# Environmental Strategies to Prevent Cannabis Use among Youth and Young Adults in the Context of Legalization

## **Information Guide**

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This Information Guide provides resources for prevention practitioners at the state and local levels to address cannabis use in their communities following the legalization of cannabis for medicinal and/or adult use using environmental strategies.


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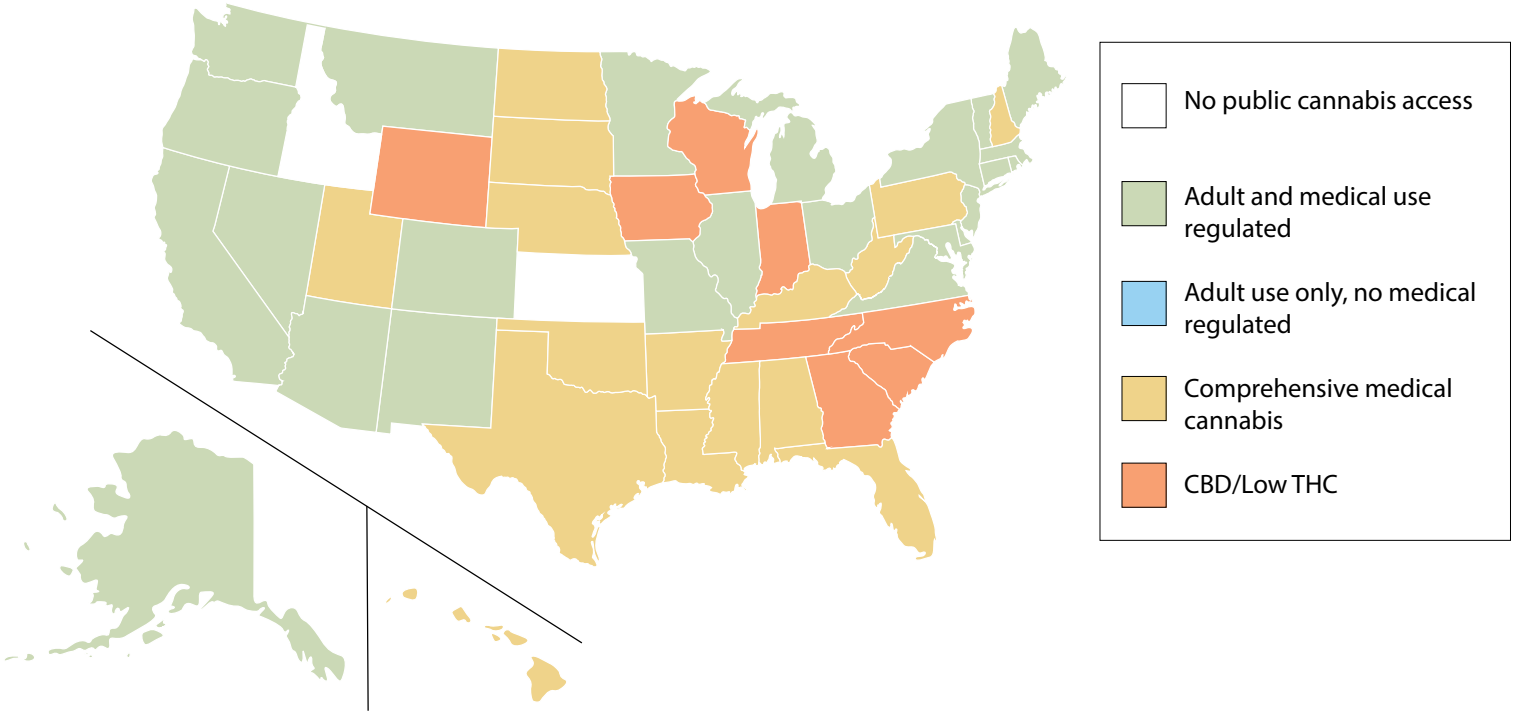
### A Note about Terminology
*Cannabis sativa* is the plant containing 100+ cannabinoids, including the psychoactive ingredient tetrahydrocannabinol (Δ9-THC). *Cannabis sativa* can be broadly classified as marijuana or hemp. Given that the term “marijuana” carries historical concerns related to stigma due to its association with stigmatization and inequitable enforcement, the Information Guide uses the term "cannabis" instead of marijuana. While the strategies were specifically identified for cannabis/marijuana products, some of the strategies may be relevant for hemp-derived cannabis products.

# Introduction to the Environmental Strategies to Prevent Cannabis Use among Youth and Young Adults Information Guide

The legal status of cannabis in the United States is evolving, with ongoing changes in regulation across federal, state, and local levels. As of June 26, 2025, forty states, three territories, and the District of Columbia have legalized medical use of cannabis. Of those states, 24 states and two territories and the District of Columbia have legalized adult recreational use of cannabis.[1] Cannabis laws in the United States create a complex framework that affects access, norms, use, and prevention efforts, particularly among youth and young adults.

**Figure 1. Map of cannabis legislation in the United States, 2025**




This Information Guide provides strategies that prevention practitioners at the state and local levels can implement to address cannabis use in their communities following the legalization of medicinal and/or adult cannabis use.

This Information Guide highlights environmental strategies to prevent and reduce cannabis use among youth and young adults in the context of legalization. Environmental strategies target the broad social, structural, and contextual settings in which individuals live, work, and engage with others. These strategies emphasize policy and structural changes targeting contexts rather than individuals and are designed to reduce risk factors and enhance protective factors within a population.[2] Environmental strategies represent a key approach in public health, particularly for advancing substance use prevention. The four categories of environmental strategies presented in this guide include product, place, promotion, and price.

## Environmental Cannabis Prevention Framework

**PRODUCT**
(What is sold)

**PLACE**
(Where access occurs)

**PROMOTION**
(How it's marketed)

**PRICE**
(How much it costs)

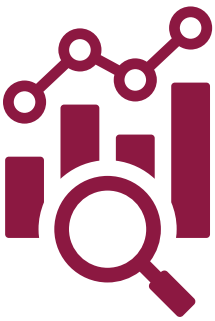
The content of the Information Guide was generated from two sources: (1) interviews conducted in 2023 with prevention practitioners in states that have legalized cannabis for medicinal and/or adult use and (2) a scoping review of the literature available between January 1996 and August 2022. The research team who collected and synthesized the data for the Information Guide are trained in public health, qualitative research, and community-engaged research and are listed as the authors of the guide.

**Interviews**

Members of the research team spoke directly with substance use prevention practitioners about what works in their communities to reduce youth cannabis use in the context of legalization. Between April and June 2023, in-depth interviews were conducted with 18 prevention practitioners from 12 states where medical or adult-use cannabis is legal. Practitioners shared their experiences planning, carrying out, and evaluating prevention strategies, including local policies and community actions. Interviews lasted about 45 minutes, were conducted by phone or online, and were recorded and carefully reviewed to capture prevention practitioners' insights. Participation was voluntary, confidential, and approved by an independent ethics board.

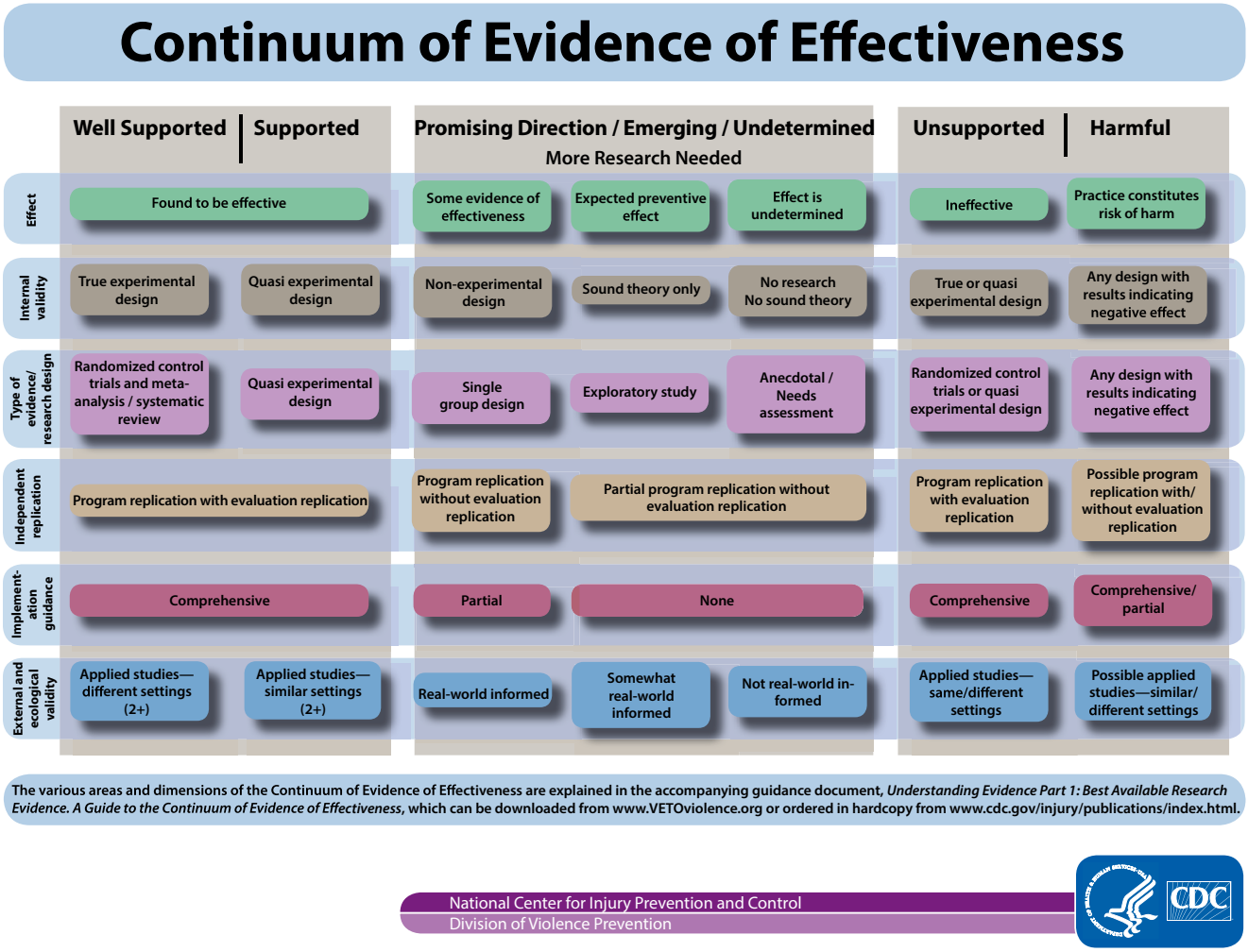
Interview responses were systematically analyzed using established public health frameworks, organizing findings into the "4 Ps" (product, price, place, and promotion) to identify common themes and practical strategies for preventing youth cannabis use in the context of legalization. More details on the methods for the interviews can be found in **Appendix A.**

**Scoping Review**



Members of the research team conducted a scoping review of studies based in the United States on environmental strategies to prevent youth cannabis use. Eligibility criteria included 1) peer-reviewed studies published since 1996, when medical cannabis legalization began in the United States; 2) original research studies focused on cannabis use or its consequences; and 3) studies described community-level policies, environmental prevention strategies, or risk and protective factors directly related to environmental strategies (e.g., exposure to advertising). Each study was independently reviewed by two researchers to reduce bias and ensure accuracy, resolving any disagreements through group discussion. Out of nearly 2,500 studies initially identified, 35 high-quality studies met all criteria and were included, allowing the team to summarize what is known, how research has been conducted, and where important gaps remain in preventing youth cannabis use. The scoping review also includes the grey literature, i.e., resources published by funding agencies, organizations that train and provide technical assistance to prevention practitioners, and repositories of evidence-based programs and practices, to identify environmental strategies to prevent youth cannabis use in the context of legalization. More details on the methods for the scoping review can be found in **Appendix B.**

**Figure 2. CDC's Continuum of Evidence of Effectiveness**




This Information Guide is structured to first provide the environmental strategies identified from the interviews and grey literature and then provide the level of evidence of effectiveness based on peer-reviewed research studies identified in the scoping review. There may be new strategies and/or assessment of their effectiveness that have emerged since our scoping review was completed. This Information Guide is organized by the four categories of environmental strategies that address product, place, promotion, and price and concludes with words of advice and encouragement to prevention practitioners from the prevention practitioners interviewed for this project.


**Spoiler:** *The research on youth cannabis prevention strategies is limited, although growing, resulting in most identified strategies being considered "Undetermined" or "Emerging". Many of these strategies have stronger evidence of effectiveness for alcohol and tobacco which we discuss later in this Guide.*

To assess evidence of effectiveness, we used the Centers for Disease Control and Prevention's (CDC) C*ontinuum of Evidence of Effectiveness* (Figure 2). This framework is used to describe how strongly a program, policy, or practice is supported by research evidence and how confident decision makers can be that it produces its intended outcomes. Developed by the CDC's National Center for Injury Prevention and Control, the *Continuum of Evidence of Effectiveness* places interventions along a spectrum. Interventions are classified by the CDC based on multiple dimensions of the best available research evidence, including the rigor of study design (non-experimental studies, quasi-experimental designs, and randomized controlled trials), consistency and magnitude of effects, independent replication, and the availability of implementation guidance. The following is the spectrum of the *Continuum of Evidence of Effectiveness*:

- ***Well-Supported/Evidence-Based*** approaches have multiple high-quality evaluations with replicated positive outcomes and clear guidance for implementation.
- ***Effective/Supported*** approaches demonstrate consistent beneficial effects using stronger designs such as quasi-experimental or randomized studies.
- ***Promising*** approaches show preliminary positive effects from limited or less rigorous studies.
- ***Emerging*** approaches are grounded in theory with little or no empirical testing.
- ***Ineffective*** or ***Harmful*** practices approaches show no benefit or negative effects in experimental or quasi experimental designs.
- ***Undetermined*** approaches have yet to be evaluated.

Overall, the CDC emphasizes that the continuum is a decision-support tool, not a fixed ranking, and should be used alongside contextual and experiential evidence to guide public health action.

Guided by the CDC's Continuum of Evidence of Effectiveness, we applied the following criteria to assess the current evidence of effectiveness for environmental strategies for youth and young adult cannabis use prevention in the context of legalization:

- Studies had to be peer-reviewed.
- The population had to be youth or young adults.
- The environmental strategy had to be an independent variable.
- For the study to be considered for "Well-supported", "Supported", or "Promising", the outcome had to be use of cannabis.
- For the study to be considered "Emerging", the outcome had to be grounded in behavioral theory (e.g., attitudes, intentions, etc.).

# Environmental Strategies to Prevent Cannabis Use among Youth and Young Adults in the Context of Legalization

## Overview of Environmental Strategies

**Table 1** provides an overview of all the environmental strategies referenced in this Information Guide. Details about each strategy follow and are organized within the categories of **product, place, promotion, price.**

**Table 1. Environmental strategies to prevent youth and young adults' cannabis use**

| | Strategy | Level of Evidence |
|---|---|---|
| Product | Delta-9-tetrahydrocannabinol (THC) dose ceiling/max | Undetermined |
| | Prohibit cannabis concentrate products | Undetermined |
| | Limited product diversity | Undetermined |
| | Limited list for medical cannabis | Undetermined |
| Place | County/city ban on cannabis sales | Undetermined |
| | Retail outlet density | Promising |
| | Retail outlet placement | Promising |
| | Time of sale/hours of operations | Undetermined |
| | Minimum purchase age laws | Undetermined |
| | Minimum entry age | Undetermined |
| | Minimum employment age | Undetermined |
| | Store placement of cannabis products | Undetermined |
| | Compliance checks | Undetermined |
| | Social host ordinance | Undetermined |
| | Home storage of cannabis | Undetermined |
| | Workplace policies | Undetermined |
| Promotion | Warning labels on packaging | Emerging |
| | Advertising and marketing restrictions | Emerging |
| | Counter advertising campaigns | Promising |
| Price | Prohibition of price promotions, bulk purchases, coupons, freebies | Undetermined |
| | Product taxes | Undetermined |
| | Revenue allocation | Undetermined |

# PRODUCT

**Product** involves regulating cannabis products to make them less accessible, appealing, or harmful to youth. This can include measures such as restricting the delta-9-tetrahydrocannabinol (THC) dosage or potency of cannabis products, limiting the list of conditions for medical cannabis, and establishing child-proof packaging.

**Table 2** includes the specific strategy and the definition of the strategy. An example of each strategy is provided below the table.

**Table 2. Product strategies to address cannabis use**

| Strategy | Definition | Level of Evidence |
|---|---|---|
| **Delta-9-THC dose ceiling/ max** | Limits on the THC content in cannabis products for sale or purchase. | Undetermined |
| **Prohibit cannabis concentrate products** | The sale of cannabis concentrate products is prohibited. | Undetermined |
| **Limited product diversity** | The types of cannabis products available for sale are limited. | Undetermined |
| **Limited list for medical cannabis** | Medical cannabis eligibility criteria are grounded in scientific evidence. | Undetermined |

## THC dose ceiling/max

High-THC potency cannabis is associated with increased risk of cannabis dependence and more severe use patterns, and emerging evidence links high-potency exposure during adolescence to adverse neurodevelopmental outcomes, including impaired cognitive functioning and mental health symptoms.[3,4] These public health concerns are amplified for youth, whose developing brains may be more vulnerable to the effects of concentrated THC.[5] A prevention practitioner we interviewed recommended setting potency caps that can provide "some degree of moderation of cannabis use."

A limited number of states have enacted laws to limit the amount of THC sold by product type, limit the amount of THC a consumer may purchase at one time, and tax cannabis products by total THC or type of product.[6] Montana is one state that limits the amount of THC in products sold. They limit flower products to 35% THC or less, capsules to 100 mg THC/800 mg per pack, tinctures to 800 mg THC, edible food to 10 mg THC per serving or 100 mg THC per pack, topical to 6% THC or 800 mg THC per pack, and suppository or patch to 100 mg THC/800 mg per pack.6 Illinois imposes purchase limits, allowing residents to buy up to 5 grams of concentrate, 30 grams of flower, and no more than 500 mg of THC-infused products; non-residents may purchase half these amounts.[6] A different prevention practitioner recommended placing caps on THC potency and setting the cap lower than the current commonly used caps of 30% THC for flower products and 60% THC for other product types.[6] States concerned about public health should consider sales limits and basing them on total tetrahydrocannabinol content across all purchased products.[7]

## Prohibit cannabis concentrate products

A cannabis concentrate is a product with high levels of active compounds from the cannabis plant, such as THC and CBD, which are extracted from the plant material. These potent extracts can come in various forms, like oils, waxes, or shatter (a brittle, glass-like cannabis concentrate), and are consumed by methods like dabbing, vaping, or adding to

food. Some public health experts have recommended banning the sale of high-potency THC concentrates because their elevated THC levels may increase the risk of dependence, overconsumption, and youth use.[8] There is state level variation in regulating cannabis concentrates with some only allowing for medical use, THC dose caps, and more stringent penalties for possessing cannabis concentrate products.[11]

### Limited product diversity

Product diversity refers to the general range of cannabis products available for sale. Increased cannabis product diversity not only expands access for adults but also raises the potential for youth access.

### Limited list for medical cannabis

Currently, the U.S. Food and Drug Administration (FDA) has not approved the use of cannabis as a treatment for any medical condition. However, several synthetic cannabinoids have been approved by the FDA, including Epidiolex for severe forms of epilepsy and dronabinol and nabilone for chemotherapy-induced nausea and AIDS-related anorexia. As of 2024, most qualifying conditions for medicinal cannabis use listed across state laws are not grounded in scientific evidence.[9] This was discussed in our interviews with prevention practitioners, identifying the need to have a more limited list for medical cannabis eligibility. They shared that, initially, the state had a limited list of medical conditions that was informed by scientific evidence. However, over time, the list was expanded as people shared anecdotal reports claiming cannabis helped with other conditions rather than being grounded in scientific evidence. Having a limited list grounded in scientific evidence for medical cannabis eligibility is important, as it can prevent misuse, enhance patient safety, and provide a framework for practitioners and policymakers.

# PLACE

**Place strategies** involve regulating the locations and settings in which cannabis products are sold, used, or promoted to limit youth exposure and access. These environmental approaches operate at both the county or city level and within individual dispensaries, encompassing measures such as age-verification compliance checks, enforcement of minimum employment or entry age laws, and zoning restrictions that prevent sales near youth-frequented areas. Additional strategies include regulating retail outlet density, establishing distance buffers, and, in some jurisdictions, implementing bans on cannabis sales altogether. Some prevention practitioners also reported updating workplace policies to address cannabis-related practices.

**Table 3** includes the specific strategy and the definition of the strategy. An example of each strategy is provided below the table.

**Table 3. Place strategies to address cannabis use**

| Strategy | Definition | Level of Evidence |
|---|---|---|
| **County/city ban on cannabis sales** | Regulations on the purchase, possession, or use of cannabis products within a specific jurisdiction. | Undetermined |
| **Retail outlet density** | Regulations limiting how many retail stores can operate in a certain area and where they can be located. | Promising |
| **Retail outlet placement** | Regulations on where retail stores can be located, how far they must be from youth-oriented locations, and the minimum distance between similar businesses. | Promising |
| **Time of sale/hours of operations** | Limiting the hours/times when a business is allowed to sell cannabis products. | Undetermined |
| **Minimum purchase age laws** | Laws governing the minimum age to purchase cannabis products. | Undetermined |
| **Minimum entry age** | The age required to enter a place selling cannabis. | Undetermined |
| **Minimum employment age** | The minimum age required to work at a location selling cannabis. | Undetermined |
| **Store placement of cannabis products** | The location of cannabis products in the store. | Undetermined |
| **Compliance checks** | A strategy to identify cannabis retailers that do not appropriately verify age of customer and/or sell to individuals who are under the legal age to purchase cannabis. | Undetermined |
| **Social host ordinance** | Policy that holds property owners responsible for allowing underage cannabis to use on their property. | Undetermined |
| **Home storage of cannabis** | Practices put in place to facilitate safe storage of cannabis at a consumer's residence. | Undetermined |
| **Workplace policies** | Addition of cannabis practices to pre-existing workplace policies. | Undetermined |

### County/city ban on cannabis sales

In some states, counties and municipalities may choose to prohibit the sale of cannabis products within their jurisdictions, even when such sales are permitted at the state level. These decisions are commonly described as "opting in" or "opting out" of cannabis sales. Several prevention practitioners noted that coalition advocacy played a significant role in shaping local decisions to ban cannabis sales. However, opting out did not guarantee the absence of cannabis products in a community. Prevention practitioners reported that some dispensaries in jurisdictions that had opted out of recreational cannabis sales were circumventing the policy by selling recreational products under the guise of medical branding. Thus, while local bans may limit legal access, they do not eliminate cannabis availability altogether. This underscores the complexity of regulating cannabis sales at the community level.

A naturally occurring longitudinal quasi-experimental study comparing two youth cohorts in Oregon examined the effects of community-level decisions to opt out of recreational cannabis sales during state legalization. Findings suggest that state-level legalization may have an immediate impact on youth who had already initiated cannabis use, with increased use following legalization. This pattern persisted even in communities that opted out of retail sales, indicating that local opt-out policies alone may be insufficient to reduce youth cannabis use, particularly given potential spill-over effects from neighboring communities.[10]

### Retail outlet density

Limiting retail outlet density through zoning restrictions helps reduce youth exposure and prevent the overconcentration of cannabis retailers. A prevention practitioner noted that their county had 54 dispensaries for a population of 100,000, allowing youth to "shop, shop, shop" and obtain cannabis easily. To address these issues, some public health experts recommend limiting retail outlet density and have suggested an ideal ratio of one dispensary per 15,000–20,000 residents.[11,12] Establishing and enforcing zoning restrictions to control retailer density can help communities maintain responsible access to cannabis while minimizing potential harms.

Peer-reviewed studies on the impact of cannabis retail density on youth cannabis use and attitudes show mixed results. Several studies found that greater retail availability or proximity to dispensaries was linked to higher cannabis use, greater co-use of cannabis with alcohol among youth, and increased intention to use among youth and young adults.[13–17]

### Retail outlet placement

Retail outlet placement restrictions regulate where dispensaries are permitted to operate within a community. These restrictions prevent cannabis sales in youth-proximal settings; for example, a prevention practitioner noted instances of cannabis products being sold at a bookstore in their community. A peer-reviewed cross-sectional study examined the proximity of cannabis dispensaries to schools and found that youth who attended schools closer to cannabis dispensaries had higher cannabis use and less perceived harm of cannabis use.[18] Some public health experts recommend laws that prohibit dispensaries from locating near sensitive locations (i.e., places frequented by youth, such as schools [including colleges], playgrounds, libraries, youth-serving facilities, and residential areas).[12] Practitioners recommended establishing buffer zones of at least 500 feet between sensitive locations and dispensaries. Overall, placement and buffer requirements help ensure that cannabis sales occur in appropriate, adult-oriented locations, thereby protecting youth and supporting community safety.

### Time of sale/hours of operations

Designating specific times of sale or limiting hours of operation for cannabis businesses can help reduce youth access by narrowing the window during which cannabis products are available. A prevention practitioner described how their community shifted dispensary closing times from 10:00 p.m. to 7:00 p.m. When discussing the significance of this change, the practitioner explained, "Every hour that they [dispensaries] are not open is cannabis that's not being sold." This example illustrates how adjusting hours of operation can serve as a practical strategy to reduce overall cannabis availability.

### Minimum purchase age laws

Minimum purchase age laws help prevent youth access to cannabis products. The American Society of Addiction Medicine current public policy statement specifies 21 as the recommended minimum age for cannabis access[19,20] and all U.S. states that have legalized recreational cannabis sales set the minimum purchase age to 21.[21] The effectiveness of this strategy requires that retail establishments are compliant, and current research suggests that consistent age verification varies by state, suggesting the potential for improved implementation practices.[22–24]

### Minimum entry age

Minimum age entry laws aim to prevent youth exposure to cannabis products by requiring potential customers to be 21 years of age or older to enter the retail establishment. A prevention practitioner shared that some dispensaries also have signs outside the business informing customers that they cannot enter the establishment if they are under a specific age. In addition to brick and mortar retail establishments, many websites that sell cannabis products ask web visitors to certify that they are over 18 years of age before granting access.[25] Two studies assessed minimum entry age in Colorado[24] and California;[23] all dispensaries displayed ID requirement signage, but there was less consistency with verifying age at store entry.

### Minimum employment age

Minimum employment age laws ensure that underage individuals are not exposed to, or handling, cannabis products. These regulations directly correspond to minimum entry or purchase age laws. Two prevention practitioners identified the minimum employment age requirement of people working at a business selling cannabis products in their communities is 21 years of age. A prevention practitioner noted that minimum employment age laws as a "foundational piece" of cannabis regulation. Overall, enforcing regulations on the minimum employment age of dispensary employees reinforces efforts to prevent youth cannabis use.

### Store placement of cannabis products

Keeping products behind the counter, out of reach, and out of sight reduces impulse interest, limits unsupervised access, and strengthens the effectiveness of age-verification practices—collectively lowering the likelihood that youth will obtain or experiment with these products. A prevention practitioner noted that in their community cannabis products were expected to be placed behind the counter, in line of sight of the cashier, and at least four feet above the ground to prevent direct visibility to youth.

### Compliance checks

This strategy focuses on monitoring and/or enforcing dispensary sale practices related to age verification and adherence to minimum purchase age requirements. Compliance checks often includes fining dispensary owners for youth sales and rewarding clerks who maintain a 100% compliance rate, and underscoring the importance of holding owners accountable while incentivizing staff to prevent underage sales.[26] Prevention practitioners emphasized the need for inspectors or other enforcement mechanisms to routinely verify that dispensaries are following regulations. They described age verification compliance checks—often referred to as "ID checks" or "carding"—as a primary method for enforcing minimum age laws, with some noting the use of security cameras and advanced ID scanning technologies to further deter underage purchasers. Another prevention practitioner shared that penalties for violating cannabis laws in their community may include civil fines under $25 for a first offense, with subsequent violations potentially requiring participation in substance use treatment or education programs. Together, these enforcement strategies help ensure that dispensaries comply with legal requirements and contribute to safer retail environments that limit youth access to cannabis products.

### Social host ordinance

Social host ordinances hold the property owner accountable for youth using cannabis on their property.[26] These ordinances typically address parties, often defined as two or more people, hosted or attended by youth who are underage at a property owned by an adult. Social host ordinances aim to limit youth access to cannabis by holding adults responsible to prevent underage use.

### Home storage of cannabis

Secure home storage of adult cannabis products is intended to reduce the risk of accidental ingestion by children and limit access for youth. A prevention practitioner described partnering with cannabis retailers to distribute lock boxes—a storage method traditionally used to prevent nonmedical prescription opioid use—to cannabis retailers in the county for free distribution to customers. "Each retailer has gotten somewhere between 10 and 20 lock boxes that they're able to give to their customers who might have children. We also say pets, too, but to be able to have a way to secure their cannabis and keep it out of reach."

### Workplace policy

These policies articulate the rules and expectations related to cannabis in the workplace. One prevention practitioner described updating policies for both employees and volunteers to include drug testing requirements, prohibitions on cannabis use prior to work, and restrictions on possessing cannabis at the worksite. Another practitioner noted that a coalition hosted a workplace policy workshop to inform employers about regulatory considerations and available options following the authorization of recreational cannabis sales. Such approaches illustrate how organizations are adapting workplace policies in response to evolving cannabis laws.

# PROMOTION

**Promotion** refers to the advertising, marketing, and communication practices surrounding cannabis products, with the goal of reducing their appeal, normalization, and accessibility among youth. This strategy includes implementing clear and visible warning labels on cannabis packaging to inform consumers about health risks, delayed onset of effects, and dangers associated with high-potency products. It also encompasses restrictions on advertising and marketing techniques that disproportionately reach or appeal to youth—such as the use of cartoon imagery, bright packaging, product placement on social media, influencer partnerships, or promotions near schools, parks, and youth-focused venues. Counter-advertising and health communication campaigns are another key component of this strategy. These campaigns aim to correct misperceptions, communicate risks, and counteract pro-cannabis messaging by using evidence-based visuals and narratives that resonate with youth and caregivers. Collectively, promotion-focused strategies help create a media environment that supports healthy development, reduces youth initiation, and strengthens broader community prevention efforts.

**Table 3** includes the specific strategy and the definition of the strategy. An example of each strategy is provided below the table.

**Table 3. Promotion strategies to address cannabis use**

| Strategy | Definition | Level of Evidence |
|---|---|---|
| **Warning labels on packaging** | A statement on cannabis product packaging that informs consumers of potential risks, hazards, or necessary safety precautions. | Emerging |
| **Advertising and marketing restrictions** | Strategies used to limit influence or exposure to cannabis products, especially among youth. | Emerging |
| **Counter advertising campaign** | Coalitions or community groups utilizing public messaging strategy that challenges or counters marketing for cannabis. | Promising |

## Warning labels on packaging

State cannabis labeling policies generally require standardized health and safety warnings on product packages (and, for some products like edibles, sometimes directly on the product), with the specific text and formatting set in state regulations. Common required elements include warnings about impairment (e.g., driving/operating machinery), keeping products away from children, age restrictions, THC potency information, and in many states a state-specific "universal symbol" indicating the package contains cannabis.[27] The exact policies vary by state in the extensiveness of health risk communication (e.g., California's Proposition 65), the degree of product-level marking (e.g., Colorado's symbol stamped on edibles), and the specificity of regulatory formatting requirements, reflecting variation in how states operationalize consumer protection within legalized cannabis markets.

In California, for example, adult-use cannabis products must include the state's universal cannabis symbol and specific health and safety warnings, including statements about delayed effects for edibles, impairment, and risks during pregnancy and breastfeeding. In addition, cannabis products are subject to California Proposition 65, which requires warnings about exposure to chemicals known to cause cancer or reproductive harm, resulting in broader toxicological risk disclosures than many other states.[28,29] By contrast, Colorado does not layer on an additional chemical exposure warning framework comparable to Proposition 65. Several studies highlight the role of warning labels and packaging regulations in shaping consumer perceptions and reducing cannabis-related harms.

Evidence shows that clear, concise warnings, including a universal cannabis symbol, can educate consumers, reduce product appeal, and influence harm perceptions.[30–32] Research also recommends regulating health claims, as statements like "helps you relax" increase positive consumer responses, and framing warnings around impaired driving or text-based messages is more effective than standard disclaimers such as FDA disapproval notices.[33,34] Other studies further showed that plain, standardized packaging should be utilized to reduce youth appeal and prevent safe consumption.[30,31] These studies were conducted among adult populations and utilized discrete choice and qualitative methods and more evidence is needed to determine real-world impacts for youth.

### Advertising and marketing restrictions

Restrictions on marketing practices are necessary to help prevent youth exposure, limit overly appealing promotions, prevent the normalization of cannabis use, and ensure that sales practices prioritize safety over profit. Multiple research studies have found that exposure to cannabis advertising is consistently associated with youth cannabis use and intentions to use, highlighting the need for stronger advertising regulations.[18,35–37,38–40] This is problematic as exposure to advertising is high in some states that have legalized cannabis for adult use; a study conducted in Oregon found that more than half of the residents saw cannabis ads in the past 30 days month.[41] Prevention practitioners highlighted the importance of marketing restrictions as exposure to advertising normalizes cannabis use. A prevention practitioner shared the negative effects cannabis advertising can have on youth, saying "they are witnessing this [advertising], and every single time they witness it, it is normalizing this activity." Another prevention practitioner explained how cannabis is marketed to youth as a health benefit, saying "...wellness is always in the marketing." Unfortunately, this can lead youth to the misconception that all cannabis products have health benefits.

States that permit adult-use cannabis sales regulate advertising primarily through content and placement restrictions designed to reduce youth exposure. For example, Colorado and California prohibit advertising that is attractive to minors and requires that ads be placed only where at least ~70% of the audience is reasonably expected to be age 21 or older (Colorado Revised Statutes §44-10; California Business & Professions Code §26152). Washington similarly prohibits youth-appealing imagery and restricts outdoor advertising, including limitations on billboards (Washington Administrative Code 314-55). Across states, additional safeguards commonly include mandatory health warnings, restrictions on giveaways and branded merchandise, and enforcement by state cannabis control agencies. Research examining promotional messaging found that despite existing regulations, dispensaries continue to use youth-appealing tactics, particularly online[38,39] and inside dispensaries.[22,23] Although regulatory policies are in place, sustained monitoring and enforcement are necessary to ensure compliance with restrictions on the density and placement of cannabis advertising, particularly in proximity to schools and other locations where youth congregate.[42]

### Counter advertising campaigns

Counter advertising campaigns aims to reduce youth cannabis use by correcting misperceptions about peer norms, increasing awareness of health risks, and countering pro-cannabis marketing messages. A list of campaigns that have been implemented by states that have legalized cannabis for medicinal and/or adult use can be found in **Appendix C.** Counter advertising campaigns are likely to be most effective if they emphasize the use of clear information about legalization and relatable firsthand accounts over fear-based methods.[43] Currently, there is a lack of peer-reviewed research on current counter advertising campaigns targeting youth cannabis use. There is some evidence of effectiveness of campaigns; the 'Above the Influence' was correlated with decreased cannabis use among 8th grade girls when it was assessed from 2006-2008.[44]

# PRICE

**Price** focuses on the cost and economic accessibility of cannabis products for youth. Specific measures include enacting product taxes and prohibiting financial promotions of cannabis products. In addition to influencing purchasing behavior, product taxes can generate revenue which can then be allocated to promote public health initiatives and substance use prevention programs.

**Table 4** includes the specific strategy and the definition of the strategy. An example of each strategy is provided below the table.

**Table 4. Price strategies to address cannabis use**

| Strategy | Definition | Level of Evidence |
|---|---|---|
| **Prohibition of price promotions, bulk purchases, coupons, freebies** | Methods used to restrict financial incentives encouraging the purchase of cannabis products. | Undetermined |
| **Product taxes** | A percentage of the retail price of a product added at the point of sale in accordance with policies set by state or local governments. | Undetermined |
| **Revenue allocation** | Process of designating a portion of the funds collected from cannabis sales and/or taxes to support prevention initiatives and public health programs. | Undetermined |

## Prohibition of price promotions, bulk purchases, coupons, freebies

Policies that prohibit price promotions, coupons, multi-buy discounts, and free giveaways reduce youth cannabis use by limiting industry tactics that lower prices and increase product appeal. Research indicates that lower prices increase the appeal of cannabis products and people who use recreational cannabis identify price as the most influential attribute of the product.[34] Adolescents are particularly price-sensitive; restricting discounts reduces affordability, decreases impulse purchasing, and dampens initiation and frequency of use. By curbing promotional strategies that normalize and glamorize recreational cannabis, these policies help reduce youth exposure, delay initiation, and mitigate progression to regular use.[45] Prevention practitioners shared that price promotions were common incentives used by dispensaries in their communities with some advertising "buy one blunt, get one free" and a promotional event on 4/20 advertising "for $25 you could have it all." In addition to policies limiting price promotions, there is a need for stronger enforcement of these prohibitions as discounts and free sample violations are common,[23] including on social media despite restrictions.[39]

## Product taxes

Product taxes are another approach to raise the price floor of cannabis products to prevent youth consumption.[42] States use three primary cannabis tax structures—ad valorem (price-based), weight-based, and THC-based (potency-based)—each with different implications for youth prevention. While ad valorem and weight-based taxes can increase

retail prices and reduce youth use through price sensitivity, their effectiveness may erode as market prices fall or as producers shift toward higher-potency products that are not directly taxed based on THC content. THC-based taxes are more closely aligned with youth prevention goals because they maintain price leverage in maturing markets and create a direct financial disincentive for high-potency products associated with greater risk of frequent use and cannabis-related harms. Illinois is an example of a state that sets different tax rates by THC content with a 10% tax on purchase price for products with THC level of 35% or less and 25% tax on purchase price for products with THC level above 35%.[6]

### Revenue allocation

States that legalize recreational cannabis can earmark a portion of cannabis excise tax revenue to fund evidence-based substance use prevention programs, including school- and community-based interventions, public education campaigns, and youth development initiatives.[12] At the local level, dedicated cannabis tax allocations can support prevention coalitions, enforcement of retail regulations, and capacity-building for prevention practitioners to implement data-driven strategies aligned with state prevention priorities. Several of the prevention practitioners we interviewed shared the importance of tax revenue allocation for prevention. One prevention practitioner shared that they were able to secure $300,000 from cannabis tax revenue to do prevention work. However, several practitioners observed that anticipated cannabis tax revenue may incentivize some jurisdictions to permit retail cannabis sales within their communities, potentially undermining prevention strategies aimed at reducing product availability through outlet density restrictions.

# A note about the current research on environmental strategies for cannabis use

Research examining the impact of environmental and policy strategies on cannabis use is still emerging, largely because cannabis legalization is relatively recent and implemented differently across U.S. states. Legal frameworks vary widely in their approaches to taxation, retail licensing, advertising restrictions, product regulation, and local control, creating a complex policy environment that makes it difficult to isolate the effects of individual strategies on cannabis-related outcomes. As a result, systematic reviews have noted that the evidence base on cannabis policy impacts is still developing and findings remain mixed across jurisdictions and populations.[46,47] Continued evaluation will be needed as states refine regulatory approaches and additional longitudinal data become available.

Although the cannabis evidence base is still evolving, a substantial body of research on alcohol and tobacco demonstrates that environmental prevention strategies can meaningfully influence substance use patterns, particularly among youth. Policies that reduce availability, increase price through taxation, restrict marketing and advertising, and limit retail outlet density have consistently been associated with reductions in youth initiation and overall consumption of alcohol and tobacco products.[48,49] For example, higher tobacco taxes and comprehensive marketing restrictions have been shown to decrease youth smoking rates, while limits on alcohol outlet density and price increases are associated with reductions in alcohol consumption and related harms.[48,49] These findings provide a strong theoretical and empirical foundation for applying similar environmental strategies to cannabis policy.

We used several strategies to identify overlap of the environmental strategies to address cannabis, alcohol, and tobacco use. First, we reviewed the County Health Rankings and Roadmaps' (CHR&R)50 list of evidence-informed strategies for alcohol, tobacco, and substance use. The CHR&R evidence rating includes "Scientifically Supported" (best rating for supportive evidence), "Some Evidence", "Expert Opinion", "Insufficient Evidence", "Mixed Evidence" (some in support and against), and "Evidence of Ineffectiveness" (sufficient evidence that the strategy is not effective). Then, we reviewed The Community Guide,[51] a collection of evidence-based recommendations and findings from the Community Preventive Services Task Force (CPSTF), for strategies that were not rated by CHR&R. We did not find additional evidence of effectiveness from The Community Guide. Finally, we reviewed the "Effectiveness of Environmental Strategies on the Prevention of Prescription Drug, Marijuana, Alcohol and Tobacco Use".[52] We did not find additional evidence of effectiveness from this source.

This review of the evidence of effectiveness of environmental strategies to address youth alcohol and tobacco use is not intended to be comprehensive and may not include other sources that indicate that these strategies are effective. Rather, the intent is to demonstrate that while environmental strategies to address youth cannabis use may not have documented effectiveness, they are grounded in strategies that have demonstrated effectiveness for alcohol and tobacco.

| Strategy | | Level of Evidence | Alcohol | Tobacco |
|---|---|---|---|---|
| Product | Delta-9-tetrahydrocannabinol (THC) dose ceiling/max | Undetermined | - | - |
| | Prohibit cannabis concentrate products | Undetermined | - | - |
| | Limited product diversity | Undetermined | - | - |
| | Limited list for medical cannabis | Undetermined | - | - |
| Place | County/city ban on cannabis sales | Undetermined | - | - |
| | Retail outlet density | Promising | Scientifically Supported[53] | Expert Opinion[54] |
| | Retail outlet placement | Promising | - | Expert Opinion[54] |
| | Time of sale/hours of operations | Undetermined | Some Evidence[55] | |
| | Minimum purchase age laws | Undetermined | Scientifically supported[56] | Scientifically Supported[57] |
| | Minimum entry age | Undetermined | - | - |
| | Minimum employment age | Undetermined | - | - |
| | Store placement of cannabis products | Undetermined | - | - |
| | Compliance checks | Undetermined | Scientifically Supported[58] | |
| | Social host ordinance | Undetermined | Expert Opinion[59] | |
| | Home storage of cannabis | Undetermined | - | - |
| | Workplace policies | Undetermined | - | - |
| Promotion | Warning labels on packaging | Emerging | - | - |
| | Advertising and marketing restrictions | Emerging | Some evidence[60] | Some evidence[61] |
| | Counter advertising campaigns | Promising | Insufficient evidence[62] | Scientifically Supported[63] |
| Price | Prohibition of price promotions, bulk purchases, coupons, freebies | Undetermined | Some evidence[64] | - |
| | Product taxes | Undetermined | Scientifically Supported[65] | Scientifically Supported[66] |
| | Revenue allocation | Undetermined | - | - |

When considering the current evidence of effectiveness of environmental strategies to address youth alcohol and tobacco use, there are several strategies that are likely to have a preventative impact on youth cannabis use. We identified retail outlet density, retail outlet placement, and counter advertising campaigns as promising strategies to prevent youth cannabis use. The existing evidence from other substances supports the likely effectiveness of these strategies. Further, we identified advertising and marketing restrictions to be emerging strategies to prevent youth cannabis use which have some evidence from the alcohol and tobacco literature. Although effectiveness research on the impact of minimum purchase age laws, compliance checks, and product taxes on youth cannabis use has yet to be conducted, evidence from other substance use is indicative of potential benefit. While definitive conclusions cannot yet be drawn, the established evidence from alcohol and tobacco control suggests that environmental strategies aimed at reducing availability, limiting marketing, and increasing regulatory oversight may play an important role in shaping cannabis use patterns as legalization policies continue to evolve.

# Words of advice from prevention practitioners to other prevention practitioners

At the conclusion of each interview, we asked prevention practitioners for one piece of advice that they would share with prevention practitioners at the state and local levels who are preparing for cannabis legalization in their state.

## Here is what they had to say:

**Start Early**

Prevention practitioners emphasized that practitioners working in states that are considering cannabis legalization should begin preparing early and proactively. Several prevention practitioners noted that legalization can shift social norms quickly, often faster than communities anticipate, making it critical for prevention practitioners to anticipate changes in youth exposure and attitudes toward cannabis. Interviewees encouraged prevention practitioners to begin planning prevention strategies in advance, particularly those aimed at youth, to avoid being caught unprepared once policies are enacted. As a prevention practitioner explained, when exposure and access increase, social norms can change rapidly, which can ultimately influence patterns of use. Taking a proactive approach—developing strategies, identifying safeguards, and preparing community partners—was viewed as essential to protecting youth and public health.

> "My suggestion to anybody that's being faced with this is get ahead of it. Make sure that the law that is passed has every safeguard you can possibly think to it."

> "If they were going to make it legal, I would hope that they would take more time and think things through and make sure they set up an entity to test the cannabis to regulate it, to make sure it's coming from a reputable source."

**Engage in the Policy Process**

Prevention practitioners stressed the importance of engaging in the policy development process. Prevention practitioners recommended working closely with policymakers, legislative staff, and community leaders to help shape legislation before it is finalized. This may involve educating policymakers about prevention science, meeting with legislative offices, and advocating for strong safeguards within the law. Prevention practitioners suggested that they and the coalitions within communities should clearly articulate their position on cannabis policies and communicate that stance consistently. Ensuring that legislation includes regulatory safeguards—such as product testing, oversight of cannabis production, and mechanisms to reduce youth access—was viewed as an important opportunity for prevention professionals to help mitigate potential harms.

> "I would say be firm on what your position is. Right now you may think it's common sense to have a position paper. You'd be surprised how many people don't have one. So, what is your coalition's position on marijuana, and make it clear. Make it plain."

> "Well the best you can educate the policymakers who are crafting the legislation and that can mean a lot of personal contacts with the staff of the legislators or working with the legislators or their caucuses and so it means often you have to head to the capital and show that you're interested and you want to work with them and you want to help craft a safe bill."

**Communicate with the Public**

Another key recommendation was to strengthen public education and prevention messaging. Prevention practitioners described the need for accurate, age-appropriate communication campaigns to address common misconceptions about medical cannabis, particularly among youth who may interpret "medical" as meaning harmless. Prevention practitioners suggested implementing community-wide educational initiatives that promote healthy behaviors, build developmental assets among youth, and provide balanced information about potential risks. They also emphasized the importance of education for adults, including older adults who may be unfamiliar with the potency of contemporary cannabis products or unaware of potential interactions with medications. Delivering this information in non-stigmatizing ways that encourage open dialogue with healthcare practitioners was viewed as an important component of harm reduction.

> "Citywide, we're trying to launch basically an assets campaign, have everybody trained in like especially youth-serving practitioners, in developmental assets, because if we create caring relationships with these students, then they're less likely to smoke marijuana or do any of these other risky behaviors."

> "...older adults who may have consumed cannabis when they were much younger, it's a different cannabis now."

> "There should be another media campaign with accurate information that's age appropriate, specific, and have a community approach. Our elementary and middle school kids think it's good for you because it is advertised as medical marijuana. We need to do promotion around what is healthy."

**Be Collaborative**

Finally, practitioners highlighted the importance of collaboration, funding, and learning from other jurisdictions. Practitioners encouraged prevention professionals to rely on one another for support and to examine policies and prevention strategies implemented in other states to avoid repeating past mistakes. Many interviewees emphasized that effective prevention requires sustained investment in prevention, treatment, and recovery services. They suggested that cannabis tax revenues, if generated, should be directed toward these services to ensure communities have the resources needed to respond effectively. Working collaboratively across prevention practitioners, schools, parents, law enforcement, and healthcare professionals was seen as essential for developing comprehensive strategies that reduce youth access, strengthen community relationships, and promote healthier outcomes.

> "I would tell anybody look at what they've got now and try to model your stuff after them. Hard lessons learned. Don't make the same mistakes they made, and don't make the same mistakes we're making."

> "Work together. Do what you're doing right now. Talk to other states, other communities. What are they doing? What's working? Just rely on the resources that are already in place to take a look at how you as a community can implement those things."

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# Appendix A: Prevention practitioner interview methodology

**Study design**
In April-June 2023, the research team conducted semi-structured qualitative interviews with a sample of substance use prevention practitioners (N=18) working in 12 states that have legalized cannabis for medicinal or adult use. Qualitative data on real-world best practices and lessons learned during planning, implementation, and evaluation to address cannabis use by youth was collected. The interview guide covered prevention policies, strategies, and actions enacted to prevent youth cannabis use. All interviews lasted approximately 45 minutes and were audio-recorded. Interviews were conducted virtually or by phone by two trained study members (IV and KE). Interviews were audio-recorded and transcribed verbatim.

This study was approved by the East Carolina University IRB (UMCIRB 22-000635). Informed consent was ascertained prior to conducting the interviews. Data was obtained voluntarily from Prevention practitioners specifically and exclusively for research purposes and stored on password-protected and access-limited servers.

**Sampling and recruitment**
Participants were substance use prevention practitioners who worked to prevent youth cannabis use in their communities following adult use and medicinal legalization at the state-level (N=18). The final sample consisted of prevention practitioners from the following states: California, Illinois, Maine, Maryland, Minnesota, Montana, New Jersey, Ohio, Oregon, Pennsylvania, Virginia, and Washington. Of these states, both medical and adult-use cannabis were legalized in California, Illinois, Maine, Montana, New Jersey, Oregon, Virginia, and Washington. Only medical use was permitted in Maryland, Minnesota, Ohio, and Pennsylvania at the time the interviews were conducted.

The goal was to interview a representative sample of prevention practitioners based on state cannabis policy (medicinal-only vs adult use) and regions across the United States. Potential prevention practitioners were identified based on referrals from the state National Prevention Network (NPN) representative and Community Coalitions of America's (CADCA) Stories in Action highlighting a community's work to prevent youth cannabis use. Recruitment was completed when data saturation and a representative sample of states and regions were ascertained. Potential prevention practitioners were sent up to three email invitations and one phone call to inform them about the study and schedule an interview. Participants received a $30 Amazon gift card following completion of the interview.

**Data analysis**
Three researchers (MW, CW, KE) coded the interviews using ATLAS.ti software. KE developed the codebook using previously identified environmental strategies (i.e., the 4 Ps) and the CFIR Framework. Qualitative data was approached with open coding following the organization of data into the following a priori environmental strategies (i.e., product, place, promotion, and price) and CFIR domains (i.e., innovation characteristics, outer setting, inner setting, characteristics of individuals, and process). After each coder analyzed the interview data, the coders discussed and resolved any discrepancies in coding for each transcript.

To identify environmental strategies, code reports per strategy (product, place, promotion, and price) were created. Code reports were analyzed to identify unique strategies for each environmental strategy category. We developed a table that organizes the strategies by environmental strategy type.

# Appendix B: Scoping review methodology

The scoping review consisted of manuscripts and resources from peer-reviewed and grey literature.

## Peer-reviewed literature

### Study design

The study team conducted a review of the literature to scope the existing body of literature, investigate research conduct, and identify knowledge gaps using a rigorous and reproducible protocol.[67] The study design followed procedures outlined by the PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analyses) systematic review guidelines to ensure transparency in the process of identifying, selecting, and reporting findings.68

### Search strategy

A medical librarian (AH) searched PubMed (via legacy pubmed.gov using the advanced search), Embase, ProQuest Search, PsycINFO (via the EBSCOhost interface), and the Cochrane Central Register of Controlled Trials (via the Ovid interface) to identify potential studies published between January 1996 and August 2022 that met our inclusion criteria. A medical librarian (AH) iteratively developed keywords in the domains of marijuana/cannabis and community-level policies or strategies aimed to address substance use behaviors through harvesting terminology identified in known, relevant studies and expert consultation. The keywords were combined with controlled vocabulary from PubMed/MEDLINE for the purpose of preliminary search testing and construction. The search strategy was mapped and implemented across identified databases. The full search strategy is below.

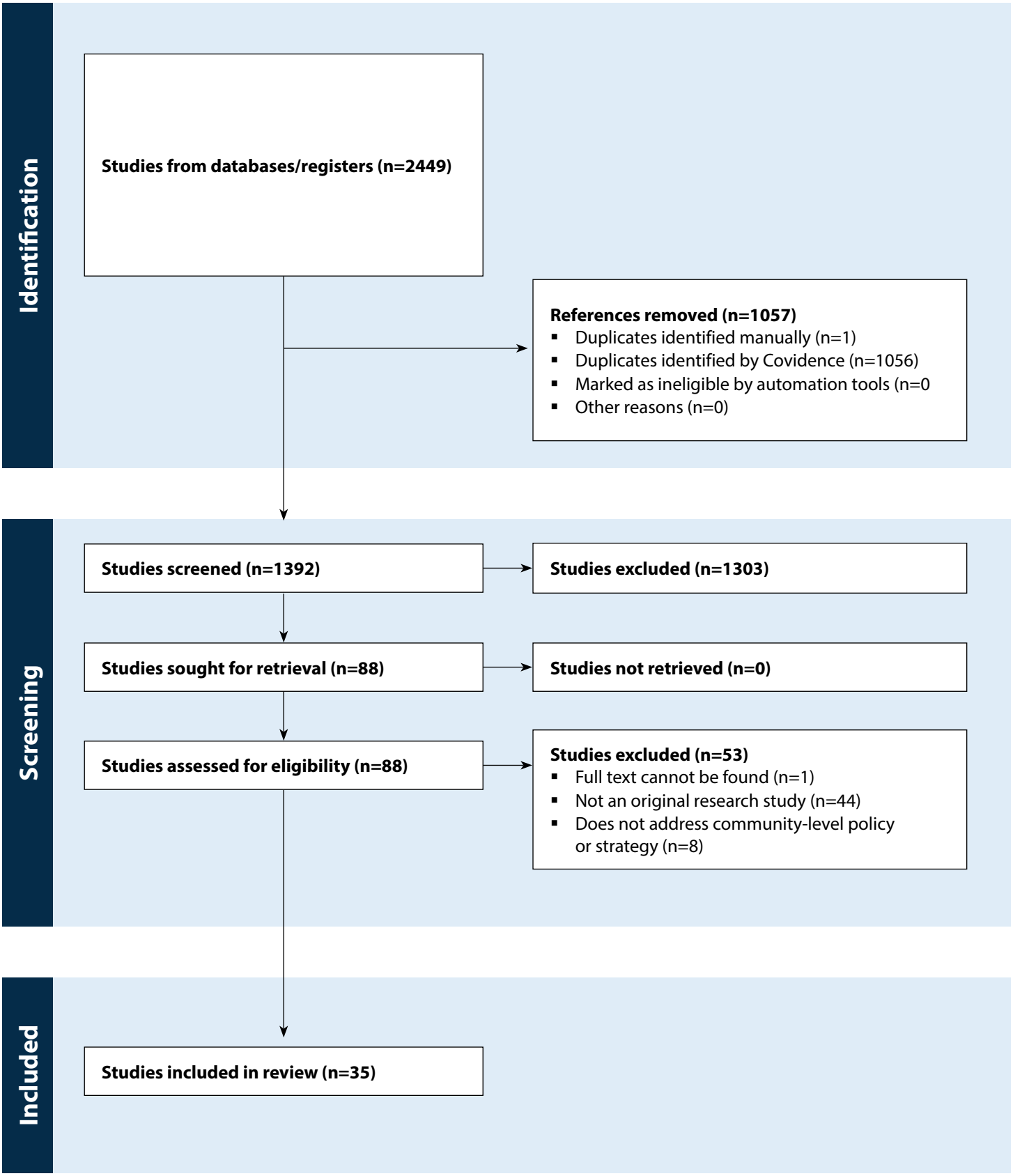
((“Marijuana Use”[Mesh] OR “Cannabis”[Mesh] OR “Medical Marijuana”[Mesh] OR “Marijuana Abuse”[Mesh] OR Cannabis[tiab] OR marijuana[tiab]) AND (legal*[tiab] OR decriminaliz*[tiab] OR medicin*[tiab] OR nonmedic*[tiab] OR recreation*[tiab] OR illegal[tiab] OR retail[tiab] OR dispensar*[tiab] OR market*[tiab] OR outlet*[tiab] OR “point of sale”[tiab] OR promotion*[tiab] OR giveaway*[tiab] OR coupon*[tiab] OR “branded merchandise”[tiab] OR security[tiab] OR packag*[tiab] OR label*[tiab] OR “health warning”[tiab] OR “health claims”[tiab] OR delivery[tiab] OR shipping[tiab])) AND ((“Policy”[Mesh] OR “Driving Under the Influence”[Mesh] OR “Social Control, Formal”[Mesh] OR “Law Enforcement”[Mesh] OR Policy[tiab] OR policies[tiab] OR regulat*[tiab] OR restrict*[tiab] OR barrier*[tiab] OR ban[tiab] OR ordinance*[tiab] OR moratori*[tiab] OR zoning[tiab] OR buffers[tiab] OR distance[tiab] OR driving[tiab] OR “under the influence”[tiab] OR “legal age”[tiab] OR tax[tiab] OR taxes[tiab] OR taxation[tiab] OR “tax exempt”[tiab] OR access[tiab] OR “advisory committee”[tiab] OR “land use”[tiab] OR campaign*[tiab] OR “public service announcement*”[tiab] OR “formal social control”[tiab] OR law[tiab] OR legal[tiab]) AND ((“Young Adult”[Mesh] OR “Adolescent”[Mesh] OR “young adult”[tiab] OR adolescen*[tiab] OR underage*[tiab]) AND (intention[tiab] OR intend[tiab] OR use[tiab] OR usage[tiab] OR compliance[tiab] OR identification[tiab] OR storage[tiab] OR access[tiab]))) AND (“United States”[Mesh] OR City[tiab] OR Cities[tiab] OR County[tiab] OR Counties[tiab] OR State[tiab] OR States[tiab] OR Alaska[tiab] OR Alabama[tiab] OR Arizona[tiab] OR Arkansas[tiab] OR California[tiab] OR Colorado[tiab] OR Connecticut[tiab] OR Delaware[tiab] OR Florida[tiab] OR Hawaii[tiab] OR Illinois[tiab] OR Louisiana[tiab] OR Maine[tiab] OR Maryland[tiab] OR Massachusetts[tiab] OR Michigan[tiab] OR Minnesota[tiab] OR Mississippi[tiab] OR Missouri[tiab] OR Montana[tiab] OR Nevada[tiab] OR “New Hampshire”[tiab] OR “New Jersey”[tiab] OR “New Mexico”[tiab] OR “New York”[tiab] OR “North Dakota”[tiab] OR Ohio[tiab] OR Oklahoma[tiab] OR Oregon[tiab] OR Pennsylvania[tiab] OR “Rhode Island”[tiab] OR “South Dakota”[tiab] OR Utah[tiab] OR Vermont[tiab] OR Virginia[tiab] OR Washington[tiab] OR “West Virginia”[tiab] OR “District of Columbia” [tiab] OR “Puerto Rico”[tiab] OR Guam[tiab] OR “Northern Mariana Islands”[tiab] OR “US Virgin Islands”[tiab])

**Study selection**
Published studies detailing original research examining community-level strategies and policies aimed at preventing youth cannabis use were included. Inclusion criteria were that studies addressed cannabis use or the consequences of cannabis use and included a discussion of community-level policies or environmental strategies. Only studies conducted in the United States and English language publications were included. Studies were included if the data was collected between 1996 to the present day (August 2022) to reflect when the first state in the US legalized cannabis for medicinal use. We included studies that utilized quantitative, qualitative, or mixed method designs and excluded reviews, editorials, and conference abstracts.

Three authors were involved in screening identified records. After the de-duplication of records, two authors independently screened the title and abstract of each record for inclusion. Next, two authors reviewed the full text of each record. Blinding was used during the screening process. All conflicts were brought to the entire group of authors who then discussed the conflict and reached a consensus on inclusion.

In total, 2,449 titles and abstracts were screened for inclusion, of which 88 were submitted for full-text review. Following full-text screening, 35 records met the inclusion criteria. Figure 1 depicts the PRISMA flowchart for screening details and reasons for exclusion.

**Data extraction**
Data from all records included following full-text review were independently extracted by the project lead (KE). Important variables were extracted from each article and compiled in a Microsoft Excel spreadsheet. These variables were study identifiers (first author name, title, publication information), aim of the study, study design, environmental strategy, date range of the study, sample age range and size, study location, and state-level cannabis policy. The specific environmental strategy was identified and appended.


Identification
Studies from databases/registers (n=2449)
References removed (n=1057)
Duplicates identified manually (n=1)
Duplicates identified by Covidence (n=1056)
Marked as ineligible by automation tools (n=0
Other reasons (n=0)
Screening
Studies screened (n=1392)
Studies excluded (n=1303)
Studies sought for retrieval (n=88)
Studies not retrieved (n=0)
Studies assessed for eligibility (n=88)
Studies excluded (n=53)
Full text cannot be found (n=1)
Not an original research study (n=44)
Does not address community-level policy or strategy (n=8)
Included
Studies included in review (n=35)

## Grey literature

### Study design
A review of the grey literature following a process modified from Godin et al 201569 was conducted.

### Search strategy
The grey literature search plan was developed by reviewing targeted organizational websites identified with consultation with subject-matter experts. The following websites were searched:

1. Substance Abuse and Mental Health Services Administration (funding agency)
2. Centers for Disease Control and Prevention (funding agency)
3. National Institute on Drug Abuse (funding agency)
4. Community Anti-Drug Coalitions of America (professional training/resource center)
5. Prevention Technology Transfer Center (professional training/resource center)
6. Addiction Technology Transfer Center (professional training/resource center)
7. Blueprints (Intervention and Policy Registries)
8. Healthy People (Intervention and Policy Registries)
9. Getting it Right from the Start: Advancing Public Health and Equity in Cannabis Policy (Intervention and Policy Registries)

A Google search was explored but did not yield relevant sources.

### Study selection
We included published sources detailing original research examining community-level strategies and policies aimed at preventing youth cannabis use. Inclusion criteria were that sources addressed cannabis use or the consequences of cannabis use and included a discussion of community-level policies or environmental strategies. Only sources conducted in the United States and English language publications were included. Sources were included if the data was collected between 1996 to the present day (June 2025).

One author was involved in screening identified records (MW). Any questions were brought to the project lead (KE) and consensus on inclusion was reached. Because abstracts are often unavailable in grey literature, all potential sources underwent full text review. Following full-text screening, 98 records met the inclusion criteria.

### Data extraction
Key variables were extracted from each webpage and compiled in a Microsoft Excel Workbook, with a separate worksheet/tab created for each website. Key variables included identifiers such as the name of the author/source, date identified, title of webpage, and URL. The environmental strategies referenced (product, place, promotion, and price and specific strategy within each category) were identified and documented in a separate column. After reviewing all the websites, all the identified sources were combined in an Excel spreadsheet for extraction for the report.

# Appendix C: Campaigns implemented by states that have legalized medicinal or recreational cannabis use

| Campaign Name | State/ Community | Target Audience | Media Channels Used | Link |
|---|---|---|---|---|
| **Mind Over Marijuana** | California (Statewide) | Youth | Social media, video ads, digital ads | blog.rescueagency.com/youth-cannabis-mental-health |
| **Cannabis Education & Youth Prevention Program** | California (Statewide) | Youth & Parents | Web, print, community outreach | www.cdph.ca.gov/Programs/CCDPHP/sapb/cannabis/Pages/default.aspx |
| **You Can** | Washington (Statewide) | Youth | Social media, website, videos | www.youcanwa.org/about |
| **Cannabis Prevention & Education Program** | Washington (Statewide) | Youth & Adults | TV, radio, print, social media | doh.wa.gov/you-and-your-family/cannabis/prevention-and-education |
| **Youth Marijuana Prevention** | NE Tri County Health District (WA) | Youth | Community outreach, print | www.netchd.org/206/Marijuana-Prevention |
| **Youth Marijuana Prevention Toolkit** | Pierce County (WA) | Youth & Parents | Toolkit, print, posters | tpchd.org/wp-content/uploads/2023/12/Marijuana-Toolkit.pdf |
| **Retail Marijuana Education & Youth Prevention** | Colorado (Statewide) | Youth & Community Agencies | Web resources, fact sheets | cdphe.colorado.gov/marijuana-education-and-youth-prevention-resources-for-community-agencies |
| **More About Marijuana** | Massachusetts (Statewide) | Parents, Youth, Adults | TV, transit ads, web ads | masscannabiscontrol.com/document/massachusetts-public-awareness-campaign-more-about-marijuana-summary-and-effectiveness-june-2020/ |
| **Cann We Chat?** | Missoula County, MT | Parents | Website, parent guides | missoulapublichealth.org/communities/coalitions/healthy-missoula-youth/cann-we-chat/ |
| **Marijuana Prevention Campaign** | New Hampshire (Raymond Coalition for Youth) | Youth & Community | Print, community outreach | www.rcfy.org/what-we-do/programs/marijuana-prevention-campaign.html |
| **Youth Now Prevention Initiative** | Youth Now Initiative (WA Communities) | Youth & Community | Social media, youth engagement | www.youthnow.me/about-youth-now |
| **Stanford Cannabis Awareness & Prevention Toolkit** | National (CAPT Toolkit) | Schools, Youth, Educators | Curriculum toolkit | med.stanford.edu/cannabisprevention toolkit/about.html |
| **Youth Marijuana Prevention** | Montana (Statewide) | Youth | Community outreach | dphhs.mt.gov/ecfsd/addiction/marijuana |
| **Cannabis Education & Youth Prevention** | Vermont (Statewide) | Youth & Parents | Web, fact sheets | www.healthvermont.gov/alcohol-drugs/cannabis |
| **Keep Your Focus** | Connecticut (Durham & Middlefield) | Youth | School posters, banners, social media | www.cadca.org/resource/coalitions-action-youth-create-keep-your-focus-marijuana-awareness-campaign/ |