Washington State Health Care Authority

Report to the Legislature

High THC policy | Final report

Exploring policy solutions to address public health challenges of high THC products

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High THC product policy

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Executive summary

The amount of Tetrahydrocannabinol (THC) in legally sold cannabis has increased in the last decade. The risks associated with using products that contain high amounts of THC are becoming better understood. A University of Washington and Washington State University 2020 Consensus Statement and report[1] found that:

1. Young people are more vulnerable to high THC products, especially for developing cannabis use disorder.
2. Young adults, people with lower incomes, racial and ethnic minorities, and those reporting poor mental health are more likely to "dab", the riskiest method of using high THC concentrates.
3. High THC products can have lifelong mental health consequences. Policy makers in several U.S. states have begun to consider ways to mitigate these harms.

To address this emerging public safety challenge, the WA State Health Care Authority was directed by **ESSB 5092 (2021)** to contract with the University of Washington's Addictions, Drug & Alcohol Institute (ADAI) to identify areas of common ground and consensus, and develop recommendations for state policies related to cannabis concentration and mitigating detrimental health impacts.

This report describes the recommendations for state policies based on the perspectives of WA stakeholders, research evidence on public policies designed to mitigate harms associated with non-medical use of high THC cannabis products and other legally commercialized health-compromising products, and cannabis policies that have been considered or adopted in North America.

This report recommends a comprehensive package of policies aimed at:

- Decreasing access to high THC products.
- Preventing initiation of high THC products.
- Empowering consumers and the public with information and education about high THC products.

Recommended policies are specific to non-medical cannabis and are summarized below:

Decrease access to high THC products

Implement excise tax levels proportional to total THC content in products with greater than 35 percent THC concentration.

There is strong evidence from alcohol and tobacco taxation that excise taxes are an effective way to de-incentivize use and reduce related harms of these products. Community and professional stakeholders in WA support such a tax, although cannabis advocates do not, which is consistent with the position of alcohol and tobacco producers who have a financial conflict of interest with such measure. Three adult use states, Connecticut, Illinois, and New York, have THC-based taxes. While a shift in high THC production may occur to a limited extent, there is good evidence suggesting that the benefits of taxation will outweigh the harms of illicit production. Tax increases will be more of a purchase barrier for people with lower incomes, however cannabis taxes constitute a minor proportion (i.e., 1 percent) of the tax burden for most people.

Prevent initiation of High THC products

Prohibit marketing and advertising of high THC products.

Cannabis, alcohol, and tobacco research demonstrate that youth who are exposed to advertising report an increased intent to use that product in the future. Comprehensive advertising bans of tobacco products are effective at decreasing initiation; partial bans (e.g., limiting channels, times, types of messages) are less effective. WA community and professional stakeholders support an advertising ban, while cannabis advocates supported only limited restrictions already in place. Most U.S. states, including WA, have limited cannabis advertising bans, and Canada imposes heavy restrictions on the promotion of cannabis.

Raise the legal age for high THC products' purchase to 25 years old.

Human brains develop rapidly through the age of 25, so decreasing accessibility for those 21-24 year would potentially have the largest health benefit if adopted. Raising the legal age to purchase alcohol and tobacco resulted in lower use among those under 21. All WA stakeholders viewed high-THC specific age restrictions to 25 years old as impactful. To date, no age specific restrictions to purchasing high-THC products have been implemented in North America.

Empower consumers and the public with information and education about high THC products

Add high THC-specific mandatory health warning labels (HWL)

Clear and prominent HWLs are a low cost, effective way to communicate health risks to consumers, empowering them to make informed purchasing decisions. There was also consensus among stakeholder groups that readable labels were both impactful and feasible to implement, with the recommendation of "doing the marketing research to determine the most effective placement and fonts size is for health concerns related to these products." Three states currently require warning labels, New Jersey, Nevada, and Colorado, and Canadian Federal regulations require rotating HWLs including two warnings specific to high THC products.

Add standard THC serving unit and total servings to cannabis product labels

Adopt a 10 mg total THC serving size for all cannabis products and include the expression of a standard THC unit on product labels will provide consumers a more direct way to understand the amount of THC in products. The National Institute on Drug Abuse endorses a standard THC unit to help consumers, researchers, prevention, and treatment providers better gage use, similar to how alcohol is measured in standard units of ethanol across product types. Studies indicate that consumers currently have low THC literacy and would benefit from clear product information on labels to help them make informed product choices. Cannabis professionals and community groups rated this option as highly impactful with low feasibility, and cannabis advocates rated this as neither impactful nor feasible. As of August 2022, New Jersey was the only state to set a THC serving unit across all products. Quebec, Canada requires labels to provide information on serving sizes defined as 5 mg of total THC, and several states mandate that product labels indicate whether the package contains more than one serving.

Require point-of-sale education about high THC products' risks, labels, and dosing

Create point-of-sale educational materials for consumers that includes potential harms, who is most at risk, comparative dosing, and how to read a product label can increase informed and safer decisions around cannabis consumption. Provision of training for cannabis retail staff can be also helpful Researchers have documented low THC literacy among cannabis users, and cannabis retail staff have indicated a desire to better inform consumers so that they have a pleasurable experience with cannabis. Point-of-sale education in restaurants has been effective in helping consumers make healthier choices. All WA stakeholder groups viewed point-of-sale education as impactful and feasible. Only three states require such education: Colorado, Vermont, and Nevada.

Fund social media campaigns and public service announcements (PSAs) targeting people at elevated risk for experiencing high THC products' negative effects

Health messaging is most effective when targeted campaigns are tailored for the people most at risk of harm, and when tied to a specific action that can be taken (e.g., choose an alternative product or call to seek help). Stakeholders across all groups viewed the use of tax revenue for this purpose as impactful and feasible. No educational campaigns targeting people at greatest risk of harm from high THC use exist currently.

Additional recommendations include:

- Sufficiently funding compliance monitoring and evaluation in of all above policies to strengthen implementation and measure success.
- Ensuring that policies designed to decrease access, such as taxation, are designed to not interfere with a patient's ability to obtain cannabis recommended to them by their healthcare provider.
- Reduce the possibility that synthetic cannabinoids derived from hemp do not threaten the success of the policies by placing regulation of these products under WSLCB jurisdiction.

Notably, we are not recommending capping THC content currently. Capping THC content to allow only low concentrations of THC is an evidence-based policy to be considered in the future, however it received low stakeholder support from all three groups involved in ADAI assessment. This is a policy option that could become more feasible as cannabis education and THC literacy increases in WA, THC testing accuracy improves in our state, and more is learned from caps in other states and provinces.

Background on high THC products

THC is the most well-studied compound in cannabis and the primary psychoactive (mind-altering) substance. The percentage of THC found in cannabis products is used as a measure of its concentration, or how strong it is.

There is a wide variety of high-THC products or concentrates. These include wax, shatter, hash oil, and more. These products are manufactured to contain much higher concentrations of THC than what is naturally found in the plant. Cannabis flower in WA contains an average of 15-20 percent THC, while concentrates have 60-90 percent THC. Concentrates are very popular among young consumers because they are heavily advertised, low-cost, potent, and widely available.

Since the mass production of high-THC products is new, research on health effects is still new. Researchers from the University of Washington and Washington State University created a report[1] compiling what is currently known about how higher doses of THC affect people's health. Here's what they found:

- **Young people are more vulnerable**. There is strong evidence that THC use during adolescence can be harmful, and negative impacts may be worse for those who use high-THC products more often.
- **The risk of developing cannabis use disorder (addiction)**, especially among young people, is higher when using high-THC products.
- **Younger adults, people with lower-incomes, racial and ethnic minorities, and those reporting poor mental health** are more likely to "dab" in WA State, a method of use that provides a large amount of THC in one hit.
- **High-THC products can have lifelong mental health consequences.** Daily cannabis use, especially of high-THC products, are associated with an increased risk of developing a psychotic disorder (like schizophrenia) and can worsen symptoms in people with an existing psychotic disorder.
- **Concentrates are more likely to contain residues and contaminants**, including chemical solvents used in production and other additives. The health effects of exposing human lungs to these contaminants are not fully known.

These findings suggest that the greater the THC concentration, the more likely people will experience negative health effects.

To address this emerging public safety challenge, the WA State Health Care Authority was directed by ESSB 5092 (2021) to contract with the University of Washington's Addictions, Drug & Alcohol Institute (ADAI) to identify areas of common ground and consensus, and develop recommendations for state policies related to cannabis concentration and mitigating detrimental health impacts.

Policy recommendations for the Washington State Legislature

The recommendations for policy adoptions for mitigating detrimental health impacts of non-medical use of high THC products outlined below are based on:

Research on public policies to decrease risks associated with use of high THC cannabis products and other legally commercialized health-compromising products such as high-fat food, high-sugar food, tobacco, and alcoholic beverages. Sources included:

- **Cannabis Concentration and Health Risks**[1]: A 2020 report developed by a workgroup of research scientists from the University of Washington (UW) and Washington State University (WSU) with the intent of providing policy makers with a summary of the current evidence on topics of public health importance related to cannabis concentration.
- Selection of peer-review articles from weekly Google Scholar publication results for (keywords cannabis OR marijuana)
- Purposeful search in PubMed database on evidence-based policies to curb harms of health-compromising commercially available products
- **"High THC Cannabis in Legal Regulated Markets: Documenting Risks and Exploring Solutions for non-medical use"** symposium presentations.
- The **International Cannabis Policy Study (ICPS)**, an annual study examining the impact of cannabis policies at the national and provincial/state levels, with large national samples in the United States and Canada. The overall objective of the ICPS project is to understand the impact of cannabis policies, including the overall impact of legalization, as well as specific regulatory measures, such as product standards, retail policies, cannabis marketing, and public education. Publications from ICPS are **available here**.
- The Washington 2021 Cannabis Report[2], a comparative analysis of the state of Washington and other U.S. states utilizing data from ICPS and funded by the Washington State Liquor and Cannabis Board.

Policies in North America aimed at minimizing the negative impact of high THC products' availability in states with legalized adult use.

- United States information was obtained in consultations with Dr. Gillian Schauer, Executive Director of the Cannabis Regulators Association (CANN-RA), expert in cannabis regulation and UW ADAI Research Scientist. Policies are updated as of August 2022 **(Appendix B).**
- Canada policy information is restricted to federal regulations and the province of Quebec. Information was obtained in governmental sources such as Health Canada[3].

Perspectives of Washington State stakeholders and partners collected through:

- Concept mapping surveys, a 2-step method that invites people to suggest policy solutions to a defined topic, and in a second step present all ideas generated and ask participants to rate them according to each idea's feasibility and impact on addressing the topic at hand. See chart below for a description of the stakeholders consulted and how they were grouped in the analysis presented **(Appendix E & Appendix F).**

- Individual interviews with select stakeholders to inform and contextualize the ideas generated during concept mapping.

Note: tribal partners were invited to share their perspectives through a Dear Tribal Leader Letter distributed by WA HCA in January of 2022 and in a presentation at the January 2022 Monthly Tribal Meeting, and nine tribal organizations and indigenous groups were invited to participate in concept mapping. Participation in concept mapping is anonymous, but notably, no one chose "tribal partner" as a primary identity. Therefore, recommendations are based on WA state stakeholder perspectives and further consultations with tribes that may be impacted by changes to state policy should continue to be explored.

Table 1: Overview of stakeholder groups

Stakeholder groups	Examples
Community	Prevention & treatment organization employees, educators & school administrators, employees for organizations that represent historically underserved communities, mental illness advocacy organization employees, people with lived expereince of harms related to high THC cannabis, and people concerned with healthy youth development
Professionals	Local & state government employees, health care practitioners, health science & public health researchers, and first responders
Cannabis advocates	Cannabis consumers, producers, processors, retail owners, lobbying associations, and related cannabis industry agencies

NOTE: Table 1 describes the different stakeholder groups and lists examples that belong in each group. View Appendix D to learn more.

The recommendations made in this report refer solely to public health challenges derived from the availability of high THC non-medical products, recognizing that medical users have specific needs and work in partnership with their clinicians to make decisions that are appropriate to their health (and therefore are out of the scope of this report). Products containing THC that are not regulated by Washington State Liquor and Cannabis Board (WSLCB) as of October of 2022 (often reported as hemp-derived THC) are also not included in the mandate of this report (see Further Recommendations below).

Policy recommendations

Table 2 enumerates the policy options assessed (first column) and policy recommendations (second column) according to each policy's research evidence, level of local stakeholder support, and similar policies proposed or implemented in North America.

The policies recommended should be adopted as a comprehensive package, as they address complementary domains of the multifaceted challenge of de-incentivizing the production, commercialization, and use of high THC cannabis, namely: decrease access, prevent initiation, and empower consumers and the public with information and education about high THC products.

Table 2: Policies considered for de-incentivizing high THC use (Recommended policies are bolded)

Policies considered	Recommended for WA State	Research support	WA stakeholders' support	Similar policies in North America (as of August 2022)
Decrease access to high THC products				
1. Implement excise tax levels proportional to total THC content in products with greater than 35 percent THC concentration	Yes	Yes	Yes	Yes
Cap THC concentration	No, reassess in the future	Yes	No	Yes
Set purchase limits for THC content	No, reassess in the future	Yes	No	Yes
Prevent initiation of high THC products				
2. Prohibit Marketing and Advertising of high THC products	Yes	Yes	Yes	No
3. Raise legal age of purchase for high THC products to 25 years old	Yes	Yes	Moderate Support	No
Empower consumers and the public with information and education about high THC products				
4. Add high THC specific mandatory health warnings	Yes	Yes	Yes	Yes
5. Add standard THC serving unit and total servings to all cannabis product labels	Yes	Yes	Moderate support	Yes
6. Require point-of-sale education about high THC products risks, labels, and dosing	Yes	Yes	Yes	Yes
7. Fund social media campaigns and public service announcements (PSAs) targeting people at elevated risk for experiencing high THC products negative effects	Yes	Yes	Yes	No
Education in communities/schools about high THC products risks	No. Instead, increase support for evidence-based substance use prevention.	No	Yes	No

NOTE: Table 2 lists each policy that was considered and whether it is recommended to the WA State Legislature, and supported by research and local stakeholders, and which similar policies have been implemented in North America.

Decrease access to high THC products

1. Implement excise tax levels proportional to total THC content in products with greater than 35 percent THC concentration

Recommendation

We recommend that when a cannabis product contains more than 35 percent of THC concentration, the excise tax will increase proportional to the total THC content.

Additionally, we recommend a) earmarking the excise tax revenue collected in products over 35 percent THC concentration to equity-focused initiatives such as education and social investments in low-income areas and/or focused on communities disproportionately impacted by the failed war on drugs; b) exempting high THC products recommended by a health care provider to registered medicinal users from this tax increase.

We expect that adoption of such policies will discourage market trends toward higher THC products, encourage non-medical consumers to consume lower THC concentration products, and maintain current accessibility of medicinal products to people suffering from conditions not alleviated by mainstream treatments who rely on the out-of-pocket purchase of cannabis products.

We also recommend that further analysis be done to decide whether a tax tied to total THC content replaces or supplements the current ad valorem tax, at what point the tax is collected (e.g., at the wholesale or retail level), and levels of taxation recommended to achieve significant health benefits for people in WA State.

To answer these questions, we recommend consultation with at least three health economists with a documented professional background in advising and researching taxation of cannabis, alcohol, tobacco, or sweetened beverages with the purpose of de-incentivizing consumption and protecting public health.

What science says

There is strong research evidence that adopting policies that increase the prices of alcohol[4] and tobacco[5] through excise taxes are one of the most effective means of de-incentivizing use and reducing health related harms of these products. Evidence suggests that cannabis is no exception, as the Law of Demand states that "the inverse relationship between the price of a commodity and the quantity demanded is almost universal, and that only the strength of this relationship will vary across commodities or population groups"[4].

Because of the widespread variation of THC content in cannabis products, health economists, policy researchers, and professional associations have proposed an increase in cannabis taxes in proportion to the THC content[6,7], following the well-established policies of taxing alcoholic beverages according to its main intoxicant, ethanol.[8]

Research has also been instrumental in documenting the importance of the allocation of taxes collected. Multiple U.S. cities with "soda taxes" have earmarked the tax revenues collected for investment in lower-income communities to offset a higher impact of such taxes among lower income populations. A recent study in Seattle demonstrates that when the revenue collected is used to fund programs targeting lower income populations, these taxes can promote equity.[9]

Washington is among the 10 highest median income states in the U.S.[10] Meanwhile, according to a Washington-specific report from the International Cannabis Policy Study (ICPS)[2] the cost of one gram of cannabis dried flower in the WA state legal regulated market is the second lowest in the country. Low prices are expected to ease the migration of high THC consumers to flowers, as Caulkins[11] describes, de-incentivizing one type of product works best when other similar products are available legally. That most cannabis consumers (last 12 months, nationally and in WA state) are multi-product users is likely to ease this transition.[2]

These findings indicate that WA State seems capable of absorbing an increase in excise taxes for high THC products with no significant harms to the cannabis industry and with potential and significant benefit to the public's health.

What Washington State stakeholders support

ADAI research found that WA State stakeholders find increasing taxes for products with THC concentration of 35 percent or higher to be feasible and impactful. When each stakeholder group **(see table 1)** was analyzed separately, those who self-identified as cannabis advocates were not supportive of increasing taxes of high THC products. Community stakeholders supported such a tax increase, and the highest support level was found among professionals

Some support was also expressed for the policy option "tax cannabis by total amount of THC in the product." Professionals rated this option as both feasible and impactful, while community stakeholders considered this measure impactful but with low feasibility. Cannabis advocates were not supportive of taxing per total THC amount.

The resistance of the cannabis industry to increasing taxes on high THC products is consistent with the historic resistance of tax increases among tobacco, alcohol, and unhealthy food industries, given the financial conflict of interest involved. As for cannabis consumers, our recommendation to spare medicinal users of a tax increase on high THC products may alleviate some resistance, as it addresses concerns that were expressed to us that adult medicinal users would be penalized by a change aimed at de-incentivizing non-medical use of such products.

Taxation of high THC products in North America

Three adult use states have THC-based taxes. In Connecticut, in addition to other sales taxes, there is a THC-based tax collected from the consumer at the time of sale wherein: cannabis plant material is taxed at a rate of 0.625 cents/mg of total THC as reflected on the product label; cannabis edible products are taxed at a rate of 0.275 cents/mg of total THC as reflected on the product label, and all other cannabis products are taxed at a rate of: 0.9 cents/mg of total THC as reflected on the product label. In Illinois, there is a tiered THC-based tax at the point of sale wherein: cannabis with a delta-9 THC level at or below 35 percent is taxed at 10 percent of the purchase price; cannabis infused products are taxed at a rate of 20 percent; and cannabis (other than infused-cannabis) with a delta-9 THC level above 35 percent is taxed at

a rate of 25 percent of the purchase price. New York has a wholesale tax of $0.008 per mg of THC for concentrate products.

Concerns that taxation will shift high THC to the illicit market

An often-used argument for not increasing taxes is that an increase in prices will push higher-priced products to the unregulated, illegal market. There are several factors to consider when evaluating the likelihood that this will occur.[11] First is the extent of compliance monitoring and the costs to illegal producers and sellers if they are caught. Effective monitoring can prohibit illicit production and is key to protecting producers and sellers in the legal market. Next is whether the illicit market is likely to involve production or diversion. If neighboring states allow less expensive high-THC products, illicit transportation of products could occur. Bans of other consumer products, while different from taxation, offer some insight into this possibility, and indicate that diversion from another jurisdiction often occurs at a low enough rate to not negate the intended effects of the bans, especially when other product options are available. Caulkins offers several examples, citing, for example, bans on certain explosive fireworks in local jurisdictions, where some diversion occurs, but where the availability of non-explosive fireworks offers a suitable alternative option for most consumers.[11] The FDAs 2009 ban on flavored cigarettes Is another example, which resulted in overall decreased probability of being a smoker (17 percent decrease) and number of cigarettes smoked (58 percent), despite evidence of some smokers substituting menthol cigarettes for other flavored cigarettes.[12] In the case of cannabis, the great majority of consumers (74.7 percent) already use more than one product type and exclusive use of "extracts" is very rare (0.7 percent use concentrates only), suggesting that changing to a different, less expensive product type would be realistic.[13]

While it is possible, and at some extent expected, that some of the production may shift to the unregulated market in the beginning; in the long run, mass production in a competitive market is the most effective way to decrease price of any given product, due to technology advance and product development. Already, prices of cannabis flower have fallen 77 percent per pound in WA state since legalization.[11] In a 2021 survey from ICPS, consumers who purchased dried flowers in WA state in the past 12 months reported paying a higher average price when from illegal sources ($13.58) than from legal sources ($7.38), reflecting the high price of continuing to operate an illegal business when a regulated market exists.[13] Over time, it would be difficult for an illicit market to scale production to the size needed to compete with legal markets.[11,13]

While some illegal market will always exist, as is the case with tobacco and alcohol, the net benefit of such measures should be positive, especially for reducing cannabis initiation and decreasing frequency of use of high THC products among consumers who generally prefer a legal market.

Concerns that production taxation is regressive

Tax increases on high THC products are likely to be more of a purchase barrier for people with lower incomes, a concern that expressed about alcohol taxes as well. However, like cannabis, alcohol taxes constitute a minor proportion (i.e., 1 percent) of the tax burden for most people, including those with low incomes.[4]

Elder et al (2010)[4] summarized these concerns and alternative ways of framing them for alcohol consumption. Their considerations are applicable to cannabis taxation and should be considered.

> ". . . concerns about the regressive nature of such taxes could be readily addressed by compensatory changes in other elements of the tax system. In addition, the amount of tax paid is directly related to the amount of alcohol consumed, and thus increases in alcohol excise taxes will be disproportionately paid by excessive drinkers, who also experience most of the alcohol-related harms and thus generate most alcohol-attributable economic costs. Furthermore, the beneficial economic results of reducing excessive alcohol consumption and related harms may also be disproportionately greater for people with low incomes. Lower income people may be particularly vulnerable to the harmful consequences of excessive alcohol consumption— consumed by themselves or others— because of factors such as lower rates of health insurance coverage, which may result in lack of or incomplete treatment for alcohol related illness or injuries. Increasing alcohol excise taxes could also directly benefit low-income populations if the revenue generated from these taxes is used to help improve the availability of healthcare services for uninsured and other vulnerable populations".

Prevent initiation of high THC products

2. Prohibit marketing and advertising of high THC products

Recommendation

Prohibit all marketing and advertising of products that contain THC concentration over 35 percent. Such prohibition should be comprehensive and include social media, websites/online content, point- of-sale (inside and outside stores), billboards, print magazines and newspapers, radio, TV, movies, email/texts, flyers, event promotion signs, regular postal mail, and all other channels.

Revenues collected due to cannabis industry marketing infractions should be used to fund compliance monitoring in this area, including programs incentivizing community and youth activism that identify marketing and advertising that are not compliant with such rules or that appeal to youth and historically marginalized communities.

What science says

Cannabis advertising and promotion are common in legal U.S. states and most people notice them. An ICPS study found that 55 percent of U.S. respondents and 63 percent of those residing in WA noticed at least on type of cannabis advertising in the last 12 months.[2]

This finding is important because marketing and advertising are driving forces of consumers' purchasing choices. Various studies have shown that youth are often exposed to cannabis ads in store front posts, billboards, magazines, online, and in social media.[14] Youth who see these ads are more likely to use cannabis or say they have intention to use it in the future. They also report more favorable attitudes toward its consumption.[15]

These studies are consistent with a wealth of alcohol and tobacco research. Youth who remember seeing tobacco advertising are more likely to become tobacco users years later.[16, 17] And the more ads they see, the more likely they are to start using tobacco and continue to use regularly.[16, 17] The same is true for alcohol advertising: youth are more likely to start drinking and transition to heavy drinking years later if

they grew up seeing and listening alcohol advertising, promotions, and favorable content about drinking.[18,19]

Research on tobacco marketing and advertising has documented that comprehensive advertising bans are effective for decreasing tobacco initiation.[20, 21, 22] Partial advertising restrictions (channels, times, type of messages) have limited effectiveness on decreasing youth initiation.[20, 21, 22]

What Washington State stakeholders support

WA stakeholders (see table 1) indicated that they support eliminating all advertising of high THC products in WA, rating this policy as both feasible and impactful. Other regulations of less impact and already in place were also supported such as "restrict where high THC cannabis advertising is allowed", and "ban high THC advertising on billboards" both already implemented by RCW 69.50.369[23], which prohibits graphics depicting any cannabis product on billboards in WA State.

When each stakeholder group was analyzed separately, cannabis advocates were supportive only of restrictions already in place, i.e., restricting where advertising is allowed. Community and professional stakeholders were supportive of all three measures, including a complete advertising ban of high THC products, the most stringent and effective for preventing initiation of such products.

Marketing and advertising of high THC products in North America

While most U.S. states have regulations on marketing and advertising (limits on content, audience, and/or channels) there are no product-specific marketing/advertising bans in place or under consideration as of October 2022. Federal regulations in Canada impose heavy restrictions on the promotion of cannabis including cannabis accessories and services and require plain packaging and specific warnings for high THC products on every package.[24]

3. Raise the legal age for high THC products' purchase to 25 years old

Recommendation

Protect the brain development of youth and young adults by raising the legal age of purchase for cannabis products with more than 35 percent total THC concentration.

What science says

The frontal lobe in the human brain does not fully develop until the age of 25. Young adults under the age of 25 are at risk for health impacts from high THC products. These impacts include higher chances of developing cannabis use disorder, transient panic attacks and psychotic episodes, and a much increased risk of developing a lifelong psychotic disorder such as schizophrenia. .

Age restrictions for alcohol and tobacco products have been demonstrated to protect young people's health and safety. Drinking decreased in states that increased the legal drinking age from 18 to 21 by almost 20 percent in six years, from 1985 to 1991.[25, 26] A 16 percent median decline between 1985 and 1999 in motor vehicle accidents was also seen in states that increased the drinking age to 21.[27] There is also evidence that increasing the drinking age to 21 protects drinkers from alcohol and other drug use disorders, adverse birth outcomes, suicide, and other violent crimes.[28]

Similarly, a national study conducted in 2016-2017 showed that 18–20-year-olds living in states with Tobacco 21 laws were 39 percent less likely to have recently used a tobacco product than those living in

states with a lower age limit.[29] As a result, in 2019 the legal age to purchase tobacco products increased to 21 nationwide, quickly cutting youth tobacco use rates.[29]

What Washington State stakeholders support

WA stakeholders (see table 1) report that an increase in purchasing age for high THC products can be impactful but rated this option with slightly lower feasibility than other recommended policies. Professionals rated "increasing the age to purchase high THC products to 25 years old" as feasible and impactful, some supporting the fact that it targets the population most at risk for developing psychosis or cognitive impairment associated with rapid brain development. Community stakeholders rated it as impactful with low feasibility and cannabis advocates rated it as feasible with medium impact.

Age limits in North America

To date, no age specific restrictions to purchasing high-THC products have been implemented in North America. 21 is the legal age to purchase any type of cannabis in all U.S. states that have a legal adult use market, and ranges between 18 and 21 in Canadian provinces.[3]

Empower consumers and the public with information and education about high THC products

4. Add high THC-specific mandatory health warning labels (HWL)

Recommendation

We recommend specific health warnings related to cannabis products with more than 35 percent THC concentration in addition to those already in place per RCW 69.50.346.[30] Such health warning labels (HWL) should be in font size no smaller than 10, use contrasting colors, and be placed in a prominent location that occupies at least 40 percent of the product package.

Font sizes 4-6 are the most often used for cannabis HWL in WA

- *"There may be health risks associated with consumption of this product. Should not be used by women that are pregnant or breast feeding. For use only by adults twenty-one and older. Keep out of reach of children. Marijuana can impair concentration, coordination, and judgment.*

Proposed font size: 10+

"There may be health risks associated with consumption of this product. Should not be used by women that are pregnant or breast feeding. For use only by adults twenty-one and older. Keep out of reach of children. Marijuana can impair concentration, coordination, and judgment.

We further recommend that: a) the content of such messages should be tested for comprehension and clarity among 21–24-year-olds, individuals reporting mental health challenges, and people who identify with historically marginalized groups and b) include language enumerating the risks for using these products such as acute psychotic symptoms, development of psychotic disorders (schizophrenia) and cannabis use disorder.

What science says

HWLs are a low-cost, sustainable way of communicating the health effects of products to consumers.

Comprehensive HWLs increase health knowledge, can reduce consumption, and change social norms towards a more science-based perception of risk.[2, 13]

Results from ICPS found that 59 percent of U.S. respondents support health warnings on cannabis products and that such warnings are noticed by 28 percent of cannabis users living in legal states[2,13].

These findings are consistent with tobacco research data, that demonstrates that consumers note product warnings on HWLs

more than in any other source.[2]

Decades of tobacco, alcohol, and more recently cannabis research has shown that HWLs effectiveness depends upon their design, size, position on the package, borders, and the general appearance of the warning[2, 31]: HWLs should use vivid colors to increase noticeability and maximize legibility (e.g., yellow with black print, as mandated by Health Canada[32] for cannabis products, (see Figure 2) and occupy at least 40 percent of the packaging with fonts no smaller than 10 pt. for optimal impact.[33, 34] A recent study underscores the importance of associating HWLs with plain packaging, as it is federally mandated in Canada: in an experimental study US-style packaging was compared with plain packaging from Canada and found that health warnings for youth and pregnant individuals were respectively 6.7 percent and 12.3 percent of US-style packages against 71.6 percent and 47.1 percent of Canadian plain packaging.[35]

Tobacco research has shown that use of pictorial warnings is more likely to promote cognitive elaboration of risks, increase ability to attract and hold attention, and improve recall as they are more likely to remain salient over time and promote encoding to memory.[36] These studies highlighted the importance of Integrating information on resources for obtaining help; for example, cannabis labels on all products should include contacts information for the Poison Center.

Figure 2: Mandated Canadian HWL

NOTE: Figure 2 depicts a Canadian cannabis product that has a large HWL with a yellow background and black print.

What Washington State stakeholders support

WA stakeholders (see table 1) report that they find feasible and impactful the introduction of HWLs on high THC products. While the intensity of support changes slightly, cannabis advocates, community, and professionals are all supportive of such a measure.

There was also consensus among stakeholder groups that readable labels were both impactful and feasible to implement, with the recommendation of "doing the marketing research to determine the most effective placement and fonts size is for health concerns related to these products."

Warning labels on high THC products in North America

Currently, New Jersey, Nevada, and Colorado require warning labels on cannabis products related to THC concentration. All three jurisdictions require a warning about an increased risk of psychosis from the use of high THC products; however, Colorado also has additional high THC-specific warnings including increased risk of mental health problems, cannabis hyperemesis syndrome, and cannabis use disorder.

In New Jersey, for any cannabis item that contains a total THC percentage >40 percent the following warning must be printed in no less than 10pt font on the front of the package and many not wrap around the side of the package: "This is a high potency product and may increase your risk for psychosis."

Federal regulations in Canada require rotating HWLs including two warnings specific to high THC content products[37]:

WARNING: Regular use of cannabis can increase the risk of psychosis and schizophrenia. Higher THC content can increase the risk of psychosis and schizophrenia.

WARNING: Regular use of cannabis can increase the risk of psychosis and schizophrenia. Higher THC content can lower the age of onset of schizophrenia.

5. Add standard THC serving unit and total servings to cannabis product labels

Recommendation

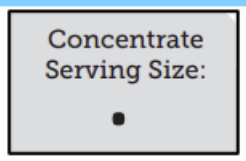
Adopt a single and uniform THC serving unit across products and require serving definition and number of total servings on all cannabis product labels.

Additionally, we recommend that the definition of a THC serving in WA state, which is 10 mg of total THC for edibles[38], to be applied to all cannabis products. This would provide a consistent criterion for adult consumers to make informed decisions about their use and has some level of support among WA stakeholders.

We also recommend this information to be displayed in black ink with a white background, as is already required for cannabis labeling, and in font size of 10 pt. or larger. The minimum font size recommendation is based on nutritional information label requirements.[39] When products contain multiple servings, the label should include in capital letters, minimum 10-point font size CONTAINS MULTIPLE SERVINGS.

Lastly, labelling should include the expression of a standard THC unit in the volume or amount of product. Examples of standard THC expression include "a serving size for dabs is about the size of the tip of a ball point pen" (used in Vermont) or a graphic representing it, as used in Colorado (see figure 3), or "serving size should not exceed 1 inhalation lasting 2 seconds per serving" as in Colorado.

Figure 3: Colorado visual for dab serving size



NOTE: Figure 3 shows the graphic used in Colorado to depict the serving size for dabs

We expect that the implementation of such a provision will provide consumers a more direct comparison across cannabis products using a familiar metric. This gives consumers a tool to monitor their cannabis use similar to how people count the number of standard drinks they've consumed to monitor their alcohol consumption. It also provides a clear metric for public health campaigns and education to communicate how to prevent overconsumption and gives healthcare providers a system to understand how much THC has been consumed during instances of adverse health effects.

What science says

Research on Standard THC unit or dose: Support for a cannabis standard serving sizes is very high in the U.S. An ICPS survey with 29,711 U.S.-based participants indicated 69 percent of all respondents and 76 percent of respondents who reported using cannabis replied "Yes" to the question "Should packaging for other cannabis products (besides edibles) display standard amount or serving sizes for THC?" to help people decide how much of an edible to consume?".[2]

The definition of a THC serving unit, and its adoption across all cannabis products has become an imperative demand to advance science and to foster consumer sovereignty and informed decision-making. In 2019, Freman and Lorenzetti[40] proposed the adoption of a standard THC dose or unit, to allow comparison of intoxication and desirable effects among the increasingly diverse landscape of cannabis products and methods of administration. Among other things, they argue that "for cannabis, as for alcohol, standard units should be based on the quantity of active pharmacological constituents. The primary psychoactive constituent of cannabis is THC. Therefore, standardized doses of THC should form the basis of 'standard THC units' rather than other proxies of cannabis exposure (e.g., grams, joints). This information could help to guide consumers on the number of standard doses each product contains at the point of sale."[40]

A year later[41], various institutes for the National Institutes of Health (more specifically NIDA, NCI, NIMH and NHLBI) endorsed Freman and Lorenzetti's proposal and defined a standard THC unit as "any formulation of cannabis plant material or extract that contains 5 milligrams of THC."[42] Such a decision occurred after years of internal and external discussion around this very topic and with the awareness that some states had defined a 10 mg of total THC as the serving unit for some products.

Those decisions were not made without serious consideration of some of the challenges presented. Scientists and research funding agencies have historically recognized that the same amount of THC may produce different effects based on route of administration, other cannabinoids and components of the plant, and consumers' experience and genetic makeup[42], in a similar way that tobacco and alcohol products also vary. But without a standard definition, science, prevention, treatment, education, and harm reduction interventions may be hindered.

Research on labelling: - Research on labelling effectiveness for cannabis products is still nascent. Studies to date suggest cannabis consumers have low THC literacy and would benefit from clear, standardized product information on labels to prevent over consumption.[43] ICPS surveys have indicated that even weekly/daily cannabis consumers are not aware of the THC levels they usually consume and 40 percent of U.S. cannabis users replied, "I don't know" to the question "Is 30 percent THC a low, medium, high amount for dried herb?"[2]

Current labelling regulations in the US seem to not be effective for helping consumers make informed choices, as illustrated by the increasing reports of adverse effects due to over intoxication.[44] Consumer difficulties include understanding numbers (e.g., mg vs. percentage), and the different ways THC levels are communicated across product categories.[43] Hammond (2021)[45] has suggested changing labelling practices to provide information of 'dose expression'—how THC 'dose' translates into consumption amounts for specific products. (See examples of dose expression above, adopted by Colorado and Vermont in their educational materials but not on product labels).

What Washington State stakeholders support

The professional and community groups rated "limit serving size in ALL products, not just edibles, to 10 mg per serving" as highly impactful, with low feasibility. Cannabis advocates considered this option neither impactful nor feasible.

There was no support for "limit THC in each serving size to 5 mg" (not feasible and not impactful for the three stakeholder groups.)

All stakeholders (see table 1) who participated in ADAI study rated as feasible and impactful the adoption of "readable labels" including "doing market research to establish the most effective placement and font size for such labels."

Adoption of standard THC serving units and labelling of THC servings in North America

Single and uniform THC serving unit across cannabis products: New Jersey is the only state in the U.S. that has set a THC serving unit (or size) across all products, defined as "no more than 10 mg of active THC or the equivalent weight as best determined based on THC potency." Other U.S. states and Canada have defined serving units (or size) for edibles and some other products, but they are not uniform across products, making the decision-making process difficult to the consumer.

Require THC serving unit definition and number of total THC servings on all cannabis product labels: The province of Quebec, Canada, labels provide information on serving sizes defined as 5 mg of total THC, dose expression per product, and cannabinoid dominance/chemotype, as can be seen in figure 4 below[13].

Figure 4: Serving definition and number of total THC servings in cannabis product in Canada

NOTE: Figure 4 demonstrates a Canadian cannabis product labeled with a serving definition (2.5mg THC & 5mg CBD) and the total numbers of servings in the product (2).

Despite the lack of uniform definition of serving sizes, Massachusetts, Montana, New Jersey, and Vermont require product labels to indicate whether the package contains more than one serving. Massachusetts mandates "INCLUDES MULTIPLE SERVINGS" in all caps and Vermont requires "CONTAINS MULTIPLE SERVINGS" in at least 10-point font. New Jersey requires the label to state the number of servings in the product, for example: "The serving size of active THC in this product is X mg. This product contains X servings of cannabis, and the total amount of active THC in this product is X mg".

6. Require point-of-sale education about high THC products risks, labels, and dosing

Recommendation

Require point-of-sale education for consumers purchasing products other than cannabis flower that includes accurate information on the potential harms of consuming high THC products, populations at

elevated risk of experiencing such harms, comparative dosing (e.g., pictorial comparisons of THC content in diverse products, dosing risks, etc.), and how to read a product label. Point of sale education should also include information on where to find help in case of negative effects and resources for quitting/reducing cannabis consumption.

We also recommend the development and provision of training to cannabis retail staff ("budtenders") who might be interested in better understanding the education materials developed to be informed on how to respond to questions from consumers.

Materials and staff training should be developed by WSLCB or a contracted entity with experience in health education in consultation with people with lived experience with high THC product harms, cannabis retail staff, consumers, and youth advocates.

What science says

ICPS data documents that THC literacy is low among occasional and frequent cannabis consumers even in states where cannabis is legal for adult use.[2] Research shows that consumers who already value health and product safety are more likely to change their purchasing behavior when product content and risks are understood. Prior work with budtenders revealed their willingness to provide mandated educational materials to their patrons and a desire to help consumers to have a pleasurable experience with cannabis and avoid over-intoxication[46], suggesting that with standardized training and support, budtenders could be appropriate for delivery of point-of-sale messages.

Much can be learned from point-of-sale consumer education programs used in other areas, such as interventions designed to improve nutritional decision making[47]. For example, the FDA requires calories to be displayed on menus and menu boards of restaurants and other food establishments that are part of a chain of 20 or more locations[48], allowing consumers to factor caloric intake into their consumer decisions.[49, 50] Several studies have evaluated consumer response to such labeling and most indicated a preference for lower calorie foods when menus including calorie labels were viewed.

And, of importance, educational interventions delivered at the time of purchase have been found to be most effective when paired with environmental changes, such as manipulation of price and availability of products meant to be discouraged.[47]

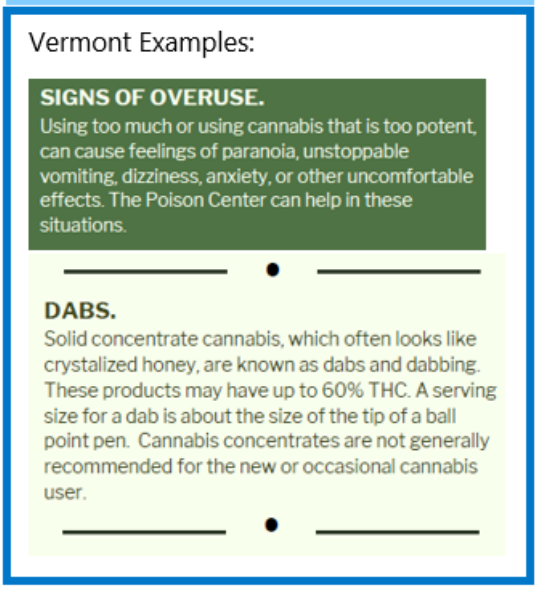
What Washington State Stakeholders support

Assessment of stakeholder opinions identified wide support for consumer education at point-of-sale across all stakeholder groups (see table 1), deeming this type of communication both feasible and impactful. Consumer education about reducing harms is viewed as an opportunity for collaboration with cannabis industry to teach why high THC products are intended for use at a far lower rate than other types of products, with one respondent suggesting "a dab will do" messaging. Community and professionals viewed posting in-store warnings as a stand-alone intervention as less impactful than other forms of communication (e.g., written materials or conversations), and indicated that point-of-sale education alone, without other regulations to reduce availability would be less impactful.

Point-of-sale education in North America

To date, only three states with adult use markets that are either open or forthcoming require educational resources to be included with purchases: Colorado, Vermont, and Nevada. Colorado has developed a tangible educational resource that includes a recommended serving size, adverse event reporting contact information, and specific warnings. Vermont will require that a point-of-sale flyer be displayed at stores and offered to customers in written or electronic form that includes consumer education developed in conjunction with the Vermont Department of Health. Similarly, Nevada requires written or electronic warnings of risk be provided to customers purchasing any consumable cannabis product; however, information about serving size and dose is not included at this time.

Figure 5: Mandated point-of-sale education in Vermont



NOTE: Figure 5 shows examples of point-of-sale education in Vermont about signs of overdose and dabs.

7. Fund social media campaigns and public service announcements (PSAs) targeting people at elevated risk for experiencing high THC products negative effects

Recommendation

Utilize tax revenue to fund targeted public messages and social media campaigns directed toward individuals most likely to suffer negative impacts of high THC products[1], including young adults under 25 years of age, individuals reporting poor mental health, and people living with mental health disorders. Messages should include information about risks, comparative dosing of products, and resources for individuals seeking support for quitting or decreasing THC intake. Materials should be developed in partnership with people targeted in such campaigns and overseen by professionals proficient in public health communication and in cannabis research.

What science says

Health messaging is more likely to impact behaviors and increase knowledge specific to use of high THC products when messages are tailored for and targeted to people most at risk of harm from use of high THC products. Several guiding principles for effective communication campaigns have been outlined by the World Health Organization[51], including:

- Having a clear and measurable aim, in this case, discouraging use of high THC cannabis products.
- Understanding the priorities and concerns of the audience, and tailoring messages to address those concerns.
- Utilizing a range of tactics and tools, including consideration of message clarity, who delivers the message, and the channels used to communicate the message

- Involving stakeholders in the campaign design process to increase legitimacy and buy-in from the start.

Campaigns such as these are also more effective when tied to a specific action, such as choosing alternative products or calling a helpline to obtain support.[52]

What Washington State stakeholders support

Stakeholders across all groups **(see table 1)** viewed the use of tax revenue to support the development of targeted public service announcements and advertisements about the long-term health effects of use of high-THC products via traditional media outlets, and specifically on online platforms, such as YouTube, Instagram, TikTok, Reddit, Twitch, and Twitter aimed at those at greatest risk of harm as both feasible and impactful.

Public service announcements and social media messages in North America

There are no specific educational campaigns targeting people at greatest risk for harms associated with use of high THC products in North America.

Evidence-based policies to be considered in the future

Decrease access to high THC products

Cap THC concentration

Considerations

Capping THC content to allow only low concentrations of THC is an evidence-based policy to be considered in the future. It is not recommended at this time due to low stakeholder support from all three groups involved in ADAI assessment. This is a policy option that could become more feasible as cannabis education and THC literacy increases in WA, THC testing accuracy improves in our state, and more is learned from caps in other states and provinces.

What science says

Research comparing use of high-THC products between Quebec, that capped THC content at 30 percent for all products, and the other Canadian provinces indicates that banning high THC products can be successful. Use of high-THC products in Quebec is lower than in the other Canadian provinces, with just under 20 percent of cannabis consumers in Quebec reporting the use of vape concentrates vs. 30-40 percent in other provinces, and roughly 12 percent reporting use of solid concentrates vs. 20-25 percent in other provinces.[13] Those few consumers who do use cannabis concentrates in Quebec are more likely to obtain it from an illegal source, however, overall use is sufficiently low to reduce concerns of shifting production to an illicit market.[13] Precedent exists for capping potency and banning highly concentrated products in alcohol regulation. Some U.S. states have banned or restricted high-potency grain alcohol and alcoholic energy drinks in response to health risks, which has reduced widespread availability of these products.[53, 54]

What Washington State stakeholders support

No stakeholder group (see table 1) viewed capping THC content, either by concentration (percent THC) or weight (mg THC) or banning specific product types (e.g., concentrates or dabs) as feasible, although community and professionals thought that capping concentration at 10-50 percent for anyone other than qualified patients would be effective in reducing harms. In general, there was a lack of consensus about what the cap should be, and suggestions ranged from 10 percent-75 percent THC. Cannabis advocates opposed caps and thought they would be neither feasible nor effective, citing limited science behind potency testing, concerns about accuracy of testing, and fear that harmful additives not currently tested for would be used as a filler in high-THC products to reduce THC concentration.

All stakeholder groups shared the concern that bans/caps would push these products to an unregulated illicit market, although it was noted by some professionals that the overall gain in reduced product availability would be greater than the harms, especially for naïve users and consumers unwilling to purchase in an illicit market. Another concern was that bans would disproportionately harm small farmers in rural WA who grow primarily for production of concentrates.

Caps of high THC products in North America

Quebec is the only North American province or state to limit THC concertation in all products to 30 percent, a concentration low enough to effectively ban such concentrates. Among the 18 states with legal adult use markets that are open or forthcoming, two have THC caps in place – Connecticut and Vermont.

Both limit THC in cannabis flower to no more than 30 percent, and both prohibit the sale of solid concentrates with more than 60 percent THC in them. Both allow higher levels of THC in prefilled cannabis vape cartridges.

Set purchase limits for THC content

Considerations

All states with adult markets in the US have possession or purchase limits, including WA. When converting such limits into standardized 10mg THC equivalents, Pacula et al[55] found that all states allowed >500 THC standard doses to be purchased in a single transaction, defeating the purpose of such limits. Imposing a limit on the amount of THC that can be purchased by an individual in a specified time period is not recommended at this time due to very low stakeholder support from all the three groups considered in ADAI stakeholders' analysis, and few evaluations of the effectiveness of such limits. This is a policy option that could become more feasible as more is understood about how best to implement such limits and which types of limits provide the greatest protection to the health of legal age consumers.

What science says

Purchase limits are intended to reduce use and prevent diversion and have been implemented in both adult use and medicinal cannabis markets in U.S. states, Canada, and Uruguay; however no formal evaluation of these could be found.

Pacula et al.[55] suggest that purchase limits be tied to THC content, rather than product weight, which is common under most current state regulations and incentivizes consumers seeking higher THC content to purchase more highly concentrated products. In addition, restricting the number of retail stores that a consumer can purchase from in a specified time period, such as Uruguay does, would increase the likelihood that purchase limits achieve their intended goals.[55]

What Washington State stakeholders support

No stakeholder group (see table 1) thought that purchase limits would be feasible, particularly if purchases are tracked for a period beyond a single transaction (e.g., number of concentrates purchased per month). Community stakeholders thought that limiting the number of high-THC products per purchase could moderately impact risks if implementation were feasible. Concerns existed that tracking consumer purchases would be invasive, would be challenging to track, and that without tracking, consumers could easily make purchases from several stores in a short amount of time to evade an imposed limit.

Possession and purchase limits in North America

In most adult use states, including WA, purchase limits or limits per sales transaction are dictated by possession limits. In terms of cannabis flower possession and/or purchase limits range from 1 ounce to 3 ounces with an equivalency for concentrates that generally ranges from 5g to 24g (500 to 2400 standard doses of 10 mg of THC per purchase).

Empower consumers and the public with information and education about high THC products

Education in communities/schools about high THC products risk

Considerations

We support the increase of funds for substance use prevention efforts supported by science. Prevention initiatives must match the risk level of the population the education is intended to reach. Educating youth about a subset of cannabis products in schools/communities is not supported by science and may even increase interest in products that the vast majority of school children are not aware exist.

Washington State has been a model in the U.S. and beyond on how to plan, implement, and evaluate prevention initiatives centered on reducing the chances that youth will engage in risky behaviors using a comprehensive approach. Coalitions such as the statewide Youth Marijuana Prevention & Education Program (YMPEP)[56] and Community Prevention and Wellness Initiatives (CPWI)[57] are only one of the various examples of science-backed prevention efforts.

What science says

In the 1980s, prevention interventions were almost synonymous with "communicating the facts" to youth about the risks of engaging in unhealthy behaviors, including using substances.[58] Currently, Prevention Science focuses on the many factors that influence the likelihood of adolescents and teens choosing to use or not use substances, including cannabis products.[59] In the case of cannabis, risk factors are those that increase youth chances risk of cannabis use while protective factors are things that that decrease youth risk. These factors appear at different levels, ranging from individual factors to societal factors[60]:

- Individual: encompassing biological and personal history factors.
- Relationship: close peers', partners and family members and how they influence behaviors and contribute to experiences
- Community: Settings, such as schools, workplaces, and neighborhoods, in which social relationships occur
- Society: Broad factors that help to maintain economic or social inequalities between groups such as social and cultural norms, health, economic, educational, and social policies that help to maintain economic or social inequalities between groups

Targeting only one context when addressing a person's risk or protective factors is not ideal because people don't exist in isolation. Evidence-based interventions have used the social-ecological model framework for prevention intervention development and for implementation that encompasses multiple levels of protective and risk factors.[61]

What Washington State stakeholders support

There was high support across stakeholder groups (see table 1) for educating youth in schools and community centers about the risks of high THC products. Cannabis advocates were particularly supportive of these measures and viewed the creation of such campaigns as an opportunity for collaboration with prevention advocates. Some concern was expressed by professionals that broad campaigns would produce iatrogenic effects, leading to an increase in use of high-THC products. Finally, some community members expressed concern that collaboration with industry would be used to increase name recognition

of specific retailers who could associate themselves with social responsibility, providing cover while they oppose more impactful policy changes.

Education in schools/community centers in North America

No general education specific to high-THC products exists in North America that we are aware of. Education mandates that do exist have focused on consumer education, primarily at point-of-sale.

Further recommendations

Sufficient funding is imperative

The legal adult-use cannabis market has resulted in high THC products that have never been so widely available. All policies intended to mitigate harm from wide availability and use of these products are new, and to have any chance for success will require sufficient funding, leveraging tax revenues generated by the cannabis industry.

Compliance

Robust routine compliance monitoring will be needed to ensure that the policies recommended are implemented as intended. Both alcohol and tobacco have demonstrated that enforcement of advertising regulations results in reduced youth access[62], and that the implementation of meaningful consequences for illegal production and sales are important to ensure a healthy legal marketplace. WSLCB has existing education and compliance protocols to monitor sales to underage customers[63], and these protocols should be broadened to ensure that new policies are adhered to effectively. To this end, WSLCB will require the resources to plan, staff, and maintain ongoing compliance monitoring. Jernigan recommends a comprehensive records management system accessible to researchers and the public of compliance and adjudication incidents that includes "data by income, race, sex, and location to facilitate public monitoring of equity in enforcement practices."[64]

Policies incentivizing public complaints and encouraging the growth of civil engagement on cannabis marketing surveillance through watchdog organizations inspired by alcohol and tobacco experience can protect youth from industry targeting and should be considered[65, 66, 67] in our state.

Evaluation

States are looking to each other to better understand the public health effects of legalization and how to support a sustainable market, while decreasing the risk of harm. Assessment of state policy will go beyond informing local change but will likely inform policy implementation across the country. Legislators should consider who is equipped to evaluate each policy change and ensure that there is funding to support such evaluation. In addition to pre-determined policy evaluation, state tracking systems, including seed to sale data, should be made publicly available.

Patients should not be affected by policies to mitigate the harms of high THC products

The scope of this work included only adult use, non-medical high-THC products, and excluded use of such products by patients. Use of such products used medicinally falls in the purview of health care entities and medical associations and should not be impacted by the recommendations contained here. To this end, Washington State would benefit from an improved system for documenting medical authorization that rests with the state, rather than relying on retail stores to verify and record eligibility.

Patients who have determined with their provider that high THC products are a necessary part of their clinical care should be exempted from the related excise taxes proposed in this report

Place regulation of hemp-derived consumable cannabinoids under WSLCB jurisdiction

Finally, it's important to note that several stakeholders shared concerns about the availability of hemp-derived synthetic cannabinoids, such as delta-8 THC, reducing the effectiveness of policies that are only applied to the state-regulated market. Increasing the cost and restrictions on legal cannabis it was feared, would incentivize the purchase of synthetic products, driving down pricing and creating a "public health crisis". One suggested solution is to ban synthetics altogether, or to at a minimum, subject these products to the same or similar regulations required for cannabis. While hemp-derived products are outside the scope of this review, we recommend consideration of this important issue and support placing the regulation and compliance of hemp-derived consumable products under WSLCB jurisdiction.

Conclusion

As WA cannabis markets increase production and sales of high THC products, it is extremely likely the negative health effects associated with its use will also increase. WA stakeholders are concerned with non-medical use of high THC products and support policy changes. Now, while the market is relatively nascent, is the time to make course corrections that will protect the health of WA residents from unforeseen harm. Policies that empower consumers to make educated choices, that reduce access for people under 25, and that use taxation to incentivize use of products with lower THC concentration will lead the way in evidence-based cannabis policy that supports a balanced approached to cannabis legalization.

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Appendix A: Glossary and full list of appendices

Full appendices, including the **glossary**, can be accessed here: https://adai.uw.edu/wordpress/wp-content/uploads/HighTHCReport-Appendices.pdf