

THE TRIANGULUM: TOBACCO, MARIJUANA, AND ELECTRONIC SMOKING DEVICES (ESD)

*Position Statementⁱ
September 29, 2016*

I. INTRODUCTION

The United States “smoking” landscape is rapidly changing, presenting a very complex and challenging new paradigm for tobacco control. Even though the talking points that follow deal mainly with the smoking and aerosolizationⁱⁱ of marijuana, there are many other things being “smoked” in the 21st century. This new smoking terrain, which some have dubbed the “Triangulum” (Triangulum, Latin for triangle), reflects the intersection of tobacco, marijuana, and electronic smoking devices (ESD); the latter being the delivery device to aerosolize not only nicotine, but also cocaine, heroin, methamphetamine, marijuana and other drugs. Youth and young adults are now using marijuana, hookah, and ESD on a regular basis, more than regular cigarettes. Many kids are using e-liquids without nicotine, whether in a hookah pen, an e-cigarette and/or a vaporizer. Most youth do not realize that the aerosolization of flavors, in and of itself, is hazardous, since many may be respiratory irritants.

In addition, there is a plethora of new nicotine products, including dissolvable tobacco sticks, orbs and strips; snus; nicotine water and nicotine gels; electronic hookah pens aerosolizing flavored liquids, with and without nicotine; and heat-not-burn products that produce an aerosol, but no fire or smoke (see table on page 10). Moreover, youth who are using cigarettes are frequently using them in combination with other tobacco products and other substances. Analogous to the “roll your own” marijuana joints of the last century, today, kids can “mix their own” combinations of assorted e-liquid flavors at different levels of nicotine concentration and inhale the aerosolized mixture. In addition, vaporizers are being used to aerosolize highly concentrated forms of marijuana, and youth using blunts are now adding crack or crystal meth and calling it “caviar.”

The bottom line is that this new confluence of smoked and aerosolized substances produces toxins that are not safe for the user, are not safe to people nearby them, are environmental hazards, and are increasingly being used by youth and young adults and should be regulated just as cigarettes are regulated.

II. TEROC POSITION STATEMENT

The Tobacco Education and Research Oversight Committee (TEROC) believes that California’s experience in tobacco control should be applied to the potential legalization of

ⁱ The talking points below calling for the regulation of marijuana like tobacco products are in no way meant to pertain to the sacred or religious use of marijuana by certain groups in the United States (U.S.).

ⁱⁱ Although the terms “vaping” and “vapor” are widely used with respect to ESD, a more accurate term is “aerosol.” A liquid aerosol is the collection of chemical droplets and particles suspended in air ranging in size from fine, to ultrafine, to nano.

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commercial marijuanaⁱⁱⁱ, in order to prevent or mitigate unintended negative public health consequences of marijuana legalization. We also acknowledge that other areas of public health expertise have applicability to preventing and reducing potential harms resulting from marijuana legalization. These fields include alcohol prevention, prescription opioid abuse prevention, poison control, and driver safety.

Drawing on California's experience with the tobacco industry, it could be disastrous to give the marijuana industry free reign on marijuana commercialization without checks and balances to safeguard the health of the public.

III. TEROC RECOMMENDATIONS

In making these recommendations, TEROC seeks to prevent or mitigate increased youth initiation, the negative impact of marijuana on the developing brain, the exacerbation and earlier onset of mental illnesses, the worsening of health disparities among vulnerable populations, as well as to protect non-users from secondhand marijuana smoke and aerosol exposure. These vulnerable populations include communities of color, lesbian, gay, bisexual and transgender (LGBT) communities, and low socioeconomic status populations. TEROC strongly recommends that California and local jurisdictions:

- Implement a comprehensive marijuana educational outreach campaign to inform and protect young people, non-users, and the general public from the harms of marijuana use;
- Restrict marijuana use in a manner consistent with clean indoor air and smoke-free laws that restrict the use of cigarettes in indoor and outdoor settings;
- Implement policies to regulate marijuana use based on tobacco control policies, which have been demonstrated to protect the public, help prevent uptake by young people, and reduce tobacco-related disparities;
- Reduce children's and adolescents' exposure to promotional activities that glamorize and encourage the use of marijuana by restricting marijuana marketing and advertising in a manner similar to tobacco marketing restrictions;
- Prioritize evaluation and research to study health effects of marijuana use and the relationships between tobacco use, marijuana, and other risky behaviors, as well as health effects and policy impact.

IV. SUPPORTING FACTS

TEROC's concerns about marijuana use and exposure, and its potential commercialization is based on available and emerging science on the impacts of this drug, detailed as follows.

ⁱⁱⁱ TEROC has deliberately chosen to utilize the term "commercial marijuana" rather than "recreational marijuana." TEROC is concerned that referring to "recreational marijuana" minimizes the potential harms related to use of this drug and normalizes its use. "Commercial marijuana," on the other hand, highlights the fact that this drug will be mass-marketed to Californians, with a greater likelihood of putting marijuana industry profits over the health of the public.

Marijuana Use Prevalence and Perception of Harm

Marijuana Use Prevalence Is Rising and Exceeds Cigarette Smoking Prevalence

- In California from 2013 to 2015, 5.0 percent of 7th graders, 13.4 percent of 9th graders, and 22 percent of 11th graders reported using marijuana in the past 30 days [1].
- Nationally, marijuana use exceeded cigarette use among high school students in 2015; 21.3 percent of seniors reported using marijuana in the past 30 days, compared with 11.4 percent who smoked cigarettes [2].
- In California from 2013 to 2015, 70 percent of 11th graders reported it was fairly easy or very easy to get marijuana; in comparison, 63.1 percent of 11th graders reported it was fairly easy or very easy to get cigarettes [1]. Nationally, in 2015, 79.5 percent of high school seniors reported that it was easy to get marijuana [2].
- In 2016, 9.5 percent of California adults aged 18 to 64 used marijuana or marijuana hash oil at least one day in the past 30 days. In comparison, 13.6 percent of 18 to 64 year-olds had smoked cigarettes in the past 30 days [3].
- In 2013-2014, of the ten states with the highest rates of past-month marijuana use among adolescents aged 12-17, five were states/jurisdictions that had legalized commercial marijuana (Colorado, Alaska, Washington, Oregon, and the District of Columbia), and the rest were states that had medical marijuana programs. Colorado had the highest reported past-month marijuana use for adolescents aged 12 to 17, at 12.6 percent [4].
- Nationally, daily marijuana use among high school students increased, with 6.0 percent of high school seniors reporting daily use in 2015, compared to 5.2 percent in 2009. Among 10th graders, 3.0 percent reported daily use in 2015, compared to 2.8 percent in 2009 [2].
- The perceived risk of harm associated with marijuana use is decreasing. Nationally, in 2015, only 31.9 percent of high school seniors thought regular marijuana smoking was harmful; in 2009 the rate was 52.4 percent [2].
- Over the past decade, the prevalence of past year adult use of marijuana in the United States (U.S.) doubled, from 4.1 percent in 2001-2002 to 9.5 percent in 2012-2013. Nationally, in 2012-2013, 30 percent of marijuana users met the criteria for marijuana use disorder, including taking increasing amounts of the substances over a longer period than intended, inability to cut back, and failure to fulfill obligations. When examined by age, young adults aged 18-29 were at the highest risk for marijuana use and disorder, with use having increased from 10.5 percent to 21.2 percent, and disorder increasing from 4.4 percent to 7.5 percent [5].

Marijuana Is Perceived as Safe, Particularly Among Young People

- Marijuana use in pop culture – music, social media, television, and movies – is portrayed as silly, harmless, amiable, or is revered, and results in normalization of marijuana use [6].
- A 2015 Colorado study revealed the varying perceptions of harm of tobacco and marijuana. Tobacco secondhand smoke was perceived as harmful, including beliefs that it could kill you and your pets, while the perception of marijuana secondhand smoke was that it is medicine and produces less smoke, so it is not harmful [7].
- A 2014 study of young adults who smoked both cigarettes and marijuana found that while cigarette and marijuana use, temptations to use, and pros/cons of using were related among the participants, there were differences in motivation and thoughts about abstinence. This suggests that young adults may be more receptive to interventions for tobacco than marijuana use [8].
- A 2015 study among young adults showed that cigarettes were perceived to be more harmful to health, more addictive, and less socially acceptable than marijuana. Public health messages about marijuana are not as salient when compared with tobacco, which may contribute to perceptions of low harm and addictiveness [9].

Health Disparities and Disproportionate Use in Vulnerable Populations

- Past year marijuana use among African American adults increased in the U.S. from 4.7 percent in 2001-2002 to 12.7 percent in 2012-2013, and marijuana use disorder increased from 1.8 percent to 4.6 percent. Among Latinos, use increased from 3.3 percent to 8.4 percent, and marijuana use disorder increased from 1.2 percent to 2.8 percent [5].
- In Colorado, there is disproportionately higher marijuana use among low socioeconomic, African American, and Lesbian, Gay, Bisexual, Transgender (LGBT) populations. Colorado's 2014 Behavioral Risk Factor Surveillance System (BRFSS) survey showed current marijuana use among people earning less than \$25,000 was 19.8 percent, compared to those earning over \$50,000 at 11.1 percent; African Americans reported current use almost 50 percent higher than the state average of 13.6 percent; and, nearly one third of LGBT adults were currently using marijuana, over twice the state average [10].
- In Colorado in 2015, medical and retail marijuana stores were more likely to be located in neighborhoods that had a high racial and ethnic minority population, a

lower household income, a higher crime rate, or had a greater density of alcohol outlets, suggesting disparities in vulnerable populations [11].

- Blunts are used disproportionately by young African Americans, and puts them at risk of not only the adverse health effects of marijuana use, but also to well-established negative health effects from using tobacco products. Blunts are a combination of marijuana and a small cigar (such as the *Swisher Sweet* brand). They are created when the tobacco in the cigar is removed and replaced with marijuana. Since small cigars are made with a tobacco leaf wrap, users are exposed to the same toxins as other tobacco users. An analysis of 2013 national data showed that young African Americans have disproportionate rates of blunt use, and report a greater number of marijuana and alcohol use disorder symptoms [12].

Substantial Increase in Tetrahydrocannabinol (THC) Concentration Levels

- **Tetrahydrocannabinol (THC) concentration levels determine the psychoactive impact of marijuana. Over time, marijuana has been genetically modified to yield plants with higher THC concentration** [13]. THC concentration increased from 3.7 percent in the early 1990s to 9.6 percent in 2013. For higher concentration marijuana known as “sinsemilla,” or “skunk,” the THC increased from 7.5 percent in the 1990s to 16 percent in 2013 [14].
- **Marijuana potency has steadily increased over the past few decades. In addition, newly developed methods of smoking or eating THC-rich extracts such as butane hash oil (BHO) and wax, may deliver very high levels of THC to the user.** The average marijuana extract contains over 50 percent THC, with some samples exceeding 80 percent. These trends raise concerns that the consequences of marijuana use could be worse than in the past [14].
- The THC content of marijuana products is associated with the intensity of the effects experienced by users. Favorable effects may include calming, relaxing, stimulating, or uplifting feelings. There may also be unfavorable effects like anxiety, panic attacks, and paranoia. Higher THC content may intensify and exacerbate unfavorable effects [13, 15].

Health Effects

- **Secondhand marijuana smoke contains many of the same chemicals and carcinogens as secondhand tobacco smoke. Results from laboratory testing under standard conditions found that secondhand marijuana smoke contained more than**

twice as much tar and ammonia as tobacco smoke, and more than eight times as much hydrogen cyanide [16].

- Early marijuana use is associated with impaired school performance; an individual who initiates marijuana use is 2.3 times more likely to drop out of high school than a non-user [17],[18].
- Marijuana use, especially in adolescents and young adults, is significantly associated with higher risk of anxiety disorders [19] and psychoses [20], higher odds of occurring suicidal thoughts [20, 21], and increased risk of unipolar depression [22, 23].
- The exposure to marijuana secondhand smoke impairs vessel function for much longer than the exposure to tobacco smoke. A study using a rat model showed that, similar to tobacco, marijuana secondhand smoke exposure impairs the ability of arteries to vasodilate (regulation of diameter based on conditions). Although impairment is temporary, repeated exposure leads to long-term impairment [24].
- Animal research suggests that exposure to THC in late pregnancy could have profound and long-lasting health impacts for both the brain and the behavior of the offspring. In addition, studies have shown that THC can be transferred from mother to infant in breast milk and that children exposed to marijuana in utero perform worse in problem solving skills, memory, and the ability to remain attentive [14].
- A 20-year longitudinal study found that at the age of 38, the Intelligence Quotient (IQ) scores of heavy and early onset marijuana users declined by an average of eight points from their IQ at the age of 13 [25]. The average IQ of heavy users was below 70 percent of their peer group [26].
- Frequent use of high-potency marijuana, including sinsemilla or “skunk”, has been associated with greater risk, and earlier onset, of psychosis. Frequent use of high-potency marijuana has been shown to alter and damage the brain, resulting in long-term effects similar to that of experiencing a concussion. A 2015 study using neuroimaging showed that the alterations were similar for users with and without an existing psychotic disorder [27].
- Individuals predisposed to mental illness who use marijuana regularly are at greater risk of exacerbation and earlier onset of schizophrenia [28].

Dependency and Gateway to Tobacco

- Approximately nine percent of marijuana users become addicted to marijuana [23, 29]. This rate rises to 17 percent for those who started using marijuana in adolescence [30] and 25 to 50 percent for daily users [31].
- A 10-year cohort study found that weekly or more frequent use of marijuana in teenaged non-smokers predicted a more than eight-times increased odds of initiation of tobacco use in later life. For 21-year-old smokers that were not yet nicotine-dependent, daily marijuana use raised the odds of nicotine dependence at the age of 24 years by more than three times [32].

The Triangulum: Tobacco, Marijuana, and Electronic Smoking Devices (ESD) Interact

- Marijuana can be used or consumed in several ways, including via combustible smoking, vaping, dabbing, in edible form such as candies, cookies, and other baked foods, and in liquid form including teas and flavored beverages [14] [33]. Other methods of use or consumption of marijuana include pills, tinctures, sprays, oils for cooking, creams, ointments, eye drops, and suppositories [34].
- Electronic smoking devices (ESD) can be modified to efficiently vape marijuana in the form of highly concentrated liquid hash oil and waxy forms of THC, or dried cannabis buds or leaves. THC concentrations of vaporized hash oil and waxes can exceed that of dried cannabis by four to 30 times [35, 36].
- A study of Connecticut high school students showed that vaping marijuana was common among lifetime ESD users (18.0 percent), lifetime marijuana users (18.4 percent), and lifetime dual users (26.5 percent) [37].
- Marijuana concentrates, such as butane hash oil, budger, and shatter, are extremely potent and may contain concentrations of THC of up to 90 percent, and are becoming increasingly popular [14] [33]. These concentrates are often used with ESD.
- Spliffs, like blunts, are another variation of the converging and concurrent use of tobacco and marijuana, and are joints filled with tobacco and marijuana. A 2015 study analyzing nationwide data showed that the co-use of tobacco and marijuana increased among adults between 2003 and 2012, and among Whites, African Americans, and Latinos. The prevalence of co-use was highest among African Americans [38].

Public Safety and Community Health Impact

- **Increasing incidences of fires and home explosions** caused by illegal manufacturing of butane hash oil often results in death or severe burn injuries requiring long-term and costly hospitalization and rehabilitation [39].
- **Incidents of emergency room visits and poison-control calls for children nine years of age and younger who had ingested marijuana products increased after commercial legalization in Colorado.** About twice as many children visited the emergency room per year in 2014 and 2015 as did in years prior to the opening of commercial marijuana stores, and annual poison-control cases increased by five times [40].
- **Marijuana use impairs the skills required for driving a car**, including psychomotor skills, ability to simultaneously attend to multiple tasks, lane tracking, and cognitive functions. Marijuana users are more likely to be involved in accidents. A 2011 meta-analysis showed that marijuana use by drivers was associated with a significantly increased risk of being involved in motor vehicle crashes [41, 42].
- One in six children hospitalized for symptoms of bronchiolitis tested positive for THC, showing exposure to secondhand hand marijuana smoke, according to a 2016 Colorado study [43].
- Drivers with marijuana in their system increased from 8.6 percent in 2007 to 12.6 in 2014, a nearly 50 percent increase, according to the voluntary and anonymous National Highway Traffic Safety Administration's 2013-2014 National Roadside Survey of Alcohol and Drug Use by Drivers [44].
- Workers who cultivate and process marijuana may be acutely or chronically exposed to hazardous chemicals and materials, including pesticides, fertilizers, adulterants, and mold. The United Food and Commercial Workers' (UFCW) Cannabis Workers Rising chapter is working to integrate marijuana workers into existing health and safety curriculums [45] [46].

Environmental Impact

- An estimated 60 to 70 percent of the United States' marijuana is grown in California and cultivation has shown to have significant effects on the environment [47].
- Growing marijuana uses nearly twice as much water as cultivating wine grapes. Using Google Earth and on-the-ground busts of illegal marijuana growing sites, the California Department of Fish and Wildlife estimated that the grow sites use up to three billion liters of

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water per square kilometer in one growing season. Much of the water is diverted from streams essential to the survival of habitat and wildlife, including endangered species [47].

- Sediment and pollutants such as petroleum products, fertilizers, and killing agents used in marijuana grow sites have also polluted the landscape and the water, and have compromised the food chain [47].
- Marijuana cultivation has resulted in the conversion and fragmentation of lands, and unsanctioned forest clear cutting which increase erosion and destroy existing habitat [47].

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Marijuana Product Definitions

Name	Definition [48]
Blunt	Ground marijuana rolled in a cigar or cigarillo tobacco leaf wrap (such as the <i>Swisher Sweet</i> brand of little cigars). Since cigars are made with a tobacco leaf wrap, users are exposed to the same toxins as other tobacco users, and are at risk of addiction and cancer.
Concentrates/BHO	Concentrates are a potent consolidation of cannabinoids that are made by dissolving marijuana in its plant form into a solvent, usually butane (lighter fluid). The resulting product has very high THC levels (generally more than flowers or hashish), and can produce varying products that range from thick sticky oils (Butane Hash Oil/BHO) to moldable goo (budder/wax) to resinous bits (shatter). Referred to by a variety of slang terms, the classification of concentrates is often dependent on the manufacturing method and the consistency of the final product.
Dab/Dabbing	A dab is a slang term used to refer to a dose of BHO received through butane combustion and inhalation. The act of "dabbing" refers to partaking in dabs.
Edibles/Medibles	Edibles and medibles are edible goods that have been infused with cannabis extracts. They are commonly baked goods such as cookies and brownies, but options as varied as flavored coffee drinks, breads, and candies exist as well. Dispensaries also often sell marijuana-infused butters or oils for patients or consumers to make their own edibles. Consuming edibles means the active components from the extracts require longer to take effect as they need to be absorbed through the digestive system, and users are at greater risk of overdosing.
Joint	Ground marijuana rolled in cigarette rolling paper.
Spice/Synthetic Marijuana	Synthetic cannabinoids are laboratory-made psychoactive chemicals sprinkled on dry plant material to be smoked, or sold as a liquid to be vaporized. Also known as Spice or K2, users report some effects similar to marijuana use, with reports of stronger psychoactive effects, including extreme anxiety, paranoia, and hallucinations. Spice is popular due in part to the fact that a standard drug test cannot easily detect the chemicals [49].
Spliff	Ground marijuana mixed with tobacco and rolled in cigarette rolling paper. Since tobacco is smoked with the marijuana, users are exposed to the same toxins as other tobacco users, and are at risk of addiction and cancer.

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