARDI). Annual Average for United States 2011–2015 Alcohol-Attributable Deaths Due to Excessive Alcohol Use, All Ages. Available at: https://nccd.cdc.gov/DPH_ARDI/Default/Report.aspx?T=AAM&P=1A04A664-0244-42C1-91DE-316F3AF6B447&R=B885BD06-13DF-45CD-8DD8-AA6B178C4ECE&M=32B5FFE7-81D2-43C5-A892-9B9B3C4246C7&F=AAMCauseGenderNew&D=H. Accessed 9/24/20. Methodology: According to the CDC, due to [scientific updates to ARDI](#), estimates of alcohol-attributable deaths or years of potential life lost generated in the current version of ARDI should not be compared with estimates that were generated using the ARDI default reports or analyses in the ARDI Custom Data Portal prior to July 30, 2020.

EXTINGUISHING THE TOBACCO EPIDEMIC *in* MARYLAND

THE PROBLEM

Cigarette smoking remains the leading cause of preventable death and disability in the United States, despite a significant decline in the number of people who smoke. Over 16 million Americans have at least one disease caused by smoking. This amounts to \$170 billion in direct medical costs that could be saved every year if we could prevent youth from starting to smoke and help every person who smokes to quit.



MARYLAND KEY FACTS

\$1.2M

Was received from CDC for tobacco prevention and control activities in FY 2019

In 2017, **21.6%** of Maryland high school **youth** reported currently using **any tobacco product**, including e-cigarettes. Among Maryland high school **youth**, **8.2%** reported currently smoking **cigarettes**.

12.5%

Of adults smoked cigarettes in 2018

7,500

Adults die from smoking-related illnesses each year

\$2.7B

Was spent on healthcare costs due to smoking in 2009

PUBLIC HEALTH RESPONSE TO TOBACCO USE IN MARYLAND

Despite Maryland's success in lowering youth tobacco use rates, the state program found that many Maryland retailers were illegally selling tobacco to kids at increasing rates. In 2014, just 37% of Maryland youth reported being asked to provide photo ID to purchase cigarettes, and nearly 70% of youth smokers reported being able to purchase cigarettes directly or by proxy. In response, the program launched the Responsible Tobacco Retailer Initiative, which educated retailers, increased the enforcement of youth access laws, and improved partnerships between state, local, public and private entities, including retailers. This concerted effort proved to be successful – illegal tobacco sales to minors declined by 56% from 2014 to 2015. Due to this positive outcome, Maryland continues to implement the Responsible Tobacco Retailer Initiative, sustaining effective programs and partnerships. State compliance inspections from 2016 show the violation rate has declined even further – less than 11% of retailers are selling tobacco to minors, a 65% reduction from 2014.

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U.S. Department of
Health and Human Services
Centers for Disease
Control and Prevention

www.cdc.gov/tobacco

Print Only

CDC's ROLE IN ADVANCING STATE TOBACCO CONTROL PROGRAMS

Maryland is one of 50 states plus DC that receives funding and technical support from the Centers for Disease Control and Prevention to support comprehensive tobacco control efforts and quitlines. The Office on Smoking and Health (OSH) is the lead federal agency for comprehensive tobacco prevention and control. For decades, OSH has led public health efforts to prevent young people from using tobacco and to help all tobacco users to quit.

CDC's *TIPS FROM FORMER SMOKERS® (Tips®)* CAMPAIGN HELPS MARYLAND SMOKERS QUIT SMOKING



Despite significant progress, tobacco use remains the leading preventable cause of death and disease in the US. The good news is that 7 out of 10 smokers want to quit smoking. That is why since 2012 CDC has been educating the public about the consequences of smoking and exposure to secondhand smoke and encouraging smokers to quit through a federally funded, national tobacco education campaign, *Tips From Former Smokers®*. The campaign features former smokers suffering from the real consequences of smoking.

The *Tips®* campaign connects smokers with resources to help them quit, including a quitline number (1-800-QUIT-NOW) which routes callers to their state quitline. The Maryland quitline provides free cessation services, including counseling and medication. These services are effective in improving health outcomes and reducing healthcare costs.

"I was thinking about relapsing today and the new commercials came on. It changed my mind real fast. You don't understand the power of these commercials until you have made the decision to quit. Terrie Hall makes me cry every time . . . that could easily be me."

– Justin: January 2016

Incoming calls to the Maryland state quitline increased by an average **50%** during the 2019 *Tips®* campaign. The Maryland state quitline received a total of **13,546** calls from April 23rd – October 8th during the 2019 *Tips®* campaign.

MARYLAND TOBACCO PREVENTION & CONTROL PROGRAMS REDUCE HEALTHCARE COSTS

Tobacco prevention and control activities are a public health "best buy." Evidence-based, statewide tobacco control programs that are comprehensive, sustained, and accountable have been shown to reduce the number of people who smoke, as well as tobacco-related diseases and deaths. For every dollar spent on tobacco prevention, states can reduce tobacco-related health care expenditures and hospitalizations by up to \$55. The longer and more states invest, the larger the reductions in youth and adult smoking. A comprehensive statewide tobacco control program includes efforts to:



1 Prevent initiation of tobacco use especially among youth and young adults



2 Promote cessation and assist tobacco users to quit



3 Protect people from secondhand smoke

For more information on tobacco prevention and control, visit cdc.gov/tobacco.

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U.S. Department of
Health and Human Services
Centers for Disease
Control and Prevention

www.cdc.gov/tobacco

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MARYLAND



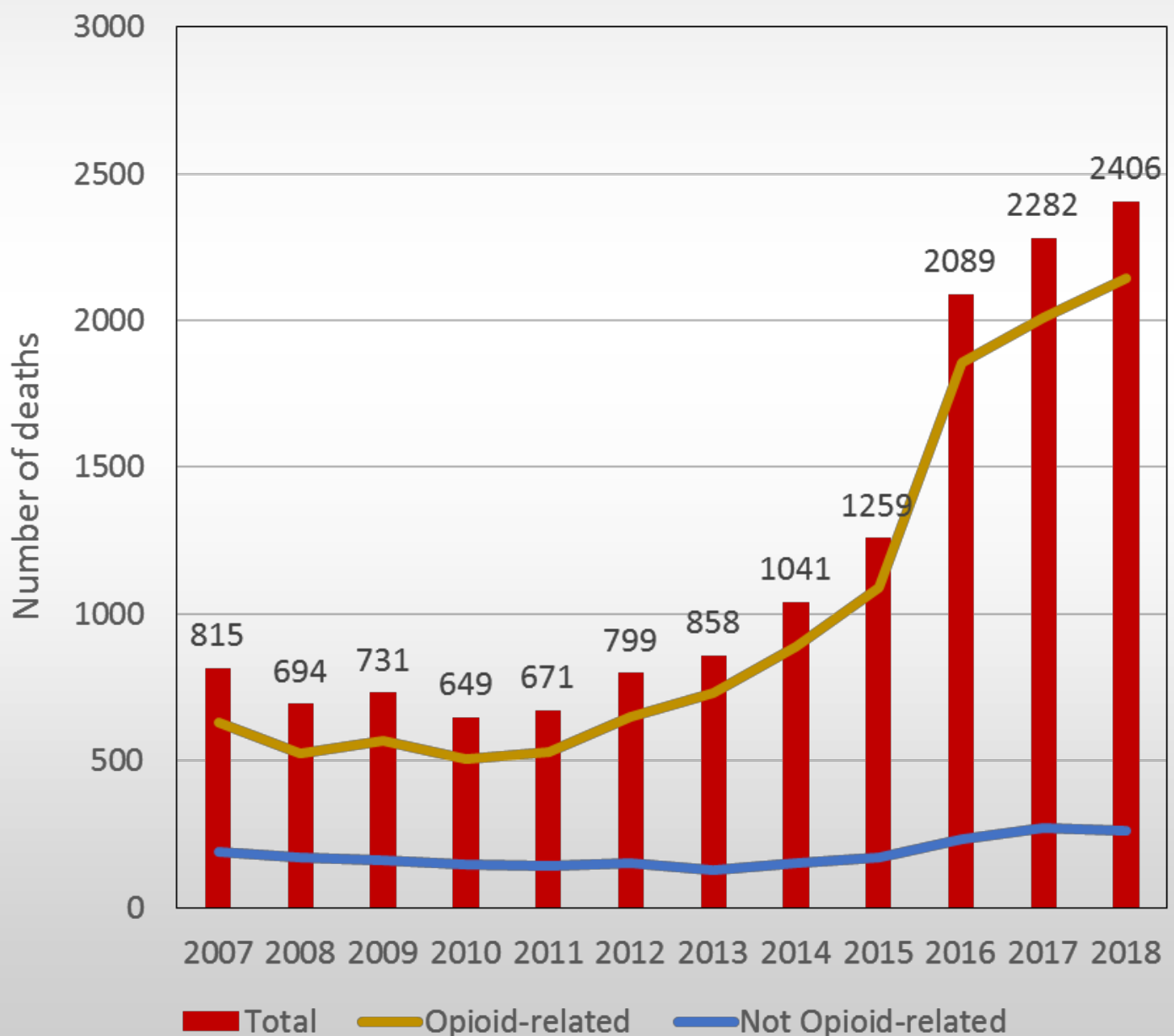
Maryland Department of Health

Larry Hogan, Governor – Boyd Rutherford, Lt. Governor – Robert R. Neall, Secretary

CHANGING
Maryland
for the *Better*

May 2019

Unintentional Drug- and Alcohol-Related Intoxication Deaths in Maryland, 2018

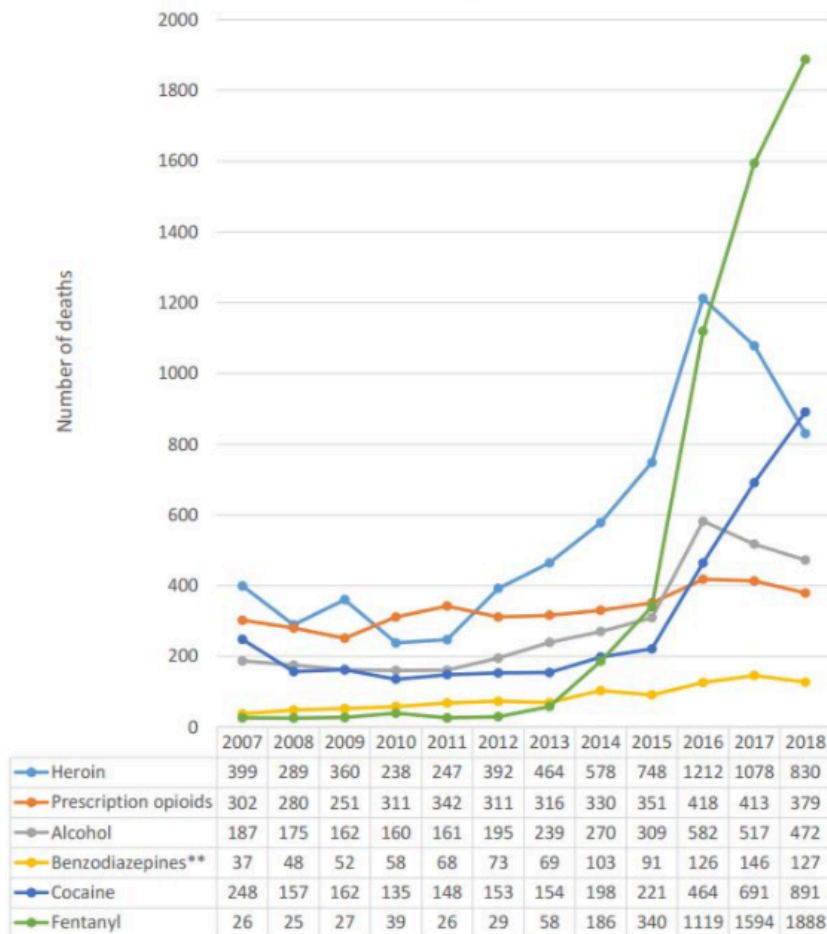


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OVERDOSE PREVENTION

Overdose Data and Reports

Number of Unintentional Drug- and Alcohol-Related Intoxication Deaths by Selected Substances*, Maryland, 2007-2018.



*Since an intoxication death may involve more than one substance, counts of deaths related to specific substances do not sum to the total number of deaths.

**Includes deaths caused by benzodiazepines and related drugs with similar sedative effects.

Source: Annual Overdose Death Reports, Maryland Vital Statistics Administration



January 2018

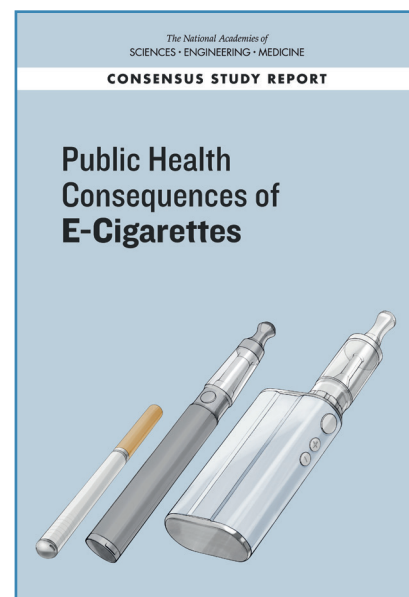
Public Health Consequences of E-Cigarettes

Millions of Americans use electronic cigarettes (e-cigarettes). Young people especially, age 17 and under, have quickly taken up their use: Substantially more young people use e-cigarettes than any other tobacco product, including traditional combustible tobacco cigarettes.

Despite their popularity, little is known about the health effects of e-cigarettes. Perceptions of potential risks and benefits of e-cigarette use vary widely among the public, users of the products, health care providers, and the public health community.

With support from the Center for Tobacco Products of the Food and Drug Administration (FDA), the National Academies of Sciences, Engineering, and Medicine convened an expert committee to conduct a critical, objective review of the scientific evidence about e-cigarettes and health. The resulting report, *Public Health Consequences of E-Cigarettes*, provides an overview of the evidence, recommends ways to improve the research, and highlights gaps that are priority focus areas for future work.

As part of its work, the committee conducted a comprehensive, in-depth review of the scientific literature around e-cigarettes, including key constituents in e-cigarettes, human health effects, initiation and cessation of combustible tobacco cigarette use, and harm reduction. The committee considered the quality of individual studies and the totality of the evidence to provide 47 structured, consistent conclusions on the strength of the evidence (categorized as conclusive, substantial, moderate, limited, insufficient, and no evidence—all defined on the next page).



CONSTITUENTS OF E-CIGARETTES

E-cigarettes contain liquids (called e-liquids), which typically contain nicotine, flavorings, and humectants (to retain moisture).

With respect to nicotine, conclusive evidence shows that exposure to nicotine from e-cigarettes is highly variable. It depends on characteristics of the products, including those of the device and e-liquids, as well as how the device is operated. Substantial evidence also shows that among experienced adult e-cigarette users, exposure to nicotine can be comparable to that from combustible tobacco cigarettes.

Most of the flavorings used in e-cigarettes are generally regarded as safe by the FDA, although these designations relate to oral consumption (flavorings used in food), and most have not been studied for safety when inhaled with an e-cigarette.

The primary humectants are propylene glycol and glycerol (also known as vegetable glycerin). Similar to flavorings, they are generally regarded as safe for ingestion, but less is known about their health effects when inhaled.

Overall, e-cigarette aerosol contains fewer numbers and lower levels of toxicants than smoke from combustible tobacco cigarettes. Nicotine exposure can mimic that found with use of combustible tobacco cigarettes, but it is highly variable. The exposure to nicotine and toxicants from the aerosolization of flavorings and humectants depends on device characteristics and how the device is used.

HEALTH EFFECTS OF E-CIGARETTES

Because e-cigarettes have only been on the U.S. market for a relatively brief time—first imported in 2006, most have entered the market much more recently—it is difficult to scientifically compare their health effects to those of combustible tobacco cigarettes, whose health effects were not fully appreciated until after decades of use. However, in contrast to long-term effects, research on short-term health effects of e-cigarettes is now available.

The committee evaluated the current state of knowledge on outcomes including dependence and abuse liability, cardiovascular diseases, cancers, respiratory diseases, oral diseases, reproductive and developmental effects, and injuries and poisonings.

Overall, the evidence reviewed by the committee suggests that e-cigarettes are not without biological effects in humans. For instance, use of e-cigarettes results in dependence on the devices, though with apparently less risk and severity than that of combustible tobacco cigarettes. Yet the implications for long-term effects on morbidity and mortality are not yet clear.

To see the full text of the committee's conclusions organized by levels of evidence and outcome, visit [nationalacademies.org/eCigHealthEffects](https://www.nationalacademies.org/eCigHealthEffects).

Levels of Evidence for Conclusions

Conclusive evidence: There are many supportive findings from good-quality controlled studies (including randomized and non-randomized controlled trials) with no credible opposing findings. A firm conclusion can be made, and the limitations to the evidence, including chance, bias, and confounding factors, can be ruled out with reasonable confidence.

Substantial evidence: There are several supportive findings from good-quality observational studies or controlled trials with few or no credible opposing findings. A firm conclusion can be made, but minor limitations, including chance, bias, and confounding factors, cannot be ruled out with reasonable confidence.

Moderate evidence: There are several supportive findings from fair-quality studies with few or no credible opposing findings. A general conclusion can be made, but limitations, including chance, bias, and confounding factors, cannot be ruled out with reasonable confidence.

Limited evidence: There are supportive findings from fair-quality studies or mixed findings with most favoring one conclusion. A conclusion can be made, but there is significant uncertainty due to chance, bias, and confounding factors.

Insufficient evidence: There are mixed findings or a single poor study. No conclusion can be made because of substantial uncertainty due to chance, bias, and confounding factors.

No available evidence: There are no available studies; health endpoint has not been studied at all. No conclusion can be made.

The net public health outcome of e-cigarette use depends on the balance between positive and negative consequences.

E-CIGARETTES AND HARM REDUCTION

FDA regulations require that tobacco products introduced to the U.S. market over the past decade must show a net public health benefit. In considering this public health effect, a product must pose less risk to users than combustible tobacco cigarettes. Additionally, if a product caused more people to start harmful tobacco use, or caused fewer people to quit tobacco use, a product would be kept off the market. So separate from the health effects of e-cigarettes, the tobacco control field must pay close attention to the effects of e-cigarettes on starting and quitting combustible tobacco products.

For youth and young adults, there is substantial evidence that e-cigarette use increases the risk of ever using combustible tobacco cigarettes. For e-cigarette users who have also ever used combustible tobacco cigarettes, there is moderate evidence that e-cigarette use increases the frequency and intensity of subsequent combustible tobacco cigarette smoking.

There is insufficient evidence from randomized controlled trials about the effectiveness of e-cigarettes as cessation aids compared to no treatment or to FDA-approved smoking cessation treatments. While the overall evidence from observational trials is mixed, there is moderate evidence from observational studies that more frequent use of e-cigarettes is associated with increased likelihood of cessation.

Overall, the evidence suggests that while e-cigarettes might cause youth who use them to transition to use of combustible tobacco products, they might also increase adult cessation of combustible tobacco cigarettes.

Completely substituting e-cigarettes for combustible tobacco cigarettes conclusively reduces a person's exposure to many toxicants and carcinogens present in combustible tobacco cigarettes and may result in

reduced adverse health outcomes in several organ systems. **Across a range of studies and outcomes, e-cigarettes appear to pose less risk to an individual than combustible tobacco cigarettes.**

To examine the possible effects of e-cigarette use at the population level, the committee used population dynamic modeling. Under the assumption that using e-cigarettes increases the net cessation rate of combustible tobacco cigarettes among adults, the modeling projects that in the short run, use of these products will generate a net public health benefit, despite the increased use of combustible tobacco products by young people. Yet in the long term (for instance, 50 years out), the public health benefit is substantially less and is even negative under some scenarios. If the products do not increase combustible tobacco cessation in adults, then with the range of assumptions the committee used, the model projects that there would be net public health harm in the short and long terms.

RESEARCH RECOMMENDATIONS

There is a great need for more evidence around the new field of e-cigarettes; research with both long- and short-term horizons is required.

The committee identified gaps in the literature in every aspect in its work and provides overarching categories of research needs and specific research suggestions within the final chapters of each of the three major sections of the report. These overarching categories include: (1) addressing gaps in substantive knowledge and (2) improving research methods and quality through protocol and methods validation and development, including the use of appropriate study design.

To download a copy of the report and read the full text of the committee's recommendations, please visit **[nationalacademies.org/eCigHealthEffects](https://www.nationalacademies.org/eCigHealthEffects)**.

Committee on the Review of the Health Effects of Electronic Nicotine Delivery Systems

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CONCLUSION

Although e-cigarettes are not without risk, compared to combustible tobacco cigarettes they contain fewer toxicants; can deliver nicotine in a similar manner; show significantly less biological activity in most, but not all, in vitro, animal, and human systems; and might be useful as a cessation aid in smokers who use e-cigarettes exclusively. However, young people who begin with e-cigarettes are more likely to transition to combustible cigarette use and become smokers who are at risk to suffer the known health burdens of combustible tobacco cigarettes. The net public health outcome of e-cigarette use depends on the balance between positive and negative consequences.

More and better research is needed to help clarify whether e-cigarettes will prove to reduce harm—or induce harm—at the individual and the population levels. The approach taken by the committee to evaluate the health effects of e-cigarettes in this report is anticipated to provide a generalizable template for future evaluations of the evidence.

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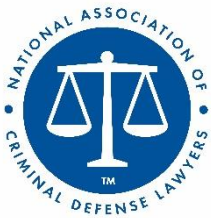
U.S. Food and Drug Administration

To read the full report, please visit
nationalacademies.org/eCigHealthEffects

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Thursday, February 27, 2020

The Honorable Frank Pallone
Chairman, House Committee on Energy and Commerce
2125 Rayburn House Office Building
Washington, DC 20515

Re: Coalition Concerns with Blanket Prohibition on Menthol and Other Flavored Tobacco within H.R. 2339, Reversing the Youth Tobacco Epidemic Act

The undersigned civil rights and civil liberties organizations write to express concerns with a broad prohibition on menthol and other flavored tobacco products within H.R. 2339, the Reversing the Youth Tobacco Epidemic Act of 2019. While this legislation is a well-intended effort to address health issues associated with tobacco use among youth, we have concerns that a blanket prohibition on menthol and other flavored tobacco products, which will apply to adults, will (1) disproportionately impact people and communities of color; (2) trigger criminal penalties, prioritizing criminalization over public health and harm reduction; and (3) instigate unconstitutional policing and other negative interactions with local law enforcement.

I. H.R. 2339 Disproportionately Impacts People and Communities of Color

Of adults, approximately 80 percent of Blacks and 35 percent of Latinx who choose to smoke prefer menthol cigarettes.¹ Thus, any ban on menthol cigarettes will disproportionately affect people of color. While H.R. 2339 and similar legislation are often motivated by the desire to decrease and eliminate smoking among certain populations, Blacks and other people of color should not disproportionately bear the brunt of enforcement of such prohibitions, which a menthol ban would ensure.

¹ CENTERS FOR DISEASE CONTROL AND PREVENTION, SMOKING & TOBACCO USE: MENTHOL AND CIGARETTES, https://www.cdc.gov/tobacco/basic_information/tobacco_industry/menthol-cigarettes/index.html (last visited Aug. 1, 2019).

Similarly, enforcement of a ban on flavored cigars will also disproportionately impact people of color given cigar preferences. Black adults are 60% of cigarillo and non-premium cigar smokers, with these products often flavored.² Additionally, at Committee markup, H.R. 2339 was amended to exempt certain traditional, expensive cigars from a prohibition of online tobacco sales.³ There is no justification for differentiating a La Palina from a Black and Mild. Making this distinction undermines the public health arguments made for this bill and suggests that some tobacco preferences, within certain communities, will be prioritized and protected over others.

II. H.R. 2339 Increases Criminal Penalties Over Public Health

H.R. 2339 prohibits menthol and other flavored tobacco products under the Food, Drug, and Cosmetic Act (FD&C Act). This prohibition criminalizes the manufacturing, importing, distributing, or selling of menthol and other flavored tobacco products under the FD&C Act, imposing up to three years of imprisonment.⁴ Violating a menthol and flavored tobacco ban would implicate other federal criminal penalties as well. For example, the Federal Cigarette Contraband Trafficking Act would be implicated, allowing up to five years of imprisonment.⁵

With a criminal legal system that incarcerates Blacks at nearly six times the rate of white Americans and a prison population that is 67 percent Black and Latinx,⁶ any prohibition on menthol and flavored tobacco products promises continued over-criminalization and mass incarceration of people of color. A ban on menthol and flavored tobacco products could reintroduce many of the harms imposed by the failed war on drugs as lawmakers work to legalize cannabis and take a public health approach to opioids. A bill criminalizing tobacco is contrary to those efforts. Righting the wrongs of earlier failed drug policy requires consideration of the unintended consequences of well-intentioned policies, especially on the most vulnerable communities. It also requires us to remember that harm reduction, including education and counseling, are what work to reduce usage and harm in our society, not prohibition.⁷

² Catherine G. Corey MSP, et. al., *US Adult Cigar Smoking Patterns, Purchasing Behaviors, and Reasons for Use According to Cigar Type: Findings From the Population Assessment of Tobacco and Health (PATH) Study, 2013–2014*, 20 NICOTINE TOBACCO RESEARCH 1457, Sep. 15, 2017, <https://academic.oup.com/ntr/article/20/12/1457/4159211?searchresult=1>.

³ Protecting American Lungs and Reversing the Youth Tobacco Epidemic Act of 2019, H.R. 2339, 116th Cong. Sec. 108 “Exemption from premarket approval of certain tobacco products,” (2019).

⁴ 21 U.S.C. § 333 (2017).

⁵ Federal Cigarette Contraband Trafficking Act, 18 U.S.C. §§ 2341-2346 (2006).

⁶ THE SENTENCING PROJECT, CRIMINAL JUSTICE FACTS, <http://www.sentencingproject.org/criminal-justice-facts/> (last visited Feb. 21, 2020).

⁷ See, Tim Lancaster & Lindsay F. Stead, *Individual behavioral counseling for smoking cessation*, Cochrane Systematic Review – Intervention (2017) (examining the positive effect of individually-delivered counselling on attempts to quit smoking); Centers for Disease Control and Prevention, Smoking & Tobacco Use: Quitting Smoking, https://www.cdc.gov/tobacco/data_statistics/fact_sheets/cessation/quitting/index.htm (last visited Feb. 21, 2020) (highlighting counselling and medication as primary effective methods to quit smoking).

III. H.R. 2339 Encourages Harmful Police Practices

Recent history shows us that drug prohibitions and bans increase negative interactions between law enforcement and people of color. The New York Police Department's (NYPD) stop and frisk program resulted in nearly 700,000 stops in 2011, with drugs serving as the alleged pretext for most of those stops.⁸ Ninety percent of those stops were of Black and Latinx people.⁹ We are concerned that law enforcement's attempts to enforce a menthol and flavored tobacco ban will undoubtedly lead to fines, arrests, and eventual incarceration for those who continue to use and sell menthol and flavored tobacco products. While the legislation was amended at Committee to try to minimize law enforcement practices here, it only applies in the context of federal enforcement of the FD&C Act; it does not govern local enforcement around any state and city prohibition policies that will follow.

The death of Eric Garner in 2014 generated national attention not only for the brutality he experienced at the hands of NYPD police, but for the reason that led to the encounter with law enforcement. Mr. Garner died from an illegal chokehold having been stopped by police for selling single cigarettes in violation of state law. Gwendolyn Carr, Eric Garner's mother, cautions: "When you ban a product sold mostly in Black communities, you must consider the reality of what will happen to that very same over-represented community in the criminal justice system."¹⁰ With a federal prohibition on menthol and flavored tobacco products, states will develop their own prohibition and enforcement policies that could result in harmful police practices like that witnessed with Mr. Garner.

Based on our concerns, we urge you to not impose a blanket ban on menthol and related tobacco products. A prohibition on all menthol and flavored tobacco products will not achieve a public health goal of reducing smoking among Black people, young people, or others. We hope we can work together to avoid repetitions of policies that are intended to protect youth and communities of color, but instead only further engrain systemic criminalization and racism.

⁸ NYCLU, STOP AND FRISK DATA, <https://www.nyclu.org/en/stop-and-frisk-data> (last visited Feb. 21, 2020).

⁹ Id.

¹⁰ Roz Edward, *Mothers of Trayvon Martin, Eric Garner join fight against menthol cigarettes*, CHI. DEFENDER (Oct. 18, 2019), <https://chicagodefender.com/mothers-of-trayvon-martin-eric-garner-join-fight-against-menthol-cigarettes/>.

To follow up, please be in touch with Kyra Stephenson-Valley of the National Action Network at kvalley@nationalactionnetwork.net or Kanya Bennett at the American Civil Liberties Union at kbennett@aclu.org.

Sincerely,

American Civil Liberties Union
Center for Popular Democracy
Drug Policy Alliance
Friends Committee on National Legislation
Law Enforcement Action Partnership
National Action Network
National Association of Criminal Defense Lawyers

cc: The Honorable Nancy Pelosi, Speaker, U.S. House of Representatives
The Honorable Steny Hoyer, Majority Leader, U.S. House of Representatives
The Honorable James E. Clyburn, Majority Whip, U.S. House of Representatives
The Honorable Karen Bass, Chair, Congressional Black Caucus
The Honorable Joaquin Castro, Chair, Congressional Hispanic Caucus
The Honorable Mark Pocan, Chair, Congressional Progressive Caucus
The Honorable Pramila Jayapal, Congressional Progressive Caucus



The impact of a comprehensive tobacco product flavor ban in San Francisco among young adults

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ABSTRACT

Objective: Flavors play an important role in the initiation and use of tobacco products. The FDA, states, and cities have been implementing or considering banning flavored e-cigarettes or any flavored tobacco products. This study empirically assessed the impact of one of the first comprehensive bans of all flavored tobacco products other than tobacco-flavored e-cigarettes among young adults in San Francisco, California.

Methods: Using Amazon Mechanical Turk, a sample of San Francisco residents aged 18–34 who previously used tobacco products (N = 247) were surveyed about their tobacco use both before and after the ban. Descriptive statistics and regression models were applied.

Results: The prevalence of overall flavored tobacco use decreased from 81% and 85% to 69% and 76% for 18–24 years and 25–34 years old, respectively. The prevalence of flavored e-cigarettes decreased from 57% and 56% to 45% and 48% for 18–24 years and 25–34 years old, respectively. The prevalence of cigars uses reduced as well. However, cigarette smoking increased, although not statistically significant among 25–34 years old. 66% of participants did not support the ban and 65% believed the ban had not been enforced completely. Most users reported being able to obtain flavored tobacco products in multiple ways despite the ban.

Conclusions: These findings suggest that comprehensive local flavor bans, by themselves, cannot sharply reduce the availability or use of flavored tobacco products among residents. Nevertheless, local bans can still significantly reduce overall e-cigarette use and cigar smoking but may increase cigarette smoking.

1. Introduction

Starting in 2013, the United States has experienced a surge in youth e-cigarette use that the FDA has termed an epidemic (Cullen, 2019; Gentzke, 2019; United States, 2019; U.S. Department of Health and Human Services, 2018). E-cigarettes have the potential of being a less-harmful alternative to current smokers if they switch from smoking to e-cigarettes completely and flavors in e-cigarettes may help such switching (Litt et al., 2016; Buckell et al., 2019; Russell, 2018). At the same time, research indicates that flavors increase youth initiation into e-cigarette use (Zare et al., 2018; Landry, 2019; Schneller, 2019; Soneji et al., 2019), and flavored e-cigarette use may lead some youth into smoking who otherwise would not (Villanti, 2017; Harrell, 2017). In 2009, the Family Smoking Prevention and Tobacco Control Act banned all characterizing flavors in cigarettes except menthol and tobacco, but there are no federal restrictions on flavors for e-cigarettes, cigars, and other tobacco products. A key challenge for the FDA and tobacco control regulators in other

countries is how to regulate flavors effectively to maximize public health gains (e.g., by increasing total cessation and complete switching from smoking to e-cigarettes reducing) while minimizing related public health losses (e.g., by reducing tobacco use initiation).

In response to the surge in youth e-cigarette use – and the separate outbreak of sudden lung diseases and deaths from vaping (King, 2020) – the FDA, Congress, and many states and cities have been implementing or considering laws and policies with various flavor bans or restrictions. The FDA has implemented a new enforcement policy to stop the sale of all cartridge-based e-cigarettes with flavors other than tobacco or nicotine unless or until their manufacturers show that allowing the marketing of the e-cigarettes with additional added flavors would be “appropriate for the protection of public health” (FDA, U.S., 2020). In the second half of 2019, several states temporarily or permanently banned or restricted the sale of vaping products, and the bans in some states have been blocked by court orders partially due to the risk of pushing e-cigarette users back to smoking (Kounang and Erdman, 2019;

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Eggert, 2019; Foden-Vencil, 2019; Marcelo, 2019).

Determining the optimal regulatory approach to flavors remains difficult because of insufficient experience and research. Due to the potential substitutability and complementarity among various tobacco products (Feng et al., 2018), a flavor ban on some tobacco products may promote the use of other products. For example, in response to a menthol ban for cigarettes, some menthol cigarette smokers may reduce or quit smoking (Buckell et al., 2018; Guillory, 2019; Chaiton, 2018; Chaiton and Ban, 2019; Soule, 2019), while some may switch to menthol/other flavored e-cigarette or other products. (Buckell et al., 2018; Chaiton, 2018; Soule, 2019; Rose, 2019). At the same time, banning flavors in e-cigarettes alone would prompt e-cigarette use cessation and reduce e-cigarette initiation but may also push some e-cigarette users to turn to cigarette smoking and could prompt some youth to initiate into smoking instead of e-cigarette use. Additionally, current users' reactions to a flavor ban may be complicated by heterogeneity among users such as gender, age, and socioeconomic status, and contextual effects such as the influence of social and retailer environment. For example, flavors are more attractive to women, youth, and young adults than other groups (Hoffman, 2016; Rath, 2016). Another key concern is whether local or state flavor bans will simply prompt users to obtain their flavored tobacco products in nearby jurisdictions that still sell them, from illegal local sellers, or through Internet sales, thereby reducing any beneficial public health impacts.

Research on the impact of flavor bans is crucial to inform evidence-based decision-making and policy change. Unfortunately, only a small number of studies have examined the impact of actual/hypothetical flavor bans or restrictions (Glantz and Gardiner, 2018). Particularly, most studies focused on a specific tobacco product (e.g., cigarette) or a specific flavor (e.g., menthol) and our knowledge on the impact of a comprehensive flavor ban are limited. Early evidence indicated that the Family Smoking Prevention and Tobacco Control Act's ban on all cigarette flavors other than menthol and tobacco reduced cigarette smoking, but this already small positive effect was diminished due to the availability of menthol-flavored cigarettes and a wide range of flavored smoked tobacco products labeled as little cigars or filtered cigars that are virtually identical to conventional cigarettes (Lindblom and Has, 2020; Lindblom, 2019; Delnevo, 2006; Delnevo and Hrywna, 2007) and other flavored smoked tobacco products (Courtemanche et al., 2017). Some experimental studies (Buckell et al., 2018; Guillory, 2019), empirical surveys in Canada (Chaiton, 2018; Chaiton and Ban, 2019; Soule, 2019), and simulation models (Levy, 2011) indicate that a ban of menthol flavor in cigarettes increase quitting among menthol smokers and reduce overall smoking, and other evidence indicates that a menthol ban for only cigarettes would likely increase the use of alternative flavored tobacco products, such as e-cigarettes and cigars (Buckell et al., 2018; Chaiton, 2018; Soule, 2019; Rose, 2019). Similarly, one experimental study (Buckell et al., 2018) indicates that a flavor ban for only e-cigarettes would reduce e-cigarette use but increase cigarette smoking, and a ban on both menthol cigarettes and flavored e-cigarettes might decrease e-cigarette use and reduce menthol cigarette smoking, but also increase the use of non-menthol cigarettes.

In January 2019, San Francisco, California implemented a comprehensive ban on the sale of all flavored e-cigarettes (other than tobacco flavor), menthol cigarettes, and other non-tobacco flavored tobacco products (San Francisco, 2018; Francisco, 2018). In this study, we aimed to empirically assess the impact of the flavor ban policy among young adults (18–34 years old) in San Francisco, focusing on the change in the uses of menthol cigarettes, e-cigarettes, and cigars. We focused on young adults because young adulthood is the period during which experimental tobacco use often transitions into regular use and nicotine dependence (U.S. Department of Health and Human Services, 2012; Pierce et al., 2009).

2. Methods

Data were collected on Amazon Mechanical Turk (MTurk) (Keith

et al., 2017). MTurk is efficient, reliable, and cost-effective for generating sample responses that are largely comparable to those collected via more conventional means (Mortensen and Hughes, 2018). Recently, MTurk has been used widely in tobacco studies (Morean, 2018; Bauhoff et al., 2017; Jo, 2018; Hall et al., 2014; Lipkus and Mays, 2018; Mays, 2017; Scott-Sheldon and Stroud, 2018). MTurk workers tend to be young adults who live in large cities (Huff and Tingley, 2015), consistent with our target population. Inclusion criteria were: age 18–34 years; lived, worked or studied in the city of San Francisco from December 2018 (one month before the ban went into effect) until the time of the survey without interruption; ever used any tobacco product including cigarettes, e-cigarettes, cigars, hookah/waterpipe, pipes, smokeless/dissolvable tobaccos from December 2018 until the time of the survey; and $\geq 90\%$ approval rating from previous MTurk tasks. Eligible participants were given access to the survey, hosted by Qualtrics (<https://www.qualtrics.com/>). The “Prevent Ballot Box Stuffing” option provided by Qualtrics was used to keep participants from taking the survey multiple times. To further increase the quality of the survey and prevent fake information, we designed a zip-code double-checking mechanism. First, participants were requested to provide the zip-code where she/he lived and the zip-code where she/he spent most of her/his day time (likely to be a workplace or college campus), and the input was checked to make sure at least one of two zip-codes was in the city of San Francisco. Second, before the end of the survey (at this stage, the participants were not allowed to roll back to review their previous input), each participant was asked to provide the zip-code where she/he lives again, and those who could not provide an identical zip-code that they provided at the beginning of the survey were considered as “fake participants” and were excluded. A brief introduction of San Francisco's flavor ban was provided at the beginning of the survey and pictures of the major tobacco products were provided repeatedly in the survey as reminders. The survey was active in MTurk between November 9 and 23, 2019. Each approved participant was compensated \$ 0.3. The Institutional Review Board at the University of Memphis approved this study.

Participants reported basic demographic information such as age, gender, race/ethnicity, educational attainment, employment status, and student status. Parents' educational attainment was requested as a proxy of the participant's socioeconomic status because direct measures such as the household income may not accurately reflect a young adult's status since they may live with their parents or may not have completed their education (Erola et al., 2016; Williams, 2017; Patrick, 2012). Participants reported their attitudes towards the ban in general by responding to “I am glad the City banned all sales of flavored tobacco-nicotine products”, attitudes towards the ban for each of five product categories by checking the product that the participant thinks should not be banned, and perceptions of retailers' compliance to the ban by answering “Do you agree or disagree with the following statement: the flavor ban has been enforced completely and there are no retailers in San Francisco that sell flavored tobacco or vape/e-cigarette products?”. Participants also reported their subjective reaction to the flavor ban (e.g., try to quit/reduce the use of tobacco product, was able/unable to quit/reduce the use, stock up flavored products before the ban, buy flavored products from illegal sellers after the ban). Participants were asked to check all products that had been used at least once both before the ban (during December 2018) and currently (during the past 30 days). For each of five categories including cigarettes; e-cigarettes; cigars (including cigars, cigarillos, and little cigars, referred to as cigars in the following text); hookah/waterpipe; and smokeless/dissolvable tobacco, if a participant used any products in these categories, there was a follow-up question to ask how/where they typically obtained that products (e.g., online, from friends, tobacco retailers in/outside of San Francisco).

To analyze the data, we first used descriptive statistics to depict the prevalence of several smoking/vaping products and the distribution of various ways of obtaining each product category before and after the

flavor ban. Chi-square tests were used to test differences in demographics among those who used menthol cigarettes, flavored e-cigarettes, and flavored cigars before the ban, respectively. Paired t-tests were used to test for the change in the prevalence of each smoking/vaping product among participants, stratified by two age groups including 18–24 and 25–34 years. Chi-square tests were used to test the difference in the distribution of ways of obtaining smoking/vaping products before and after the ban. Second, we summarized the participants' attitudes, perceptions, and subjective reactions to the flavor ban. Third, we examined the switch/change of tobacco product use after the ban among those who used menthol cigarettes, flavored e-cigarette, and flavored cigars before the ban. Finally, logistic regression models (PROC LOGISTIC in SAS, version 9.4) were used to estimate the odds of using flavored products after the flavor ban among the whole sample, for menthol cigarettes, flavored e-cigarette, and flavored cigars, respectively. The regression models adjusted for basic demographics and tobacco use before the ban (whether the specific flavored product had been used, whether the specific non-flavored product had been used, and for dual/poly use of tobacco products). Analyses were performed using SAS 9.4.

3. Results

As shown in Table 1, among the 247 participants who completed the survey, the majority were male (61%), between 25 and 34 years of age (75%), white (61%), with high educational attainment (93% with college/associate degree, bachelor degree, or above), and had a full-time job (76%). The mean age was 27.2 years, with a standard deviation of 4.3 years. The demographic characteristics were not significantly different between those who smoked menthol cigarettes, those who used flavored e-cigarettes, and those who used flavored cigars before the ban, except that women were less likely to use flavored cigars, the younger group (18–24 years old) was less likely to use menthol cigarettes compared with other products, and Black and Asian American respondents were more likely to use menthol cigarettes and flavored cigars than e-cigarettes (although not statistically significant).

As presented in Table 2, among both the 18–24 and 25–34 age groups, the prevalence of using any tobacco products (both overall and flavored) decreased significantly after the flavor ban, and the

prevalence of using any smoking products including both cigarettes and cigars kept stable. For both age groups, the prevalence of using flavored e-cigarettes decreased significantly after the flavor ban as well, as one might expect, with increases in the use of still-permitted tobacco-flavored e-cigarettes. However, among the 18–24 age group, there was also a significant increase in cigarette smoking overall, but a significant decrease in the smoking of cigars, both flavored and overall. Among the 25–34 age group, there was a significant decrease in the exclusive use of e-cigarettes and the dual use of e-cigarettes with cigars.

As shown in Table 3, the proportions of e-cigarettes, cigarettes, and cigars obtained over the Internet or through the mail increased after the ban, and the proportions obtained from retailers outside of San Francisco also increased overall. But the overall distribution was only significantly different for e-cigarettes and not for cigarettes or cigars.

As shown in Table 4, 70% of participants who used menthol cigarettes exclusively before the ban continued to use them exclusively after the ban. Likewise, 73.8% of those who used menthol cigarettes along with other products before the ban continued to do so after. Among those who exclusively used flavored e-cigarettes before the ban, about 60% continued to use them exclusively after the ban, and among those who used flavored e-cigarettes and other products before the ban, 65% continued to do so after the ban. However, nearly 21% of those who exclusively used flavored e-cigarettes before the ban quit all tobacco/nicotine use, including vaping, after the ban, and the proportion of those who quit was much smaller among those used menthol cigarettes whereas, in contrast, only about 4% of those who used flavored e-cigarettes and other tobacco products before the ban quit the use of all tobacco/nicotine products after the ban.

As shown in Table 5, the odds of using menthol cigarettes, flavored e-cigarettes, or flavored cigars were substantially greater among those who had (vs. had not) used the same product before the ban. Differences in the odds ratio of using the same product before the ban indicate that among flavored tobacco products, the use of menthol cigarettes (odds ratio of 54.9) was the least likely to quit after the ban, and flavored cigar smoking (odds ratio of 5.7) was the most likely to quit after the ban. After the ban, women were less likely to use menthol cigarettes and flavored e-cigarettes compared with males. Participants who were 25–34 years of age, as well as blacks, students, and those with higher educational attainment were more likely to use flavored cigars

Table 1

Characteristics of young adults (N = 247) who lived or worked in the city of San Francisco and used tobacco or vaping products between December 2018 and November 2019.

		Use of flavored tobacco products before the ban %			
		All (N = 247) %	Menthol cigarettes (N = 81)	Flavored e-cigarettes (N = 139)	Flavored cigars (N = 42)
Gender	Female	38.1	44.4	36.7	28.6 *
	Male	60.7	56.8	61.9	71.4 *
	Else	1.2	1.2	1.5	0 *
Age	18–24	25.1	11.1 **	25.2	28.6
	25–34	74.9	88.9 **	74.8	71.4
Race /ethnicity	White	60.7	55.9	69.8	62.2
	Black	9.7	18.9	5.7	16.2
	Asian	12.6	17.6	11.5	21.6
	Hispanic	13.4	14.8	8.6	11.9
	Others and mixed	3.6	1.4	4.3	0
Education	Below bachelor	47.8	45.6	50.4	40.5
	Bachelor and above	52.2	54.4	49.6	59.5
Parental education	Below bachelor	49.4	51.8	50.3	54.7
	Bachelor and above	50.6	48.2	49.7	45.3
Employment status	Full-time work	75.7	77.8	77.0	85.7
	Part-time work	15.4	14.8	15.1	9.5
	Not employed	8.9	7.4	7.9	4.8
Student status	Full-time student	21.1	16.0	17.3	9.5
	Part-time student	14.2	9.8	14.4	19.1
	Not a student	64.8	74.1	68.3	71.4

Note: boldface indicates statistical significance, with * for $P < 0.05$, and ** for $P < 0.01$.

Table 2
Prevalence (%) of tobacco or vaping products before and after the flavor ban.

		18–24 years (N = 62)			25–34 years (N = 185)		
		Before the ban	After the ban	Difference (95% CI)	Before the ban	After the ban	Difference (95% CI)
Any tobacco products		100	82.3	−17.7 (−27.5, −8.0) ***	100	92.4	−7.6 (−11.4, −3.7) ***
Any smoking products including cigarettes and cigars		43.6	43.6	0 (−10.43, 10.3)	68.7	67.0	−1.6 (−7.2, 3.9)
Any flavored tobacco products		80.7	69.4	−11.3 (−23.6, 1.0)*	84.9	76.2	−8.6 (−14.0, −3.3) ***
Cigarettes	Any	27.4	37.1	9.7 (−1.3, 20.7) *	57.8	58.4	0.5 (−5.6, 6.7)
	Menthol flavor	14.5	19.4	4.8 (−3.7, 13.4)	38.9	38.4	0.5 (−6.1, 5.0)
	Non-flavored	17.7	21	3.2 (−4.7, 11.2)	29.2	29.7	−0.5 (−5.2, 6.3)
E-cigarettes	Any	56.5	46.8	−9.7 (−21.6, 2.2)	60	50.8	−9.2 (−15.4, −3.0) ***
	Any flavors	56.5	45.2	−11.3 (−22.7, 0.07) *	56.2	48.1	−8.1 (−14.7, −1.5) **
	Menthol flavor	19.4	12.9	−6.4 (−16.6, 3.7)	26.5	24.9	−1.6 (−7.0, 3.7)
	Tobacco flavor	11.3	3.2	−8.1 (−16.4, 0.3) *	13.5	17.3	3.8 (−1.3, 8.9)
	Any flavors than menthol and tobacco	43.6	38.7	−4.8 (−14.5, 4.8)	35.1	27	−8.1 (−13.5, −2.7) ***
	Non-flavored	1.6	1.6	0 (−4.6, 4.6)	8.7	7.6	−1.1 (−5.4, 3.2)
Cigars (incl. cigars, little cigars, cigarillos)	Any	22.6	12.9	−9.7 (−20.7, 1.3) *	22.7	19.5	−3.2 (−9.1, 2.6)
	Flavored	19.4	6.5	−12.9 (−23.7, −2.1) **	16.2	13	−3.2 (−9.3, 2.8)
	Non-flavored	8.1	8.1	0 (−9.2, 9.2)	11.4	8.7	−2.7 (−7.1, 1.7)
Hookah	Any	24.2	24.2	0 (−11.2, 11.3)	24.2	21.6	−1.6 (−7.4, 4.1)
	Flavored	19.4	21	1.6 (−10.1, 13.3)	21.6	20	−1.6 (−7.8, 4.5)
	Non-flavored	8.1	3.2	−4.8 (−12.0, 2.3)	7	3.8	−3.2 (−7.2, 0.7)
Smokeless/dissolvable tobacco products	Any	6.5	8.1	1.6 (−5.7, 8.9)	6.5	6.5	0.0 (−3.0, 3.0)
	Flavored	3.2	8.1	4.8 (−2.3, 12.0)	3.8	4.9	1.1 (−1.9, 4.1)
	Non-flavored	4.8	0	−4.8 (−10.3, 0.7) *	2.7	2.7	0.0 (−2.1, 2.1)
Exclusive use	Cigarettes	9.7	12.9	3.2 (−4.7, 11.2)	22.2	22.7	0.5 (−3.6, 4.7)
	E-cigarettes	33.9	24.2	−9.7 (−20.7, 13.1) *	22.2	19.5	−2.7 (−8.0, 2.6)
	Cigars	4.8	1.6	−3.2 (−7.8, 13.0)	4.3	4.9	0.5 (−3.0, 4.1)
	Hookah	6.5	8.1	1.6 (−5.6, 8.8)	3.2	2.7	−0.5 (−2.9, 1.9)
	Smokeless/dissolvables	3.2	1.6	−1.6 (−4.8, 1.6)	0.5	1.1	0.5 (−0.5, 1.6)
	Cigarettes & e-cigarettes	11.3	12.9	1.6 (−4.7, 7.2)	28.6	26.5	−2.2 (−7.8, 3.5)
Dual use and poly-use	Cigarettes & cigars	6.4	6.4	0 (−8.0, 8.0)	11.9	10.8	−1.1 (−5.4, 3.2)
	E-cigarettes & cigars	8.1	6.4	−1.6 (−8.9, 5.7)	14.1	9.7	−4.3 (−8.6, −0.1) **
	Cigarettes, e-cigarettes, & cigars	1.6	1.6	0 (−4.6, 4.6)	9.7	7.0	−2.7 (−6.2, 0.8)

Note: boldface indicates statistical significance, with * for $P < 0.1$, ** for $P < 0.05$, and *** for $P < 0.01$.

Table 3
Distribution (%) of various ways to obtain tobacco or vaping products before and after the ban.

		Cigarettes		Cigars (incl. cigars, little cigars, cigarillos)		E-cigarettes **	
Ways to obtain smoking or vaping products		Before the ban	After the ban	Before the ban	After the ban	Before the ban	After the ban
Over the Internet/through the mail		3.2	6.9	7.1	11.4	15.8	26.8
Friends, family members, or other persons		23.4	19.9	25.0	22.7	18.5	15.5
A smoke shop, tobacco specialty store or tobacco outlet store, etc.	In SF *	21.8	19.9	19.6	15.9	11.6	2.4
	Out of SF	10.5	13.7	7.1	6.8	4.8	8.1
A supermarket, convenience store, gas station, grocery, drug store, etc.	In SF	33.1	31.3	10.7	15.9	8.9	7.3
	Out of SF	8.1	7.6	3.6	2.3	3.4	5.7
A cigar bar	In SF	N/A	N/A	21.4	13.6	N/A	N/A
	Out of SF	N/A	N/A	5.4	11.4	N/A	N/A
A vape shop or vapor lounge	In SF	N/A	N/A	N/A	N/A	27.4	19.5
	Out of SF	N/A	N/A	N/A	N/A	8.9	13.0

* Here SF refers to the city of San Francisco.

** the distribution of ways to obtain e-cigarettes was significantly different before and after the ban, with $p < 0.001$.

compared to those aged 18–24 years, of other races/ethnicities, who were not students, and those with lower educational attainment.

In terms of participants' attitudes and reactions to the ban, 8.1% of participants supported the flavor ban, and 35% agreed that the ban had been enforced completely in San Francisco (see Table A.1 in the Appendix A). A greater percentage of participants opposed the ban on flavored cigars (approximately 66%) than opposed the ban on flavored e-cigarettes (42%). Overall, 20% of participants reported that they quit using tobacco and another 14% reported that they reduced their tobacco use after the

ban. Some participants reported that they kept using the banned flavored products by evading the ban in various ways such as purchasing online (15%), stocking up before the ban (13%), purchasing from outside of the city (12%), making illegal purchases (5%), or purchasing from otherwise legal retailers in SF that did comply with the ban (4.5%).

Among the 36 participants who left informative comments about the ban, 20 were negative, nine were positive, and seven were neutral. The negative comments repeatedly included adjectives such as ridiculous, stupid, and invasive. One commented “*The ban does nothing except make*

Table 4

Change in smoking or vaping products use after the ban, among those who used menthol cigarettes and flavored e-cigarette before the ban.

Before the ban		After the ban	Percent
Menthol cigarettes	Exclusive use (N = 20)	Maintained exclusive use, n = 14	70.0%
		Quit any tobacco use, n = 1	5.0%
		Use any other products, n = 5	25.0%
	Use together with other products (N = 61)	Maintained use together with other products, n = 45	73.8%
		Quit any tobacco use, n = 2	3.3%
Use any other products, n = 14		23.0%	
Flavored e-cigarettes	Exclusive use (N = 58)	Maintained exclusive use, n = 35	60.3%
		Quit any tobacco use, n = 12	20.7%
		Use any other products, n = 11	19.0%
	Use together with other products (N = 81)	Maintained use together with other products, n = 53	65.4%
		Quit any tobacco use, n = 3	3.7%
		Use any other products, n = 25	30.9%

people want it more” and another commented, “I no longer live in San Francisco!”. Among the positive comments, one mentioned “I quit tobacco and hate the smell of cigarettes. Would love to see less of them around.” Another who reportedly quit tobacco use after the ban stated: “The ban definitely influenced my decision a little bit and for that reason, I think it would be nice if cigarettes were banned completely forever in all forms from retailers.”

4. Discussion

To our knowledge, this is the first study to examine self-reported changes in tobacco use after a comprehensive flavor ban in a large metropolitan area, and the first to provide evidence (albeit preliminary) of the impact of a flavor ban that includes e-cigarettes. Despite the small sample size and convenience sampling, the findings may provide insights for policies related to tobacco flavors at local, state and federal levels and provide some useful insights to guide future research.

Our results indicate that among young adults, comprehensive local flavor bans for tobacco products are likely to reduce the use of tobacco products overall and flavored tobacco products overall. Specifically, the ban reduced cigarette use and cigar smoking by reducing the use of flavored tobacco products but can also increase, or not reduce, cigarette smoking as some former users of the banned flavored tobacco products switch to smoking. In particular, the findings indicate that the use of flavored cigars is more likely to decrease after the ban than the use of

menthol cigarettes or flavored e-cigarettes. However, the number of participants who used flavored cigars in this study was relatively small and larger studies will be needed to confirm this finding. Our finding that menthol cigarette smokers, especially exclusive users, were the least likely to change their use among all flavored tobacco product users. Our finding is consistent with previous studies that reported a lower likelihood of switching to other tobacco products or quit smoking among the users of menthol cigarettes (Wackowski et al., 2015; Pearson, 2012; D'Silva et al., 2015). Also consistent with other studies, this study found that banning flavors not only prompted flavored e-cigarette users to switch to other products but also significantly increased their total cessation (Harrell, 2017; Harrell, 2017).

Our study found that the younger age group (18–24 years) was more sensitive to the ban than the older group (25–34 years) and that observation produced both gains (e.g., reductions in e-cigarette use and cigar smoking) and harms (e.g., increases in cigarette smoking). Two factors may have contributed to this difference. First, younger age groups tend to be at earlier stages of tobacco use, with higher levels of experimentation and lower levels of regular, addicted use (U.S. Department of Health and Human Services, 2012; Pierce et al., 2009; Hammond, 2005; Freedman et al., 2012). Second, compared with the older group, the younger group may have fewer economic and other resources to facilitate obtaining flavored tobacco products after the ban.

We found that retailer compliance with the flavor ban in San Francisco

Table 5

Odds of using menthol cigarettes, flavored e-cigarettes, and flavored cigars after the flavor ban among young adults (N = 247) in the city of San Francisco, with the 95% confidence interval shown for statistically significant differences by product.

		Menthol cigarettes	Flavored e-cigarettes	Flavored cigars
Age groups	25–34 years	1.03	1.18	4.14 (1.06, 16.21) **
	18–24 years (ref)	1	1	1
Gender	Female	0.44 (0.18, 1.10)*	0.52 (0.25, 1.08)*	0.60
	Male (ref)	1	1	1
Race/ethnicity	Black	2.51	0.58	3.50 (0.98, 12.53) *
	Asian	0.91	0.71	0.60
	Hispanic	0.62	0.75	1.12
	Others and mixed	1.17	6.72 (0.90, 50.33) *	< 0.001
	White (ref)	1	1	1
Work status	Work	1.90	1.05	0.54
	Not work (ref)	1	1	1
Student status	Student	1.24	1.10	4.35 (1.51, 12.50) ***
	Not student (ref)	1	1	1
Educational attainment	Bachelor and above	1.93	0.92	2.85 (1.01, 8.04) **
	Below bachelor (ref)	1	1	1
Parents' educational attainment	Bachelor and above	0.98	1.61	0.46
	Below bachelor (ref)	1	1	1
Use the same product before the ban	Yes	54.89 (19.47, 154.70) ***	15.28 (7.02, 33.23) ***	5.71 (2.02, 16.16) ***
	No (ref)	1	1	1
Use the non-flavor of the product before the ban	Yes	0.76	2.74	0.68
	No (ref)	1	1	1
Dual or poly use before the ban	Yes	0.75	2.15 (1.00, 4.66) *	1.56
	No (ref)	1	1	1

Note: boldface indicates statistical significance, with * for $p < 0.10$, ** for $p < 0.05$, and *** for $p < 0.01$.

was moderate, as indicated by only 35% of participants agreeing that the flavor ban had been enforced completely and significant percentages reporting that they still purchased e-cigarettes from San Francisco retailers. Similarly, previous studies examining the 2010 New York City ban on the sale of flavored tobacco products other than cigarettes or e-cigarettes (Rogers, 2017) and the 2016 partial ban on menthol cigarettes in Chicago (Czaplicki, 2018) found only moderate retailer compliance.

More generally, the proportion of participants who continued to obtain their tobacco products from retailers within San Francisco decreased only slightly, or, for some products, did not change after the ban. At the same time, the proportion of participants who obtained tobacco products from friends or purchased them online increased slightly for most products, and purchases from sales outlets outside of San Francisco increased. This indicates that the flavor ban made it less convenient to obtain flavored tobacco products within the city but most users could readily continue buying and using flavored tobacco products in a variety of ways. For example, one participant commented “I usually bought ... on my way to & from school & work I rarely had to buy them while in SF”. Similar comments included “I can find alternative outlets to find flavored products”, and “just like banning anything else, if people want to get it they will”.

Nevertheless, only 8.1% of respondents supported the ban, similar to other studies finding support for flavor bans higher among never users than among former or current tobacco users (Soule, 2019; Agaku, 2019). For each of the five flavored product categories, we examined, about half of the participants thought the flavored products should not be banned. Among flavored e-cigarette users, two-thirds were against the ban.

Our findings should be interpreted cautiously in light of two major limitations. First, our sample was a relatively small convenience sample. However, the demographic characteristics of our sample share several unique features with the general population of young adults in San Francisco, including a higher proportion of minorities and those with a college degree and above (Census and City, 2020). Due to the small sample size, however, we could not rigorously examine switching patterns before and after the ban. Second, the flavor ban was implemented in January 2019 while our survey was conducted in November 2019, and some participants might not have recalled their past tobacco use patterns precisely. More importantly, we cannot exclude the possible impact of factors other than the flavor ban policy; for example, the reported outbreak of sudden lung injuries and deaths associated with vaping in 2019 (King, 2020) could have reduced nicotine e-

cigarette use, including switching back to cigarette smoking.

One novelty of this study is our design of zip-code double-checking mechanism. The zip-codes where the participants lived and worked (or studied) are valuable geographical information themselves because they could help to examine the influence of the retailer environment. More important, using double-checking, we increased the survey quality by keeping fake information out and that is a major problem for most crowdsourcing survey platforms.

Overall, our study indicates that a comprehensive ban of all flavors, even when done by an individual city, will significantly reduce flavored tobacco product use, despite incomplete compliance and the availability of flavored tobacco products online or in nearby jurisdictions. Besides, those reductions in flavored tobacco use and other user responses, such as increased quit attempts, will likely reduce e-cigarette use and cigar smoking but could also increase cigarette smoking. Accordingly, cities and other jurisdictions implementing flavor bans might consider complementary strategies such as public education campaigns to encourage total cessation and discourage new or continued smoking, and restricting smoked tobacco product sales to adult-only sales outlets.

To provide more certain knowledge and guidance regarding the optimal way to structure and implement flavor bans to prevent and reduce overall use and harms, additional research should take advantage of the different types of flavor bans and restrictions being implemented by different states and localities (see several examples mentioned in the introduction). These different state and local policies provide a “laboratory” to examine and compare how existing users and nonusers, including youth, react to different restrictions implemented in different policy contexts. Such evaluations of state flavor restrictions would be especially insightful, given their more homogeneous policy environments compared with city-specific restrictions.

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6. Ethics approval

University of Memphis Institutional Review Board.

Appendix A

See Table A.1.

Table A.1
Attitudes and reactions to the flavor ban in San Francisco.

	Percent (%)
General perception	
Support the flavor ban	8.1
Heard of the flavor ban before the survey	62.8
Agreed that the flavor ban has been enforced completely	34.9
The product that should NOT be banned	
Menthol cigarettes	51.8
Flavored e-cigarettes	42.5
Flavored cigars, little cigars, and cigarillos	66.4
Flavored hookah	51.4
Flavored smokeless/dissolvable tobacco product	39.3
Positive reactions	
Quit	19.8
Tried but was unable to quit	16.2
Reduced use	14.2
Tried but was unable to reduce use	8.5
Negative reactions	
Stocked up on flavored products before the ban	13.4
Bought flavored products online after the ban	15.4
Bought flavored products outside of SF after the ban	12.2
Flavored products were still available in SF after the ban	4.5
Bought flavored products illegally in SF after the ban	5.3

Appendix B. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.abrep.2020.100273>.

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Article

Quit and Smoking Reduction Rates in Vape Shop Consumers: A Prospective 12-Month Survey

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Abstract: *Aims:* Here, we present results from a prospective pilot study that was aimed at surveying changes in daily cigarette consumption in smokers making their first purchase at vape shops. Modifications in products purchase were also noted. *Design:* Participants were instructed how to charge, fill, activate and use their e-cigarettes (e-cigs). Participants were encouraged to use these products in the anticipation of reducing the number of cig/day smoked. *Settings:* Staff from LIAF contacted 10 vape shops in the province of the city of Catania (Italy) that acted as sponsors to the 2013 No Tobacco Day. *Participants:* 71 adult smokers (≥ 18 years old) making their first purchase at local participating vape shops were asked by professional retail staff to complete a form. *Measurements:* Their cigarette consumption was followed-up prospectively at 6 and 12 months. Details of products purchase (*i.e.*, e-cigs hardware, e-liquid nicotine strengths and flavours) were also noted. *Findings:* Retention rate was elevated, with 69% of participants attending their final follow-up visit. At 12 month, 40.8% subjects could be classified as quitters, 25.4% as

reducers and 33.8% as failures. Switching from standard refillables (initial choice) to more advanced devices (MODs) was observed in this study (from 8.5% at baseline to 18.4% at 12 month) as well as a trend in decreasing the e-liquid nicotine strength, with more participants adopting low nicotine strength (from 49.3% at baseline to 57.1% at 12 month).

Conclusions: We have found that smokers purchasing e-cigarettes from vape shops with professional advice and support can achieve high success rates.

Keywords: smoking cessation; smoking reduction; electronic cigarette; vape shop; tobacco harm reduction

1. Introduction

Most smokers want to quit and make attempts to do so, but the majority of these attempts fail largely because the powerful addictive qualities of nicotine and non-nicotine sensory and behavioural cues [1,2]. For those willing to quit, combination of pharmacotherapy and intensive behavioural intervention for smoking cessation can support their quit attempts and can double or triple quit rates [3,4]. However, outside the context of rigorous randomized controlled trials, reported efficacy rates are somewhat lower [5–7]. Consequently, the need for novel and more efficient approaches to smoking cessation interventions is unquestionable.

Electronic cigarettes (e-cigs) are an attractive long-term alternative nicotine source to conventional cigarettes because of their many similarities with smoking [8,9] and randomized controlled trials with early generation products have shown that they may assist smokers to remain abstinent during their quit attempt [10,11]. E-cigs come in all sorts of shapes and sizes. Some, commonly referred to as first generation devices, resemble tobacco cigarettes (cigalikes) with a mouthpiece resembling a cigarette filter, a battery and a LED which glows when the user inhales on the device. These devices comprise low-capacity disposable or re-chargeable batteries and combined cartridges and atomisers (cartomisers). Second generation devices often resemble a pen (personal vaporizer) are equipped with high-capacity lithium batteries, a more efficient vaporizing system compared to cigalikes and can be refilled with a wide combination of flavours and nicotine levels. These devices assent to a more fulfilling vaping experience compared to first generation e-cigs with the choice of an extensive number of e-liquid aromas, and thicker vapour [12,13].

Third generation devices (more advanced devices-MODs) bear little visual resemblance to cigarettes, use larger-capacity batteries, replacement heating coils and wicks for atomizers, and adjustable and programmable power delivery.

These products can be purchased in tobacco retail environments, convenience stores, liquor stores, pharmacies, and on the Internet. Shops devoted exclusively to trial and sales of e-vapour products (e.g., refillable and disposable e-cigs, several types of solution strengths and flavours, customizable atomizers and tank systems, and other accessories) are known as “vape shops” and their popularity has been growing in parallel to that of e-cigs [14].

Two randomised controlled trials investigating success rates in smokers asked to try cigalikes have reported disappointingly low quit rates; 4%–8.7% for the ECLAT study in Italy [10] and 4%–7.3% for

the ASCEND study in New Zealand [11]. Not surprisingly, much higher success rates have been reported in clinical trials with refillable penlike e-cigs, with an overall quit rate of 36% at 6 months [15,16]. Nonetheless, it is likely that their performance and appeal as cigarette substitutes can be further improved outside the rigid context of an experimental setting by describing success rates with refillables purchased by smokers at vape shops where professional advice and regular technical support it is also available. Therefore, we hypothesized that vape shops environment together with best matched e-vapour products may promote high success rates in smokers interested in trying this alternative to tobacco smoking. Here, we present results from a prospective pilot study that was aimed at surveying changes in daily cigarette consumption in smokers making their first purchase at vape shops. Modifications in products purchase over time were also noted.

2. Methods

2.1. Participants and Study Design

Adult smokers (≥ 18 years old) making their first purchase at local participating vape shops were asked by professional retail staff to complete a form with their basic demographic and smoking history details together with scoring of their level of nicotine dependence by means of Fagerstrom Test of Nicotine Dependence (FTND) questionnaire [17]. Participants were instructed how to charge, fill, activate and use their e-cigs. Key troubleshooting was addressed and phone numbers were supplied for technical assistance. Participants were encouraged to use these products in the anticipation of reducing the number of cig/day smoked. Their cigarette consumption was followed-up prospectively at 6 and 12 months. Details of products purchase (*i.e.*, e-cig hardware, e-liquid nicotine strengths and flavours) were also noted. University of Catania Ethics Review Board approved the study protocol and subjects gave consent prior to participation.

2.2. Vape Shops

Staff from Lega Italiana Anti Fumo (LIAF) contacted 10 vape shops in the province of the city of Catania (Sicily) that acted as sponsors to the 2013 No Tobacco Day. Vape shop owners were asked to help with a survey of smokers making their first purchase at their vape shops. Three declined, but seven accepted to be involved. Participating shops were bar or lounge types and displayed a wide range of nicotine in juices, large selection of flavours and hardware (including cigalikes, refillables and MODs).

2.3. Study Outcome Measures

Sustained 50% reduction in the number of cig/day from baseline (*reducers*) was defined as sustained self-reported 50% reduction in the number of cig/day compared to baseline for the 30-day period prior to follow-up visit.

Sustained 80% reduction in the number of cig/day (*heavy reducers*) and sustained smoking abstinence from baseline (*quitters*) were defined as sustained self-reported 80% reduction in the number of cig/day compared to baseline and complete self-reported abstinence from tobacco smoking (not even a puff) for the 30-day period prior to follow-up visit respectively. Smokers who failed to

meet the above criteria and those who were lost to follow-up were categorized as reduction/cessation failures (*failures*).

2.4. Statistical Analyses

Primary and secondary outcome measures were computed by including all enrolled participants and assuming that all those individuals who were lost to follow-up are classified as failures (intention-to-treat analysis). Data were expressed as mean (\pm SD). One-way Analysis of Variance (ANOVA) was used for detecting differences between means, and χ^2 test for testing differences in variable frequency distributions. Repeated Measures ANOVA was used for detecting differences at different time points.

3. Results

3.1. Participant Characteristics

A total of 71 (M 44; F 27) regular smokers (mean [\pm SD] pack/years of 32.4 [\pm 13.7]) with a mean (\pm SD) age of 41.7 (\pm 8.8) years, and mean (\pm SD) FTND score of 5.6 (\pm 2.2) were enrolled by seven participating vape shops (Table 1). Retention rate was high, with 49 (69%) participants completing all study visits and attending their final follow-up visit at 12 month. Baseline characteristics (sex, age, pack/year, and FTND) of those who were lost to follow-up were not significantly different from those of participants who completed the study.

Table 1. Characteristics of the study sample at enrollment.

	M	F	<i>p</i> Value
Sex <i>n</i> (%)	44 (62)	27 (38)	
Age (years, mean \pm SD)	42.6 \pm 8.6	40.4 \pm 9.3	0.31
FTND (mean \pm SD)	5.6 \pm 2.3	5.1 \pm 1.9	0.12
Packs/year (mean \pm SD)	36.0 \pm 14.3	26.5 \pm 10.5	0.004
CPD (mean \pm SD)	26.5 \pm 7.9	22.3 \pm 4.6	0.016

CPD: cigarettes per day; FTND: Fagerstrom Test for Nicotine Dependence.

3.2. Changes in Smoking Behaviour

Participants' smoking status at baseline and at 6 and 12 month follow-up visits is presented in Figure 1. Taking the whole cohort of participants ($n = 71$), the cig/day use changed (mean and range) from 24.9 (15–50) at baseline to 4.0 (0–30) at 6 month and 2.6 (0–15) at 12 month ($p < 0.0001$). At 12 month, 29/71 subjects (40.8%) could be classified as quitters, 18/71 (25.4%) as reducers, of which 11 (15.5%) reduced their cig/day consumption by at least 80% from baseline, and 24/71 (33.8%) were classified as failures, of which 22 (31%) were lost to follow-ups.

Overall, combined smoking reduction and smoking abstinence was shown in 47/71 (66.2%) participants, with a mean (range) of 24.7 cig/day (15–50) at baseline, decreasing significantly to 2.2 cig/day (0–10) at 12 month ($p < 0.0001$), which is equivalent to an overall 89.1% reduction from baseline.

None of the individual characteristics (age, gender, pack/years, FTND) recorded at baseline were a significant predictor the smoking status at the final follow-up visit.

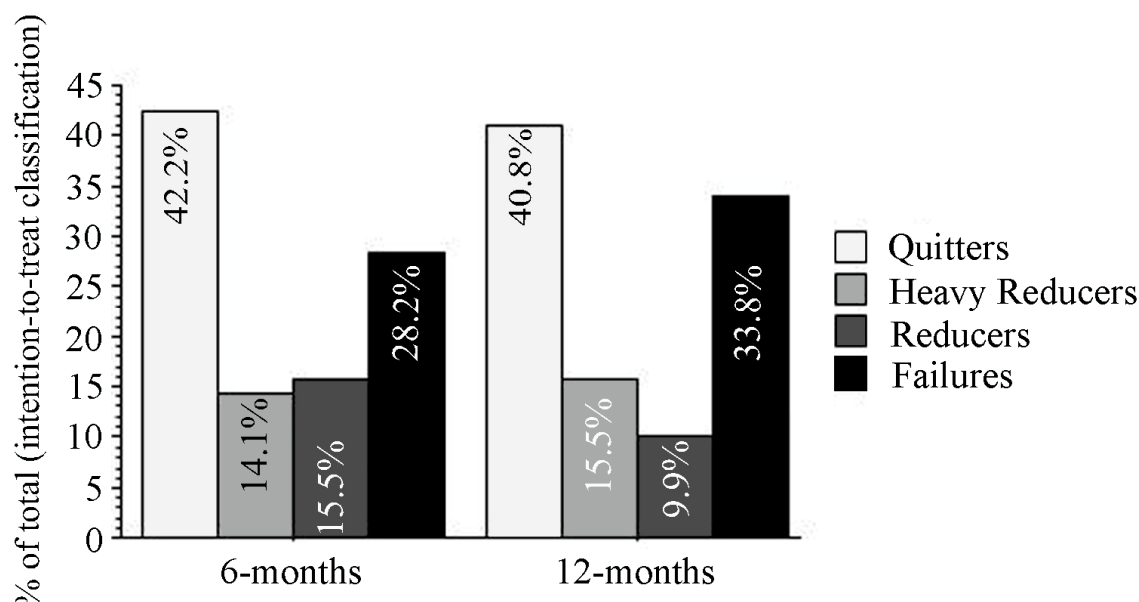


Figure 1. Distribution of smoking phenotype classification (intention-to-treat analysis) at 6 and 12 month follow-up visits.

3.3. Changes in Products Choice

Participants' products choice at baseline and at 6 and 12 month follow-up visits is illustrated in Figure 2.

An increasing percentage of participants switched from standard refillable e-cigs (initial choice) to more advanced devices (MODs) during the study (from 8.5% at baseline to 18.4% at 12 month). Participants also tended to decrease the nicotine strength of their e-liquid with time. More users used a low (4–9 mg/mL) nicotine strength at 12 months, and, less users used a medium (12–18 mg/mL) nicotine strength at 12 month, compared to baseline. Some change did occur too for the preferred flavour used by the participants over time, but most of the participants in our study consistently preferred tobacco flavours over other flavours.

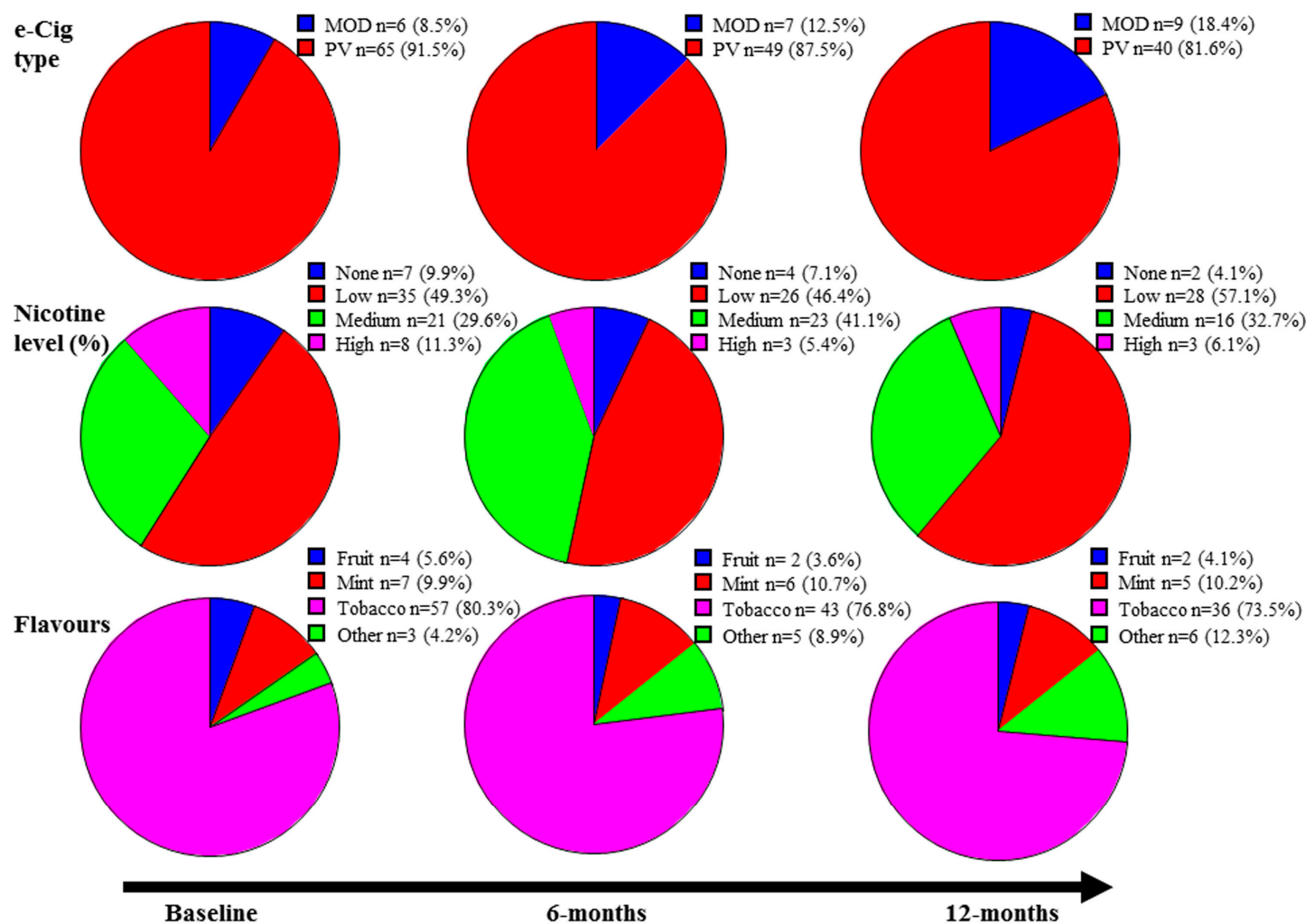


Figure 2. Details of e-Cigs type, e-liquid nicotine strengths (%) and flavours purchased at baseline and at 6 and 12 month follow-up visits. PV: personal vaporizers. MODs: more advanced devices. Low nicotine (4–9 mg/mL), medium nicotine (12–18 mg/mL), high nicotine (19–24 mg/mL).

4. Discussion

E-cigs' success rates have been reported in several clinical trials [10,11,15,16] and Internet surveys [18–20], but never in prospective studies under natural conditions. Here, we present results from the first prospective survey of changes in daily cigarette consumption in smokers making their first purchase at vape shops. The higher success rates observed in this study could reflect both a progress in the type of e-cigs used currently, and a better support and advice from the vape shop staff.

Success rates were not only high, but also stable thorough the whole observation period with quit rates of 42.2% in the intent-to-treat analysis at 6 month barely decreasing to 40.8% at 12 month. The reported quit rates are not only higher than those obtained with pharmaceutical products for the treatment of nicotine addiction [21,22], but also greater than those of first generation cigalikes [10,11]. In contrast, similar quit rates were observed in a recent prospective 6-month study with refillable e-cigs [15].

In addition to those quitting completely, 25.4% substantially reduced cigarette consumption. The prevalence of dual use (that is, use of both e-cigs and conventional cigarettes) in our survey is much lower than that reported for cigalikes [18–20]. Although dual use by leading to gradual reduction in cigarette consumption may aid future quit attempts [23,24], it is not known to what extent this behaviour may confer significant reduction in risk and reversal of harm in long-standing dual users.

The large number of consumers still using the product at 12 months (combined single and dual usage was 66.2%) and the high retention rate (69%) in this study may suggest that the products purchased were providing adequate satisfaction. This may be due to several factors including quality hardware, large selection of flavours and nicotine. Nicotine absorption using high quality e-vapour products has been shown to be consistently superior compared to cigalikes [25,26], which is compatible with a better suppression of the withdrawal symptoms. Last but not least, the high success rate in this study may be also attributable to participants self-selection (*i.e.*, smokers well motivated in trying e-cigs and making their first purchase at vape shops).

Nonetheless, about one third of smokers in this study failed to quit or to substantially reduce cigarette smoking with e-cigs. That reasons for failure were not collected in this study, but this could be due to the fact that probably not all smokers could find the adequate hardware-liquidware combination to allow a fulfilling vaping experience or that some unknown factor hindered their use under realistic conditions. It is not excluded also, that some of them may have persisted to use e-cigs, but went to buy their products in other vape shops than the one chosen for this study.

It is interesting that 69% of vape shop consumers went regularly back to their local vape shop for more personalized e-cig support and advice. This loyalty factor is perhaps a key informative finding and suggests that vape shop staff can promote healthier life-style changes in smokers.

As noted in other (internet) surveys, e-cig users tend to adapt their vaping experience over time [13,27]. This is reflected somewhat in the increased percentage of participants who switched from standard refillables (initial choice) to more advanced devices (MODs) in this study (from 8.5% at baseline to 18.4% at 12 month). Similarly, we observed a trend in decreasing the nicotine strength of their e-liquid, with more participants using low nicotine strength at 12 months compared to baseline, and inversely, with less participants using medium nicotine strength at 12 month compared to baseline. This could confirm that nicotine dependence decreases over time with e-cig use, as noted by other investigators [13,28], but cannot

be validated in our study as we did not measure nicotine dependence at 12 month. The change in vaping experience was also the case for the preferred flavour used by the participants over time, although less significant in our study than in others [12,13,20], with the participants in our study consistently preferring tobacco flavours over any other flavour. This may reflect differences in study populations, vape shop consumers representing a more natural condition compared to those responding to online questionnaires.

There are some limitations in our study:

Firstly, this is a small prospective study (already stated in the text), hence the results observed may be due to bias and not due to a true effect; and consequently be interpreted with caution. However, despite being a small study we were able to detect positive significant changes for success outcomes.

Secondly, patients in this study may represent a self-selected sample, which is not representative of all smokers who switch to e-cigs.

Lastly, smoking abstinence was self-reported. However, self-reported number of cigarettes smoked per day in studies of this type is not subjected to the kind of biases observed in clinical trials where there is the tendency to claim abstinence [29].

This small uncontrolled study shows that combination of high quality e-vapour products together with personalized e-cig support and advice at vape shops promotes high success rates in smokers interested in trying this alternative to tobacco smoking. Complete tobacco cessation is the best outcome for smokers, but the powerful addictive qualities of smoked nicotine and of the ritualistic behavior of smoking create a huge hurdle, even for those with a strong desire to quit. Tobacco harm reduction (THR), the substitution of low-risk nicotine products for cigarette smoking, is a realistic strategy for smokers who have difficulty in quitting. E-cigs are the newest and most promising products for THR [30]. This approach has been recently exploited to reduce or reverse the burden of harm in smokers with mental health disorders and chronic airway diseases [31,32]. It is ironic, but the extent of displacement from tobacco smoking to regular vaping will also depend on how efficient e-cigs will become in replicating smokers' smoking experience and how prevalent and helpful will be vape shops. As a matter of fact, substantial public health benefits (*i.e.*, increase in smoking cessation rates and a continued decline in smoking prevalence) are now reported in countries with high prevalence of vaping [33].

Improved products reliability and attractiveness might have contributed to the very low number of lost to follow-up and high success rates thus confirming the notion that these products are attractive substitutes for conventional cigarettes. Although larger longitudinal studies in vape shops are warranted to confirm these encouraging results, the notion that high quality e-vapour products together with personalized e-cig support and advice at vape shops can substantially decrease cigarette consumption, and allow a large number of smokers to quit should be taken into consideration by regulatory authorities seeking to adopt proportional measures for the vapour category [34].

5. Conclusions

Here we have shown for the first time that combining availability of appealing e-vapour products for smoking substitution with professional advice from vape shops staff it is possible to achieve high and stable success rates. By promoting healthier life-style changes in smokers, vape shops may

become valuable allies in the fight against smoking. Larger studies are now needed to confirm these preliminary findings and to establish the importance of integrating these antismoking services into future tobacco control strategies.

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Author Contributions

Riccardo Polosa: Principal investigator involved in the study concept, protocol design, data interpretation and drafting the manuscript. Pasquale Caponnetto: Co-Principal investigators involved in the study concept, protocol design, coordination of the study, data interpretation and revised the manuscript. Fabio Cibella: Carried out the data analyses, was involved in their interpretation and revised the manuscript. Jacques Le-Houezec: Involved in data interpretation and drafted the manuscript. All authors have read and approved the final manuscript.

Conflicts of Interest

Riccardo Polosa has received lecture fees and research funding from Pfizer and GlaxoSmithKline, manufacturers of stop smoking medications. He has also served as a consultant for Pfizer and Arbi Group Srl, an Italian distributor of e-Cigarettes. Riccardo Polosa is currently scientific advisor for LIAF, Lega Italiana Anti Fumo (Italian acronym for Italian Anti-Smoking League). Jacques Le-Houezec is a consultant for Johnson & Johnson France, a manufacturer of nicotine replacement therapy, and was reimbursed for travel and accommodation to present at a conference in Shenzhen (China) organised by the e-cig manufacturer association (CECMOL). Pasquale Caponnetto and Fabio Cibella have no relevant conflict of interest to declare in relation to this work.

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Prevalence of population smoking cessation by electronic cigarette use status in a national sample of recent smokers

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Highlights

- Over half of daily e-cig users in the sample quit smoking in the last 5 years.
- Daily e-cig users were 3 times more likely to be quit than never e-cig users.
- Some day e-cig users were least likely to be quit.
- Some smokers may have quit or are preventing relapse with frequent e-cig use.