

Health Equity Implications of Retail Cannabis Regulation in Los Angeles County

Health Impact Assessment

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Contents

Acronym Listing.....	1
Executive Summary.....	3
Background	3
Results.....	3
Recommendations	7
Introduction	9
Methods.....	10
Advisory Group Process, Conceptual Framework, and Research Questions.....	10
Data Sources	11
Literature Reviews	11
Quantitative Analysis of Secondary Data Sources	11
Key Informant Interviews.....	12
Focus Groups.....	13
Observational Survey of Dispensaries.....	14
Results.....	15
Research Question #1— How could cannabis business locations and density impact equity in the distribution of SDOH and health outcomes in unincorporated LA County and other LA County jurisdictions?	15
Literature Review.....	15
Secondary Data Analyses	16
Focus Groups and Key Informant Interviews.....	24
Summary	26
Research Question #2—How could cannabis business practices impact equity in the distribution of SDOH and health outcomes in unincorporated LA County and other LA County jurisdictions?	27
Literature Review.....	27
Observational Survey of Dispensaries.....	28
Focus Groups and Key Informant Interviews.....	31
Summary	33

Research Question #3— How would enforcement of compliance with cannabis regulations impact equity in the distribution of SDOH and health outcomes in unincorporated LA County and other LA County jurisdictions?..... 34

 Literature Review 34

 Secondary Data Analyses 36

 Focus Groups and Key Informant Interviews..... 41

 Summary 43

Research Question #4—How could cannabis taxation impact equity in the distribution of cannabis-related SDOH and health outcomes in unincorporated LA County and other LA County jurisdictions?45

 Literature Review 45

 Secondary Data Analyses 47

 Focus Groups and Key Informant Interviews..... 54

 Summary 58

Recommendations 59

Secondary Data Sources 64

Glossary of Terms..... 67

Community Stakeholder Advisory Group Members..... 69

Bibliography 70

Acronym Listing

ABC*	California Department of Alcoholic Beverage Control
ADA	Americans with Disabilities Act
AI/AN	American Indian or Alaskan Native
BCC*	California Bureau of Cannabis Control
BHPD*	Beverly Hills Police Department
Board	Los Angeles County Board of Supervisors
CBD [†]	Cannabidiol
CDTFA*	California Department of Tax and Fee Administration
CHIE	Center for Health Impact Evaluation
CHKS*	California Healthy Kids Survey
CID [†]	Cannabis-Impaired Driving
CSAG	Community Stakeholder Advisory Group
CTC	Communities That Care
CUD [†]	Cannabis Use Disorder
DCBA	Los Angeles County Department of Consumer and Business Affairs
DCR*	City of Los Angeles Department of Cannabis Regulation
DIE [†]	Drug Influence Evaluation
DPH	Los Angeles County Department of Public Health
DRE [†]	Drug Recognition Expert
DRP*	County of Los Angeles Department of Regional Planning
DSM-V	Diagnostic and Statistical Manual of Mental Disorders
EAP	Employee Assistance Program
ED	Emergency Department
FRPM	Free or Reduced-Price Meals
GIS	Geographic Information System
HIA	Health Impact Assessment
HIPAA	Health Insurance Portability and Accountability Act
HPI*	Healthy Places Index

ICD	International Classification of Disease
INLA	Integrated Nested Laplace Approximation
KII	Key Informant Interview
LAC eGIS*	Los Angeles County Enterprise Geographic Information System
LACHS*	Los Angeles County Health Survey
LAPD*	Los Angeles Police Department
LASD*	Los Angeles County Sheriff's Department
MAUCRSA	Medicinal and Adult-Use Cannabis Regulation and Safety Act
MET	Motivational Enhancement Therapy
MMID	Medical Marijuana ID
MML	Medical Marijuana Law
MRST [†]	Marijuana Retail Surveillance Tool
NHOPI	Native Hawaiian or Pacific Islander
OSHPD*	California Office of Statewide Health Planning and Development
PI	Pacific Islander
RPC*	Regional Planning Commission
SAP	Student Assistance Program
SAPC	Division of Substance Abuse Prevention and Control
SBHC	School-Based Health Center
SBIRT	Screening, Brief Intervention, and Referral to Treatment
SDOH [†]	Social Determinants of Health
THC*	Tetrahydrocannabinol
TMCU	Teen Marijuana Check-Up
USPSTF	US Preventive Services Taskforce
VCC [†]	Vaporizable Cannabis Concentrates

* These entities are described in the Secondary Data Sources descriptions on pages 64-66.

[†] These terms are defined in the Glossary of Terms on page 67.

Executive Summary

Background

A growing number of U.S. states are legalizing the cultivation, sale and use of cannabis for medical or recreational purposes. The regulatory model adopted by many states allows local jurisdictions to play an important role in shaping local cannabis markets to achieve broader social policy goals. Cities and counties in these states can ban the retail sale of cannabis within their boundaries and may also tailor local ordinances and regulations governing the local cannabis sales.¹ This Health Impact Assessment (HIA) is in response to a Los Angeles County Board of Supervisors (Board) motion requesting that the LA County Department of Public Health (DPH) assess the potential *health equity** implications of allowing licensed cannabis dispensaries to operate within the county’s unincorporated areas. Health equity is achieved when everyone has fair and just access to the goods, services, resources and power they need for optimal health and well-being. It requires policies that remove barriers to good health experienced disproportionately by some communities based on factors such as race, ethnicity, class, sexual orientation, place of residence, religion, or social status. The Board expressed concerns that unfettered commercialization of cannabis could contribute to a widening of health inequities in Los Angeles County.²

The four primary research questions addressed in this HIA examine the potential health impacts of policy and regulatory decisions related to: 1) cannabis business locations and density, 2) cannabis business practices, 3) cannabis regulatory enforcement, and 4) cannabis taxation. To address these research questions, we used four main sources of data: We conducted targeted reviews of the academic literature; we performed statistical analyses of quantitative data from existing administrative and survey data sources; we conducted an observational survey of licensed and unlicensed dispensaries in and near unincorporated areas of LA County and statistically analyzed survey results; and we conducted and identified cross-cutting themes from key informant interviews and focus groups with *cannabis dispensary* operators, city cannabis regulators, *medicinal cannabis* users, physicians, and community residents.

Results

Research Question #1— How could cannabis business locations and density impact equity in the distribution of SDOH and health outcomes in unincorporated LA County and other LA County jurisdictions?

By the end of 2018, a year after ten LA County cities began setting up regulatory frameworks for cannabis dispensaries within their jurisdictions, a discernable difference had emerged between the geographic patterning of licensed versus unlicensed dispensaries in relation to health equity indicators. Unlicensed dispensaries were concentrated in health-disadvantaged areas and areas with high concentrations of *Latinx*** and African Americans, while licensed dispensaries were not. Violent crimes were more prevalent in census block groups with higher concentrations of unlicensed dispensaries, but not in tracts with higher concentrations of licensed dispensaries. Finally, in 2017 (the year after Proposition 64 was passed but before state cannabis retail licensing began), both overall cannabis-related emergency department (ED) visit rates in LA County and the disparity between African Americans and Whites had doubled compared to 2012. A greater number of cannabis-related ED visits among residents of a zip code was associated with

* Note: First instances of terms defined in the Glossary of Terms (p. 67) are in italics.

** Latinx is a gender-neutral term referring to people of Latin American descent.

a significantly higher density of dispensaries in that zip code, although a distinction between licensed and unlicensed dispensaries could not yet be made.

Quantitative evidence of an overconcentration of unlicensed dispensaries in health-disadvantaged areas leads to the question of whether unlicensed dispensaries engage in business practices that put their surrounding communities at higher risk of negative health outcomes than their licensed counterparts. This question is addressed in the next section. Also, as the first group of cities allowing dispensaries will likely double their total number of licensed dispensaries by the end of 2020, it will be important to track locations and impacts of the next wave of licensed dispensaries, many of which will be part of *cannabis social equity licensing programs*. This issue is addressed in the last two sections.

Research Question #2—How could cannabis business practices impact equity in the distribution of SDOH and health outcomes in unincorporated LA County and other LA County jurisdictions?

Based on an observational survey comparing licensed versus unlicensed dispensary business practices we found that unlicensed dispensaries, in addition to being more concentrated in health-disadvantaged areas, were also more likely to engage in business practices linked to negative health-related outcomes. For example, unlicensed dispensaries were more likely to sell and promote on-site consumption of high potency cannabis products (e.g., *moonrocks* or wax) through the free use of devices designed to maximize THC inhalation (e.g., *dab rigs*). They were also less likely to have visible security personnel on site and more likely to sell products designed to be attractive to use and that were not in child-resistant packaging.

Licensed dispensaries are experiencing unfair price competition from unlicensed operators whose prices do not incorporate state and local taxes or other regulatory and licensing costs. Presumably in response to this situation, they are marketing their products to less price-sensitive consumers in the higher-income areas where they are located. This is evidenced by their greater product diversification (e.g., *tinctures*, topicals, capsules) based on the belief that more price-sensitive clients are buying flower and dabbing concentrates from unlicensed dispensaries. Thus, the greater potential health risks associated with unlicensed dispensary business practices are disproportionately impacting low-income communities of color.

While we were unable to access data on the geographic distribution or legality of cannabis billboard advertising, regulators are responding to resident complaints by crafting local ordinances to enhance their enforcement authority without necessarily veering from state regulations. Meanwhile, licensed operators report that most of their advertising is through online sources.

Finally, medicinal cannabis users, including those under the supervision of a physician, are experiencing significant price increases on the specialized products they seek. Until the federal government eases restrictions on the pharmacological studies required to determine potential therapeutic uses of CBD and THC, and insurance companies agree to include cannabis-derived drugs in their formularies, these patients will have to pay 100% of the costs out-of-pocket. The next section examines unlicensed dispensaries and product safety from a regulatory enforcement perspective.

Research Question #3— How would enforcement of compliance with cannabis regulations impact equity in the distribution of SDOH and health outcomes in unincorporated LA County and other LA County jurisdictions?

California has had a loosely regulated medicinal cannabis market far longer than any other state prior to the legalization of adult use. This has likely amplified the staying power of the unlicensed market as

California transitions to a new state licensing system. In LA County cities that agreed to allow licensed dispensaries beginning in 2018, the number of unlicensed dispensaries advertising on Weedmaps decreased considerably during the first months after the state began issuing licenses. Areas of the county that did not allow licensed dispensaries did not see similar decreases in unlicensed dispensaries. In fact, the total number of unlicensed dispensaries in those areas increased in 2018. In cities allowing licensed dispensaries, the initial decrease in unlicensed dispensaries plateaued at around the time that new product testing rules went into effect. As a result of these new rules, a surplus of cannabis products no longer sellable in the legal market was diverted to unlicensed dispensaries, and this may have contributed to the persistence of the plateau through the end of 2018.

It remains to be seen whether the expected doubling of licensed dispensaries in the city of LA by the end of 2020 will have a further dampening effect on the unlicensed market or whether increases in both administrative and criminal penalties that began in 2019 will have an opposite effect. The question also remains as to whether allowing licensed dispensaries in LA County's unincorporated areas and other jurisdictions in 2018 would have led to a similar decrease in unlicensed dispensaries in those areas. Monthly trends in the number of licensed and unlicensed dispensaries in areas with and without bans on licensed dispensaries (**Figure 13**) suggest that local cannabis licensing ordinances may exert some pressure on the unlicensed market.

From an equity perspective, fostering a viable legal cannabis market through carefully crafted local ordinances coupled with strong administrative penalties for unlicensed operators may be preferable to a criminal justice approach focused on arresting and charging unlicensed operators with misdemeanor and/or felony crimes. Some of these unlicensed operators may otherwise be eligible for the city of LA's social equity program designed to allow those most impacted by the *war on drugs* to profit from the newly legal cannabis industry. Having a recent criminal record would diminish their chances of benefiting from a program specifically designed to help them.

The fact that unlicensed dispensaries sell products with disregard to new state testing requirements suggests that their products are more likely to be tainted with harmful contaminants, including pesticides. While this HIA's analyses of cannabis-related ED visits indicate that these visits are more prevalent in areas with higher concentrations of cannabis dispensaries, licensed versus unlicensed dispensaries cannot be compared until 2018 hospital data is obtained from the California Office of Statewide Health Planning and Development (OSHPD) later in 2019. A stronger relationship between ED visits and unlicensed dispensaries could suggest a higher risk associated with products sold by the latter. Meanwhile, until cannabis testing standards and technologies are as reliable as those for traditional pharmaceuticals, even products in licensed dispensaries may have inaccurate dosage information and may contain unsafe levels of pesticides or other contaminants.

Finally, with regard to *cannabis-impaired driving (CID)*, LA County ED visit data indicates that the proportion of cannabis-related ED visits involving vehicle injuries is quite small, increasing from just 2.5% to 3.2% from 2013 to 2017. While cannabis may be underreported in these ED data, the overall increase in cannabis-related ED visits was considerably greater, in absolute and relative terms, than the increase among the subset of those visits involving vehicle injuries. While continued monitoring of these trends is important, they suggest that, thus far, vehicle injuries are not a major public health threat associated with the legalization of cannabis in LA County.

Research Question #4—How could cannabis taxation impact equity in the distribution of cannabis-related SDOH and health outcomes in unincorporated LA County and other LA County jurisdictions?

In a recent national survey of U.S. adults, the generation of tax revenue was ranked the number one argument in favor of cannabis legalization (with reduction in prison overcrowding a close second).³ While so-called “sin taxes” do not always produce stable long-term revenue streams,⁴ city and county-level cannabis sales and excise taxes, coupled with locally targeted state taxes, can generate a significant amount of revenue in the short to mid-term, particularly for large jurisdictions. Thus far, cities in LA County are opting to channel these tax revenues to their general funds where they can be used flexibly. At this early stage after Proposition 64 implementation, the most pressing cannabis-related local policy issue appears to be the persistence of unlicensed dispensaries.

Data from the California Healthy Kids Survey suggests that youth cannabis use in LA County had been gradually decreasing across most sociodemographic groups until the year after adult-use legalization, when there was a small but consistent increase. It is too soon to tell if this is the beginning of a change in the overall trend, but careful monitoring is critical. Despite the steady decrease in overall use up to the most recent year of available data, we found evidence that youth use is significantly correlated with socioeconomic status such that students in lower-income schools are significantly more likely to use cannabis than those in higher-income schools. Use was also higher among certain marginalized groups like Native American and sexually and gender non-conforming students. A focus on health equity would thus require action to reduce these disparities, despite declining aggregate trends. Several community and school-based interventions have been shown to both reduce initiation of cannabis use among youth and reduce use among those that have already initiated.⁵⁻⁹ Through an analysis of LA County school-based survey data, we also found that the principles upon which these programs are based—i.e., empathic and motivating adults providing youth with opportunities for achieving mastery and meaningful participation—were significantly predictive of abstention from cannabis use in the past 30 days, even after controlling for sociodemographic factors.

Another key policy issue regarding cannabis taxation is the exemption from certain taxes for those using cannabis for medicinal purposes. By exempting consumers with a state medical marijuana ID (MMID) card from all sales and use taxes, state cannabis regulations under the Medicinal and Adult-Use Cannabis Regulation and Safety Act (MAUCRSA) recognize the medicinal uses of cannabis. The cities of Los Angeles and Long Beach have gone one step further by offering a discounted local excise tax rate not only to MMID card holders, but also to people with a physician's recommendation who choose not to apply for a state MMID card. The fact that MMID card applications surged in 2018, even though adults no longer needed one to purchase cannabis, is further indication that there is a small group of consumers who self-identify as medicinal users. Some of these users are being guided by physicians. While we still have relatively little scientific evidence on the therapeutic effects of CBD and THC, largely due to federal restrictions on cannabis research, the principle of health equity suggests that those experiencing health benefits from cannabis should not experience barriers to the cost savings to which the state and certain localities have entitled them. Nevertheless, we found evidence that some medicinal cannabis users were unaware of the MMID card program and others were afraid of potential negative repercussions of program participation. Some cannabis dispensary owners were less than transparent about the tax savings offered by the program and some appeared to dismiss the program entirely as an unnecessary hassle for consumers.

Recommendations

Please see page 59 for a more thorough discussion of these recommendations.

1. Consider a four-pronged strategy for reducing unlicensed dispensaries in local jurisdictions:
1) authorize and begin shut-off of water and power, padlocking of entrances and fining of operators at all unlicensed dispensaries; 2) establish a phased-in cannabis tax regimen that starts low and gradually increases; 3) implement a universal licensed dispensary emblem program and a user friendly web-based tool to assist consumers in recognizing and locating licensed dispensaries; and 4) review strategies for initiating licensing and inspection of retail cannabis dispensaries.
2. When developing guidelines for cannabis dispensary siting, follow existing state sensitive use buffer requirements and limit density to no more than 1 dispensary per 10,000-15,000 residents. Consider adding points to applications from prospective licensees locating near concentrations of unlicensed dispensaries and subtracting points from those locating near concentrations of liquor stores.
3. Work with local public health and planning departments to periodically monitor the geographic distribution and density of licensed and unlicensed dispensaries in relation to the Healthy Places Index.
4. Use social equity and corporate social responsibility programs to mitigate potential risks of licensed dispensary concentration in health-disadvantaged areas. Decisions on dispensary licensing in health-disadvantaged areas should positively weight these community investment strategies.
5. Require all licensed dispensaries to undergo regular health inspections and explore options for including laboratory testing of products as part of the inspection process. Link licensed dispensary emblem program (see Recommendation #1) to health inspection permitting such that emblems are reserved for licensed dispensaries that have passed their health inspection.
6. As part of the health permitting process (see Recommendation #5) require licensed dispensaries to provide written information, included with purchases and/or posted visibly on site, about known health risks and therapeutic effects of cannabis use, how to use cannabis legally and responsibly, and what to do in case of overconsumption.
7. Consider developing a list of certified budtender trainings and positively weighting the presence of at least one certified budtender in dispensary licensing decisions. Accepted trainings should cover product potency, dosing, evidence of harms to youth, evidence for specific therapeutic effects and when/how to recommend consulting with a physician.
8. Develop local cannabis advertising ordinances that complement and supplement current state regulations on cannabis advertising, within the limits of the law. Look to other jurisdictions for model ordinances.

9. Conduct periodic surveillance of licensed dispensary business practices for ongoing improvement/refinement of regulatory requirements.
10. Monitor trends in cannabis-related emergency department visits by race/ethnicity and age, in comparison to alcohol and other drug-related visits. Further investigate potential explanations for racial/ethnic disparities in cannabis-related emergency department visits.
11. Monitor trends in youth cannabis use in LA County by issuing an annual report using California Healthy Kids Survey data to describe trends in and factors associated with youth use.
12. Invest youth prevention dollars in schools serving lower income communities and in programs that have both universal and targeted components, and incorporate evidence-based practices for positive youth development and motivational interviewing.
13. Require licensed cannabis dispensaries to post visible information about the MMID program and about differential tax rates for consumers with physicians' recommendations and/or MMID cards. Require the itemization of taxes on purchase receipts.
14. Post information about the MMID card program on all City/County websites where cannabis consumers go for information about cannabis. Include clear and transparent information about data privacy and about any potential negative repercussions of participation in the program.
15. Conduct public education on the dangers of cannabis-impaired driving (CID) and continue to monitor trends in traffic-related injuries and deaths involving cannabis. Wait until cannabis impairment testing technology improves before investing additional resources in law enforcement approaches to deterring CID.

Introduction

A growing number of U.S. states are legalizing the cultivation, sale and use of cannabis for medical or recreational purposes. The regulatory model adopted by many states allows local jurisdictions to play an important role in shaping local cannabis markets to achieve broader social policy goals. Cities and counties in these states can ban the retail sale of cannabis within their boundaries and may also tailor local ordinances and regulations governing local cannabis sales.¹ Soon after California adopted this model, through the passage of Proposition 64 in 2016 and the subsequent enactment of the Medicinal and Adult-Use Cannabis Regulation and Safety Act (MAUCRSA) in 2017, the Los Angeles County Board of Supervisors (Board) began a careful and deliberate process of information gathering to inform its response to the new state law.

This Health Impact Assessment (HIA) is in response to a Board motion requesting that the LA County Department of Public Health (DPH) assess the potential *health equity** implications of allowing licensed cannabis dispensaries to operate within the county’s unincorporated areas. Health equity is achieved when everyone has fair and just access to the goods, services, resources and power they need for optimal health and well-being. It requires policies that remove barriers to good health experienced disproportionately by some communities based on factors such as race, ethnicity, class, sexual orientation, place of residence, religion, or social status. The Board expressed concerns that unfettered commercialization of cannabis could contribute to a widening of health inequities in Los Angeles County.²

In collaboration with a Community Stakeholder Advisory Group (CSAG—described below in Methods section), we identified four overarching goals for this HIA:

1. Estimate the health and health equity impacts of potential *cannabis dispensary* policies and regulations in unincorporated LA County and other LA County jurisdictions
2. Provide guidance to local cannabis regulatory bodies so their policies and ordinances reflect a careful consideration of health and health equity
3. Advance the evidence base for health-protecting cannabis business and regulatory practices in unincorporated LA County and other LA County jurisdictions
4. Lay the groundwork for ongoing monitoring of health and health equity impacts to inform continuous improvement of cannabis policies and regulations in LA County

At the request of the CSAG, all of these goals are phrased to broaden the utility of the HIA findings and recommendations to all LA County jurisdictions (i.e., cities and unincorporated areas) considering ways to regulate cannabis retail sales. Some of our methods focus on unincorporated areas, but our findings and recommendations are relevant across jurisdictions.

* Note: First instances of terms defined in the Glossary of Terms (p. 67) are in italics.

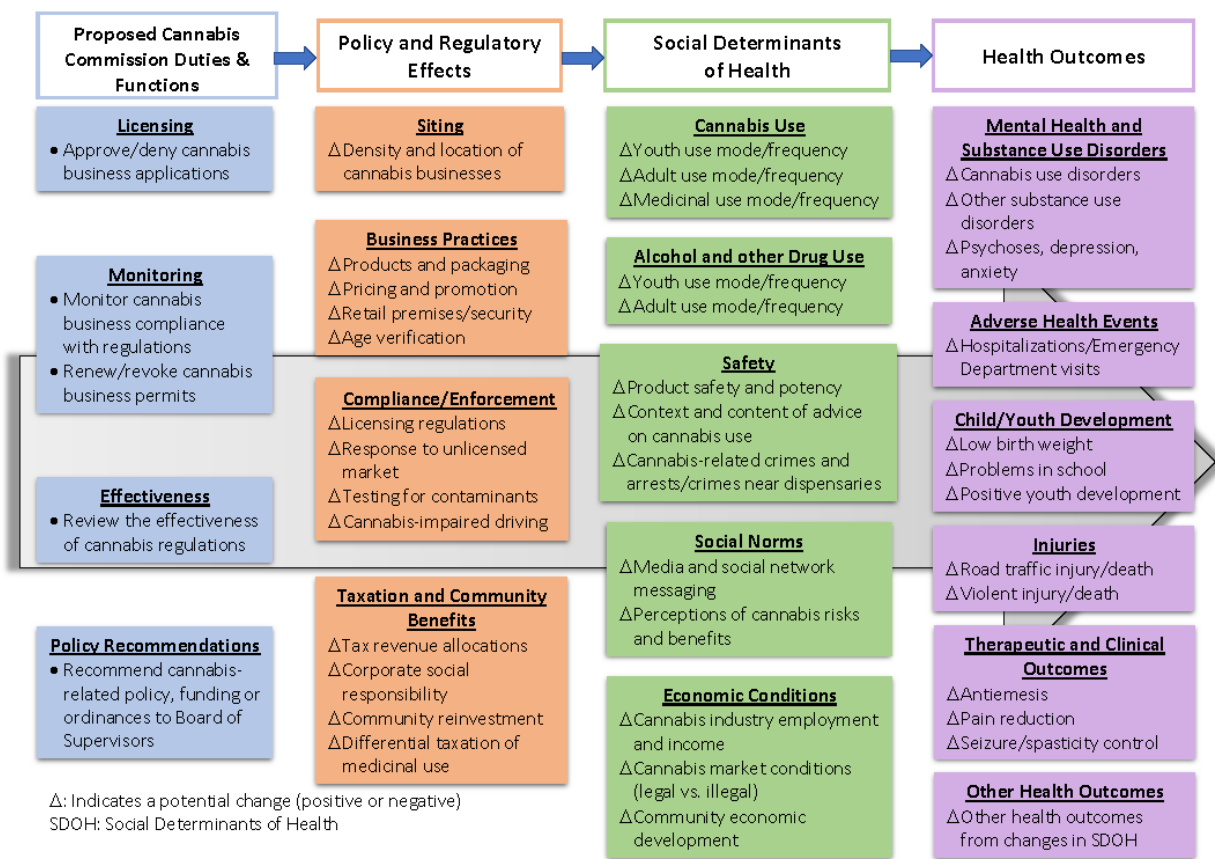
Methods

Advisory Group Process, Conceptual Framework, and Research Questions

An ad-hoc Community Stakeholder Advisory Group (CSAG) was convened to engage representatives from key constituencies and to ensure alignment with stakeholder priorities. A list of CSAG members can be found on page 69. The CSAG convened for two half-day meetings. At the first meeting, in June 2018, we obtained CSAG input on the scope of the HIA, including the overarching goals, the conceptual framework linking cannabis policy and regulatory decisions to health outcomes, the research questions guiding the assessment, and the methods and data sources. At the second meeting, in February 2019, following completion of the assessment phase, we obtained CSAG input on our preliminary results and on potential recommendations based on findings. Between and after the two meetings, we consulted with specific CSAG members on an as-needed basis on issues relevant to their expertise. The CSAG was also invited to provide comments on the final report draft.

Figure 1 presents the conceptual framework for this HIA. The blue boxes summarize the duties and functions of a proposed LA County Cannabis Commission, as described in a June 2018 memo from the Interim Director of the LA County Department of Consumer and Business Affairs (DCBA) to the Board.² The orange boxes represent the proximal policy and regulatory effects flowing from the duties and functions of the Commission or from potential cannabis regulatory bodies in other LA County jurisdictions.

Figure 1: Cannabis Regulation in LA County, Health Impact Assessment Conceptual Framework



The green boxes represent behavioral and *social determinants of health (SDOH)* impacted by cannabis policies and regulations in the near- to medium-term, and the purple boxes represent longer-term health outcomes impacted by these SDOH.

The primary research questions addressed in this HIA are derived from the conceptual framework and examine the potential impacts of the four categories of policy and regulatory effects on the equitable distribution of SDOH and health outcomes:

1. How could cannabis *business locations and density* impact equity in the distribution of SDOH and health outcomes in unincorporated LA County and other LA County jurisdictions?
2. How could cannabis *business practices* impact equity in the distribution of SDOH and health outcomes in unincorporated LA County and other LA County jurisdictions?
3. How could *enforcement of compliance* with cannabis regulations impact equity in the distribution of SDOH and health outcomes in unincorporated LA County and other LA County jurisdictions?
4. How could *cannabis taxation* impact equity in the distribution of cannabis-related SDOH and health outcomes in unincorporated LA County and other LA County jurisdictions?

Our ability to examine impacts on health-related outcomes was limited by the availability of data, and thus most of the assessment is focused on the SDOH. Longer-term work on overarching goal #4 stated above will involve the tracking of health outcomes not measurable within the HIA’s time frame. In keeping with standard HIA practices,¹⁰ the best available research literature and secondary data were utilized, along with primary data collected by the HIA team, to develop evidence-based policy recommendations in a timely manner to inform pending policy decisions. The HIA research protocol was approved by our Institutional Review Board, which ensures adherence to national rules governing the protection of human subjects and the ethical conduct of research.

Data Sources

Literature Reviews

For each of the research questions, a review of existing literature on the potential effects of cannabis-related policies and regulations on SDOH and health outcomes was conducted. When available, empirical studies were reviewed, but given the limited research on cannabis regulations, the reviews also included descriptive articles on field experiences from states in the early stages of cannabis legalization.

Quantitative Analysis of Secondary Data Sources

To augment our literature reviews, we performed statistical analyses of quantitative data from a variety of administrative and survey data sources (see pages 64-66 for descriptions of each source):

1. California Bureau of Cannabis Control (BCC)
2. California Department of Alcoholic Beverage Control (ABC)
3. California Department of Tax and Fee Administration (CDTFA)
4. California Healthy Kids Survey (CHKS)
5. California Office of Statewide Health Planning and Development (OSHPD)
6. City of Los Angeles Department of Cannabis Regulation (DCR)
7. County of Los Angeles Department of Regional Planning (DRP)
8. Crime Incident Reports from Beverly Hills Police Department (BHPD)

9. Crime Incident Reports from Los Angeles County Sheriff’s Department (LASD)
10. Crime Incident Reports from Los Angeles Police Department (LAPD)
11. Healthy Places Index (HPI)
12. Los Angeles County Enterprise Geographic Information System (LAC eGIS)
13. Los Angeles County Health Survey (LACHS)
14. US Census Bureau
15. Weedmaps
16. City websites (for data on cannabis taxation and regulation)

Key Informant Interviews

To complement findings from the literature reviews and quantitative analyses with the lived experiences of local community stakeholders, key informant interviews were conducted with cannabis regulators, licensed cannabis business operators, *medicinal cannabis* patients and caregivers, and physicians. All interviews were conducted using semi-structured interview guides with questions focused on the four research questions described above. Emerging themes in each category were identified and exemplary quotes representing each theme were selected for inclusion in the report.

Local Cannabis Regulators

In November and December 2018, interviews were conducted with city staff in charge of cannabis regulation for seven of the ten incorporated cities in LA County that voted to allow licensing of cannabis dispensaries by June 2018: Bellflower, Culver City, Long Beach, Los Angeles, Malibu, Maywood, and West Hollywood. The three cities not included (Huntington Park, Pasadena, Santa Monica) had not yet begun the process of soliciting cannabis dispensary applications. An interview was also conducted with the principals at a consulting firm that contracts with cities to help them develop and implement cannabis regulatory systems. All interviews with city staff were conducted in person at city offices by two team members (one interviewer and one notetaker) and lasted approximately 60 minutes. The interview with the consulting firm was conducted via phone. All interviews were recorded with the permission of the interviewees and transcribed for analysis.

Local Cannabis Dispensary Operators

In November and December 2018, seven interviews were conducted with licensed cannabis dispensary operators. Six were interviewed in person and one provided written responses to interview questions. These individuals were recruited through a local cannabis business association and through referrals from city cannabis regulators and colleagues. At the time of the interviews, the City of LA had not yet rolled out its *cannabis social equity program*, so no social equity applicants were interviewed. However, one interviewee played a leadership role in a local minority business association. All interviewees had worked in the cannabis industry for six or more years. In-person interviews were conducted at the interviewees’ place of business. Interviews were conducted by two team members (one interviewer and one notetaker) and lasted approximately 60 minutes. All interviews were recorded with the permission of the respondents and transcribed for analysis.

Physician-Supervised Medicinal Cannabis Patients and Caregivers

In January 2019, we interviewed one adult patient and three caregivers of child patients who were using medicinal cannabis under the supervision of a physician. Patients were recruited through their physicians, who were interviewed separately (see below). All interviews were conducted over the phone and lasted

approximately 60 minutes. Respondents received a \$20 Target gift card for their participation. All interviews were recorded with the permission of the respondents and transcribed for analysis. Pediatric patients had an average age of seven years, used *cannabis tinctures* daily for their ailments, and had been using cannabis for an average of almost four years. The adult patient used edibles and tinctures daily and had been doing so for about three months at the time of the interview. All cannabis use in this group was exclusively for medicinal purposes.

Physicians

From November 2018 to March 2019, we interviewed eight physicians with backgrounds in addiction medicine, emergency medicine, geriatrics, internal medicine, pediatrics, preventive medicine, and psychiatry. Two of the physicians were actively recommending cannabis as part of a therapeutic regimen for patients with specific medical indications. Physician interviewees were recruited through the UCLA Cannabis Research Initiative and through staff physicians at the LA County Department of Public Health. All physician interviews were conducted by a physician volunteering on the HIA in partial fulfillment of a UCLA preventive medicine fellowship program. Physician interviews were conducted either in person or over the phone, depending on the respondent's preference. A notetaker was present for each interview and the interviews were recorded with the permission of the respondents and transcribed for analysis.

Focus Groups

Community Residents

During December 2018, we conducted four focus groups with community residents of unincorporated LA County and cities within LA County where cannabis dispensaries were not currently permitted. To minimize bias, residents were not informed in advance of the specific topic of the focus groups but were told they involved public health issues. The focus groups were conducted in areas where community organizations assisted us in securing free-of-cost facilities: Lancaster, Pomona, San Fernando, and Willowbrook. LA County's Division of Substance Abuse Prevention and Control (SAPC) and their contracted community-based organizations assisted with recruitment of community residents. One group was conducted in Spanish and the rest were conducted in English. Due to recruitment challenges, Craigslist advertisements were used to recruit the remaining participants for the resident focus groups. Craigslist respondents were screened by the qualitative team to ensure eligibility (i.e., age 18 or older and residing in an area not currently permitting dispensaries). The four groups had a total of 26 participants, including 9 males and 17 females. Participants received a \$20 Target gift card for their participation and refreshments were served. The sessions were led by a facilitator and notetaker and lasted about 90 minutes each. All focus groups were recorded with participant consent and transcribed for analysis.

Community Medicinal Cannabis Users

As recruitment of exclusively medicinal users for focus groups proved challenging, several physician key informant interviewees assisted by recruiting their cannabis-using patients to participate voluntarily in our qualitative research. Since the patients/caregivers preferred one-on-one phone interviews (see Physician-Supervised Medicinal Cannabis Patients and Caregivers section above), the focus groups were oriented toward self-identified community medicinal cannabis users who also used cannabis recreationally. To be eligible, the community medicinal cannabis focus group participants had to have used cannabis in the past 30 days with at least 50% of their use for medicinal purposes.

Two focus groups were conducted with a total of nine community medicinal cannabis users. Five were male, four were female, and their average age was 32 years. The majority identified as *Latinx*^{*}, had some college education, and an annual income of \$40,000 or less. Additionally, most were employed and nearly all were renters. Most participants had a current or lapsed doctor’s recommendation for cannabis. None had a state medical marijuana ID (MMID) card. Most participants used cannabis daily, and on average, 77% of their reported use was for medicinal purposes. Participants received a \$20 Target gift card for their participation and refreshments were served. The sessions were led by a facilitator and notetaker and lasted about 90 minutes each. All focus groups were recorded with the consent of the participants and transcribed for analysis.

Observational Survey of Dispensaries

Using the *Marijuana Retail Surveillance Tool (MRST)*^{11,12} as a model, an observational survey instrument (administered via smartphone application) was developed to capture LA County cannabis business practices with regard to: 1) security measures, 2) measures to prevent underage access to cannabis, 3) types of cannabis products sold, 4) types of promotional activities, and 5) proximity to liquor stores and tobacco/vape shops. Using Weedmaps and BCC licensing data to develop a comprehensive listing of dispensaries in LA County, the survey was conducted at: 1) all unlicensed dispensaries in unincorporated areas of the county, 2) all licensed dispensaries and 3) a random sample of unlicensed dispensaries within a two-mile buffer area around unincorporated areas with parcels zoned for dispensaries according to the DCBA June 2018 recommendation to the Board.² Data on parcels zoned for dispensaries was obtained from the County’s Department of Regional Planning (DRP).

The observational surveys were completed by staff members in pairs. Staff participated in a field safety training and a safety check-in call was made to the supervisor at the beginning and end of each round of visits. For the first five dispensaries visited, two observers completed surveys independently to determine the inter-rater reliability of the survey instrument. Responses were identical for over 90% of the items and the survey protocol was adjusted to ensure maximum reliability. Of a total sample of 168 dispensaries, 129 surveys were completed, resulting in a 77% completion rate (**Table 1**). For licensed dispensaries, all incomplete surveys were due to the dispensary not yet being open because of renovations, construction, or pending final permission. For unlicensed dispensaries, incomplete surveys were due to safety concerns or to the site appearing to be closed or nonoperational.

Table 1: Cannabis Dispensary Premise Surveys, Los Angeles County, 2018-2019

Group	Attempted	Completed	Safety Concern/Not Open
Unlicensed in Unincorporated Areas	75 (census)	56 (75%)	19 (25%)
Unlicensed ≤ 2 Mi. from Unincorporated Areas	50 (random sample)	36 (72%)	14 (28%)
Licensed ≤ 2 Mi. from Unincorporated Areas	43 (census)	37 (86%)	6 (14%)
TOTAL	168	129 (77%)	39 (23%)

Sources: County of Los Angeles Department of Regional Planning (DRP), Los Angeles County Cannabis Dispensary Premise Survey (2018/2019)

^{*} Latinx is a gender-neutral term referring to people of Latin American descent.

Results

Research Question #1— How could cannabis [business locations and density](#) impact equity in the distribution of SDOH and health outcomes in unincorporated LA County and other LA County jurisdictions?

Literature Review

Limited research exists on the relationship between cannabis dispensary locations and health-related indicators. All but one of the studies reviewed used data on medicinal cannabis dispensaries prior to the legalization of adult-use cannabis, and none of them distinguished between licensed and unlicensed dispensaries. Two studies examined the cross-sectional relationships between cannabis dispensaries and neighborhood socio-demographics. A 2012 study of medicinal cannabis dispensaries in the city of Los Angeles found that, after controlling for commercial zoning, highway ramp access, and alcohol outlet density (all of which were significantly associated with dispensary density), the only socio-demographic factor associated with dispensary locations at the census tract level was the percentage of Latinx residents.¹³ A study of medicinal and adult-use dispensaries in Colorado, which did not control for commercial zoning or highway ramp access, found that dispensaries were more likely to be in census tracts with higher proportions of racial and ethnic minority populations, lower household incomes, higher crime rates, and higher density of on-premise alcohol outlets.¹⁴

Studies have also examined relationships between cannabis dispensary density and health-related outcomes, including youth cannabis use, cannabis-related hospitalizations, and property and violent crimes. Two studies focused on youth use and found that the proximity of medicinal marijuana dispensaries to high schools was not associated with students' use of marijuana.^{15,16} As a potential reason for the lack of association, the authors noted that youth are legally restricted from accessing marijuana at medicinal dispensaries and that many cities prohibit the siting of dispensaries within distances from schools that are considerably shorter than the buffer zones used in these studies. A study in California of the relationship between dispensary locations and patient hospitalizations with a cannabis-related primary or secondary discharge code found that an additional one dispensary per square mile in a zip code was associated with a 7% increase in cannabis-related hospitalizations among patients living in that zip code.¹⁷

Most of the research to date on potential negative effects of dispensary siting has focused on crime, and the findings on this topic are mixed. A study in Sacramento reported that the density of medical marijuana dispensaries was not associated with violent or property crime when controlling for neighborhood characteristics associated with the Routine Activity Theory of crime.¹⁸ A later study in Los Angeles found that the number of medicinal dispensaries within a census block group and the surrounding half-mile area was associated with an increase in a variety of types of crime.¹⁹ A study of the effect of dispensary closures on crime in Los Angeles found that violent and property crimes increased within a 1/3-mile radius of dispensaries that closed, compared to the same radius of dispensaries that remained open but were otherwise similar.²⁰ This study concluded that security measures in place at cannabis dispensaries likely have a deterrent effect on crime in the immediate vicinity. This conclusion was also drawn by authors of subsequent studies in Long Beach and Denver, who found that the density of medicinal marijuana dispensaries was associated with increased crime in areas adjacent to these dispensaries, but not in their

immediate vicinities.^{21,22} Finally, a recent study from Denver, using very small grid cell areas (1,000 x 1,000 feet) as the unit of analysis and a dichotomous indicator (0, >=1) for dispensaries, found that the presence of at least one dispensary was associated with increases in rates of crime within the grid cell.²³

Secondary Data Analyses

To assess the potential health equity impacts of cannabis dispensary locations and density, the geographic distribution of licensed and unlicensed dispensaries in LA County was examined in relation to: 1) census tract level data on the Healthy Places Index (HPI), 2) zip code level data on cannabis-related emergency department (ED) visits, and 3) census tract level data on violent and property crimes. For all three sets of analyses, Weedmaps was the source for address data on unlicensed cannabis dispensaries and the BCC was the source for address data on licensed cannabis dispensaries.

Weedmaps is an online directory where cannabis dispensaries pay monthly fees to advertise their locations and products. Weedmaps allows dispensaries to advertise on their site regardless of whether they have a state license. While it cannot be assumed that every unlicensed dispensary advertises on Weedmaps, a study of online methods for locating medicinal marijuana dispensaries in LA County found that Weedmaps was the most effective website for locating stores verified as being open (95% were located). Weedmaps was also the website that listed the lowest number of stores verified as being closed (24% located).²⁴ Starting in January 2018, through a data sharing agreement with researchers at Ohio State University, the HIA team began receiving monthly extracts of electronic data on LA County cannabis dispensaries advertising on Weedmaps. By combining this data with cannabis licensing data from the BCC, unlicensed dispensaries were identified (dispensaries that advertised on Weedmaps but did not have a state-issued dispensary license).

Analysis of Dispensary Density in Relation to Healthy Places Index

The Healthy Places Index (HPI) combines 25 community characteristics (across eight sub-domains) that predict life expectancy. The economic domain (including poverty, income, and employment) is the highest weighted sub-domain. Race/ethnicity is not included in the HPI but was accounted for independently in the HIA analyses. Developed by the Southern California Public Health Alliance and an academic partner, the HPI is scored on a continuous scale, with a higher score signifying greater health assets. All census tracts in LA County with at least 1,500 residents have been assigned an HPI score. **Figures 2 and 3** show the census tract-level concentrations per square mile of licensed and unlicensed cannabis dispensaries in late December 2018, in relation to census tract HPI scores. Given the apparent greater concentration of unlicensed dispensaries in areas with low HPI scores, regression modeling was used to examine the associations between numbers of licensed versus unlicensed dispensaries and census tract HPI scores.

Figure 2: Licensed Dispensary Density & Healthy Places Index Score, Southern LA County, 2018

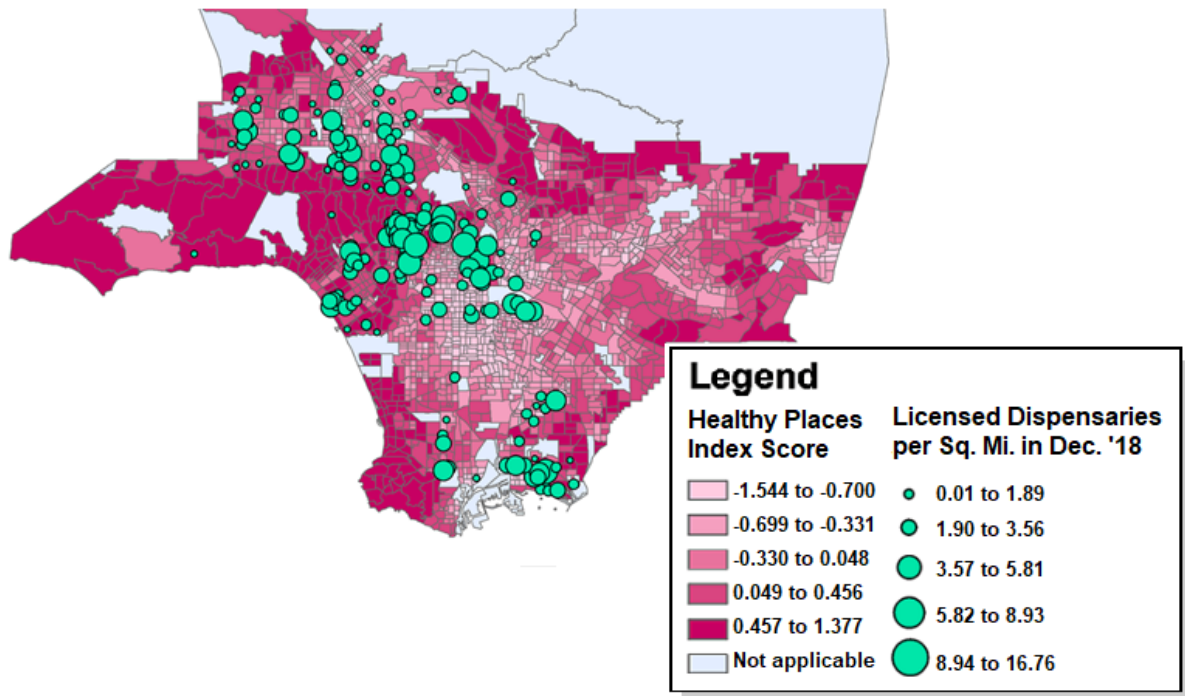
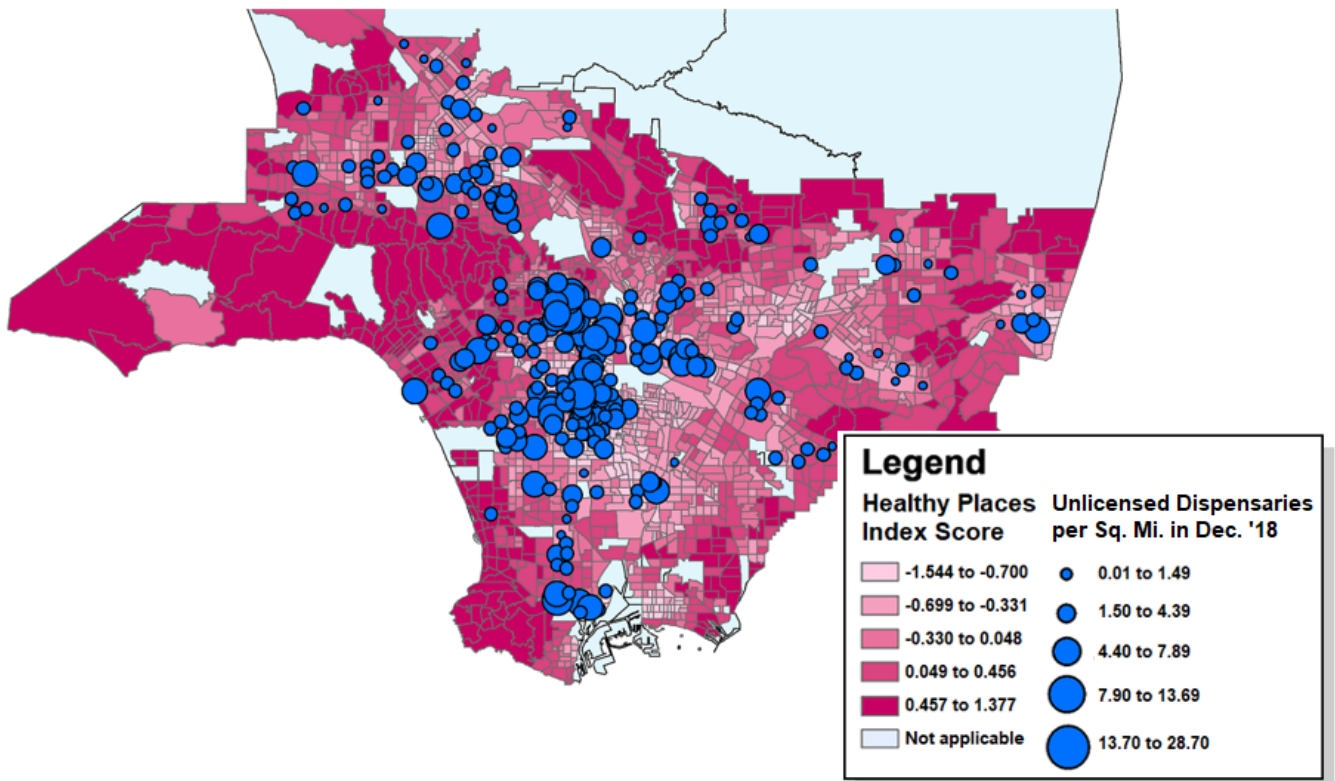


Figure 3: Unlicensed Dispensary Density & Healthy Places Index Score, Southern LA County, 2018



Sources for both figures: Healthy Places Index (HPI), Weedmaps, California Bureau of Cannabis Control (BCC)

As there are many more census tracts in LA County without dispensaries than with dispensaries, a modeling technique was used that allowed simultaneous prediction of: 1) the number of dispensaries in tracts where dispensaries existed (“count models”) and 2) whether tracts had any dispensaries at all (“zero models”). Separate analyses were conducted for licensed and unlicensed dispensaries, yielding four models, displayed in **Table 2**. The “count models” predict the number of dispensaries in census tracts, while the “zero models” predict the odds of tracts having zero dispensaries. In addition to HPI score and percentage of African American, Latinx and Asian residents, all models included covariates for percentage of commercially-zoned land, liquor stores per square mile, and percentage of the population less than age 18. The models for unlicensed dispensaries included all LA County census tracts with HPI scores (n=2,275) while the models for licensed dispensaries only included tracts where dispensaries were legal (n=1,200). Hence, legality was only controlled for in the unlicensed dispensary models.

In the “zero models,” HPI score significantly predicted the presence of unlicensed dispensaries but not of licensed dispensaries. In other words, census tracts with greater health disadvantage were more likely to have unlicensed dispensaries but were not more likely to have licensed dispensaries. In the “count models,” HPI score did not significantly predict the number of licensed or unlicensed dispensaries. However, unlicensed dispensaries were significantly more concentrated in tracts with higher percentages of Latinx and African American residents, but licensed dispensaries were not. Also, tracts with higher percentages of African American residents were significantly less likely to have any licensed dispensaries. Tracts with higher percentages of Asian residents had significantly fewer licensed dispensaries. Finally, tracts with higher concentrations of liquor stores were significantly more likely to have any unlicensed dispensaries. Liquor store concentration had no effect on whether there were any licensed dispensaries in a tract, or on the density of licensed or unlicensed dispensaries.

Table 2: Zero Inflated Negative Binomial Regression Models of Dispensary Counts per LA County Census Tract, 2018[†]

Variable	Count Model: Licensed (n=1200 Tracts)		Count Model: Unlicensed (n=2275 Tracts)		Zero Model: Licensed (n=1200 Tracts)		Zero Model: Unlicensed (n=2275 Tracts)	
	IRR ^a	95% CI	IRR ^a	95% CI	OR ^b	95% CI	OR ^b	95% CI
HPI Score	.998	(.529, 1.881)	1.053	(.574, 1.930)	1.082	(.066, 17.704)	11.40 [*]	(1.505, 86.31)
% Commercially Zoned	.999	(.976, 1.022)	1.008	(.988, 1.029)	.240 ^{***}	(.115, .498)	.844	(.702, 1.015)
Liquor Stores per Sq Mi	1.006	(.970, 1.042)	.993	(.960, 1.027)	1.377	(.978, 1.939)	.269 ^{***}	(.125, .579)
% Population <18	.954 [*]	(.921, .989)	.962 [*]	(.925, .9998)	1.161	(.983, 1.372)	.970	(.862, 1.091)
Legality	--	--	1.65 ^{**}	(1.145, 2.389)	--	--	.124 ^{**}	(.033, .465)
% Latinx	1.004	(.990, 1.018)	1.020 ^{**}	(1.008, 1.033)	.984	(.928, 1.043)	.985	(.952, 1.019)
% African American	1.004	(.986, 1.022)	1.025 ^{***}	(1.012, 1.040)	1.095 ^{**}	(1.024, 1.171)	1.011	(.976, 1.047)
% Asian	.976 [*]	(.957, .994)	.994	(.979, 1.009)	1.074	(.955, 1.208)	.972	(.930, 1.016)

^aIncident Rate Ratio; ^bOdds Ratio
^{*}p<.05; ^{**}p<.01; ^{***}p<.001

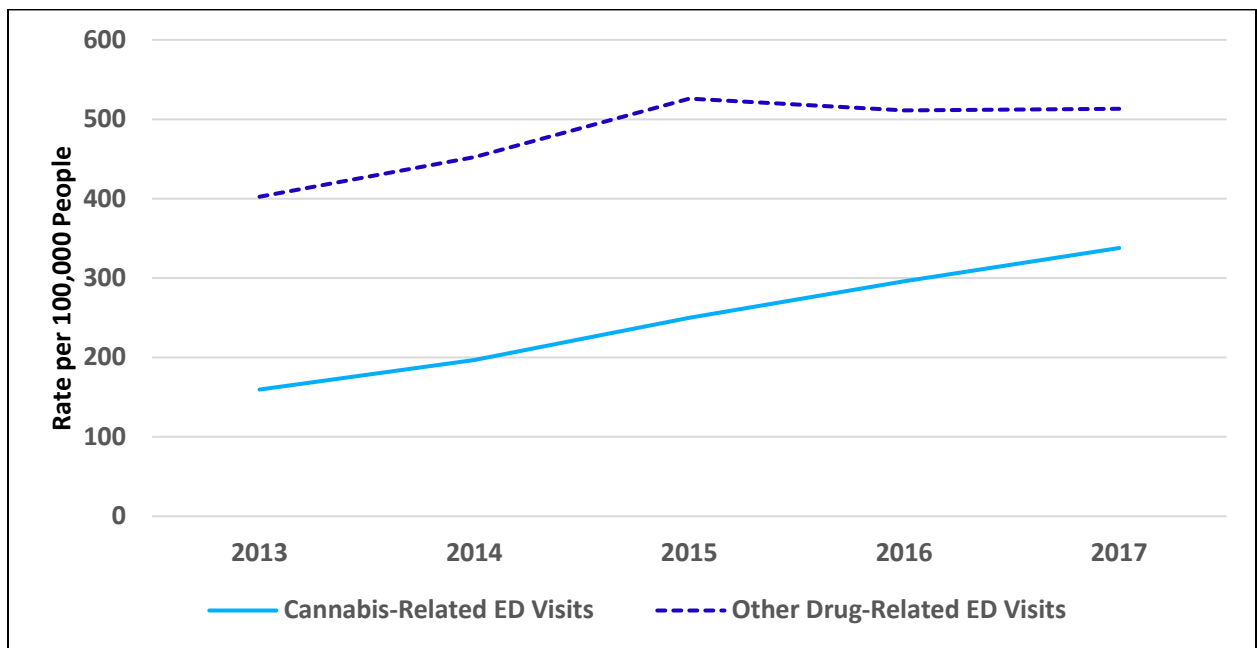
Sources: Healthy Places Index, CA Department of Alcoholic Beverage Control, Los Angeles County eGIS, US Census

[†] To account for spatial dependence in the data, the integrated nested Laplace approximation (INLA) package in R²⁵ was used to estimate a Bayesian model for the data. The strength of association and credible intervals of parameters resulting from the INLA models were similar to the corresponding results of the zero inflated models in Table 2.

Analysis of Dispensary Density in Relation to Cannabis-Related Emergency Department Visits

The California Office of Statewide Health Planning and Development (OSHPD) collects and reports zip code level data on International Classification of Disease (ICD) codes associated with all ED visits. ICD version 10 (ICD-10) was implemented in the fourth quarter of 2015 and includes a more expansive and detailed set of cannabis-related codes than ICD version 9 (ICD-9). **Figure 4** shows population trends in rates of ED visits with any cannabis-related codes from 2013-2017. Coders select a primary code for each visit and can select multiple codes per visit. A cannabis code was the primary code for less than 1% of visits from 2013-2017. The ten primary codes most frequently reported for visits with a cannabis-related non-primary code were related to anxiety, chest pain, abdominal pain, psychosis, nausea with vomiting, suicidal ideations, and alcohol abuse. For comparison, **Figure 4** also includes population trends in ED visits with any non-cannabis drug-related codes. The rate of cannabis-related ED visits more than doubled between 2013 and 2017, from 160 to 338 per 100,000. The trend is linear, with no notable change in trajectory after ICD-10 codes were implemented. In contrast, rates of other drug-related ED visits were higher across all five years, but after increasing between 2013 and 2015 they remained flat through 2017.

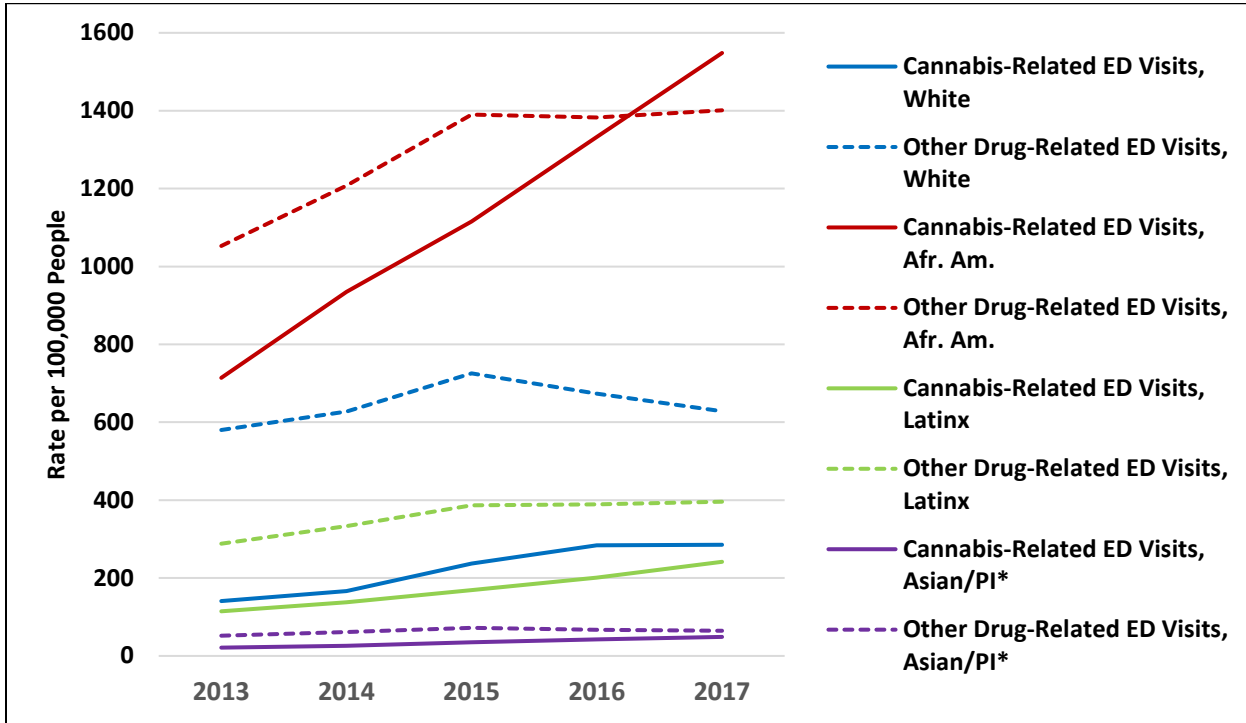
**Figure 4: Cannabis-Related and Other Drug-Related Emergency Department (ED) Visits
Los Angeles County, 2013-2017**



Source: California Office of Statewide Health Planning and Development (OSHPD)

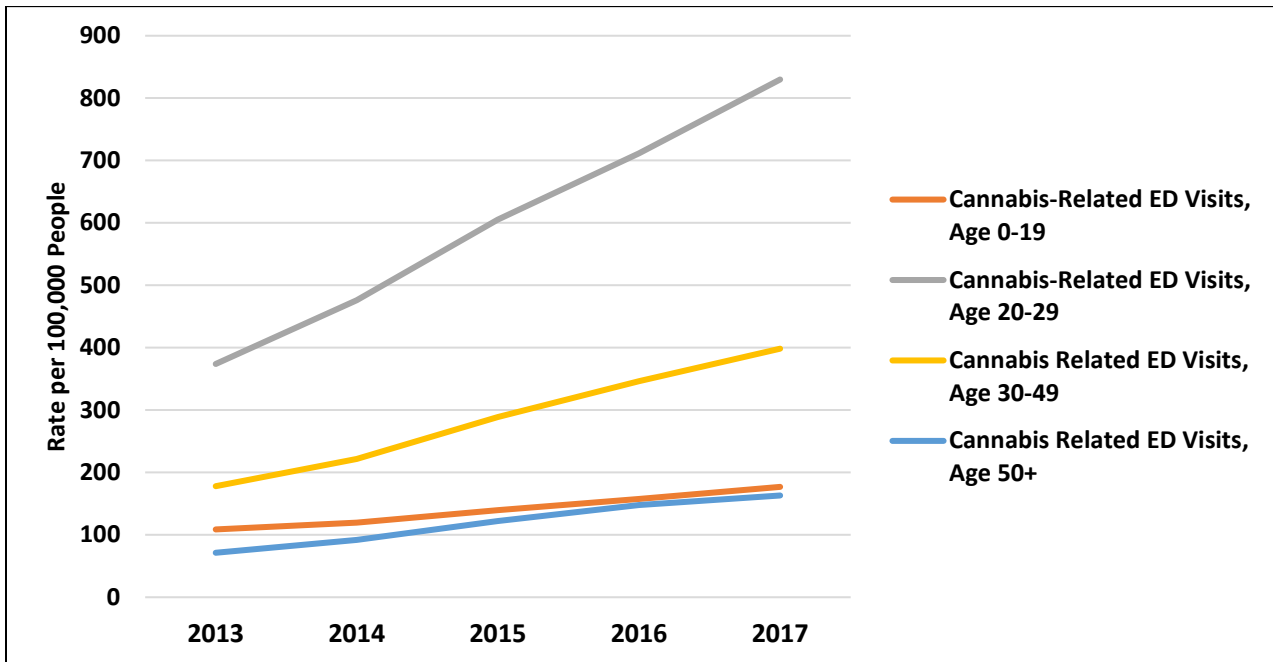
Figure 5 shows cannabis-related ED visit trends by patient race/ethnicity. While the population rates of cannabis-related ED visits roughly doubled for all racial/ethnic groups between 2013 and 2017, the baseline rate and absolute increase was much higher for African Americans. Thus, the disparity between African Americans and Whites in cannabis-related ED visits more than doubled between 2013 and 2017, from 573 per 100,000 to 1,263 per 100,000. In 2016 and 2017, the cannabis-related ED visit rate among African Americans met and then surpassed the rate for other drug-related ED visits. The cannabis-related ED visit trend among Latinx was slightly lower than that among Whites. Asians had rates considerably lower than Whites, Latinx, and African Americans across all years.

Figure 5: Cannabis-Related and Other Drug-Related Emergency Department (ED) Visits by Race/Ethnicity Los Angeles County, 2013-2017



*PI – Pacific Islander. Source: California Office of Statewide Health Planning and Development (OSHPD)

Figure 6: Cannabis-Related Emergency Department (ED) Visits by Age Group Los Angeles County, 2013-2017



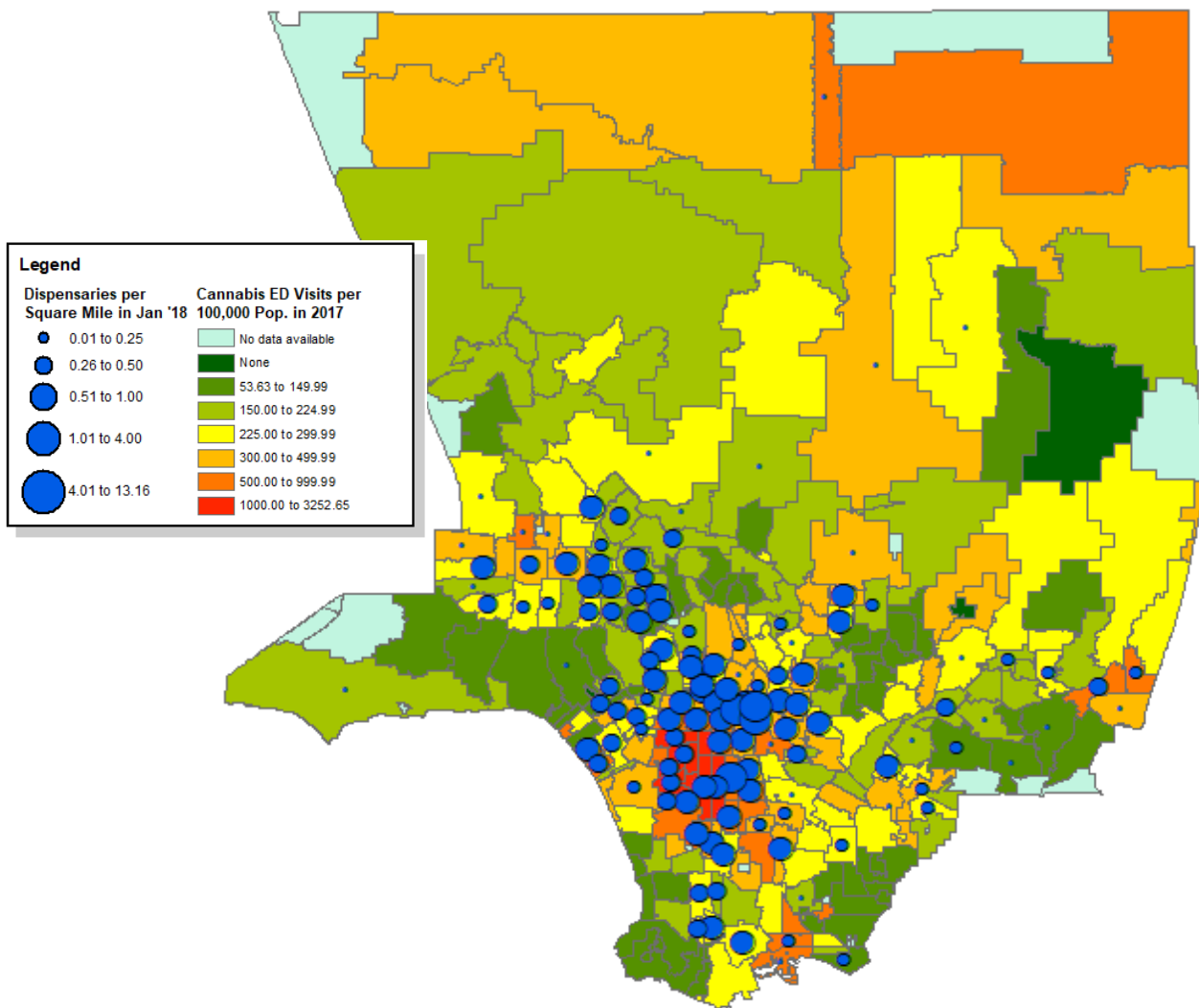
Source: California Office of Statewide Health Planning and Development (OSHPD)

Figure 6 shows cannabis-related ED visit trends by patient age. Across all years, rates were highest for young adults (age 20-29) and lowest for children and adolescents (age 0-19) and older adults (age 50+).

The relative and absolute rate increase was also highest for young adults, whose cannabis-related ED visit rate more than doubled between 2013-2017 and was almost five times greater than that of children and adolescents in 2017. Visit rates among children and adolescents had the lowest rate of increase over time, but still increased by 62% between 2013-2017.

Figure 7 shows zip code-level concentrations per square mile of all cannabis dispensaries advertising on Weedmaps in January 2018* in relation to 2017 cannabis-related ED visit rates by zip code. Given the apparent concentration of dispensaries in zip codes with high rates of cannabis related ED visits, regression modeling was used to further explore this relationship. Since the most recent ED visit data available was for 2017, i.e., before the new cannabis dispensary licensing process was implemented, we used dispensary data from January 2018* in the models. Thus, a comparison of licensed versus unlicensed dispensaries was not possible for this analysis.

Figure 7: Cannabis-Related Emergency Department (ED) Visits and Dispensary Density, by Zip Code Los Angeles County, 2017



Sources: California Office of Statewide Health Planning and Development (OSHPD), Weedmaps

* Weedmaps data were unavailable for 2017 so data from January 2018 were used as a proxy.

A negative binomial regression model was fit predicting the number of cannabis related ED visits per zip code. In addition to the number of dispensaries per square mile in the zip code, predictor variables included: 1) percent of population below 100% of the Federal Poverty Level, 2) total population, 3) percent of land area commercially zoned, and 4) percent of population in different racial/ethnic groups. Model results are displayed in **Table 3**. Independent of other covariates in the model, an additional one dispensary per square mile in a zip code was cross-sectionally associated with a 7.1% increase in the number of cannabis-related ED visits. Likewise, a larger total zip code population and greater percentages of residents who were poor, Latinx, African American and multi-racial were each independently associated with an increase in the number of cannabis-related ED visits.

Variable	Incident Rate Ratio	95% CI
Intercept	9.78	(6.626, 14.645)
Dispensaries per Sq Mi	1.071*	(1.012, 1.134)
% Below 100% FPL	1.019***	(1.009, 1.03)
% Commercially Zoned	1.004	(.993, 1.015)
Total Population/1,000	1.029****	(1.024, .1034)
% Latinx	1.008***	(1.004, 1.013)
% African American	1.031****	(1.025, .038)
% Native American	.771	(.553, 1.075)
% Asian	.998	(.992, 1.003)
% Hawaiian/Pacific Islander	.937	(.809, 1.085)
% Multi-Racial	1.105**	(1.03, 1.184)
% Other Race	1.048	(.89, 1.235)

*p<.05; **p<.01; *** p<.001; **** p<.0001

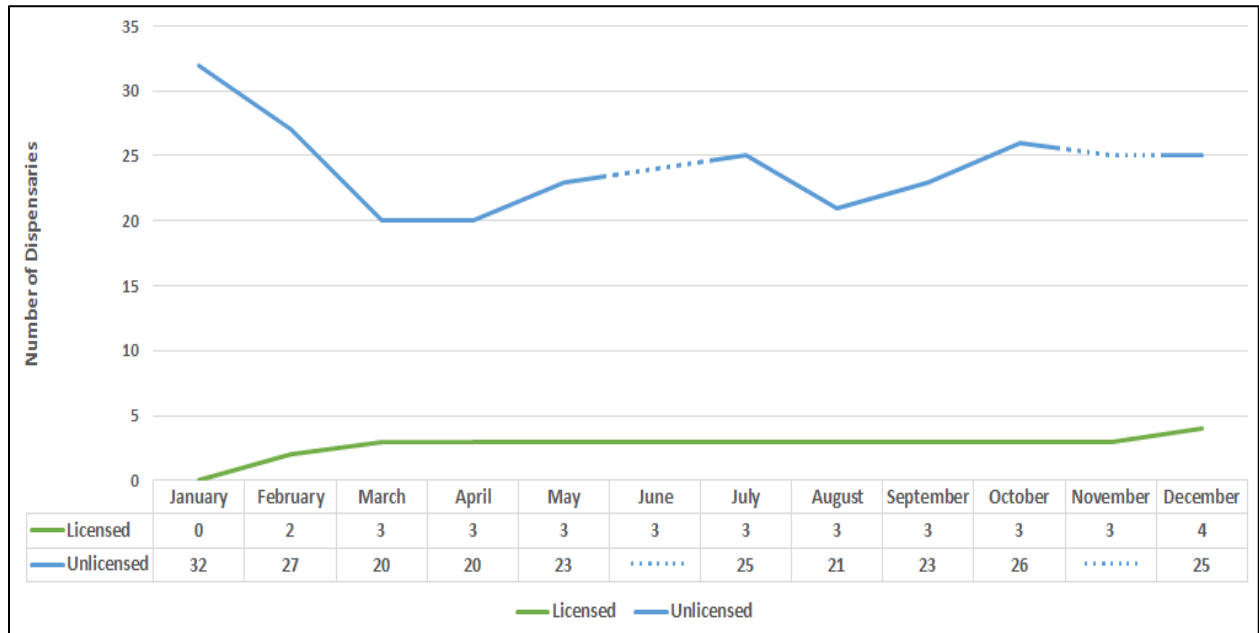
Sources: Weedmaps, California Bureau of Cannabis Control (BCC), US Census, Los Angeles County eGIS

Analysis of Dispensary Locations in Relation to Schools

Figure 8 shows the number of licensed and unlicensed dispensaries within 600 feet of a school, by month, in 2018. 600 feet is the required buffer area specified in state MAUCRSA regulations. Between 20 and 30 unlicensed cannabis dispensaries advertising on Weedmaps were within 600 feet of a school in any given month in 2018. We did not verify the distances for the small number of licensed dispensaries identified in **Figure 8**. It is possible that our distance measurement method varied slightly from the methods used by the cities where these dispensaries are located.

[†] To account for spatial dependence, we fit a spatial lag model in GeoDa, and the magnitude and statistical significance of the parameters were similar to those in the negative binomial model presented in Table 3. However, due to resource constraints, the spatial lag effect was tested using ordinary least squares regression with the zip code rate of ED visits per 100,000 population as the dependent variable.

**Figure 8: Dispensaries within 600 Feet of a Public or Private School*
Los Angeles County, January to December 2018**



*Excludes private schools with fewer than 50 students enrolled.

Note: Dotted lines indicate Weedmaps data was not available for June or November.

Sources: Weedmaps, California Bureau of Cannabis Control (BCC), California Department of Education

Analysis of Dispensary Density in Relation to Property and Violent Crimes

Given our findings that licensed and unlicensed dispensaries were differentially associated with cannabis-related ED visits and HPI scores, we used regression modelling to test for similar differences in relation to neighborhood crime. Crime data included in these analyses were from the Los Angeles Police Department (LAPD), the Los Angeles County Sheriff’s Department (LASD) and the Beverly Hills Police Department (BHPD). We used the Federal Bureau of Investigation’s National Incident-Based Reporting System guidelines to identify 2018 incidents of property and violent crimes at the census block group level for all areas patrolled by these three police departments. We fit three separate models predicting block group level incidents of property crimes, violent crimes, and both combined. In addition to licensed and unlicensed dispensaries per square mile*, other predictor variables in the models included HPI score, percentage of commercially-zoned land, liquor stores per square mile, percentage of the population male and age 15-24, total population per square mile, major roadway miles per square mile and percentage of African American and Latinx population.

A test for spatial dependence in the data indicated a potential spatial lag effect, meaning that the relationships of interest in a given block group may be influenced by the corresponding relationships in neighboring block groups. After controlling for this type of spatial dependence by including a spatial lag term (Rho) in the model, the model fit improved and the effect sizes of the predictor variables became smaller, but the effects of interest remained statistically significant. Including the spatial lag term accounted for some but not all of the spatial dependence inherent in the data. The spatial lag models are presented in **Table 4**.

* These measures of dispensary density consisted of the average numbers per square mile across our 10-12 months of dispensary count data for 2018.

Independent of other covariates in the model, an additional unlicensed dispensary per square mile in a block group was cross-sectionally associated with about 4 additional property crimes and 5 additional violent crimes per square mile. An additional licensed dispensary was associated with 9 additional property crimes but was not significantly associated with violent crime or property and violent crimes combined. An additional liquor store per square mile was associated with 6 additional property crimes and 3 additional violent crimes per square mile. Additionally, property and violent crime incidents were significantly higher in block groups with lower HPI scores (i.e., greater health disadvantage), higher percentages of commercially zoned land, lower percentages of Latinx, and higher density of major roadways and total population.

Table 4: Ordinary Least Squares Spatial Lag Model of Crime Incident Density per Census Tract Block Group Los Angeles County, January to December 2018 (n= 4,048 census tract block groups)

Variable	Property and Violent Crimes Combined		Property Crimes Alone		Violent Crimes Alone	
	Coefficient	SE	Coefficient	SE	Coefficient	SE
Intercept	350.823	63.070****	279.406	38.457****	77.073	28.532**
HPI Score	-4.790	0.645****	-2.813	0.388****	-1.894	0.296****
Population per Sq Mi	0.017	0.001****	0.010	0.001****	0.007	0.000****
% Population Males 15-24	-1.113	2.601	-1.471	1.573	0.307	1.193
% African American	0.764	0.742	-0.332	0.449	0.950	0.341**
% Latinx	-3.251	0.533****	-2.652	0.325****	-0.681	0.243**
% Commercially Zoned	4.434	0.430****	2.772	0.260****	1.647	0.197****
Licensed Dispensaries per Sq Mi	7.270	5.545	9.071	3.355**	-1.307	2.543
Unlicensed Dispensaries per Sq Mi	9.337	3.084**	4.450	1.866*	4.818	1.415***
Liquor Stores per Sq Mi	8.611	1.569****	5.608	0.949****	2.951	2.951****
Major Roadway Miles per Sq Mi	12.261	2.195****	8.432	1.329****	3.800	3.800***
Rho (spatial lag effect)	0.433	.017****	0.389	.016****	0.503	.018****

* p<.05; ** p<.01; *** p<.001; **** p<.0001

Sources: LA Police Department, LA County Sheriff's Department, Beverly Hills Police Department, Weedmaps, Healthy Places Index, US Census Bureau, California Bureau of Cannabis Control, US Department of Transportation, CA Department of Alcoholic Beverage Control, Los Angeles County Enterprise GIS

Focus Groups and Key Informant Interviews

There was universal agreement across our focus groups and KIIs that cannabis dispensaries should not be located near schools and that state and local sensitive use buffer areas around schools were appropriate. However, there was some contention about other sensitive uses, particularly day care and youth centers. Both dispensary owners and regulators acknowledged that the lack of clear definitions of these types of sensitive uses was problematic.

“...being a certain amount away from a school and things like that, I think it makes total sense... but when it comes to these grey areas - churches or youth centers...For example, we were almost shut down because of an aikido studio that’s mainly adults, but they have two classes for kids...It was very problematic; we had to pay a lot of legal fees to fight that, so it can be very detrimental to people who are doing it the right way...” (Licensed Operator)

“You could define many private businesses as a youth center, like a karate center, a dance studio, a lot of different places. How do you track those? They’re moving constantly. It’d be an impossible task to track youth centers.” (Cannabis Regulator)

For licensed operators, the concern about sensitive use definitions was linked to economics. As the allowable areas for legal dispensaries become smaller, landlords can demand higher rents in those areas. This phenomenon was observed by both dispensary operators and cannabis regulators.

“The situation...created an artificial real estate market...where very specific and very limited areas became extremely desirable to a small group of people. So, the landlord who had an empty space for the last two years is suddenly hearing ‘I’ll pay a buck fifty, triple net—I’ll pay two bucks, triple net’—he’s like, ‘What the hell is going on here? Nobody’s called me in 5 years about this property.’” (Licensed Operator)

“...it’s expensive to go through that process, especially with buffers. Cannabis businesses can only locate in certain areas, so property values of those areas jump.” (Cannabis Regulator)

Most LA County cities have adopted guidelines allowing one retail dispensary per 10,000-15,000 residents and this, along with zoning and sensitive use restrictions, has kept the density of licensed cannabis dispensaries relatively low in most smaller cities. However, by early 2019 bigger cities were still not close to reaching the maximum number of licensed dispensaries stated in these local guidelines. Dispensary owners suggested that market forces should dictate the total number of dispensaries allowed, while regulators acknowledged that density guidelines were not a hard and fast rule.

“...say our cap is 450. That cap should be allowed to be at 450 for maybe a year or two or three years max to see how everything goes. If stores have lines wrapped around them and too much traffic coming through, then it becomes a nuisance to the community...then we need to open up for more licensing. Because now these people need another location that they can go to.” (Licensed Operator)

“The city council said they will allow for one retail facility per 10,000 residents. In a city of upwards of four million, we could see 400 retail facilities be licensed with that particular framework...businesses will have the ability to petition the city council to allow licenses to be granted in excess of these initial restrictions.” (Cannabis Regulator)

At the time of this report, the City of LA was beginning to launch its cannabis social equity licensing program, which sets aside a significant portion of retail cannabis licenses for people from communities impacted by the *war on drugs*. The program is designed to allow these communities to benefit from a fair share of the profits of the newly legalized cannabis industry. Thus, future increases in the number of licensed dispensaries in Los Angeles will presumably include a large portion of social equity applicants. We discuss social equity programs under research question #4.

Medicinal cannabis users described the safety and convenience of having access to dispensaries close to their homes.

“When my friends and I will have to drive across town, then we just usually park the car and smoke somewhere. If it’s nearby, then you can just go home and smoke in the comfort of your home instead of posting up somewhere, putting yourself at risk, getting criminalized.” (Community Medicinal User)

“[Name of child] has therapy seven days a week. I don’t have time to drive to the Valley without missing three necessary therapies for her. So, it’s the same thing as why would you drive to a Target an hour away if you’re getting a pharmaceutical, rather than one that’s five minutes away.”
(Physician-Supervised Cannabis Caregiver)

Summary

By the end of 2018, a year after ten LA County cities began licensing cannabis dispensaries within their jurisdictions, a discernable difference had emerged between the geographic patterning of licensed versus unlicensed dispensaries in relation to health equity indicators. Unlicensed dispensaries were concentrated in health-disadvantaged areas and areas with high concentrations of Latinx and African Americans, while licensed dispensaries were not. Violent crimes were more prevalent in census tract block groups with higher concentrations of unlicensed dispensaries than in those with higher concentrations of licensed dispensaries. Finally, in 2017 (the year after Proposition 64 was passed but before state cannabis retail licensing began), both overall cannabis-related ED visit rates in LA County and the disparity between African Americans and Whites had doubled compared to 2012. A greater number of cannabis-related ED visits among residents of a zip code was associated with a significantly higher density of dispensaries in that zip code, although a distinction between licensed and unlicensed dispensaries could not yet be made.

Quantitative evidence of an overconcentration of unlicensed dispensaries in health-disadvantaged areas leads to the question of whether unlicensed dispensaries engage in business practices that put their surrounding communities at higher risk of negative health outcomes than their licensed counterparts. This question is addressed in the next section. Also, as the first group of cities allowing dispensaries will likely double their total number of licensed dispensaries by the end of 2020, it will be important to track locations and impacts of the next wave of licensed dispensaries, many of which will be part of social equity licensing programs. This issue is addressed in the last two sections.

Research Question #2—How could cannabis business practices impact equity in the distribution of SDOH and health outcomes in unincorporated LA County and other LA County jurisdictions?

Literature Review

The four Ps of marketing—Product, Price, Place, and Promotion—provide a useful structure for a review of the potential effects of cannabis dispensary business practices on health-related outcomes. Placement was covered under research question #1 (dispensary location and density). This section addresses two additional business practices particularly relevant to the sale of cannabis, namely age verification and security measures. Below is a review of the relatively small number of empirical studies of cannabis business practices, along with other literature that highlights potential health and health equity impacts.

Cannabis product potency (i.e., *THC* content) has increased significantly since cannabis first became widely available in the United States. The average potency of cannabis flower on the market has increased from less than 5% *THC* to over 15% *THC* over the past few decades, largely due to advanced growing techniques.²⁶ *Vaporizable cannabis concentrates (VCCs)* usually contain 60-85% *THC* and are commanding a rapidly growing share of the retail cannabis market.²⁷ In Washington State, after legalization, the sale of *VCCs* grew at twice the rate of sales of other cannabis products, and the sale of “solid” extracts used for *dabbing* (heating the concentrate with a torch and inhaling the vapor in a single hit) grew at an even faster rate than *oils* and *vape cartridges*.²⁸ From a public health perspective, higher potency cannabis products increase the risk of cannabis abuse and dependence (collectively referred to as *cannabis use disorders* or *CUD*) among users. The use of higher potency products is associated with increased risk for onset of first *CUD* symptoms and greater severity of dependence among adults.^{29,30}

With regards to price, the public health concern is that legalization will lead to a reduction in the price of cannabis products, which will increase consumption and misuse. However, the limited research available on the price elasticity of demand for cannabis products (i.e., the degree to which consumption is responsive to price changes) is based on prevalence of use in the general population. Thus, it does not consider the variation in responsiveness to price among different user groups.³¹ Heavy users comprise a small portion of total users, but a much larger portion of total cannabis consumed, and research on alcohol and tobacco consumption suggests that heavy users are more sensitive to price changes than light users.^{32,33} Another important consideration are the non-monetary aspects of the price of cannabis consumption—the perceived health and legal risks. For example, research has shown that youth, who are the majority of new users, are relatively insensitive to changes in the monetary price of cannabis, but may be considerably more sensitive to changes in perceived health risks.³⁴ Thus, the normalization of cannabis use through increased advertising may have a particularly strong effect on youth initiation.

As researchers seek better data on the sensitivity of cannabis consumers to price changes, they are also beginning to study the extent to which legalization of recreational cannabis will affect prices. However, the only published research to date focuses on the first four- to five-month period following legalization of cannabis for adult use in Colorado and Washington.³⁵ The authors found no effect of legalization on product prices overall during these early months, although consumers in Washington purchasing in adult use stores paid significantly higher prices than consumers who purchased from a friend. The authors are careful to point out that these markets had not yet transitioned to their long-run state and that prices are likely to decline over time. They also cite prior research indicating that the supply source influences

cannabis prices, suggesting that in places with a strong presence of unlicensed dispensaries (e.g., LA County), price response to the legalization of adult use may take even longer to occur.

A recent longitudinal study of medicinal marijuana advertising and youth marijuana use found that higher average exposure to advertising was associated with higher average use, intentions to use, and negative consequences of use, and that higher rates of change in advertising exposure was associated with higher rates of change in all three outcomes over seven years.³⁶ While it may not be surprising that advertising influences those exposed to it, these findings highlight the health risks of exposure to cannabis advertising among youth, even if youth are not the primary intended audience. The reported preference of cannabis business owners for advertising on social media (see KII findings below) may increase this exposure risk among youth.

The only published study of dispensary compliance with age verification requirements found that 95% of 20 licensed dispensaries surveyed in Colorado were compliant, which was a higher rate of compliance than what has been seen for alcohol sales.^{37,38} The authors suggested that the legal retail market may not be a direct source of cannabis for underage users.³⁹ This finding aligns with the limited evidence reviewed above on the lack of association between dispensary proximity to high schools and students' cannabis use.^{15,16}

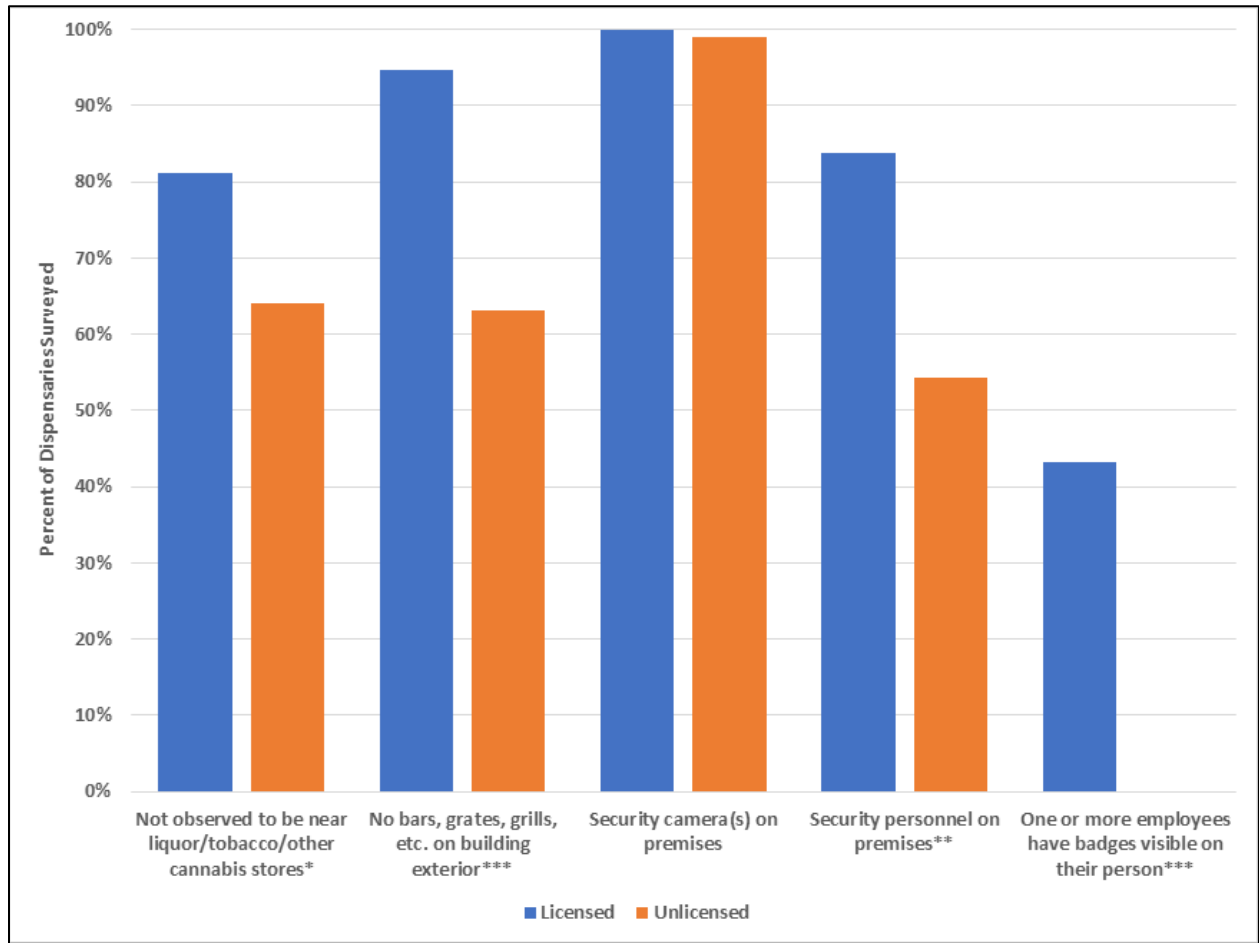
Finally, a limited amount of information on dispensary security measures comes from recent pilots of the MRST. Pilots of the tool in Colorado and Washington found that while security cameras were observed in all dispensaries, security personnel were observed in only 25-36% of dispensaries.^{11,12} The MRST was also used in a study of cannabis dispensaries and crime in Sacramento, where dispensaries with security cameras had significantly less violent crime within 100 and 250 feet buffer areas compared to dispensaries without security cameras.⁴⁰ Those with outdoor security personnel also had less violent crime nearby, but this finding was not statistically significant, likely due to the small sample size.

Observational Survey of Dispensaries

Although we surveyed unlicensed dispensaries located within and outside of unincorporated areas, we found no significant differences between these two of our three comparison groups (**Table 1** on page 14). As the only significant differences were between licensed and unlicensed dispensaries, the two samples of unlicensed dispensaries were combined in our analyses.

Findings related to security are summarized in **Figure 9**. While security cameras were ubiquitous regardless of licensure status, unlicensed dispensaries were significantly less likely to have visible security personnel. Unlicensed dispensaries were significantly more likely to have bars or grates on the exteriors of doors and windows, likely because regulations prohibit exterior bars and grates at licensed dispensaries and because unlicensed dispensaries are more likely to be in low-income areas where bars and grates are generally more prevalent. Staff at licensed dispensaries were significantly more likely to wear ID badges, although only 42% of licensed dispensaries were compliant with this regulatory requirement. Unlicensed dispensaries were more likely to be located near liquor stores, tobacco/vape shops, or other cannabis dispensaries, but the difference was not statistically significant.

Figure 9: Dispensaries with Various Security Measures by Licensure Status, Los Angeles County



* $p < .05$; ** $p < .01$; *** $p < .001$; Source: Los Angeles County Cannabis Dispensary Premise Survey (2018/2019)

Findings related to youth access are summarized in **Figure 10**. Almost all dispensaries checked for identification as an entrance requirement, regardless of licensure status. Licensed dispensaries were much more likely to have all products in their original child-resistant packaging. Unlicensed dispensaries typically sold dried flower out of large glass jars. Unlicensed dispensaries were also much more likely to sell products designed to be attractive to young people (e.g., products resembling candy and snack foods), and often had dab rigs set up for customers to consume cannabis inside the store.

In terms of product types (**Figure 11**), almost all stores sold dried flower, regardless of licensure status. Licensed stores were more likely to sell capsules, tinctures, and topicals, and unlicensed stores were more likely to sell *moonrocks* (prohibited in the legal market) and to sell edibles with THC content well above the legal limit for California. It was very rare for either licensed or unlicensed dispensaries to have product advertisements on their exteriors. Leaflets and other takeaway promotional materials were more commonly found inside licensed dispensaries, likely due to brand promotion in the licensed market. Given the fact that product prices were not always displayed, and our observational survey methodology did not allow for questioning of dispensary staff, we were unable to collect reliable data on product prices.

Figure 10: Dispensaries' Youth Cannabis Access Restrictions by Licensure Status, Los Angeles County

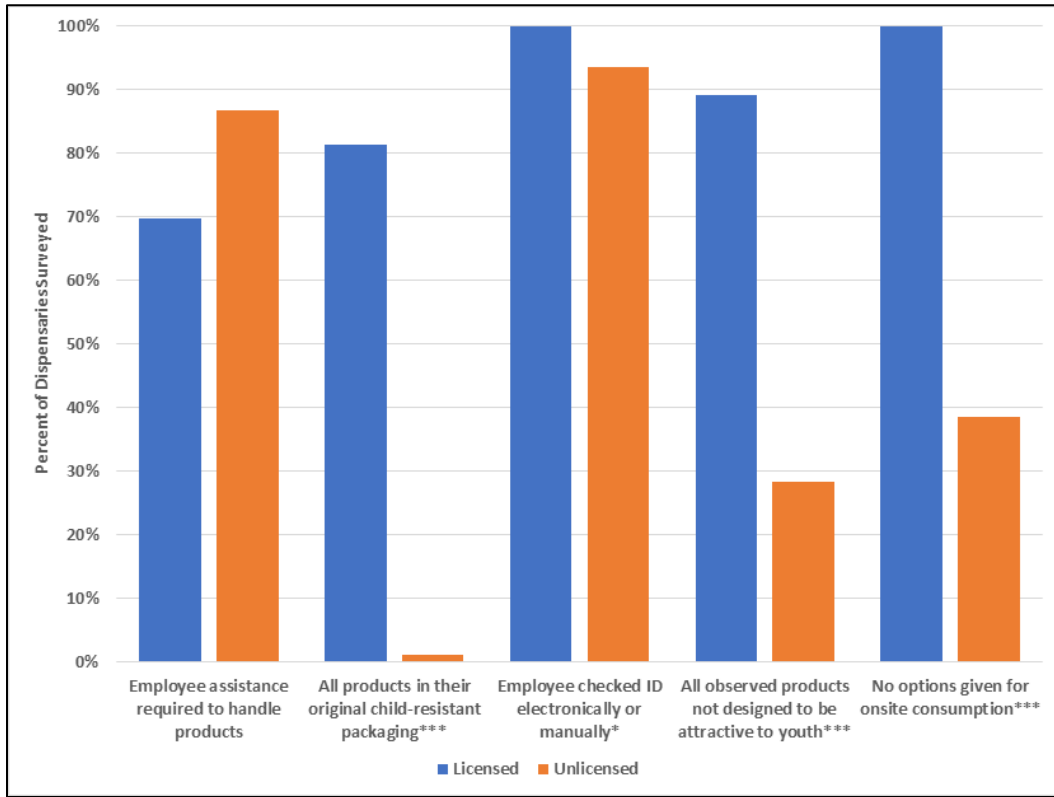
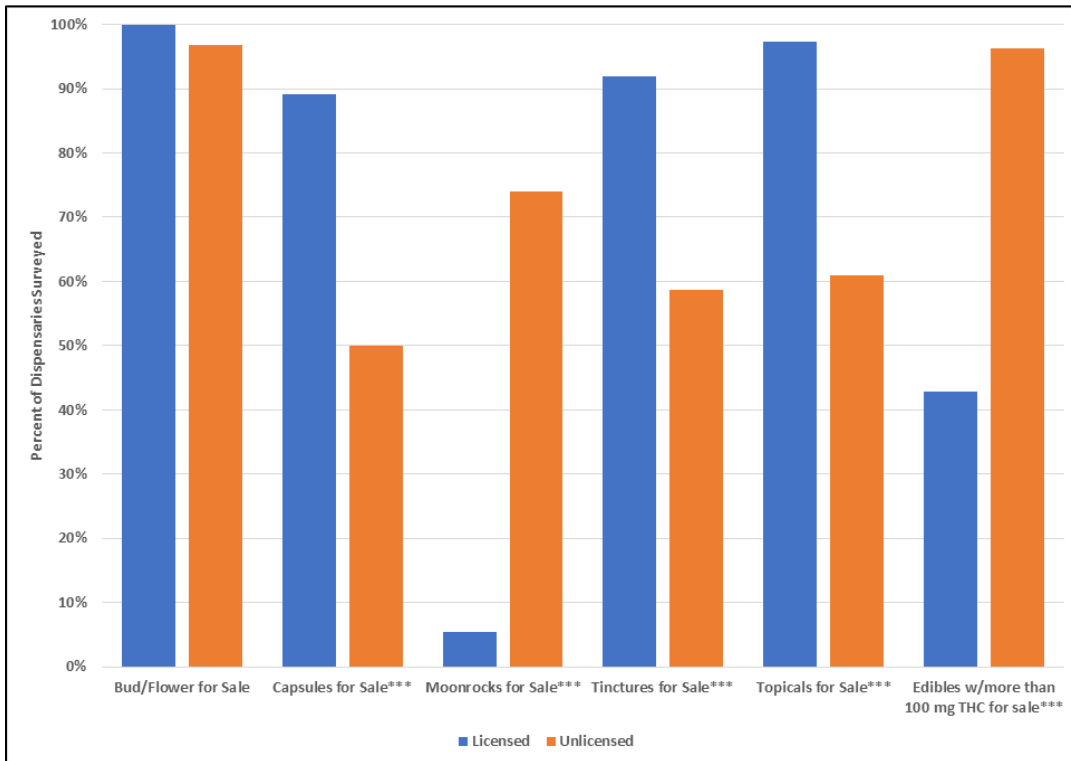


Figure 11: Dispensaries with Various Product Types by Licensure Status, Los Angeles County



*p<.05; **p<.01; ***p<.001; Source for both figures: Los Angeles County Cannabis Dispensary Premise Survey (2018/2019)

Focus Groups and Key Informant Interviews

Licensed dispensary operators confirmed that they were purposefully diversifying their product offerings to differentiate themselves from unlicensed operators, whom they perceived as serving younger, heavier, and less discerning users.

“Flowers tend to be more for the recreational user. Edibles, tinctures, patches, lotions—these are for people who are obviously looking for a little bit more of a focused use...It’s important to provide many options for people, especially with medical conditions.” (Licensed Operator)

“I didn’t want to compete with the low-hanging fruit of 24-year-old males that everyone’s competing for.” (Licensed Operator)

“At first it was just flower...it may have been a brownie and now it’s expanded to a lot more than that.” (Licensed Operator)

The only mention of product potency by dispensary operators was in the context of medicinal use. Many operators noted that, after Proposition 64, medicinal users were encountering more barriers to obtaining higher potency products that they required.

“When the regulations came, now a 100 mg bar was double the price of a 1000 mg bar and the only way she [elderly woman who took 1000 mg edibles as a substitute for Vicodin] could get to the 1000 mg was to buy ten of them and now it’s increasing the cost of her medicine tenfold....It pushed people back to the black market because you can still find 1000 mg edibles at illegal dispensaries and you won’t pay the tenfold increase.” (Licensed Operator)

“So, for example, a Cheeba Chews was the size of a Tootsie Roll. It’s still 100 milligrams now, but it has to be divided into ten 10-milligram segments...it took that Cheeba Chews that was the size of a Tootsie Roll and turned it into the size of a dinner plate.” (Licensed Operator)

“One thing that used to be really popular were high-dose syringes of oil for people who were really sick with cancer...they haven’t been available because of the regulations. That’s for really sick people that need high doses.” (Licensed Operator)

Physician-supervised medicinal cannabis patients/caregivers and their physicians also expressed concern that access to medicinal cannabis products has been negatively affected by new regulations post-Proposition 64.

“We’ve had to change and try different oils that don’t work as well for my daughter. We’re using things that we can get by on but that’s not nearly as good as what we were using. We’ve had to change what she was taking and that doesn’t have the effects that her old oils did. I can’t just walk into any dispensary because every profile is so different.” (Patient Caregiver)

“I used to just go to [name of cannabis company] and they’d ship it right out and deliver it to me the next day. It was super easy, and I could pay them through PayPal. Now it’s a complete nightmare to try to get these oils.” (Patient Caregiver)

“Prior to the new regulations, whether anybody knew it or not, all these companies were delivering. Remember, there weren’t many regulations to follow, so these companies...they just delivered it. As of January, there’s quite a few [patients] who are going to be stuck...That company is no longer going to exist because they are not going to be making the oil anymore.” (Physician)

While we were unable to collect price data in our dispensary survey, key informants reported that, similar to Washington and Colorado in the early months after legalization of adult use,³⁵ cannabis prices had not yet decreased in LA County. All dispensary operators interviewed stated that this was a result of being undersold by unlicensed operators whose prices did not include new state and local cannabis excise and sales taxes and other costs associated with regulatory compliance. According to licensed operators, the price of legally sold cannabis was unlikely to decrease while the unlicensed market maintained its presence, and the price sensitivity among potentially heavier users was evidenced by their patronage of cheaper unlicensed dispensaries.

“[Taxes and regulation of recreational cannabis] have added 40-50% on the cost of every product and it’s encouraged the black market to thrive...as a consumer, I can go somewhere and get a similar product and it’s anywhere from 25-45% cheaper depending on the city’s tax rate.”
(Licensed Operator)

“Once you get past a 20% [price] increase, you lose everybody. The only people who are coming here are people who can afford it and don’t want to put themselves at risk in any way.” (Licensed Operator)

“A lot of parents and more conservative people are just frustrated, as we are, with the proliferation of these illegal delivery services that very much market to the younger generations. These illegal shops just don’t care and they’re so much cheaper, so it’s much more attractive for younger people or whoever goes to these places.” (Licensed Operator)

“I think there’s already, like, an infrastructure in place, you know? The [unlicensed] shops are already operating for a while and I’ve seen shops that have operated illegally for 3 years now, but... everybody is accustomed to those prices – everybody in that area. They’re just conditioned to go there and get their stuff.” (Community Medicinal Cannabis User)

Regarding cannabis product promotion, local regulators cited instances of illegal promotional activities, and some localities have added language to local ordinances to enhance and support local enforcement related to cannabis advertising.

“We had issues related to billboard signs popping up and community members not being happy with cannabis ads staring them in the face...we restated in our adult use ordinance, [the state’s] distancing requirements for billboards, to clarify what the rules are and to give us something in our municipal code that we could point to and enforce.” (Cannabis Regulator)

“Our advertising restriction ordinance is supplementary and complementary to state regulations on advertising...We recognize that there are tons of ads here in [name of city] and we wanted to at least be able to empower local agencies to act. Part of this is that, just like we’re doing it for the first time, these state agencies are doing things for the first time as well, we didn’t want to overly rely on the state to enforce what was new for them. We knew that we’d have to be equal partners and even more so. We’re boots-on-the-ground here.” (Cannabis Regulator)

“[A licensed operator] put up some illegal signage. I had to send them a letter and have them remove the signage or risk having their conditional use permit revoked...My ordinance only allows one sign per facility and that cannot exceed six square feet.” (Cannabis Regulator)

Cannabis dispensary operators reported that their primary mode of advertising was through social media and other online sources including Instagram, Facebook, Twitter, Weedmaps, and cannabis-specific blogs and social media sites. Many licensed operators viewed Weedmaps as a double-edged sword, as it helped them promote their stores, but also served as a platform for unlicensed dispensaries to advertise as well.

“You have a lot of illegal establishments who have a lot of advertising on Weedmaps...so it’s negatively impacting our business because it’s still happening...” (Licensed Operator)

“Weedmaps has now become pretty much the bane of the existence of most of the legal market. Before, they were the bastion of glory because they were giving all of these new, emerging cannabis industries a platform to advertise.” (Licensed Operator)

“...go on Weedmaps, and you’ll be able to see the insane proliferation of these illegal delivery services, and we are completely surrounded by them in this neighborhood.” (Licensed Operator)

Summary

At the end of 2018, unlicensed dispensaries, in addition to being more concentrated in health-disadvantaged areas, were also more likely to engage in business practices linked to negative health-related outcomes. For example, unlicensed dispensaries were more likely to sell and promote on-site consumption of high potency cannabis products (e.g., moonrocks or wax) through the free use of devices designed to maximize THC inhalation (e.g., dab rigs). They were also less likely to have visible security personnel on site and more likely to sell products designed to be attractive to youth and not in child-resistant packaging.

Licensed dispensaries are experiencing unfair price competition from unlicensed operators whose prices do not incorporate state and local taxes or other regulatory and licensing costs. Presumably in response to this situation, they are marketing their products to less price-sensitive consumers in the higher-income areas where they are located. This is evidenced by their greater product diversification (e.g., tinctures, topicals, capsules) based on the belief that more price-sensitive clients are buying flower and dabbing concentrates from unlicensed dispensaries. Thus, the greater potential health risks associated with unlicensed dispensary business practices are disproportionately impacting low-income communities of color.

While we were unable to access data on the geographic distribution or legality of cannabis billboard advertising, regulators are responding to resident complaints by crafting local ordinances to enhance their enforcement authority without necessarily veering from state regulations. Meanwhile, licensed operators report that most of their advertising is through online sources.

Finally, medicinal cannabis users, including those under the supervision of a physician, are experiencing significant price increases on the specialized products they seek. Until the federal government eases restrictions on the pharmacological studies required to determine potential therapeutic uses of *CBD* and *THC*, and insurance companies agree to include cannabis-derived drugs in their formularies, these patients will have to pay 100% of the costs out-of-pocket. The next section examines unlicensed dispensaries and product safety from a regulatory enforcement perspective.

Research Question #3— How would enforcement of compliance with cannabis regulations impact equity in the distribution of SDOH and health outcomes in unincorporated LA County and other LA County jurisdictions?

Literature Review

Beyond the regulable business practices of licensed cannabis dispensaries discussed in the previous sections (i.e., product, price, promotion, placement), the legal and regulatory issues that appear to be causing most concern from an enforcement perspective in states that have recently legalized recreational cannabis are: 1) eliminating the unlicensed market, 2) ensuring product safety, and 3) preventing *cannabis-impaired driving (CID)*. Concerns about all three include potential impacts on public health.

In states that have legalized cannabis, the unlicensed market takes two primary forms. The first is largely outside the scope of local government enforcement and consists of the diversion of cannabis products from states where they are legal to states where they are not, or where cultivation, sale and use are more restricted. The second type consists of unlicensed cannabis businesses operating in local jurisdictions where cannabis sales are banned and/or alongside licensed dispensaries in areas where the latter are allowed. In Colorado, this type of unlicensed market was initially fueled by the large numbers of homegrown plants legally allowed for personal medicinal or adult use.⁴¹ In Washington, where home grows were banned, there was a proliferation of unlicensed dispensaries during the two-year period after recreational use was legalized but before licensed retail stores opened. This phenomenon was reportedly exacerbated by the loosely regulated medicinal market that preceded the adult-use market, and it influenced some local jurisdictions in Washington to ban adult-use sales.¹ The effect of these bans on unlicensed dispensaries has not been reported in the literature to date.

California is currently in a similar situation as Washington was in 2016, with an even longer standing medicinal marijuana market that has evolved turbulently over time and is now being replaced by more strict regulations under MAUCRSA. In the city of Los Angeles, successive efforts to rein in the proliferation of medicinal dispensaries have left behind a thriving market of unlicensed dispensaries that are now competing with newly licensed adult-use dispensaries. Meanwhile, unlicensed dispensaries are also entrenched in areas of LA County that never allowed medical dispensaries and are now reluctant to allow licensed dispensaries. Notably, one of the rationales for banning licensed dispensaries in local jurisdictions is that limiting access to cannabis will limit potential harms of misuse. However, this does not account for the potential harms of the unlicensed market or the potential dampening effect of the licensed market on the unlicensed market.

One prominent concern about the unlicensed market is that its products are not tested and thus put consumers at risk of exposure to dangerous contaminants. Pesticides are particularly concerning, given the lack of federal guidelines on pesticide use for cannabis cultivation.^{42,43} There is also evidence that pesticide levels are up to ten times higher in cannabis concentrates than in flower, and that dabbing is a highly efficient method for inhaling these pesticides and other contaminants into the lungs.⁴⁴ Due to the continued illegality of cannabis at the federal level, many states that legalize cannabis are unable to use their state laboratories for product testing since these laboratories receive federal funding for other health-related activities. This has led these states to establish an industry of private third-party labs responsible for ensuring the safety of cannabis products sold to consumers. While these labs are licensed

by the state, some observers note that they represent an abdication of concern over consumer protection to entities with a vested interest in the profitability of the cannabis industry.⁴⁵ Anecdotal evidence of cannabis businesses using multiple labs until they get a passing score suggests less-than-ethical industry practice.⁴⁶ However, there is also evidence that inter-lab variation in results is not due to deliberate attempts at deception, but rather to the fact that the standardization and precision in pharmaceutical testing is not yet existent in the nascent cannabis testing industry. One study found that identical samples of pesticide-contaminated cannabis concentrates sent to five randomly selected California cannabis testing labs yielded widely different results both in terms of pesticide detection (two of the five labs did not detect pesticides) and THC content (ranging from 77.8% to 94.5%).⁴⁷ This type of inter-laboratory variation can be caused by a lack of standard testing methods, a lack of standard reference samples, and variability in sample preparation.⁴⁸ These issues have led some state regulators to call for improved cannabis testing standards nationally.⁴⁹

Given the current potential for error in private labs, a few local jurisdictions have used their public health authority to institute local health inspections of all types of cannabis businesses, including cultivators, manufacturers, and retail stores. A recent comparison of local responses to state legalization in Washington state found that no cities or counties had yet used their public health authority in this way.¹ In Denver, the permitting process for cannabis businesses requires health inspections by the Department of Public Health and Environment.⁵⁰ Cities and counties in California are beginning to require health inspections and health permits as well.⁵¹ While these local efforts in California focus on measures designed to prevent product contamination (i.e., inspections), they do not yet include laboratory testing of cannabis products.

Regarding cannabis-impaired driving (CID), more empirical literature is available but definitive policy guidance is also lacking. Evidence that cannabis use increases the risk of collisions is quite robust,⁵² but when it comes to identifying policy effects on CID, the evidence is less clear. A study of the effects of medical marijuana laws (MMLs) on vehicle crash risk found no evidence of an overall effect but found a significant decline in alcohol-involved fatal crashes associated with MMLs.⁵³ Another national study found an 11% reduction in the traffic fatality rates post-MML implementation.⁵⁴ A recent cross-state analysis of the effects of MMLs on positive THC tests among drivers involved in fatal crashes found that these laws were not significantly associated with THC-involved fatal crash rates.⁵⁵ These seemingly counterintuitive findings may be due to a substitution effect between cannabis and alcohol or other drugs associated with a greater crash risk than cannabis. Cannabis may also increase the risk of crashes while decreasing the risk of fatality by reducing crash severity.⁵⁶

The research question most relevant to decisionmakers in local jurisdictions centers on which targeted strategies work best for reducing CID after adult use becomes legal statewide. The strategy with the best evidence for reducing alcohol-impaired driving, the setting of maximum allowable levels of blood alcohol for drivers,⁵⁷ is problematic for cannabis. THC can be detected in the blood for several weeks after cannabis use and there is no scientifically agreed upon blood level of THC that constitutes impairment. Roadside testing checkpoints for cannabis are problematic for the same reason. The only targeted strategy currently in use in the U.S. is the training of police officers as *Drug Recognition Experts (DREs)*. DREs are trained to recognize drug-related behavioral impairments and a recent study supported the value of cannabis-specific training.⁵⁸ Nevertheless, these trainings are costly, time-consuming to implement, and subject to legal challenges.⁵⁹ Finally, any strategy for deterring cannabis-impaired driving is subject to the

potential for racial profiling and disproportionate enforcement among racial and ethnic minority populations. African Americans were disproportionately arrested for cannabis possession charges in California prior to Proposition 64,⁶⁰ and the same biases that led to disproportionate possession arrests could influence traffic stops for suspected cannabis-impaired driving. Recent news reports of Los Angeles County Sheriff officers profiling racial and ethnic minorities during freeway traffic stops⁶¹ suggest that increased deployment of drug recognition experts with cannabis-specific training could result in inequitable enforcement.

Secondary Data Analyses

Trends in Licensed Versus Unlicensed Dispensaries

Figure 12 shows monthly trends in the numbers of licensed and unlicensed dispensaries in LA County from January 2018 through February 2019. The number of licensed dispensaries increased from 32 to 244 over this 14-month period, with the sharpest increases occurring in 2018 from January-March and November-December. The number of unlicensed dispensaries decreased from 487 to 356 from January to March and then increased slightly to an average of about 380 per month during this period. **Figure 13** divides the trend in unlicensed dispensaries between areas that allowed licensed dispensaries and those that did not. In areas allowing licensed dispensaries, unlicensed dispensaries decreased markedly through April 2018 and then continued to decrease at a much slower rate for the rest of the period. In contrast, in areas not allowing licensed dispensaries, the number of unlicensed dispensaries increased slightly over this same period.

Figure 12: Licensed and Unlicensed Dispensaries in Los Angeles County, January 2018 to February 2019

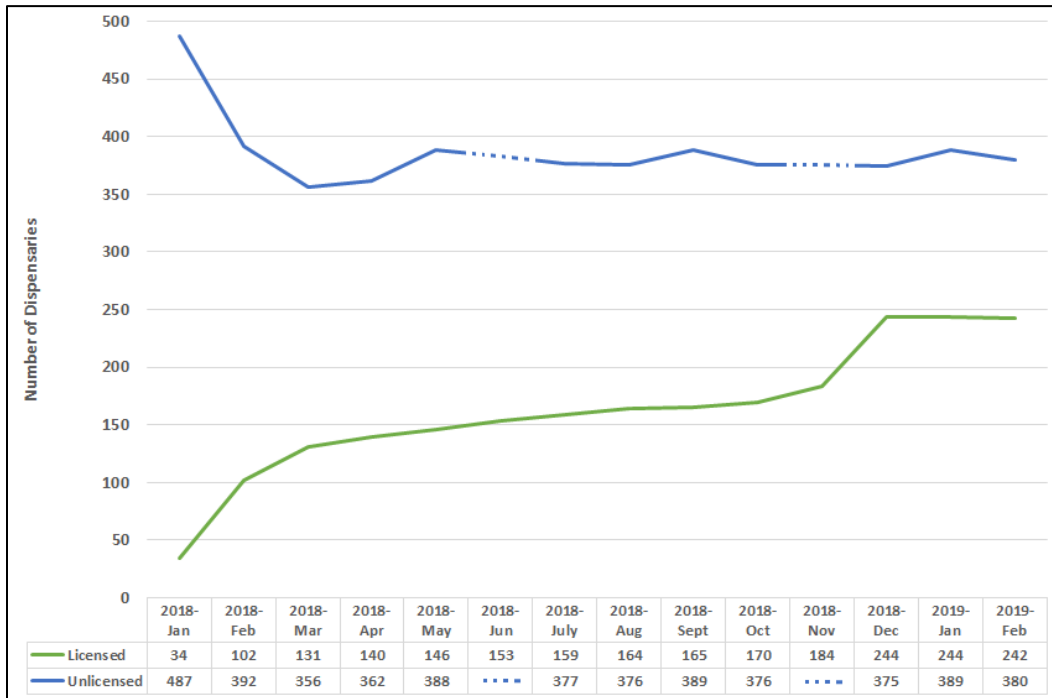
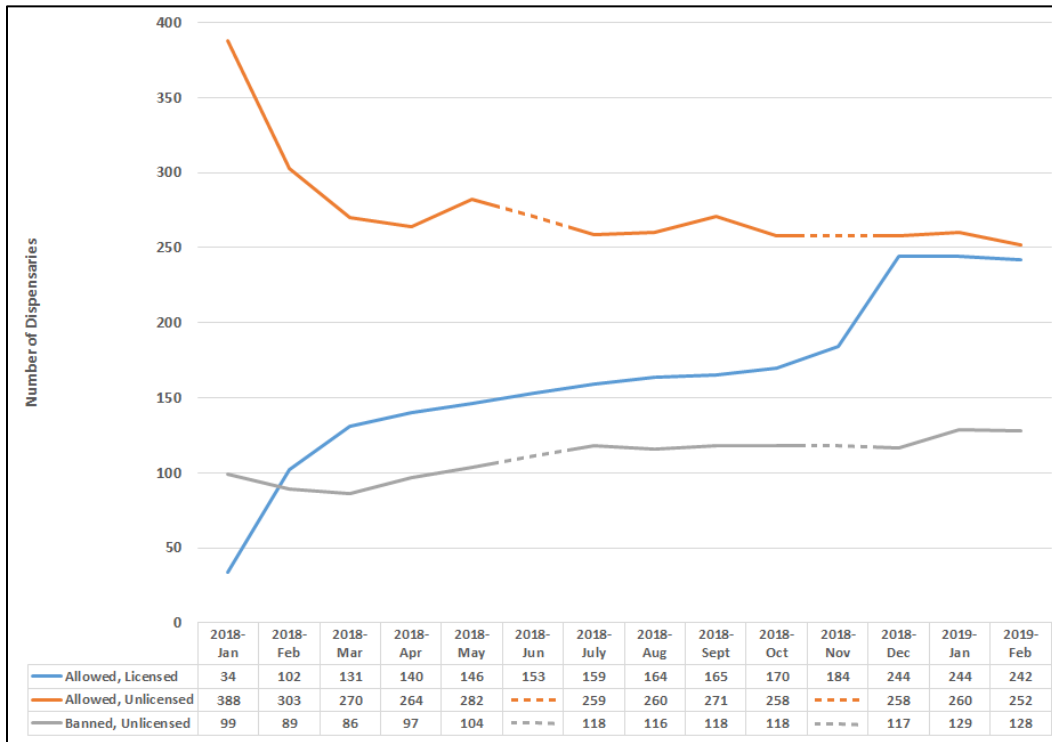


Figure 13: Licensed and Unlicensed Dispensaries in Los Angeles County, by Whether they are in an Area Currently Banning Dispensaries, January 2018 to February 2019



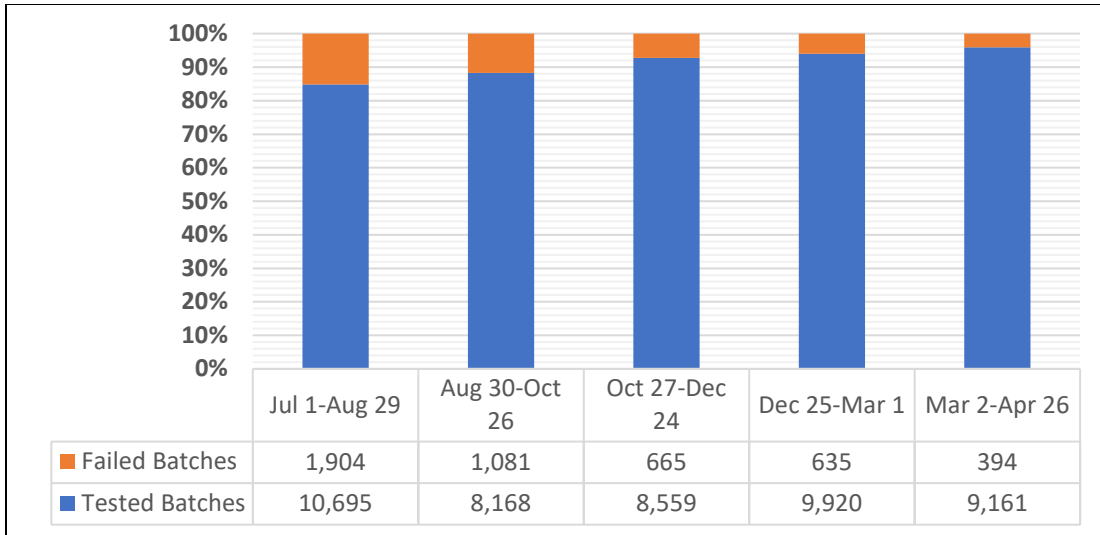
Note: Dotted lines indicate Weedmaps data was not available for June and November.

Sources for both figures: Weedmaps, California Bureau of Cannabis Control (BCC)

Trends in Cannabis Product Testing Results

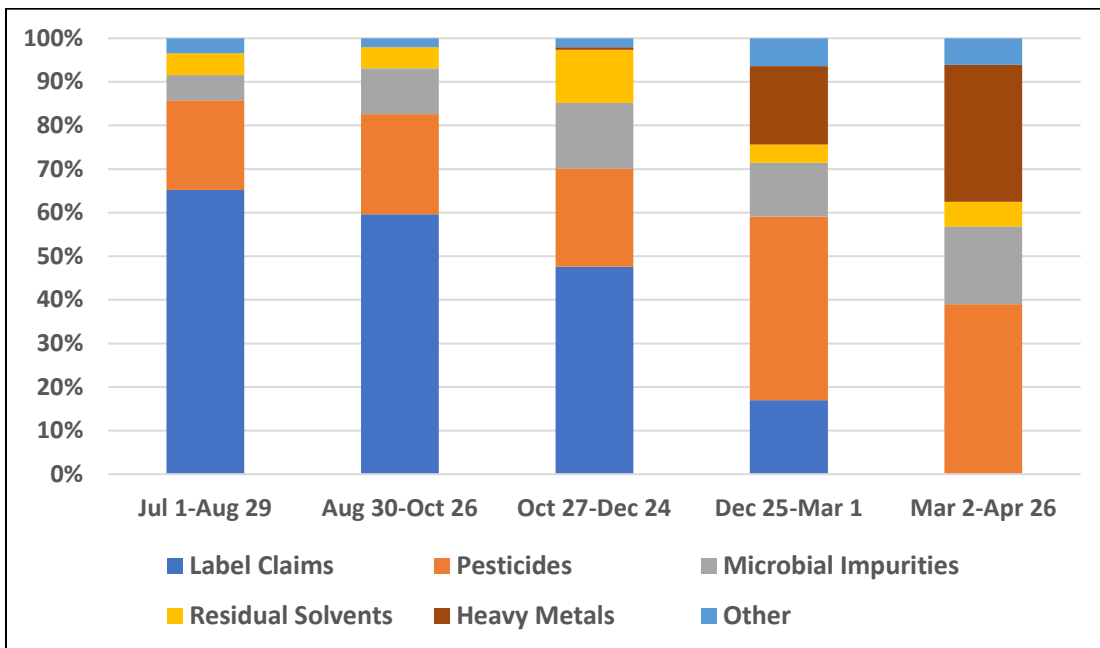
Figure 14 presents data on test results reported by state-licensed private labs. Reported test fail rates decreased considerably, from 18% in July/August 2018 (when testing began) to 4% in March/April 2019. The proportion of failures due to label claims (i.e., inaccurate labeling of THC/CBD content) declined to zero over this period (**Figure 15**). Thus, after an initial drop between July/August and September/October, the absolute number of failures due to pesticides remained relatively steady. Labs were not required to test for heavy metals until the end of December 2018, and both the number and proportion of failures due to heavy metals increased over the first four months of 2019.

Figure 14: Tested and Failed Cannabis Batches in California, July 2018 to April 2019



Source: California Bureau of Cannabis Control (BCC)

Figure 15: Reasons for Failure in Tested Cannabis Batches in California, July 2018 to April 2019



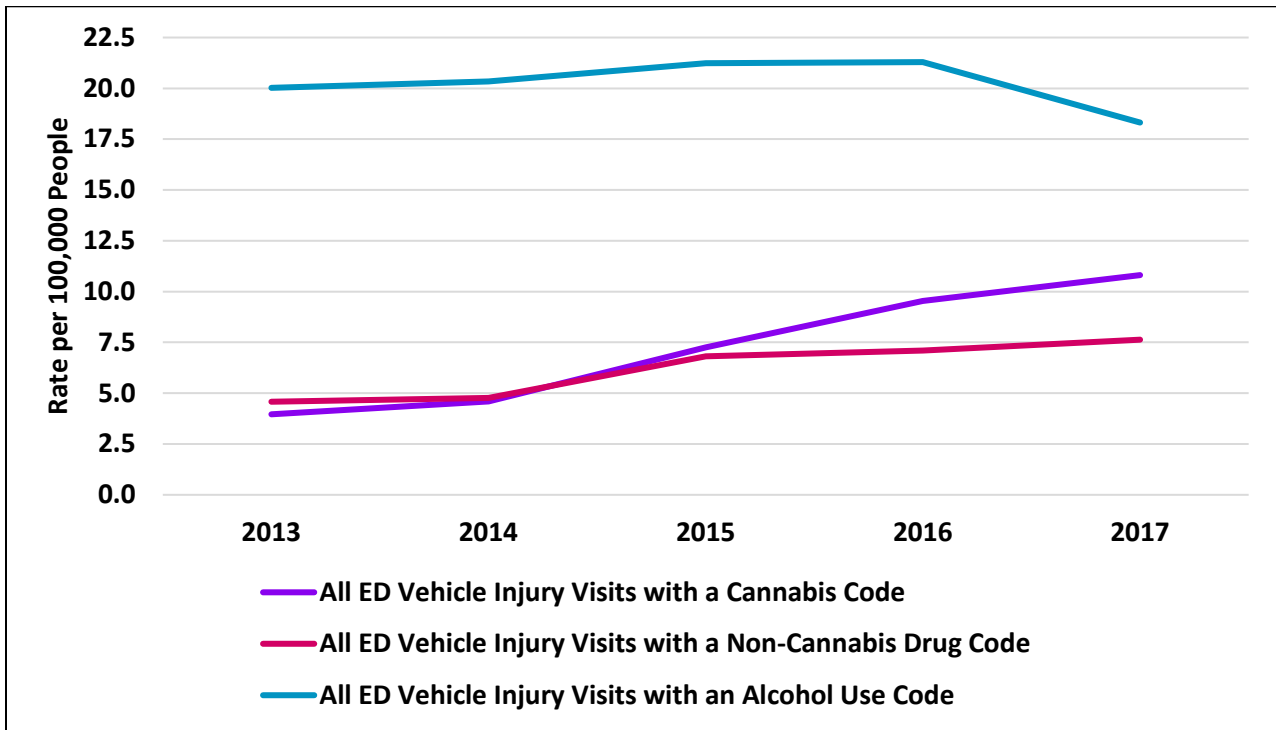
Source: California Bureau of Cannabis Control (BCC)

Trends in ED Visits for Cannabis-Involved Vehicle Injuries and in Cannabis-Related Arrests

We were unable to obtain police data on alcohol- and drug-related traffic stops or DUIs but, using ICD-9 and ICD-10 codes from OSHPD, we examined trends in cannabis-related ED visits that also involved a motor vehicle injury. **Figure 16** compares trends in motor vehicle injury-related ED visits with cannabis, other drug, and alcohol-related ICD codes.* Rates of alcohol-related vehicle injury visits are considerably higher than those for cannabis and other drugs across all years. From 2013 to 2015, the trends for cannabis and other drugs are similar, but in 2016 and 2017, rates of vehicle injury ED visits involving cannabis became greater than those involving other drugs. It is important to note that the underlying population rates for all these trends are relatively low.

Figure 17 puts the rates of cannabis-related vehicle injury ED visits in perspective by comparing them to the overall rates of cannabis-related ED visits presented earlier in **Figure 4**. Vehicle injuries were involved in only 2.5% of cannabis-related ED visits in 2013 and increased to only 3.2% of cannabis related ED visits in 2017. As mentioned earlier, the most common cannabis-related ED visits from 2013-2017 involved episodes of anxiety and chest or abdominal pain.

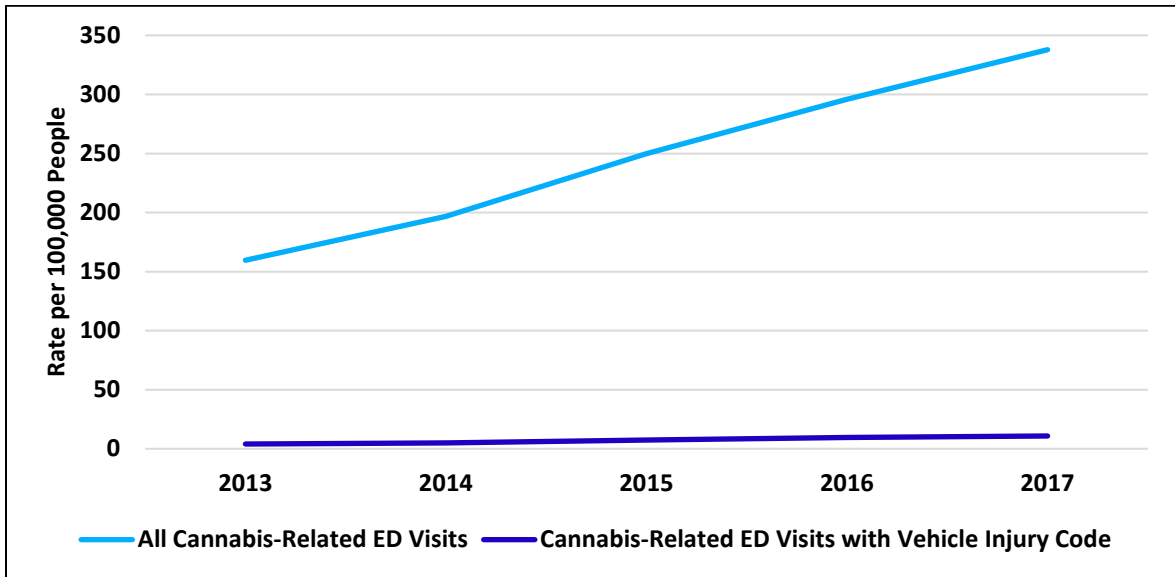
**Figure 16: Vehicle Injury-Related ED Visits with Cannabis, Other Drug, and Alcohol-Related Codes
Los Angeles County, 2013 to 2017**



Source: California Office of Statewide Health Planning and Development (OSHPD)

* The three categories are not mutually exclusive.

**Figure 17: All Cannabis-Related ED Visits and Cannabis-Related ED Visits with a Vehicle Injury Code
Los Angeles County, 2013 to 2017**



Source: California Office of Statewide Health Planning and Development (OSHPD)

The only cannabis-related law enforcement data available for analysis were LA County Sheriff's Department arrests for cannabis possession, possession for sale, possession for sale or transport, and cultivation. Trends in the absolute numbers of arrests for these crimes are presented in **Figure 18**. Possession arrests decreased by about 90% from 2,541 in 2014 to 245 in 2018. Arrests for the other offenses decreased as well but not quite as steeply. **Figure 19** shows trends in aggregate cannabis-related arrest rates by race/ethnicity. While the rates across groups and the absolute disparity in rates between Whites and African Americans and Whites and Latinx markedly decreased between 2014 and 2018, the relative disparity (i.e., % difference in rates) between these groups increased slightly.

Figure 18: Cannabis Arrests by Charge Type, LA County Sheriff's Department, 2014 to 2018

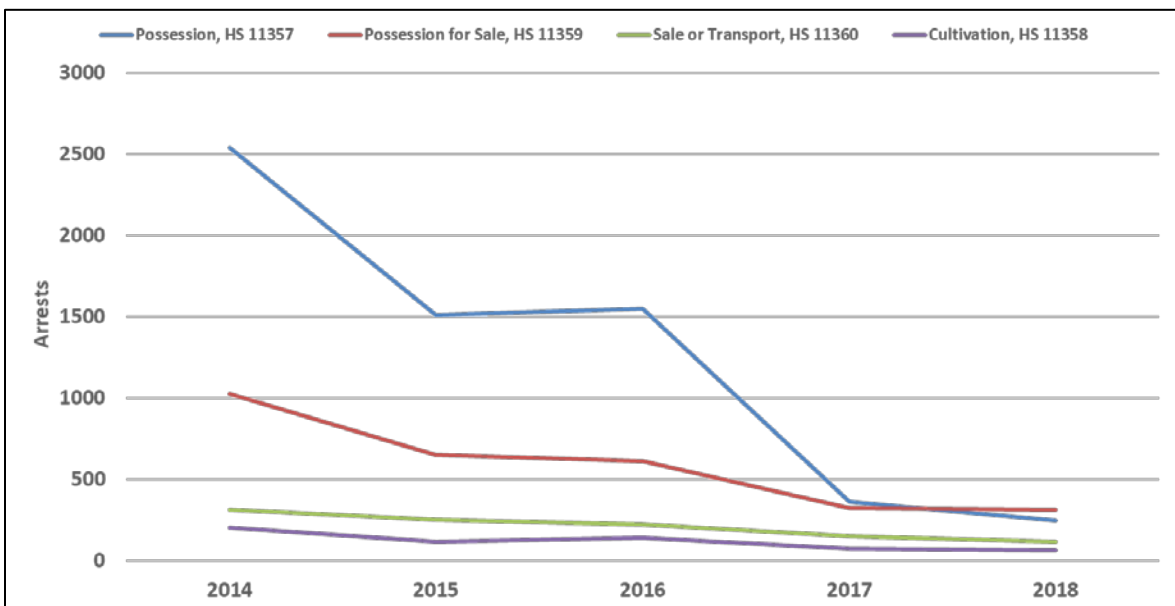
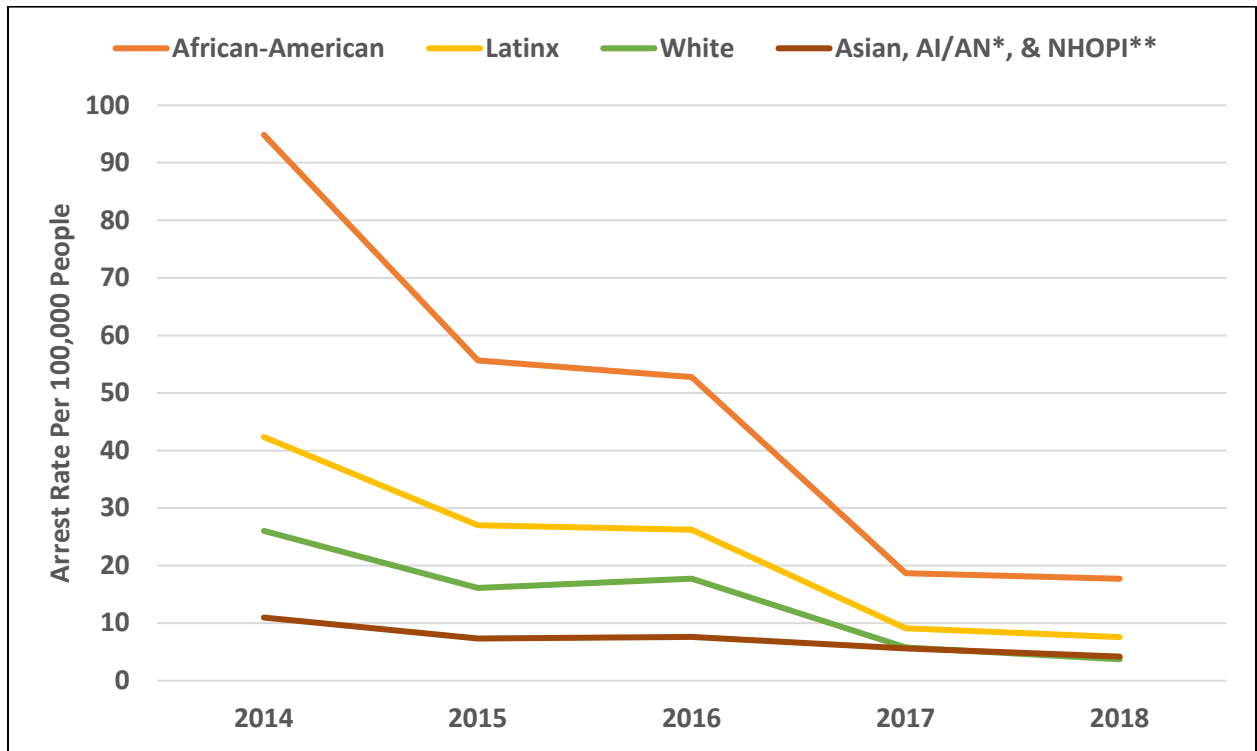


Figure 19: Cannabis Arrest Rates by Race/Ethnicity, LA County Sheriff's Department, 2014 to 2018



*AI/AN – American Indian/Alaska Native **NHOPI – Native Hawaiian or Other Pacific Islander
 Source for both figures: Los Angeles County Sheriff's Department

Focus Groups and Key Informant Interviews

Licensed cannabis operators were quite concerned about the number of unlicensed dispensaries still operating in LA County which, as noted in the previous section, impacted their viability due to unfair price competition. This concern was accompanied by frustration over perceived inaction on the part of local law enforcement. Some also perceived differential enforcement between cities and the county.

“All of those things [regulations] were supposed to delineate who’s legitimate, who’s not legitimate, so that the city could enforce. But that’s never happened. There’s no enforcement whatsoever against the illegal shops.” (Licensed Operator)

“So, I thought, come regulation, we were going to have these places shut down, and not only have they not shut down, but they’ve proliferated.” (Licensed Operator)

“All the illegal businesses are in LA County [unincorporated] and they’re not getting the [tax] money. [Name of incorporated city] is shutting them down because they want the [tax] money now. LA County is not doing anything so guess where the illegal businesses are going to run to? To LA County unincorporated.” (Licensed Operator)

Dispensary operators also offered some specific insights about how the July 1, 2018 deadline for transitioning to new product testing, labeling, and packaging regulations under Prop 64 may have helped sustain the unlicensed market.

“July 1st, all product that was currently in the system had to be destroyed or sold by then. So, all of the illegal people came in and bought half pounds at a time...they came in and bought us all out...everyone was having this massive liquidation sale, where stuff that would have sold for \$50 a half gram was now being sold for \$5 just to get it off the shelf...so they [the state] are really setting up the illegal markets.” (Licensed Operator)

“Now we’re dealing with pesticide-laden products that can’t make it into the regulated industry. They go directly to the illicit industry. So more than likely some of those products that couldn’t make it past the testing made it into their lungs.” (Licensed Operator)

Local cannabis regulators acknowledged that shutting down unlicensed operators was an ongoing challenge, but several noted that enforcement through police action was not necessarily the most effective solution:

“We contract our law enforcement...the Sheriff’s department, they’ve put together a task force where they work with us, with our code compliance staff, but I think that maybe it just doesn’t rise to a level of top priority in terms of enforcement.” (Cannabis Regulator)

“The police department is not as involved as in the past—now they just handle background investigations of cannabis businesses and in cases where things rise to a felony level, they get involved. But unless they rise to that level, we tend to not use the police department as much.” (Cannabis Regulator)

Representatives from a company that contracts with cities to perform their cannabis regulatory functions believed that enforcement through administrative penalties was more effective than police action. Several cities agreed and were already moving in this direction:

“That’s one of the biggest struggles that we have encountered with our government counterparts is that they want to continue to fix things the same way. I truly believe they’ll be more successful if they develop a sound regulatory process through administrative remedies instead of trying to arrest their way through this problem.” (Cannabis Regulator)

“We’ve had an issue with unlicensed cannabis facilities opening and recently got a new city attorney who, with our mayor...is very against unlicensed cannabis facilities, so they implemented an ordinance, so we can go in and cut off their water and power and fine them \$5k a day.” (Cannabis Regulator)

Despite their frustration with perceived government overregulation of the cannabis industry, all dispensary operators believed that government had an important role to play in ensuring product safety, and some recognized the added value of the local health department in providing an objective third-party check on the current private lab system:

“Well, they [the government] should be in charge - should help make sure that the product is safe for the consumer, and other than that, I don’t think government should be involved in much of anything else.” (Licensed Operator)

“I think there needs to be a third-party audit for labs. Right now, they are very much doing their own thing as far as the reference standards that they’re using, the calibration tools that they’re using, there is no third-party audit to standardized that...I think that needs to happen with the government, as far as lab and analytical practices, and their reference standards.” (Licensed Operator)

Local city regulators also welcomed the assistance of the LA County Department of Public Health (DPH) in helping to ensure product safety, and a temporary delay in the county’s cannabis health inspection permitting process left some regulators confused or disappointed. It should be noted that since these interviews were conducted, DPH has resumed work on its health inspection program for cannabis businesses and all the regulators quoted below are now working with DPH to implement the inspection program in their cities.

“We also want the county to be able to come in and do public health inspections at our facilities here in [name of incorporated city]. There are real concerns about consumer safety. I’ve talked to state agencies who are in the process of providing oversight to this industry and we really do need to rely on our county health agencies to protect the public and consumers and labor and work force who are going to be in these facilities.” (Licensed Operator)

“We hope that we’d be able to do a public health inspection as well. We thought we’d contract with county to do that, but we were recently told that the county will not be doing that, so that was very disappointing to us. Many cities have been relying on the county to do those because we don’t have people here to do public health inspections.” (Licensed Operator)

“We have a contract with the Department of Public Health for our eating establishments. I also heard that we were contacted by the LA County Health Department about setting up a separate contract for these inspections of cannabis businesses, but we don’t know where that is with the County Health Department at this point.” (Cannabis Regulator)

Concerns about CID were not frequently expressed in our key informant interviews or focus groups, although they came up occasionally in the resident focus groups.

“I would be concerned about driving under the influence. I think a lot of people, when they hear it’s legal, they just feel like it’s a free-for-all. I think it needs to be more publicly known that driving under the influence - it doesn’t matter if it’s alcohol or it’s marijuana, it’s still under the influence.” (Focus Group Participant)

“We can talk about driving under the influence...we’ll be experiencing more accidents because people, unless they take Uber to go buy their weed--but I doubt it--they’re going to get in their car just like they get in their car to go buy alcohol, whether they’re high on it a little bit or not.” (Focus Group Participant)

Summary

California has had a loosely regulated medicinal cannabis market far longer than any other state prior to the legalization of adult use. This has likely amplified the staying power of the unlicensed market as California transitions to a new state licensing system. In LA County cities that agreed to allow licensed dispensaries beginning in 2018, the number of unlicensed dispensaries advertising on Weedmaps decreased considerably during the first months after the state began issuing licenses. Areas of the county that did not allow licensed dispensaries did not see similar decreases in unlicensed dispensaries. In fact, the total number of unlicensed dispensaries in those areas increased in 2018. In cities allowing licensed dispensaries, the initial decrease in unlicensed dispensaries plateaued at around the time that new product testing rules went into effect. As a result of these new rules, a surplus of cannabis products no longer sellable in the legal market was diverted to unlicensed dispensaries, and this may have contributed to the persistence of the plateau through the end of 2018.

It remains to be seen whether the expected doubling of licensed dispensaries in the city of LA by the end of 2020 will have a further dampening effect on the unlicensed market and whether increases in both administrative and criminal penalties that began in 2019 will have a similar effect. The question also remains as to whether allowing licensed dispensaries in LA County's unincorporated areas and other jurisdictions in 2018 would have led to a similar decrease in unlicensed dispensaries in those areas. Monthly trends in the number of licensed and unlicensed dispensaries in areas with and without bans on licensed dispensaries (**Figure 13**) suggest that local cannabis licensing ordinances may exert some pressure on the unlicensed market.

From an equity perspective, fostering a viable legal cannabis market through carefully crafted local ordinances coupled with strong administrative penalties for unlicensed operators may be preferable to a criminal justice approach focused on arresting and charging unlicensed operators with misdemeanor and/or felony crimes. Some of these unlicensed operators may otherwise be eligible for the city of LA's social equity program designed to allow those most impacted by the war on drugs to profit from the newly legal cannabis industry. Having a recent criminal record would diminish their chances of benefiting from a program specifically designed to help them.

The fact that unlicensed dispensaries sell products with disregard to new state testing requirements suggests that their products are more likely to be tainted with harmful contaminants including pesticides. While this HIA's analyses of cannabis-related ED visits indicate that these visits are more prevalent in areas with higher concentrations of cannabis dispensaries, licensed versus unlicensed dispensaries cannot be compared until 2018 OSHPD data is obtained later in 2019. A stronger relationship between ED visits and unlicensed dispensaries could suggest a higher risk associated with products sold by the latter. Meanwhile, until cannabis testing standards and technologies are as reliable as those for traditional pharmaceuticals, even products in licensed dispensaries may have inaccurate dosage information and may contain unsafe levels of pesticides or other contaminants.

Finally, with regard to CID, LA County ED visit data indicates that the proportion of cannabis-related ED visits involving vehicle injuries is quite small, increasing from just 2.5% to 3.2% from 2013 to 2017. While cannabis may be underreported in these ED data, the overall increase in cannabis-related ED visits was considerably greater, in absolute and relative terms, than the increase among the subset of those visits involving vehicle injuries. While continued monitoring of these trends is important, they suggest that, thus far, vehicle injuries are not a major public health threat associated with the legalization of cannabis in LA County.

Research Question #4—How could [cannabis taxation](#) impact equity in the distribution of cannabis-related SDOH and health outcomes in unincorporated LA County and other LA County jurisdictions?

Literature Review

Local elected officials have many options for how to allocate cannabis tax revenues and must consider issues ranging from the desired level of specificity (e.g., general fund vs. targeted program) to departmental priorities (e.g., law enforcement vs. human services) when making allocation decisions. However, given the focus of this HIA on health equity and that people who begin using cannabis during adolescence are more likely to experience negative health consequences of use later in life,⁶² this review is designed to inform local decision makers specifically interested in using cannabis tax revenues (including state tax revenues funneled to localities) to help prevent, delay, or reduce use among youth. The literature review for this research question is narrowly focused on the evidence base for interventions designed to delay the onset and reduce the frequency of cannabis use among youth.

Screening, Brief Intervention, and Referral to Treatment (SBIRT) is a widely used evidence-based strategy for reducing the misuse of alcohol and illicit drugs.^{63,64} Designed for implementation in primary care settings, SBIRT consists of universal and standardized screening of patients for risky substance use behaviors, brief intervention via evidence-based motivational enhancement interviewing techniques for patients at risk, and referral to additional treatment for patients with indicated needs. SBIRT has been shown to reduce alcohol and drug use among risky users, although evidence of effectiveness is currently more robust for adult patients than adolescent patients. The most recent US Preventive Services Taskforce (USPSTF) review of this type of intervention among adolescents found insufficient evidence due to the relatively small number of rigorous studies available at the time.⁶⁵ However, 4 out of only 5 studies that met the review criteria and assessed marijuana use found statistically significant reductions in use among adolescents in the treatment group. One study measured initiation of use among non-users and found a significant intervention effect on prevention of initiation.⁶⁵ The USPSTF is currently conducting an updated evidence review of SBIRT for children, adolescents and young adults, which will be completed in 2020.⁶⁶

One of the biggest challenges in addressing substance use problems among adolescents is that they rarely seek treatment on their own. Less than 10% of youth in need of substance abuse treatment receive it, largely due to the perception that they don't need it. Once they finally seek treatment, the problem is typically more acute.⁶⁷ The advantage of SBIRT for adolescents in primary care is that it begins with universal screening and can be used both to help delay initiation of use and reduce use before it becomes problematic. However, fewer than half of adolescents receive an annual well visit with a primary care provider.⁶⁸

To reach youth more effectively, drug use prevention interventions have also been developed and implemented in community-wide and school-specific settings. Community-wide interventions engage residents in community-led coalitions that identify local needs and select and implement evidence-based interventions tailored to address those needs. By promoting positive youth development across multiple social settings, these community-wide interventions address individual behaviors in the context of broader social determinants of health. A recent systematic review and meta-analysis of community-wide interventions to reduce harms from alcohol and drug use found evidence of small reductions in risky

alcohol use but no significant reductions in use of marijuana and other drugs or in motor vehicle crashes, hospital admissions, arrests, or assaults.⁶⁹ The longest running and most studied example of a community-wide intervention in the U.S., Communities that Care (CTC), was implemented in 24 communities across seven states and has tracked a cohort of fifth graders as part of the Community Youth Development Study.⁷⁰ While early results found no significant effects on drug use initiation after two years of implementation,⁵ CTC showed sustained effects on reductions in and abstinence from anti-social behaviors, and cigarette, alcohol, and cannabis use through high school and beyond.^{6,71}

School-based drug prevention interventions saw an increase in the 1980s with the rise of Student Assistance Programs (SAPs), modeled after Employee Assistance Programs (EAPs), to address barriers to student learning through coordinated, school-based support services.⁷² While SAPs began with a focus on substance abuse, they have since expanded to address a wide variety of barriers to learning, including mental health, gender identity, teen pregnancy, and trauma. While SAPs vary greatly in their content and scope, their widespread presence on school campuses provides a potential home for interventions designed to delay initiation and reduce use of alcohol and drugs, including cannabis, among youth.

Given emerging evidence of the effectiveness of SBIRT among youth in clinical settings, some schools have adopted SBIRT in hopes of reaching youth in the setting where they spend most of their time.⁷³ SBIRT significantly decreased binge drinking and drug use in 13 New Mexico high schools⁷⁴ and significantly reduced alcohol use in Cherokee Nation high schools.⁷⁵ A limitation of these efforts is that they all took advantage of school-based health centers (SBHC) as the mode of delivery for the intervention, and while the number of SBHCs in the U.S. has more than doubled in the last 20 years, a very small percentage of secondary schools in the U.S. have SBHCs.⁷⁶ A community coalition in southeastern Wisconsin identified 10 high schools without SBHCs that agreed to test an SBIRT implementation plan using trained, ethnically and gender diverse seniors in a Bachelor of Social Work program under the supervision of a professional clinician. An initial feasibility study showed that SBIRT reached almost all 9th and 10th graders in participating schools, that students were highly satisfied with the program, and that students expressed a high level of trust in the health educators and in the confidentiality of their disclosures. Students also indicated substantial intentions to delay or reduce substance use following SBIRT.⁷⁷

Finally, in light of heightened concern about youth cannabis use post-Proposition 64, it is important to note that the best evidence to date of SBIRT effects in school settings has been specific to alcohol use. A meta-analysis of SBIRT interventions among youth found that those that target only alcohol use did not have secondary effects on illicit drug use or tobacco use.^{78,79} A cannabis-specific intervention developed in Washington State, called the Teen Marijuana Check-Up (TMCU), targets secondary school students at risk for CUD with an implementation strategy designed to attract youth who do not believe their use is treatment-worthy.⁷ A series of controlled trials has shown that the TMCU elicits high levels of self-referral among cannabis-using youth at risk of CUD, and reduces their cannabis use for up to 15 months, although the specific effect and durability of Motivational Enhancement Therapy (MET) as a program component has not been established.^{8,80} The Washington State Institute for Public Policy has classified TCMU as an evidence-based intervention. A randomized trial currently in progress is comparing school-based TMCU implementation via different technical assistance models to determine the cost-effectiveness of each approach.⁹

Secondary Data Analyses

The quantitative analyses for this research question began with a comparative assessment of cannabis taxation among the ten LA County cities that allow licensed retail dispensaries in their jurisdictions. Given the differential taxation of adult and medicinal use, trend data on participation in the California MMID program is also presented. Finally, to augment the literature review of interventions for preventing and reducing cannabis use among youth, we present results of our analyses of the California Healthy Kids Survey (CHKS), including trends in cannabis perceptions and use among youth and associations between youth use and aspects of positive youth development found in some of the interventions reviewed.

Cannabis Taxation in LA County

Tables 5 and 6 compare cannabis tax rates for adult use and medicinal use in the 10 cities that currently allow dispensaries. All consumers are charged a 15% state excise tax, regardless of the city in which they live. Each city may then impose an additional local excise tax. In LA County, local cannabis excise taxes currently range from 0% to 10%. Cities may also choose to charge a lower excise tax for consumers with an MMID. Currently, only Los Angeles (10% vs. 5%) and Long Beach (8% vs. 6%) have different local excise tax rates for adult-use users versus medicinal users with an MMID. State (7.25%) and county (2.25%) sales taxes apply to all adult-use cannabis purchases. Cities may add an additional local sales tax, and in LA County, the local cannabis sales taxes range from 0% to 1%. By state law, users with an MMID are exempt from all cannabis sales taxes. Finally, cities may also choose to apply their discounted local excise tax rate to medicinal consumers who have a physician's recommendation but do not have a state-issued MMID. In Long Beach and Los Angeles, medicinal users with a physician's recommendation but no MMID pay less tax than adult-use users but more tax than medicinal users with an MMID (**Figure 20**).

City Name	Total Taxes	Local Taxes		County Taxes	State Taxes	
		Excise	Sales	Sales	Excise	Sales
Bellflower	29.5%	5%*	0%	2.25%	15%	7.25%
Culver City	25%	0%	0.5%			
Huntington Park	25.25%	0%	0.75%			
Long Beach	33.5%	8%	1%			
Los Angeles	34.5%	10%	0%			
Malibu	27%	2.5%	0%			
Maywood	34.5%	10%	0%			
Pasadena	28.5%	4%	0%			
Santa Monica	25.5%	0%	1%			
West Hollywood	24.5%	0%	0%			

*Bellflower excise tax increases to 7.5% in 2020 and 10% in 2021

Sources: City Municipal Codes and Ballot Measures

Table 6: Tax Regimen for Cannabis Retail Sales—MMID Card Holder

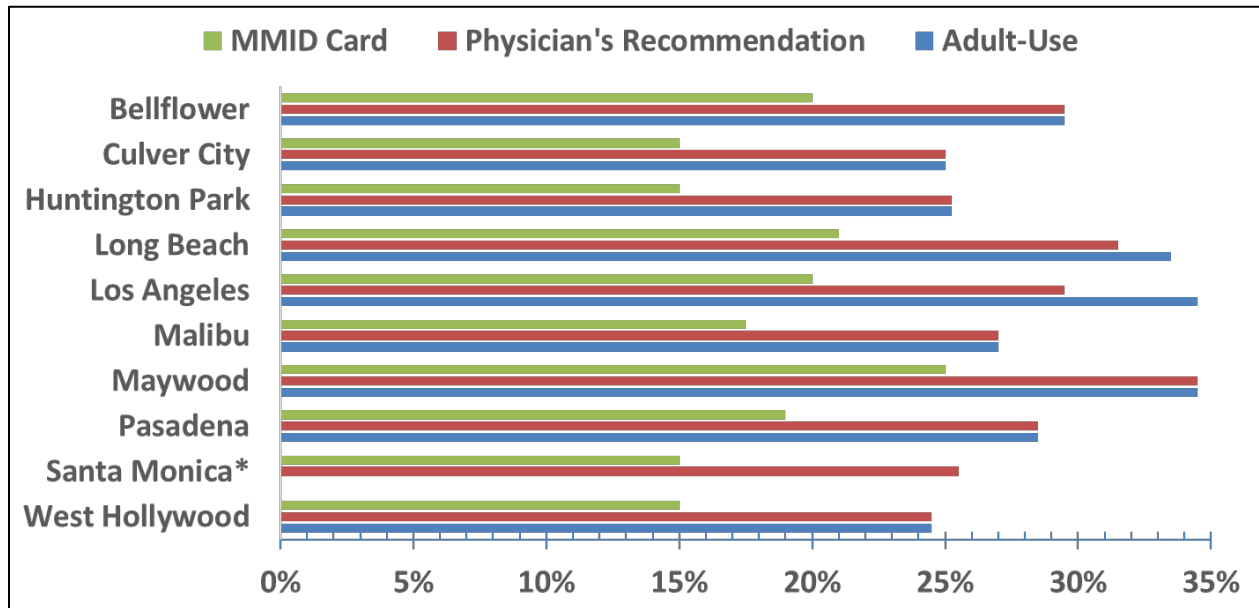
City Name	Total Taxes	Local Taxes		County Taxes	State Taxes	
		Excise	Sales	Sales	Excise	Sales
Bellflower	20%	5%*	0%	0%	15%	0%
Culver City	15%	0%				
Huntington Park	15%	0%				
Long Beach	21%	6%				
Los Angeles	20%	5%				
Malibu	17.5%	2.5%				
Maywood	25%	10%				
Pasadena	19%	4%				
Santa Monica	15%	0%				
West Hollywood	15%	0%				

*Bellflower excise tax increases to 7.5% in 2020 and 10% in 2021

Sources: City Municipal Codes and Ballot Measures

Figure 20 compares total cannabis tax rates across LA County cities by user type. Total tax for adult users ranges from 24.5% in West Hollywood to 34.5% in Los Angeles and Maywood. For MMID card holders, total tax ranges from 15% in West Hollywood, Santa Monica, Culver City and Huntington Park to 25% in Maywood.

Figure 20: Retail Cannabis Tax Rates by Consumer Type and City, Los Angeles County, 2018



*Santa Monica currently does not allow for the sale of adult-use cannabis

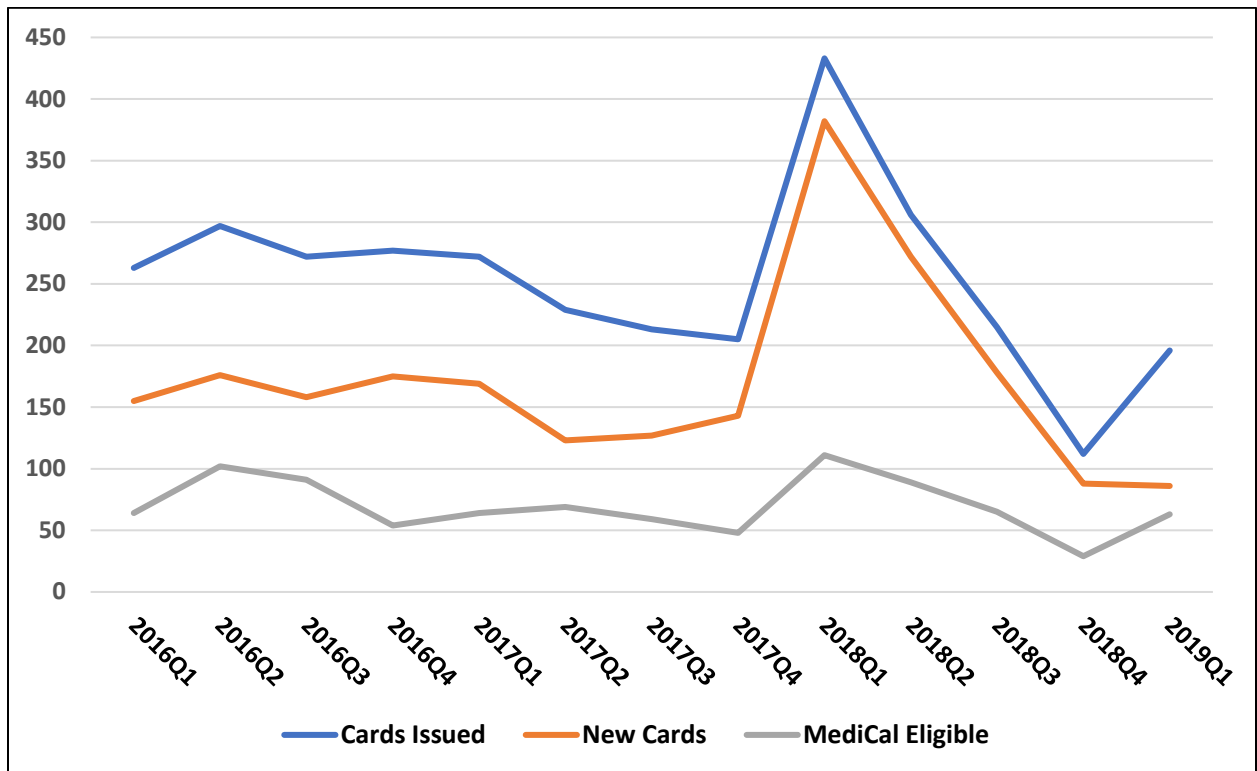
Sources: City Municipal Codes and Ballot Measures

At this point, all cities are allocating their cannabis tax revenues to their general funds, which can be spent on a variety of city services, including parks, libraries, law enforcement, fire departments, street maintenance, etc.

California Medical Marijuana ID Card Program Participation

Figure 21 shows trends in MMID card program participation by quarter from 2016 through the first quarter of 2019. Overall participation has been relatively low, with an average of about 250 cards issued per quarter in a county where almost one million adults reported using cannabis at least once in the past year.⁸¹ There was a sharp peak in the number of cards issued in the first quarter of 2018, as the new retail market was just beginning to open. This peak, and the additional cards issued through the rest of 2018, were overwhelmingly for new cardholders rather than people renewing cards. This suggests that many previous card holders decided not to renew their cards once adult use sales became legal, but that a new group of cannabis users who did not previously have MMID cards decided to take advantage of the program at the same time. Given that a medical recommendation is no longer required to purchase cannabis, these new card holders may be more likely to perceive of themselves as strictly medicinal cannabis users. It is also possible that they are particularly attuned to the tax savings offered to MMID holders, although the proportion of cardholders who were Medi-Cal eligible did not increase in 2018 as compared to 2016-2017. Data from early 2019 suggests that some portion of the people who applied for the first time in 2018 began to renew their cards in 2019, but new applications have diminished since the initial surge in early 2018.

Figure 21: Total and New Medical Marijuana ID (MMID) Cards Issued in Los Angeles County by Quarter, January 2016 to March 2019



Source: California Medical Marijuana ID Card Program

Analysis of Student and School-Level Predictors of Youth Cannabis Use (California Healthy Kids Survey)

Table 7 shows trends in past 30-day cannabis use by gender, grade, race/ethnicity, and parents’ highest education level. Use decreased over time for males and females except for a slight increase in 2017/18, and use was higher for males than females across years. Use increased by grade level across all years, with the largest proportional increase occurring between 7th and 9th grades. Use decreased over time across all grades except for a slight increase in 2017/18. Annual trends in use varied slightly across racial/ethnic groups, with Latinx and African Americans reporting the most consistent decreases in use. Use among Asian students was much lower than any group across years and use among white students was lower than among African American and Latinx students until 2017/18 when it was slightly higher. Students’ cannabis use decreased as their parents’ highest education level increased. Use decreased slightly over time across education groups except for a slight increase in 2017/18.

Table 7: Percent of Students Who Reported Using Marijuana in the Past 30 Days					
SCHOOL YEAR	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
	Percent	Percent	Percent	Percent	Percent
GENDER					
Male	14.9	12.9	11.3	9.8	10.3
Female	12.0	10.8	10.1	8.9	9.3
GRADE					
7 th	5.6	5.1	3.5	3.3	3.6
9 th	14.0	13.1	11.3	9.6	10.2
11 th	21.4	19.1	18.4	16.2	16.6
RACE/ETHNICITY					
Latinx	15.2	13.1	11.8	10.3	10.7
Native American	18.1	18.4	13.0	12.1	13.3
Asian	4.7	3.3	3.3	3.6	3.1
African American	16.7	14.0	12.0	12.1	10.2
Hawaiian/Pacific Islander	12.2	12.2	12.2	8.1	9.5
White	11.8	10.0	10.4	8.4	10.8
Mixed (two or more) races	12.5	12.4	9.7	8.7	9.5
PARENTS’ EDUCATION					
Did not finish high school	20.2	16.9	15.8	14.5	14.7
High school graduate	16.6	14.4	12.2	11.0	11.9
Some college	15.3	13.3	12.5	10.1	11.4
College graduate	10.1	8.9	8.5	7.2	8.0

Source: California Healthy Kids Survey (CHKS)

Table 8 shows trends in the percent of students who perceived that occasional cannabis use causes moderate or great harm, by gender, grade, race/ethnicity, and parents’ highest education level. Males reported lower perceptions of harm than females across all years and their perceptions of harm decreased slightly over time, while females’ perceptions of harm did not change over time. While perceived harm decreased with grade level, in contrast to past 30-day use, the largest proportional decrease in perceived harm occurred between 9th and 11th grades. Perceptions of harm did not change over time except among 9th graders, whose perceptions of harm decreased slightly. Trends in perceptions of harm varied slightly by race/ethnicity. Across years, Asian students had the highest perceptions of harm, followed by white students. Perceptions of harm increased with parents’ level of education for each year but did not vary systematically over time.

Table 8: Percent of Students Who Reported Great or Moderate Harm Done by Occasional Use of Marijuana					
SCHOOL YEAR	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
	Percent	Percent	Percent	Percent	Percent
GENDER					
Male	58.6	57.7	58.0	56.3	56.4
Female	62.3	61.6	62.4	60.2	61.5
GRADE					
7 th	63.4	61.1	64.1	60.0	61.9
9 th	64.4	62.6	62.3	61.1	60.3
11 th	53.0	54.4	53.3	53.1	54.0
RACE/ETHNICITY					
Latinx	58.4	58.7	59.0	56.9	57.3
Native American	60.9	57.0	52.8	54.0	53.7
Asian	75.3	72.9	73.1	68.7	72.4
African American	57.9	53.3	54.0	50.7	52.5
Hawaiian/Pacific Islander	64.5	68.7	64.4	62.6	62.5
White	61.3	59.3	61.0	60.7	59.7
Mixed (two or more) races	59.0	56.6	59.1	56.9	58.8
PARENTS’ EDUCATION					
Did not finish high school	56.5	57.7	57.0	56.1	56.4
High school graduate	57.9	57.7	58.0	56.6	56.4
Some college	58.6	60.1	59.5	57.9	58.0
College graduate	65.3	63.5	64.5	61.9	63.5

Source: California Healthy Kids Survey (CHKS)

Table 9 shows trends in the percent of students who perceived that it is fairly or very difficult for students in their grade to get cannabis if they really want to. Males reported higher access difficulty than females across all years, and access difficulty increased over time for males and females except for a slight decrease in difficulty in 2017/18. Access difficulty decreased with grade level but, as with use, the largest proportional decrease occurred between 7th and 9th grade. Access difficulty increased slightly over time across grades except in 2017/18 when it dipped slightly. Asian students reported the highest access difficulty across years, followed by white students. There were no notable trends over time for any racial/ethnic group. Students with parents who graduated from college reported higher access difficulty than other students but there were no notable differences in access among other education groups. All parental education groups, except those who did not finish high school, reported increases in access difficulty over time, followed by a slight decrease in difficulty in 2017/18.

SCHOOL YEAR	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
	Percent	Percent	Percent	Percent	Percent
GENDER					
Male	21.4	22.3	23.1	25.2	24.1
Female	18.4	19.6	19.9	21.6	20.3
GRADE					
7 th	30.5	31.2	33.0	35.1	34.3
9 th	18.1	17.7	18.3	19.9	18.7
11 th	11.3	12.1	12.2	13.5	12.2
RACE/ETHNICITY					
Latinx	17.8	19.6	19.7	21.3	20.8
Native American	28.5	23.9	28.3	29.9	27.2
Asian	28.4	28.1	32.1	32.0	30.3
African American	18.9	19.2	19.4	19.8	19.6
Hawaiian/Pacific Islander	23.3	23.1	25.5	24.7	28.3
White	21.4	22.6	22.3	26.2	22.0
Mixed (two or more) races	22.6	22.0	23.8	25.8	24.7
PARENTS' EDUCATION					
Did not finish high school	16.2	18.8	18.1	18.8	18.9
High school graduate	18.7	19.3	19.5	21.0	20.4
Some college	17.0	18.2	19.2	21.7	19.1
College graduate	22.0	22.9	24.1	26.9	24.4

Source: California Healthy Kids Survey (CHKS)

The California Healthy Kids Survey includes a composite “school environment” measure consisting of three subdomains: 1) caring adults in school, 2) motivating adults in school, and 3) meaningful participation at school. These school environment domains overlap with the domains of positive youth development and the principles of motivational interviewing, all of which are integral to the school and community-based youth drug use prevention interventions reviewed above. To explore the relationship between school environment and cannabis use, while also accounting for the sociodemographic factors included in the descriptive tables above, multilevel logistic regression models were run to predict whether students had used cannabis in the past 30 days. Multilevel models are often used in the analysis of student survey data since they allow for the simultaneous examination of the effects of individual student-level characteristics and school-level characteristics. Furthermore, since students in the same school may be more similar than students in different schools, multilevel models allow for the examination of independent student-level characteristics while controlling for the clustering of students within schools.

In addition to gender, grade, race/ethnicity, sexual orientation, gender identity and parental education, student-level predictors included whether English was the primary language spoken at home, and whether the student was receiving free or reduced-price meals (FRPM) at school. School-level predictors included the percent of FRPM-eligible students enrolled, the number of dispensaries per square mile in the school’s census tract, and whether the school was in an unincorporated area of LA County. The analysis was restricted to data from the 2017/18 school year, i.e., before the new cannabis dispensary licensing process was fully implemented, so January 2018 Weedmaps data was used for the dispensary density variable. Thus, it was not possible to differentiate between licensed versus unlicensed dispensaries in this analysis.

Independent of the other variables in the model, school environment was a significant predictor of cannabis use (**Table 10**). The odds of a student having used cannabis in the past 30 days were 38% lower for each unit by which the student’s school environment score exceeded the school’s average score (school environment scores, centered at their school means, ranged from -2.0 to 1.8). Each racial/ethnic category included in the model was compared to white students and the only groups that differed significantly from Whites were Asians, whose odds of using cannabis were 60% less, and Native Americans, who odds of using cannabis were 68% more than whites. Females had 12% lower odds of using cannabis compared with males. Students who identified as straight had 30% lower odds of using cannabis than did those who identified as lesbian, gay, bisexual, unsure, something else, or declined to respond. Students who identified as cisgender had 40% lower odds of using cannabis than did those who identified as transgender, were not sure, or declined to respond. Students who spoke mostly English at home had 10% greater odds of using cannabis than did those who did not speak mostly English at home. The odds of using cannabis increased significantly with grade level and decreased significantly as parental education increased. The only significant school-level predictor was the percent of FRPM-eligible students. The odds of students using cannabis increased as the percent of students eligible for FRPM in their school increased relative to the mean percent of FRPM-eligible students across all schools. Notably, the density of cannabis dispensaries in a school’s census tract was not a significant predictor of cannabis use.

Table 10: Multilevel Logistic Regression Student and School-Level Predictors of Student Use of Cannabis in the Past 30 Days		
Variable Name	Odds Ratio	95% CI
Student-Level Predictors [†]		
School Environment Score	.62****	(0.6, 0.64)
Free/Reduced Price Meals	.983	(0.924, 1.047)
Parent’s Education Level	.881****	(0.859, 0.904)
English Spoken at Home	1.096***	(1.039, 1.156)
Grade in School	1.269****	(1.24, 1.298)
Female	.885****	(0.845, 0.927)
Straight	.707****	(.665, .752)
Cisgender	.603****	(.558, .652)
Latinx	1.053	(0.969, 1.143)
African American	.983	(0.868, 1.114)
Asian	.399****	(0.345, 0.461)
Native American	1.681****	(1.278, 2.211)
Hawaiian/Pacific Islander	1.167	(0.916, 1.485)
Mixed (two or more) Races	1.044	(0.943, 1.156)
School-Level Predictors		
% Students w/Free/Reduced Price Meals	2.165**	(1.24, 3.78)
Unincorporated Area	.692	(0.455, 1.052)
# Dispensaries per Sq. Mi. in Tract	1.002	(0.832, 1.208)
*p<.05; **p<.01; ***p<.001; ****p<.0001		
[†] Female and FRPM had enough missing values to warrant imputing missing values and including “missing” terms in the model, but these terms are not included in the table.		

Sources: California Healthy Kids Survey (CHKS), California Bureau of Cannabis Control (BCC), Weedmaps

Focus Groups and Key Informant Interviews

Qualitative findings for this research question are divided into two sections. First, findings are presented on the differential taxation of adult-use versus medicinal cannabis, followed by findings on the spending of cannabis tax revenues.

Taxation of Adult Use Versus Medicinal Cannabis

While all dispensary operators were aware of the differential tax rates between adult use and medicinal use cannabis products, most reported that very few customers were opting to renew or obtain new medical recommendations or MMIDs because the latter were no longer required, and getting them was either an inconvenience, not worth the expense, or deprived customers of certain rights.

“It’s a decrease only because there is no need to renew, so they’re just naturally transforming over to the adult use market, so the need to get a doctor’s recommendation isn’t there anymore... and the sales tax for most people isn’t going to be that significant with each purchase but going to a doctor and applying for a state rec is very costly.” (Licensed Operator)

“...it’s a little more convenient not to pay for a doctor’s recommendation when they can just show their ID, walk in, and not have to go through the formalities of showing your recommendation, updating that recommendation annually.” (Licensed Operator)

“If you’re a registered marijuana user [with the state], you’re giving up your right to bear arms. Constitutional rights. I’m not going to give up a constitutional right for a 9.5% discount. People stopped even caring about that sales tax reduction.” (Licensed Operator)

“And now, I come to find that a lot of these people that followed that advice [to get an MMID], and are law-abiding citizens of this great country, are now precluded from buying a firearm. Because they are on a list and that list has become federal information. So those people have admitted that they consume cannabis, and that is a reason to deny them the ability to buy a firearm.” (Licensed Operator)

One dispensary operator agreed that the process of getting an MMID was inconvenient but suggested a practical solution that would make it easier. Another operator went as far as to say that he encouraged his medical patients to get MMIDs.

“...if you have the county card, then you don’t have to pay sales tax so that’s an advantage for them but it’s still a big process so that’s something that should be changed. Right now, people have to go to LA County. They have to go to the doctor and then go to the county, pay \$100. If they could do it online, that would be great and a lot more people would have that state card.” (Licensed Operator)

“We encourage people to get that [MMID], especially medical patients who rely on this as a consistent form of therapy and medication, it’s very expensive for them, if you have the state card, you don’t pay as much in taxes.” (Licensed Operator)

Given that the sales tax exemption linked to the MMID program is designed to defray the costs of cannabis for people using it for medicinal purposes, we asked physician-supervised medicinal cannabis users and their physicians about their opinions of the program as well. Some patients were aware of the tax savings for MMID holders. They described the financial benefits of having the card but did not always feel comfortable getting one out of fear of potential negative consequences of being on a government list.

“The only reason that people get the card is for that 10% discount with the taxes. It’s purely financial. When we first started this, we got bottles of THC for \$25. And now the same brand, it’s \$168. Without tax, right? It’s financially crippling. We can’t even write it off as a medical expense. I don’t think anybody wants to be on this list—not to sound paranoid—but nobody wants to be on this list, especially with children. You never know, and our federal government is crazy. But the only reason is that there’s a financial incentive. Anyone that I know with children that’s gotten the card—that’s why.” (Physician-Supervised Cannabis Caregiver)

“The taxes are so confusing because I know there’s another tax waiver—if you sign up with LA County and enter your name as a medical user, you can get tax waived completely, but I feel on the fence about that because it’s not for myself but it’s for a minor. As a minor, it really scares me to register my name with the city that I’m giving my child this. What if they turn around and come after me?” (Physician-Supervised Cannabis Caregiver)

Other patients were unaware of or confused about tax savings for MMID holders, whether they currently had a card or not.

“I only got it just to make me feel better, at the time I just felt it won’t hurt for me to have that card...I’ve never needed it though, because the recommendation is enough, the doctor’s recommendation.” (Physician-Supervised Cannabis Caregiver)

“I don’t have a card. I have a piece of paper that says I’ve seen a doctor and it says that she has recommended cannabis to me...I don’t understand it that well. My understanding is it doesn’t really matter, as long as you’re 21...you have to show your ID and they look you up on the computer, and they let you in. I don’t know if the policies are different at different places. It [tax savings] hasn’t been true for me where I go.” (Physician-Supervised Cannabis Patient)

Physicians recommending cannabis for their patients expressed frustration at what they perceived as the cannabis industry’s disregard for tax regulation designed to lower the cost of cannabis for people using it exclusively for medical purposes.

“Patients are not yet understanding how the pricing is working...I’ve had medical patients say I walk in, I purchase something, and they say, ‘Oh this price has all the taxes rolled in,’ and the patient doesn’t get a breakdown of the taxes. I think there should be a sign when you walk in, ‘This is what the state tax is, this is what the sales and use tax is, this is what the city tax is, and medical patients, if you have your state ID card, you get a discount on this.’ It should just be posted, so that patients can see – or maybe even hand it to them when they make a purchase, this is the breakdown of what you’re getting. There’s no standardization from place to place...” (Physician)

“Most of my 70-year-old-plus patients can’t afford the taxes. They are really stretching their budget...and insurance won’t cover it. The 30% tax was intended for recreational users, not for medical users. [Does a doctor recommendation get you a tax discount?] It won’t at certain recreational dispensaries who just basically throw my recommendation out the window, which is a good portion of them. They make them go to the Public Health Department to get the actual card but let’s be serious, it costs money. You have to go to a certain location. There is a lot of work involved in it...and most people want that privacy aspect. They don’t want to be on a list with the state.” (Physician)

Allocation of Cannabis Tax Revenues

Except for local cannabis regulators, who were asked for factual details regarding their cities' cannabis tax policies and regulations, all key informants and focus group participants were asked for their opinions about how cannabis tax revenues should be spent. Dispensary operators most often suggested spending on enforcement efforts to shut down unlicensed operators. They also suggested education to normalize cannabis use among the public, and efforts to clear criminal records of past cannabis offenses and help communities most impacted by the war on drugs.

"...The biggest thing is enforcement against illegal shops because there are so many in LA, it's ridiculous. That's probably the single best thing they can do." (Licensed Operator)

"I think it's a combination of one, the public education to more normalize the plant of cannabis within society, basically it combats reefer madness... another is for schools, and then on top of it, some type of enforcement on illegal operators, on the illicit market..." (Licensed Operator)

"I think we really need to put that back into education. We need to put that back into health services...and they need to make sure people are able to clear their past history with cannabis...marijuana convictions and stuff like that." (Licensed Operator)

"What's the county going to do to make sure some of the tax money goes back to the communities that have been negatively impacted? It should go back into the community for homelessness. I've been a partner for homeless ministry at my church for 15 years..." (Licensed Operator)

Medicinal cannabis patients most often suggested tax spending on research to better understand the health benefits of cannabis and on testing to ensure product safety.

"It would be amazing to put it towards cannabis research...at least a portion of that going to medical research for cannabis...health initiatives for the people who are taking it medicinally..." (Physician-Supervised Cannabis Caregiver)

"Maybe for more research and maybe a way to standardize it. My understanding from [name of physician] is that...she uses cannabis to help repeat opioid offenders get sober and I think to research things like that, I personally came and realized I had a problem and never relapsed, but a lot of people relapse." (Physician-Supervised Cannabis Caregiver)

"I would like to see them spend it on regulating...how things are tested, on overseeing that...and on informing the health benefits." (Physician-Supervised Cannabis Caregiver)

Community residents were most likely to suggest tax spending on efforts to prevent or reduce cannabis use among youth and to treat those with cannabis and other substance use disorders.

"I would like to emphasize prevention. If they're willing to make money and to make people get addicted to something, then they should be able to pay also for the prevention." (Focus Group Participant)

"Growing up in school, it was 'dare to resist drugs', right, and look at us 15 years later. Now it's legal. I grew up thinking that marijuana was horrible, reefer madness, don't do it. Now, all of a sudden, it's legal and I have no education other than what I Googled myself. I think it's important that they should actually get into detail and educate people on 'This is what marijuana is, this is where it comes from, this is how it's produced, this is how it affects your mind...'" (Focus Group Participant)

“In Mexico I don’t remember receiving a full semester of instruction about public health and drug use. It would great to begin teaching students about those things starting in primary school. Just like they have classes on math and English, they should have classes about drugs and public health.” (Focus Group Participant)

“It’s important to train teachers on how to deliver the message effectively. They can’t just say ‘Don’t do drugs.’ They have to explain the negative consequences of doing drugs, and also the positive consequences of not doing drugs.” (Focus Group Participant)

“What we need to do with the people whose drug charges are dropped is pay them to be the ones who educate schools and community about the dangers of drugs.” (Focus Group Participant)

The HIA’s tax related questions for city regulators were focused on the nuts and bolts of their cannabis tax policies and they all reported that, for now, these taxes were being funneled to their cities’ general funds with no specific allocation of dollars for cannabis-related programs or services. Nevertheless, a few cities had established cannabis social equity programs. These programs require a significant investment of city funds, and although they are currently funded through fees rather than taxes, they represent a significant city-level effort to leverage cannabis commercialization to promote health equity. By encouraging economic development in communities impacted by the war on drugs, these programs are aimed squarely at the social determinants of health equity.

The social equity programs in Long Beach and Los Angeles had not been fully implemented by the time of this assessment, but local regulators described some elements of their programs. They both addressed equity ownership, employment opportunities, and community benefit, although these elements varied across programs. Both interviewees acknowledged the capital-intensive nature of the cannabis industry and the challenges of creating a successful equity ownership program.

“...the package that we put together is not enough to really take someone who’s never owned a cannabis business before and suddenly allow them to own and operate a cannabis business. It’s more of something that could nudge someone who couldn’t afford to do it before but now can get it by waiving some fees, expediting the process, delaying tax payments, providing them some added support...” (Cannabis Regulator)

Regulators generally defined community benefit as something that non-equity owned businesses provide as a “give back” to the community. However, while most cities simply included descriptions of community benefits in their point systems for the application review process, the cities with social equity programs were developing more expansive community benefit programs.

“The third piece, community reinvestment...requires businesses to submit a community investment plan to the city. The equity office is currently developing rules/regs around that. It’s challenging because we’re going to have to think through things like what’s the threshold for what’s good enough...how to involve the community in reviewing these plans and making sure they’re meaningful, what’s the tool that we have for businesses that don’t submit a good plan or don’t follow through on their plan to make sure that they do so. Those are difficult questions that still need to be answered...” (Cannabis Regulator)

“Originally, we had imagined requiring a community benefit plan—trying to find ways that if businesses wanted to donate time or money or resources to community-based organizations. Part of the reason why we put that to bed early on was because...depending on how we engaged, it

could be considered a tax...Soon, the city council will pass a separate ordinance requiring a corporate social responsibility policy and program for the industry. It'll take us a while to figure out the exact infrastructure that we want to create. But I imagine a strong emphasis on community benefit.” (Cannabis Regulator)

As the various components of these social equity programs get rolled out, it will be important to monitor their effects on appropriate indicators of health equity.

Summary

In a recent national survey of U.S. adults, the generation of tax revenue was ranked the number one argument in favor of cannabis legalization (with reduction in prison overcrowding a close second).³ While so-called “sin taxes” do not always produce stable long-term revenue streams,⁴ city and county-level cannabis sales and excise taxes, coupled with locally targeted state taxes, can generate a significant amount of revenue in the short to mid-term, particularly for large jurisdictions. Thus far, cities in LA County are opting to channel these tax revenues to their general funds, where they can be used flexibly. At this early stage after Proposition 64 implementation, the most pressing cannabis-related local policy issue appears to be the persistence of unlicensed dispensaries.

Data from the California Health Kids Survey suggests that youth cannabis use in LA County had been gradually decreasing across most sociodemographic groups until the year after adult-use legalization, when there was a small but consistent increase. It is too soon to tell if this is the beginning of a change in the overall trend, but careful monitoring is critical. Despite the steady decrease in overall use up to the most recent year of available data, we found evidence that youth use is significantly correlated with socioeconomic status such that students in lower-income schools are significantly more likely to use cannabis than those in higher-income schools. Use was also higher among certain marginalized groups like Native American and sexually and gender non-conforming students. A focus on health equity would thus require action to reduce these disparities, despite declining aggregate trends. Several community and school-based interventions have been shown to reduce initiation of cannabis use among youth and reduce use among those that have already initiated.⁵⁻⁹ Through an analysis of LA County school-based survey data, we also found that the principles upon which these programs are based—i.e., empathic and motivating adults providing youth with opportunities for achieving mastery and meaningful participation—were significantly predictive of abstinence from cannabis use in the past 30 days, even after controlling for sociodemographic factors.

Another key policy issue regarding cannabis taxation is the exemption from certain taxes for those using cannabis for medicinal purposes. By exempting consumers with a state MMID card from all sales and use taxes, state cannabis regulations under MAUCRSA recognize the medicinal uses of cannabis. The cities of Los Angeles and Long Beach have gone one step further by offering a discounted local excise tax rate not only to MMID card holders, but also to people with a physician's recommendation who choose not to apply for a state MMID card. The fact that MMID card applications surged in 2018, even though adults no longer needed one to purchase cannabis, is further indication that there is a small group of consumers who self-identify as medicinal users. Some of these users are being guided by physicians. While we still have relatively little scientific evidence on the therapeutic effects of CBD and THC, largely due to federal restrictions on cannabis research, the principle of health equity suggests that those experiencing health benefits from cannabis should not experience barriers to the cost savings to which the state and certain localities have entitled them. Nevertheless, we found evidence that some medicinal cannabis users were unaware of the MMID card program and others were afraid of potential negative repercussions of program participation. Some cannabis dispensary owners were less than transparent about the tax savings

offered by the program and some appeared to dismiss the program entirely as an unnecessary hassle for consumers.

Recommendations

Based on the findings of this HIA we offer the following health-equity informed recommendations. The primary audiences for these recommendations include county and city elected officials considering the regulation of retail cannabis in their jurisdictions, leaders of local government agencies and departments that would be charged with aspects of the regulatory process, and community advocates interested in helping to shape their local cannabis market in ways that promote health equity. These recommendations are designed to serve multiple purposes, including guiding policy decisions on the structure of the local cannabis market; helping to define the oversight and monitoring roles different agencies; and informing the development of review criteria for the granting, suspension and revocation of cannabis business licenses.

- 1. Consider a four-pronged strategy for reducing unlicensed dispensaries in local jurisdictions: 1) authorize and begin shut-off of water and power, padlocking of entrances and fining of operators at all unlicensed dispensaries; 2) establish a phased-in cannabis tax regimen that starts low and gradually increases; 3) implement a universal licensed dispensary emblem program and a user friendly web-based tool to assist consumers in recognizing and locating licensed dispensaries; and 4) review strategies for initiating licensing and inspection of retail cannabis dispensaries.*

Unlicensed dispensaries pose a health risk to the communities where they are located. This four-pronged strategy for addressing the problem of unlicensed dispensaries is supported by our data which indicate that 1) cannabis regulators favor strong and consistent administrative penalties over criminal penalties for unlicensed operators, and criminal penalties can create barriers to legal market entry for otherwise eligible social equity applicants; 2) unlicensed operators maintain a competitive edge by undercutting licensed operators on price since they don't have to charge any taxes; 3) some consumers don't know the difference between licensed and unlicensed operators; and 4) areas in LA County that allow licensed dispensaries have seen a decrease in unlicensed operators while those that don't have seen a small increase.

- 2. When developing guidelines for cannabis dispensary siting, follow existing state sensitive use buffer requirements and limit density to no more than 1 dispensary per 10-15K residents. Consider adding points to applications from prospective licensees locating in areas near concentrations of unlicensed dispensaries and subtracting points for those in areas near concentrations of liquor stores.*

To date, Los Angeles County jurisdictions following these basic buffer and density guidelines have not created an overconcentration of licensed dispensaries in health-disadvantaged areas. However, to help address the overconcentration of unlicensed dispensaries in these areas, licensed dispensaries will need to increase their presence there. This could be accomplished, in part, through license review criteria that incentivize siting in areas with high concentrations of unlicensed dispensaries. We also found that unlicensed dispensaries were more likely to be present in neighborhoods with higher concentrations of liquor stores. Thus far, licensed dispensaries are not clustered near liquor stores, and local regulators could help to maintain this distance through licensing criteria that account for liquor store locations.

- 3. Work with local public health and planning departments to periodically monitor the geographic distribution and density of licensed and unlicensed dispensaries in relation to the Healthy Places Index.*

As the number of licensed dispensaries increases across the County, and as they begin to increase their presence in health-disadvantaged areas, it will be important to monitor their geographic concentrations. There is still a potential risk that licensed dispensaries will become overly concentrated in disadvantaged areas. Meanwhile, continued monitoring of the locations and density of unlicensed dispensaries is a critical part of the overall strategy for eliminating them.

- 4. Use social equity and corporate social responsibility programs to mitigate potential risks of licensed dispensary concentrations in health-disadvantaged areas. Decisions on dispensary licensing in health-disadvantaged areas should positively weight these community investment strategies.*

Licensed dispensaries are currently located in more affluent parts of the cities that allow them, in part because they can't compete with unlicensed dispensaries concentrated in more disadvantaged areas. Many in the next wave of licensed dispensaries will be social equity applicants in the City of LA. Assuming unlicensed dispensaries continue to decrease in the City of LA, many social equity businesses will locate in neighborhoods formerly occupied by unlicensed businesses.

A successful social equity program will not only provide ownership opportunities to eligible individuals but will also increase economic opportunity and vitality more generally in these neighborhoods. This requires a broader definition of social equity that includes corporate social responsibility for the industry as a whole. Other cities and counties considering licensing cannabis dispensaries should take similar proactive measures to promote equity in the distribution of the profits of commercial cannabis.

- 5. Require all licensed dispensaries to undergo regular health inspections and explore options for including laboratory testing of products as part of the inspection process. Link dispensary emblem program (see Recommendation #1) to health inspection permitting such that emblems are reserved for licensed dispensaries that have passed their health inspection.*

Cannabis regulators and business owners alike are highly supportive of local health departments conducting health inspections of cannabis businesses, much like they currently inspect restaurants. Health inspections provide a level of consumer protection above and beyond the current system of private testing labs. While inspections help identify and mitigate conditions that facilitate contamination, conducting lab tests of cannabis products would add an extra level of protection, assuming that those tests are standardized and valid. Counties should explore the feasibility of including lab testing as part of the inspection process.

- 6. As part of health permitting process (see Recommendation #5) require licensed dispensaries to provide written information, included with purchases and/or posted visibly on site, about known health risks and therapeutic effects of cannabis use, how to use cannabis legally and responsibly, and what to do in case of overconsumption.*

As part of their core functions and regulatory authority, local health departments regularly provide accurate health information to the public in multiple languages and clear and understandable formats. Given the health implications of cannabis consumption, it is incumbent upon health departments to incorporate health communication into their regulatory oversight of cannabis businesses. This should

include the provision of written health information for consumers either by way of material included with cannabis purchases and/or posted visibly at cannabis businesses.

- 7. Consider developing a list of certified budtender trainings and positively weighting the presence of at least one certified budtender in dispensary licensing decisions. Accepted trainings should cover product potency, dosing, evidence of harms to youth, evidence for specific therapeutic effects and when/how to recommend consulting with a physician.*

A cottage industry of cannabis training and education has emerged, and a recent evaluation found positive effects of employee training on responsible sales practices.⁸² To the extent that these training programs can equip cannabis businesses operators with accurate information about cannabis laws and regulations, health risks and therapeutic effects, and responsible use practices, then they should be embraced and encouraged. However, a budtender certification is not a substitute for medical training and budtenders should encourage their customers to seek medical advice from a physician or other licensed health care practitioner.

- 8. Develop local cannabis advertising ordinances that complement and supplement current state regulations on cannabis advertising, within the limits of the law. Look to other jurisdictions for model ordinances.*

Laws regarding alcohol and tobacco advertising have evolved over time in response to public health research and advocacy. Currently, the best evidence on harms of cannabis use involve links to fetal and brain development, and exposure to cannabis advertising has been shown to influence use behaviors among youth. The only current state restrictions regarding cannabis advertising are designed to limit exposure among youth. Within the limits of the law, local governments should strengthen and extend restrictions on youth and pregnant women’s exposure to cannabis advertising.

- 9. Conduct periodic surveillance of licensed dispensary business practices for ongoing improvement/refinement of regulatory requirements.*

Through observational premise surveys of cannabis dispensaries, we collected information on business practices related to health and safety. Many survey items also captured adherence to specific regulatory requirements. While we found that unlicensed dispensaries exhibited more health harming practices than licensed ones, there was also variation in practices among licensed dispensaries. As more states legalize cannabis, it will be important to track the business practices of licensed dispensaries from a health and safety perspective.

Cannabis retail premise surveys are a useful complement to health inspections and are less resource intensive because they are done only on representative samples of dispensaries, are repeated less frequently (e.g., once a year), and involve simple and brief observations of the retail premises without the need for extensive training or interaction with dispensary staff.

- 10. Monitor trends in cannabis-related emergency department visits by race/ethnicity and age, in comparison to alcohol and other drug related visits. Further investigate potential explanations for racial/ethnic disparities in cannabis-related emergency department visits.*

We found a large and growing disparity in the rates of cannabis-related ED visits between Whites and African Americans, and the rate of cannabis-related ED visits recently surpassed the rate of other drug-related visits among African Americans. This phenomenon warrants continued monitoring and investigation into potential contributing factors, including geographic concentration, primary diagnostic codes co-occurring with cannabis codes, and potential correlation with unlicensed dispensary locations.

- 11. Monitor trends in youth cannabis use in LA County by issuing an annual report using California Healthy Kids Survey data to describe trends in and factors associated with youth use.*

Cannabis use among youth in LA County schools has been on the decline but reports of past 30-day use increased slightly in 2017/18. It is too soon to tell if this is the beginning of a longer-term trend, but given the increased risk of CUD associated with initiation of use during adolescence, it will be important to continue to monitor this trend.

- 12. Invest youth prevention dollars in schools serving lower income communities and in programs that have both universal and targeted components, and incorporate evidence-based practices for positive youth development and motivational interviewing.*

Cannabis use disproportionately affects youth in lower income schools. The most effective interventions for preventing and reducing youth cannabis use incorporate practices of positive youth development and motivational interviewing techniques which provide youth with the sense of support, belonging, mastery, self-efficacy, and independence that will help them succeed in all aspects of life. Those who are already at risk of problem use will typically not seek help on their own and will require non-judgmental approaches that elicit voluntary self-referral and don't require parental consent. Resources for these interventions should be targeted to schools with higher percentages of students eligible for FRPM.

- 13. Require licensed cannabis dispensaries to post visible information about the MMID program and about differential tax rates for consumers with physicians' recommendations and/or MMID cards. Require the itemization of taxes on purchase receipts.*

After the passage of Proposition 64, the state of California has continued to recognize the medicinal use of cannabis by offering both adult-use and medicinal business license types and by reducing the tax burden on consumers who self-identify as medicinal users. There is still a small group of cannabis users in this self-identified group, as evidenced by the rise in MMID cards issued to LA County residents in 2018. Nevertheless, some medicinal users are experiencing barriers to the tax reductions to which they are entitled and data from the first quarter of 2019 indicates that early enthusiasm for the program may be waning. One way to increase participation in the MMID card program is to require cannabis businesses to educate their customers about it. This can be accomplished through the posting of standard information about the nature of the program and its tax rates.

14. *Post information about the MMID card program on all City/County websites where cannabis consumers go for information about cannabis. Include clear and transparent information about data privacy and about any potential negative repercussions of participation in the program.*

In addition to a lack of awareness of the MMID card program, some medicinal cannabis users are fearful of participating due to privacy concerns. In its efforts to educate consumers about the program, local entities in partnership with their local public health departments should use focus groups and other market research methods to identify effective messaging strategies regarding data privacy. MMID card participant information is governed by the same strict privacy rules as other health information protected by the Health Insurance Portability and Accountability Act (HIPAA).

15. *Conduct public education on the dangers of cannabis-impaired driving (CID) and continue to monitor trends in traffic-related injuries and deaths involving cannabis. Wait until cannabis impairment testing technology improves before investing additional resources in law enforcement approaches to deterring CID.*

Driving under the influence increases the risk of traffic collisions, but there is no evidence that cannabis legalization increases traffic collisions. In LA County, vehicle injury ED visits for which cannabis is identified as a secondary ICD code are increasing but are still relatively rare events. There is currently no test of cannabis impairment that is as reliable or valid as a blood alcohol test for alcohol impairment. Thus, public education about the dangers of CID is the best approach to preventing cannabis-impaired driving until better testing becomes available.

Secondary Data Sources

California Bureau of Cannabis Control (BCC)

The California Bureau of Cannabis Control maintains [publicly available data](#) on licensed cannabis businesses: storefront and non-storefront retailers, distributors (including transport-only), microbusinesses, testing laboratories, and event organizers in the state. This data can be queried by location, business/license type, and license status. In addition, the Bureau maintains [a listing of weekly to bi-weekly cumulative reports](#) from licensed laboratories on cannabis test results.

[Link to California Bureau of Cannabis Control Website](#)

California Department of Alcoholic Beverage Control (ABC)

The California Department of Alcoholic Beverage Control maintains [a publicly available database](#) of licensed alcohol retailers (both on- and off-site) in the state. This database contains license number and type, date of license issuance, license status, business names and location information.

[Link to the California Department of Alcoholic Beverage Control Website](#)

California Department of Tax and Fee Administration (CDTFA)

The California Department of Tax and Fee Administration maintains [a publicly available database](#) of licensed tobacco retailers in the state. This database contains license numbers, business names, and location information.

[Link to the California Department of Tax and Fee Administration Website](#)

California Healthy Kids Survey (CHKS)

The California Healthy Kids Survey (CHKS) is an anonymous, classroom-administered survey of school climate and safety, student wellness, and youth resiliency conducted by the California Department of Education. Districts receiving Tobacco-Use Prevention Education funding are required to participate. Other districts are encouraged (although many charter schools, as well as alternative schools, home school programs and private schools do not administer the survey). The most recent iteration of CHKS was administered between Fall 2015 and Spring 2017, consisting of data from 120 randomly-selected schools, with 45,264 students in grades 5, 7, 9, and 11 participating.

[Link to the California Healthy Kids Survey Website](#)

California Office of Statewide Health and Planning and Development (OSHPD)

The California Office of Statewide Health and Planning and Development (OSHPD) produces data from a variety of sources throughout the state, including reports submitted to OSHPD by nearly 6,000 licensed healthcare facilities. Additionally, OSHPD houses data on facility construction and healthcare workforce data managed in the administration of OSHPD programs.

[Link to the California Office of Statewide Health and Planning and Development Website](#)

City of Los Angeles Department of Cannabis Regulation (DCR)

The city of Los Angeles' Department of Cannabis Regulation maintains [publicly available data](#) on cannabis retailers that are authorized to do business in the city of LA. This data includes business names, type of business (medical or adult-use), and location information.

[Link to City of Los Angeles Department of Cannabis Regulation Website](#)

County of Los Angeles Department of Regional Planning (DRP)

The Los Angeles County Department of Regional Planning performs all land use planning functions for the unincorporated areas of Los Angeles County. The Department originated in 1922 with the establishment of the Regional Planning Commission (RPC), the oldest planning body in the United States. Commissioners are appointed by the Board of Supervisors. The RPC advises the Board of Supervisors on all land use planning matters. DRP became an independent department in 1974 and continues to support the RPC and Board of Supervisors. The Department manages spatial data on zoning types throughout LA County's unincorporated jurisdictions.

[Link to the Department of Regional Planning website](#)

Beverly Hills Police Department (BHPD)

The Beverly Hills Police Department maintains [a publicly available crime incident dataset](#) on Beverly Hills' Open Data Portal which includes basic information on crimes committed in the city of Beverly Hills, going back to January 2015. Location data is at the 100-block level, with addresses rounded either up or down.

[Link to the Beverly Hills Police Department website](#)

LA County Sheriff's Department (LASD)

The Los Angeles County Sheriff's Department has shared crime incident data with the Center for Health Impact Evaluation that contains basic information on crimes committed in areas they patrol, including all unincorporated areas of the county and 42 of the county's 88 cities, where more than 3 million people reside. The location data is at the 100-block level, with addresses rounded down (for example, a crime that occurred at 987 Anytown Road would be listed as occurring at 900 Anytown Road).

[Link to the LA County Sheriff's Department Website](#)

Los Angeles Police Department (LAPD)

The Los Angeles Police Department maintains [a publicly available crime incident dataset](#) on Los Angeles city's Open Data Portal which includes basic information on crimes committed in the city of LA, which is home to about 4 million people. Location data is at the 100-block level, with addresses rounded either up or down.

[Link to the Los Angeles Police Department Website](#)

The Healthy Places Index (HPI)

The California Healthy Places Index (HPI) is a composite weighted index of 25 indicators, across 8 sub-domains, that predict life expectancy at birth down to the census tract level. Developed by the Public Health Alliance of Southern California with academic partners, the HPI assists users in exploring and comparing health-related community conditions in geographic areas across the state. The HPI web tool offers other useful resources, including interactive maps, graphs, data tables, and a policy guide with practical solutions for improving community conditions and health.

[Link to The Healthy Places Index Website](#)

Los Angeles County Enterprise Geographic Information System (LAC eGIS)

LA County manages a [data portal](#) that contains shapefiles and other geographic information system (GIS) data for the county, including, but not limited to, zoning and land use data, city and unincorporated area boundaries, street name lookup tables, and zip code boundaries.

[Link to the Los Angeles County Enterprise Geographic Information System website](#)

Los Angeles County Health Survey (LACHS)

The Los Angeles County Health Survey is a population-based telephone survey conducted every 2 to 4 years by the Department of Public Health. It collects information on sociodemographic characteristics, health status, health behaviors, and access to health services among adults and children in the County. The most recent survey was conducted in 2015 on a sample of 8,008 adults and 5,982 children.

[Link to the Los Angeles County Health Survey Website](#)

US Census Bureau

The US Census Bureau has collected census data on the US population every ten years since the first census in 1790. Though the aim of the census is to generate a simple count of the people in the United States, decennial iterations often include questions on various topics, including race, ancestry, education, health, and housing. Starting in 2010, the long-form version of the Census was relaunched as the American Community Survey, which is now administered continuously throughout the ten-year period between Census collections. Data from various US Census Bureau projects are [publicly available via the American FactFinder](#) website.

[Link to the US Census Bureau Website](#)

Weedmaps

Weedmaps is a nationwide directory service that charges cannabis dispensaries and delivery businesses to advertise on their website. It hosts more than 3,000 listings and contains information on location, products and pricing. After receipt of a March 2018 warning letter from the California Bureau of Cannabis Control (BCC) for hosting unlicensed business listings, the site began allowing businesses to list their license information as applicable. However, there is no quality control in place to verify the accuracy of manually entered license numbers and types, and cannabis businesses operating without a license are still hosted on the website.

[Link to the Weedmaps Website](#)

Glossary of Terms

Cannabis Dispensary: While the official definition of dispensary applies to rooms where medicines are prepared, or clinics provided by public/charitable funds, the definition for *dispensary* in this report (and other cannabis nomenclature) is a retailer that sells cannabis.

Cannabis-Impaired Driving (CID): Driving while experiencing the acute effects of consumed cannabis. Cannabis use impairs attention, tracking, and psychomotor skills required for driving. CID is unlawful in California.

Cannabis Oil: Also referred to as *honey oil* and *hash oil*. Hash oil is a semi-solid extract composed of resins and terpenes extracted from cannabis in an essential and/or fatty oil. There are multiple extraction methods used; the majority involve using a solvent like butane or ethanol. Hash oil may be added to edibles or vaporizer cartridges or may be smoked via a method known as "dabbing." Some hash oil contains THC concentrations as high as 90%.

Cannabis Social Equity Program: Cannabis social equity programs are designed to help individuals and communities, disproportionately impacted by the prior criminalization of cannabis, share in the economic benefits of the newly legal cannabis market. Programs may include priority application processing and technical and financial support to individuals seeking ownership of a licensed cannabis business. They may also include broader efforts to reinvest in communities disproportionately impacted by arrests and incarcerations associated with the war on drugs.

Cannabis Tincture: This is a liquid extract of cannabis which is typically made by soaking the dried flowers of the female cannabis plant in ethanol. Tinctures are typically consumed sublingually with a dropper.

Cannabis Use Disorder (CUD): A diagnosis in the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) based on the user meeting a certain number of diagnostic criteria, including experiences of: difficulty controlling or reducing use, craving cannabis, tolerance of high doses, problems at work, school or home as a result of cannabis use, continue use despite problems, and spending a lot of time obtaining and using cannabis.

CBD: An abbreviation for cannabidiol. CBD is one of more than 100 cannabinoids, or chemical components of the cannabis plant. It does not produce any psychoactive effects in the user but has been shown to have therapeutic effects for pain management and certain forms of epilepsy.

Dabbing: A method of cannabis consumption whereby a small quantity of high potency semi-solid cannabis concentrate is heated at a high temperature on a metal surface (part of a "dab rig") and inhaled deeply into the lungs as the heat vaporizes the concentrate.

Drug Recognition Expert (DRE): Drug Recognition Experts are law enforcement officers who have undergone training on how to identify individuals who may be driving under the influence of drugs other than (or in addition to) alcohol. These officers use a Drug Influence Evaluation (DIE), a formal assessment with twelve steps, to make their determination.

Health Equity: Health equity is achieved when all individuals have access to the goods, services, resources, and power they need for optimal health and well-being.

Kief: Also called cannabis crystals, kief refers to the fine resinous outgrowths of the cannabis flower (known as trichomes) that may be sifted from dry cannabis flower and accumulated in containers. Kief contains a higher concentration of THC than the plant itself.

Latinx: A gender-neutral term referring to people of Latin American descent.

Marijuana Retail Surveillance Tool (MRST): The Marijuana Retail Surveillance Tool is a marketing surveillance survey developed and piloted by academic researchers to assess cannabis dispensaries premises.

Medicinal Cannabis: Also referred to as *medical marijuana*. Medicinal cannabis is cannabis used to treat symptoms of illness or some chronic conditions. In California, an individual must have one of the following medical conditions to qualify for medicinal cannabis: AIDS, anorexia, arthritis, cachexia (wasting syndrome), cancer, chronic pain, glaucoma, migraine, persistent muscle spasms (e.g., spasms associated with multiple sclerosis), seizures (e.g., epileptic seizures), severe nausea, or any other chronic or persistent medical symptom that either substantially limits a person's ability to conduct one or more of major life activities as defined in the federal Americans with Disabilities Act (ADA) of 1990, or, if not alleviated, may cause serious harm to the person's safety or physical or mental health.

Moonrock: Cannabis moonrocks are a high potency cannabis product (containing up to 80% THC) made from a bud of cannabis flower that is covered in cannabis hash oil and then rolled in cannabis kief.

Social Determinants of Health (SDOH): Social Determinants of Health are the environmental conditions in which people are born, live, learn, work, play, worship, and age that affect a wide range of health and quality-of-life outcomes. Some examples include: 1) access to resources like housing, education, health care, employment, parks, and healthy food 2) exposure to violence, discrimination, blight, stress in the home, and stressful neighborhood conditions and 3) social support, collective efficacy, and social capital.

THC: An abbreviation for *tetrahydrocannabinol*. THC is one of more than 100 cannabinoids, or chemical components of the cannabis plant. It is the principal psychoactive component of cannabis and produces most of the psychoactive effects experienced by an individual after consuming cannabis.

Vaporizable Cannabis Concentrates (VCCs): Also known as *vape cartridges/vape carts*. A vaporizable cannabis cartridge is a container with a mouthpiece. It is filled with cannabis concentrate, which is heated up by a device that it screws or snaps into. These cartridges are typically made of ceramic, glass and/or metal.

War on Drugs: A phrase that refers to an array of US Government policies that began in the 1970's and included severe penalties for all levels and types of drug-related offenses. A negative consequence of the war on drugs was that it led to the disproportionate arrest and incarceration of people of color for relatively low-level drug offenses.

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