Cannabis Access by Retailer Type in New York

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abstract

OBJECTIVE: Increasing state-level cannabis legalization in the United States aims to reduce risks to consumers through regulation but may also lead to more unlicensed retailers and youth access. This study examines how age verification and business practices (eg, pricing, signage, and youth-appealing products) differ by licensing status.

METHODS: The Cannabis Access and Safety in New York secret shopper study observed 37 dispensaries and smoke shops (5 licensed medical, 7 licensed recreational, 10 unlicensed dispensaries, and 15 smoke shops), randomly selected from 840 outlets across New York City (NYC) in November to December 2023 to audit age verification and other business practices.

RESULTS: Licensed retailers were significantly more likely to require age verification before store entry (100% vs 10%, $P < .01$) and purchase (100% vs 48%, $P = .01$). Unlicensed retailers displayed more cartoon signage (57% vs 0%) and sold youth-appealing products like energy drinks (48% vs 0%), soda (57% vs 0%), and candy (53% vs 0%). Both types of retailers were often near schools (75% and 76%) and offered delivery (58% and 36%) but rarely displayed health warnings (8% and 10%).

CONCLUSION: In NYC, unlicensed retailers outnumber licensed ones and often engage in practices increasing youth access to cannabis. They infrequently verify age, sell cheaper products, and use youth-friendly marketing. Licensed retailers follow age verification laws but are also often near schools and inconsistent with certificates of analysis provision. Further research is needed on policy impacts on youth cannabis use in deregulated markets.

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WHAT'S KNOWN ON THIS SUBJECT: Cannabis legalization aims to protect consumers through regulation. However, unlicensed retailers may increase youth access, which is concerning given the well-documented harms of cannabis use during adolescence.

WHAT THIS STUDY ADDS: There are significant differences in age verification and marketing practices between licensed and unlicensed cannabis retailers, highlighting the need for stricter enforcement and additional measures to prevent youth access and reduce potential harms in deregulated markets.

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INTRODUCTION

Cannabis legalization has accelerated in the United States since 2012, with 24 states allowing recreational use and 38 permitting medical use.[1] Many states have established agencies overseeing retailer licensing and compliance.[2,3] Given well-documented harms of cannabis use in adolescence, both proponents and parties opposed to legalization agree that regulatory approaches should aim to minimize access to and use of cannabis by youth.[4–7]

Limiting youth cannabis access is a public health priority. In 2022, 31% of 12th grade students reported past-year use,[8] and youth are uniquely susceptible to potential harms.[9,10] Early use substantially increases risk of later cannabis use disorder[11] and may increase the risk of developing a psychotic disorder and other adverse outcomes.[9,12,13] Research suggests legalization may increase youth use,[14] likely due to reduced harm perceptions[15,16] and increased access.[17] Age verification before sales is crucial to limiting youth access to cannabis in legalized states. Surveillance studies of licensed dispensaries show high identification (ID) verification rates, with variable rates of verification at store entry and age-restriction signage.[18,19] In contrast, nicotine vape shops, which sometimes sell cannabis, have lower verification rates.[20] Few studies focus on unlicensed cannabis retailers. One California-based study found that unlicensed dispensaries were more likely to sell products attractive to children than licensed retailers, which had high levels of regulatory compliance.[21] However, the study did not examine product pricing, proximity to schools, or sale of noncannabis youth-oriented products.

Deregulating cannabis may incentivize its marketing, increasing youth exposure to cannabis businesses both online and in person, which correlates with adolescent use.[22–25] Marketing of recreational substances shapes perceptions and increases likelihood of use by youth.[4,19,26] Techniques such as social media, cartoon imagery, online sales and delivery, and messages about health benefits are linked to adolescent cannabis use.[19,23,26,27] Selling cannabis alongside innocuous consumables like candy or soda may normalize cannabis use and attract new users.

As cannabis markets rapidly expand in the United States, monitoring retailer practices is critical to assess regulations and protect vulnerable consumers, particularly youth. Cannabis is sold by various retailers including medical cannabis dispensaries, state-licensed recreational dispensaries, unlicensed dispensaries (ie, stores specializing in cannabis products), and smoke shops (ie, stores selling nicotine products and other smoking supplies). Yet, few data compare licensed dispensaries to unlicensed ones and smoke shops in legalized areas. Here, we examine the cannabis market in a large, diverse, urban environment 1 year after recreational sales began. Findings from the Cannabis Access and Safety in New York (CASNY) study compare licensed and unlicensed cannabis retailers to address (1) differences in age verification and (2) variations in other practices such as pricing, online presence, and location.

METHODS

Setting

New York state (NYS) established a medical marijuana program in 2014 and legalized recreational use in March 2021. Recreational dispensary licenses were issued in 2022 with the first sale in December. Licensed retailers must verify age (≥21), provide certificates of analysis (COAs) describing potency and quality, and maintain distance from schools and churches (Supplement 1). However, the slow licensing process has resulted in legal retailers being greatly outnumbered by illegal dispensaries, challenging state enforcement.[28]

Legalization in NYS has resulted in 4 types of cannabis retailers in New York City (NYC): state-licensed medical (12) and recreational dispensaries (12 as of December 2023), unlicensed dispensaries, and smoke shops.[29,30] In November 2023, NYC Council estimated at least 1500 unlicensed dispensaries.[31] Unlicensed dispensaries publicly advertise cannabis and resemble recreational dispensaries but do not sell regulated products or follow state requirements (Supplement 2). Additionally, smoking and vaping shops, which proliferated before 2021, were naturally positioned to sell cannabis. In January 2023, NYC Council estimated 8000 unlicensed smoke shops.[32] Consumers also purchase cannabis from online-only retailers and street dealers.

Sampling

The CASNY study investigates cannabis access and safety focusing on youth access. A generated directory included 840 retailers across 4 categories: licensed medical (n = 12), licensed recreational (n = 7), unlicensed dispensaries (n = 155), and smoke shops (n = 666). Lists of NYS-licensed medical and recreational cannabis dispensaries were obtained from the NYS website.[30,31] Lists of unlicensed cannabis dispensaries were generated by searching Google Maps for cannabis, weed, marijuana, and δ-9-tetrahydrocannabinol (THC) or labeled as "cannabis store" with an NYC address. Smoke shops were generated by searching Google Maps for smoke shop, tobacco shop, or vaporizer store or labeled as "tobacco shop" with an NYC address. At least 1 retailer of each category was in each borough, with the exceptions of Brooklyn (no licensed recreational dispensary) and Staten Island (no licensed recreational or unlicensed dispensary; Supplement 3). Retailers were randomly chosen within each category and each borough, oversampling for unlicensed retailers and boroughs with more stores (ie, Manhattan > Brooklyn, Queens > Bronx, and Staten Island) because these are (1) more prevalent and (2) were expected to have a wider range of business practices than the regulated licensed retailers (Supplement 4).

In November to December 2023, trained research assistants went to 37 preselected retailers and attempted to purchase 2 flower products, typically less than 3.5 g, (including 1 of each shop's least expensive products). Four smoke shops (4/15, 27%) denied selling cannabis and were excluded from additional analyses.

Data Collection

Retailer Observations

A 22-year-old research assistant visited licensed recreational dispensaries, unlicensed dispensaries, and smoke shops posing as a customer. They engaged in casual conversation with staff and presented their real state ID card when asked for age verification.

A point-of-sale surveillance tool was developed based on prior nicotine and cannabis surveillance research.[19,33] The research assistant observed each shop for several minutes while obtaining samples and completed the assessment form on a smartphone immediately on leaving, which included the following categorical observations.

AQ2 *Age-restriction signage.* This is a sign indicating that an age of 21 years or older was required to enter and purchase.

ID procedures. The ID is checked at entry and checked at purchase.

Store certification. There are signs indicating "licensed retailer" and "medical marijuana."

Health information. There are signs with health warnings and signs claiming health benefits.

On-site smoking. This includes no smoking or vaping signs, active smoking or vaping in the store, and seating area (eg, lounge seating and tasting bar).

Other. This includes signage with cartoons promoting products, cannabis on open display, and promotions (eg, discount programs).

Other noncannabis products sold. These products include tobacco products, alcohol, energy drinks, soda, lottery tickets, candy, snack foods, sexual products, and alternative health and herbal products.

Product Information

Product characteristics (eg, THC potency, cost, mass, and COA availability) were reviewed by at least 2 research team members and recorded for each sample. If THC potency was not listed on the label, the store clerk was queried.

Websites

Following the in-store survey, each retailer was located on Google Maps. If no website link was listed, we reviewed the first 2 pages of Google results for a store website or social media account. Websites were reviewed for age gates (ie, pop-up windows requiring visitors to attest being ≥21 years old), functions for making online purchases, advertisement of delivery services for online orders, members clubs, sale of store apparel, and links to other social media platforms.

Geolocation

Each retailer was located on Google Maps, and the surrounding area was searched for (1) kindergarten through 12th grade (K12) schools, (2) parks or playgrounds, (3) houses of worship, or (4) other cannabis retailers (ie, those labeled "cannabis store" in Google Maps). NYS regulations restrict recreational cannabis stores from operating within 152.4 m of a school or house of worship and 304.8 m of another retailer. The average NYC block is 80.47 m, so we used a radius of 2 blocks for 1 to 3 and a radius of 4 blocks for 4. AQ3 AQ4

Tax-adjusted Prices

To calculate tax-adjusted prices, we added the NYS 13% excise tax to licensed recreational products and the state 8.8% sales tax to the cost of unlicensed dispensary products. No tax was added to medical marijuana (a 7% excise tax is applied presale), and smoke shop purchases generally had no additional line-item tax at checkout.

Data Analysis

Descriptive and bivariate analyses were calculated with Stata version 15.1.[34] Comparisons between licensed and unlicensed retailers used Fisher exact test for categorical variables and t test for continuous variables (eg, price and potency). The Benjamini-Hochberg procedure was applied to adjust P values for multiple comparisons.[35]

Ethics

Because this study focuses on stores and products, it does not meet the definition of human subjects research and does not require institutional review board assessment.

RESULTS

Age Verification

All licensed retailers verified age with photo ID before permitting store entry, but only 10% of unlicensed retailers required ID for entry ($P < .01$) and only 48% checked ID at any point before purchase ($P = .01$). See Table 1 for comparisons among retailers based on licensing status. There were no differences between licensed and unlicensed stores posting signs requiring customers be at least 21 years old for entry (42% and 43%, respectively) or to purchase cannabis (58% and 38%, respectively). Licensed retailers were significantly more likely to require website visitors

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TABLE 1. Comparisons Between Licensed and Unlicensed Retailers on Indicators of Promotion and Access to Youth

	Licensed Retailers[a] (n = 12)	Unlicensed Retailers[a] (n = 21)	*P* Value[b]
A. Youth-related metrics			
Age-related verification and signage to restrict youth access			
Any ID verification, n (%)	12 (100)	10 (48)	**.01**
ID verification at entry, n (%)	12 (100)	2 (10)	**<.01**
ID verification at purchase, n (%)	6 (50)	8 (38)	.93
Sign indicating age >21 years to enter, n (%)	5 (42)	9 (43)	1.00
Sign indicating age >21 years to purchase, n (%)	7 (58)	8 (38)	.47
Website age gate, n (%)[c]	12 (100)	3 (27)	**<.01**
Product pricing			
Price of lowest-cost flower, M (SD), $/g	10.66 (2.93)	8.77 (2.77)	.14
Price of lowest-cost flower (adjusted for additional taxes applied at purchase), M (SD), $/g	11.34 (2.71)	9.13 (2.87)	.08
Cannabis-related marketing and messaging			
Signs with cannabis-related health warnings, n (%)	1 (8)	2 (10)	1.00
Signs promoting health benefits of cannabis, n (%)	3 (25)	2 (10)	.48
Cartoon signage, n (%)	0 (0)	12 (57)	**.01**
Any social media presence, n (%)	11 (92)	9 (43)	**.02**
Online purchase of cannabis for delivery available[c]	7 (58)	4 (36)	.72
Concomitant noncannabis sales			
Sells nicotine products, n (%)	0 (0)	12 (57)	**.01**
Sells energy drinks, n (%)	0 (0)	10 (48)	**.01**
Sells soda, n (%)	0 (0)	12 (57)	**.01**
Sells candy, n (%)	0 (0)	9 (43)	**.03**
Location			
Within 2 blocks of a K12 school, n (%)	9 (75)	16 (76)	1.00
Within 2 blocks of a park or playground, n (%)	10 (83)	18 (86)	1.00
B. Other regulatory metrics			
Labeled potency of lowest price flower sample (n = 17), M (SD), % THC	21.7 (3.56)	21.4 (2.01)	.98
Certificate of analysis available for lowest-priced flower product, n (%)	8 (67)	0 (0)	**<.01**
Cannabis use observed in store, n (%)	0 (0)	3 (14)	.48

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Abbreviations: ID, identification; K12, kindergarten through 12th grade; M, mean; THC, δ-9-tetrahydrocannabinol.

[a] Legal retailers include New York state–licensed medical or recreational cannabis dispensaries. Illegal retailers include dispensaries and smoke shops selling cannabis without a New York state license. The 4 smoke shops that did not sell cannabis were excluded from further analyses.

[b] Categorical variables tested with Fisher exact test, and continuous variables tested with *t* test; *P* values adjusted for multiple comparisons using the Benjamini-Hochberg procedure.

[c] Among stores with identified web presence (n = 23, 12 licensed, and 11 unlicensed).

to confirm an age of 21 years or older (100%) than unlicensed retailers with websites (27%, $P < .01$; Table 2).

Pricing

The price of the lowest-cost flower product, adjusted for taxes applied at checkout, trended toward cost lower among unlicensed retailers, which charged $9.13/g (SD = 2.87), than licensed retailers, which charged $11.34/g (SD = 2.71, $P = .08$; Table 3).

Promotions, Marketing, and Other Product Sales

Other Products Sold

Unlicensed retailers were significantly more likely to sell cannabis alongside nicotine products (57%, $P = .01$), energy drinks (48%, $P = .01$), soda (57%, $P = .01$), and candy (43%, $P = .03$), none of which was sold by any licensed retailer (see Table 3). Alcohol was not commonly sold by any cannabis retailers (Table 3).

Online Presence

Websites or social media sites were found for 70% of all retailers, and social media presence was identified significantly more often for licensed retailers (92%) than unlicensed retailers (43%, $P = .02$; Supplement 5). Most of these retailers (74%) enable purchase of cannabis online, either for delivery or store pick-up. Instagram was the most used social media platform (87% of stores with any online presence), followed by X/Twitter and Facebook (both 44%).

Delivery

Among the 23 stores with websites, 48% facilitate online purchase of cannabis for delivery, most commonly among licensed dispensaries (86%) and unlicensed dispensaries (67%), with no significant difference between licensed and unlicensed retailers.

TABLE 2. Regulatory Compliance and Regulation-Related Signage at 4 Types of Cannabis Retailers in New York City in 2023

Variable	Total (n = 33)	Licensed Medical (n = 5)	Licensed Recreational (n = 7)	Unlicensed Dispensary (n = 10)	Unlicensed Smoke Shop (n = 11)
ID verification, n (%)					
At entry	**14 (42)**	5 (100)	7 (100)	2 (20)	0 (0)
At purchase	**14 (42)**	0 (0)	6 (86)	3 (30)	5 (45)
Regulation-related signage, n (%)					
Sign indicating age ≥21 years to enter	**14 (42)**	0 (0)	5 (71)	6 (60)	3 (27)
Sign indicating age ≥21 years to purchase	**15 (45)**	0 (0)	7 (100)	5 (50)	3 (27)
No on-site smoking and vaping allowed	**5 (15)**	0 (0)	3 (43)	1 (10)	1 (9)
Licensed retailer sign	**7 (21)**	0 (0)	6 (86)	1 (10)	0 (0)
"Medical marijuana" sign	**4 (12)**	4 (80)	0 (0)	0 (0)	0 (0)
COA available for lowest-cost flower product	**8 (24)**	1 (20)	7 (100)	0 (0)	0 (0)
Cannabis use observed in store	**3 (9)**	0 (0)	0 (0)	2 (20)	1 (9)
Cannabis health warning signage	**3 (9)**	0 (0)	1 (14)	1 (10)	1 (9)
Location within 2-block radius,[a] n (%)					
K12 school	**25 (76)**	3 (60)	6 (86)	8 (80)	8 (73)
Parks or playgrounds	**28 (85)**	5 (100)	5 (71)	9 (90)	9 (82)
House of worship	**30 (91)**	5 (100)	7 (100)	10 (100)	8 (73)
Location within 4-block radius, n (%)					
Other cannabis retailer	**20 (61)**	2 (40)	6 (86)	6 (60)	6 (55)

Abbreviations: COA, certificate of analysis; ID, identification; K12, kindergarten through 12th grade.Identified store on Google Maps, by searching for school; church, religion, mosque, or temple; park or playground; and cannabis (labeled "cannabis store" in Google Maps).

[a] Within 2 blocks around the block the store is in.

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TABLE 3. Cannabis Marketing and Promotion at 4 Types of Cannabis Retailers in New York City in 2023

Variable	Total, (N = 33)	Licensed Medical (n = 5)	Licensed Recreational (n = 7)	Unlicensed Dispensary (n = 10)	Unlicensed Smoke Shop, (n = 11)
Product characteristics					
Price of lowest-cost flower, M (SD), $/g	9.47 (2.93)	12.86 (2.48)	9.08 (2.19)	8.32 (2.89)	9.23 (2.72)
Price adjusted for tax at point of sale,[a] M (SD), $/g	9.96 (2.97)	12.86 (2.48)	10.26 (2.47)	9.05 (3.15)	9.23 (2.72)
Labeled potency of lowest-price flower sample, M ± SD, % THC	21.6 ± 2.95 (n = 17)	24.0 ± 2.98 (n = 3)	20.8 ± 3.55 (n = 7)	20.7 ± 1.92 (n = 5)	23.0 ± 1.41 (n = 2)
In-store promotional strategies					
Cannabis openly displayed, n (%)	25 (76)	4 (100)	6 (86%)	9 (90%)	6 (55)
Cartoon signage, n (%)	12 (36)	0 (0)	0 (0%)	3 (30%)	9 (82)
Signage advertising health benefits, n (%)	5 (15)	0 (0)	3 (43%)	2 (20%)	0 (0)
Seating area, n (%)	3 (9)	0 (0)	0 (0%)	3 (30%)	0 (0)
Promotions, n (%)	7 (21)	1 (20)	0 (0%)	6 (60%)	0 (0)
Other noncannabis products sold, n (%)					
Tobacco products	12 (36)	0 (0)	0 (0%)	2 (20%)	10 (91)
Alcohol	1 (3)	0 (0)	0 (0%)	0 (0%)	1 (9)
Energy drinks	10 (30)	0 (0)	0 (0%)	2 (20%)	8 (73)
Soda	12 (36)	0 (0)	0 (0%)	3 (30%)	9 (82)
Candy	9 (27)	0 (0)	0 (0%)	1 (10%)	8 (73)
Snack foods	9 (27)	0 (0)	0 (0%)	1 (10%)	8 (73)
Alternative health products (eg, kava and probiotics)	4 (12)	0 (0)	0 (0%)	0 (0%)	4 (36)
Lottery tickets	1 (3)	0 (0)	0 (0%)	0 (0%)	1 (9)
Sexual products	4 (12)	0 (0)	0 (0%)	0 (0%)	4 (36)

Abbreviations: M, mean; THC, δ-9-tetrahydrocannabinol.

[a] Prices with 13% excise tax added to licensed dispensaries and 8.8% state sales tax added to unlicensed dispensaries, consistent with observed practices.

Display

Cannabis was commonly displayed in shops (76% overall), with the lowest rates of open display in smoke shops (55% of cannabis-selling smoke shops).

Promotional Methods

Cartoon signage was common in unlicensed retailers (57%) and absent among licensed retailers ($P = .01$). Some stores (21%) offered in-store promotions, most commonly in unlicensed dispensaries (60%), and most stores with websites promoted member clubs or reward programs (61%), across all categories except smoke shops (Table 3).

Regulatory Metrics

Identifiable as Licensed Retailer

Most medical retailers displayed medical marijuana signs (80%), and most licensed dispensaries displayed licensed retailer signs (86%). Only 1 unlicensed retailer displayed a sign falsely claiming such a status (Table 2).

Geolocation

Both licensed (75%) and unlicensed retailers (76%) were commonly located within 2 blocks of a K12 school, park or playground (85% overall), or house of worship (91%). Most (61%) were also within 4 blocks of another cannabis retailer (Table 2).

Health-related Signage

Few retailers of any category displayed any cannabis health warning signs (9%) or "no smoking" signs (15%). There was no significant difference in the frequency of stores displaying signage promoting health benefits of cannabis (25% among licensed retailers, and 10% among unlicensed; Table 2).

COAs

COAs were locatable for flower products significantly more often for licensed retailers (67%) than unlicensed retailers (0%, $P < .01$), most commonly for licensed recreational retailers (100%; Table 2).

Potency

Potency (percentage of THC) of the lowest-cost flower product was reported for 83% of samples from licensed retailers and 33% of the samples from unlicensed retailers and most commonly available at licensed dispensaries (100%; Table 3). The mean reported THC percentage was 21.6% overall (SD = 3.05%), without significant difference between licensed and unlicensed retailers.

DISCUSSION

In this study examining youth access to cannabis in a legalized market, unlicensed retailers were significantly less likely to require age verification before store entry or at any point before purchase. Unlicensed retailers also were significantly more likely to sell products appealing to youth, such as energy drinks, soda, and candy, and more likely to use cartoon signage. Licensed and unlicensed retailers were similar in their limited usage of health-related or age-restriction signage, frequent locations near schools and parks or playgrounds, and offering cannabis delivery services.

Although all licensed retailers verified age by checking a photo ID before permitting store entry, consistent with prior studies of licensed dispensaries in other states, only 10% of unlicensed dispensaries and smoke shops required ID for entry.[19] Additionally, under half of unlicensed retailers required ID verification at any point before purchase, a rate far lower than a prior study of unlicensed dispensaries in California.[21] Most smoke shops visited (73%) were selling cannabis, with about half of those openly displaying cannabis to store visitors. If these rates of ID verification among a random sample of 21 retailers hold across the city, then there may be hundreds of stores that youth can currently enter and easily purchase cannabis. These findings demonstrate how legalization may result in widespread increases in youth access to cannabis if unlicensed storefront sales are not carefully monitored and controlled.

Unlicensed retailers commonly engaged in sales practices that may appeal to youth and/or make cannabis appear fun and innocuous, such as cartoon graphics (57%) and sales alongside soda (57%), energy drinks (48%), and candy (43%), which were absent among licensed retailers.[36,37] Sales of sodas and candy were observed at both unlicensed dispensaries and smoke shops and might lead to expanding the cannabis market by bringing youth into contact with cannabis products and marketing materials and normalizing its use while they purchase unrelated products. The starting price of cannabis at unlicensed retailers trended lower than at licensed retailers, although not statistically significant in adjusted analyses. This analysis might have been underpowered, and lower cost products likely appeal to price-sensitive populations such as youth, which might increase consumption of illegal products.

Both licensed and unlicensed retailers are commonly located in proximity to K12 schools (76% overall), parks and playgrounds (85%), and houses of worship (91%) at significantly higher rates than other cities (~14% near schools).[19] This may be due to 1 or more of several factors, including the unique density of NYC compared with other US cities, shorter mandated distance from schools (152.4 m vs 304.8 m in other cities), or lack of enforcement of this regulation in NYC.[19] Given previously established associations between proximity of retailers to schools and recent cannabis use in eighth and 10th grade adolescents,[22] such unprecedentedly high levels of proximity between cannabis retailers and schools may pose a unique risk to NYC youth that requires careful public health campaigns to

counteract the influence of cannabis retailers on youth perceptions and use. Youth access may also be facilitated by home delivery services,[38] which many licensed and unlicensed retailers offered (83% of licensed dispensaries, and 67% of unlicensed dispensaries). Youth perceptions of cannabis are positively impacted by exposure to cannabis marketing online and proximity to sales of cannabis for medical indications.[23,27,39–43] Licensed retailers were significantly more likely to have a social media presence (92%), often across several platforms (most commonly Instagram), and a quarter of licensed retailers advertised health benefits of cannabis in their stores. These marketing practices may reflect the highly competitive market conditions licensed retailers currently face due in part to competition from unlicensed retailers, which may stimulate procannabis marketing that shapes youth perceptions about cannabis. To modify these risks, states can require and enforce use of warning signage and labeling (eg, highlighting risks to youth, pregnant persons, and drivers and risk of addiction).[2,44] In a study of 5 other states, warnings about risks in pregnancy were common (72%), although warnings of risk to children and youth (19%) and drivers (14%) were less common.[19] New York's guidance for retail dispensaries calls for "plainly visible" warnings about impaired driving and pregnancy risks[45]; however, health warnings were observed in only 9% of stores.

Increased cannabis potency has been associated with adverse physical and mental health consequences among youth.[46,47] Transparency about product potency would inform consumers and may better enable them to avoid very high potency products, potentially reducing harms. NYS law requires that all cannabis products must be tested in an independent state-certified laboratory, and potency (percentage of THC) must be included on product labels because potency may impact effects on consumers. A COA reporting extended laboratory testing results (eg, cannabinoid and terpene profiles and testing for pesticides and microbes) must be available, typically via a link to a website. COAs and potency were available significantly more frequently for samples from licensed retailers (67% and 75%, respectively) than for unlicensed retailers (0% and 33%, respectively).

The findings of this study suggest that legalization in NYS was followed by the emergence of a large market of unlicensed retailers operating largely outside of state regulations, risking increased cannabis access and use by youth. The rollout of legal dispensaries in NYS was slow due to efforts to prioritize entrepreneurs impacted by criminalization, restrictions on medical retailers entering the recreational market, and lawsuits; during this slow rollout, illegal retailers flourished.[48–50] Although legal cannabis pervades in some states, NYS is not alone in facing many illegal retailers.[51] Because practices of unlicensed dispensaries appear to pose greater threats to public health, regulators must consider strategies for monitoring and controlling unlicensed retailers as essential components of cannabis regulatory programs.

Limitations

These findings should be considered with several limitations. Sampling was limited to NYC, and results may not generalize. However, rapid surveillance studies such as this can be replicated in other jurisdictions without requiring substantial resources. Although our sample is comprehensive for licensed retailers, it is not for unlicensed retailers, which have no official database. However, the study investigated a sizable sample across a large diverse city and provides relevant data on cannabis retail practices across a diverse array of retailers.

CONCLUSIONS

State deregulation of cannabis can prompt the proliferation of unlicensed retailers, which may far outnumber state-regulated retailers. Unlicensed retailers infrequently verify shoppers' age, sell less-costly cannabis, engage in youth-friendly marketing (eg, cartoons), and sell other youth-friendly products (eg, soda and candy). Although licensed retailers are more likely to follow state regulations, they are frequently located near schools and rarely display plainly visible health warning signs. Cannabis regulations need to include plans for monitoring and controlling unlicensed storefronts to more effectively protect youth from potential harms of expanded cannabis markets.

ABBREVIATIONS

CASNY: Cannabis Access and Safety in New York
COA: certificate of analysis
ID: identification
K12: kindergarten through 12th grade
NYC: New York City
NYS: New York state
THC: δ-9-tetrahydrocannabinol

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Queries

AQ1. Please confirm that “ID” was expanded correctly in the sentence beginning “Surveillance studies of…” or amend.

AQ2. Please confirm or amend all changes to sentences in the Retailer observations section. These were made into full sentences.

AQ3. Please confirm that “K12” was expanded correctly in the sentence beginning “Each retailer was…” or amend.

AQ4. In the paragraph beginning “Each retailer was…,” feet was converted to meters, per journal style. Please confirm or amend.

AQ5. Please explain the bold textual formatting in Tables 1 and 2 in footnotes or remove the bolding.

AQ6. Please confirm that “M” was expanded correctly in the abbreviations footnotes of Tables 1 and 3.

AQ7. Please confirm the changes made to the “Labeled potency” row of Table 3 or amend.

AQ8. In the sentence beginning “This may be due to…,” feet have been converted to meters, per journal style. Please confirm or amend.

AQ9. Please provide a title for the author Peter J. Menzi in the Contributors’ Statement.