

The Impact of Adult Cannabis Use Legalization in California: A Qualitative Review of Subject Matter Expert Opinions on Proposition 64

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ABSTRACT

Objective: California legalized adult cannabis use in 2016 with the passing of Proposition 64: The Adult Use Marijuana Act (Prop 64). This qualitative study aimed to explore the impact of legalization on various stakeholders and institutions within California, especially as it relates to public policy, health, and safety.

Method: Twenty-two semi-structured interviews were conducted from January to March 2022 with stakeholders that included Subject Matter Experts (SME) from the following categories: clinicians (primary care, pain management, addiction medicine, cannabis clinicians), researchers, advocates, dispensary owners/personnel, legal professionals, and cannabis consumers. Nine interview guides were constructed to assess participants' perceptions of Prop 64 and its impact on their given sector/industry as it relates to the use, production, distribution, and access to medicinal and adult cannabis use. Thematic analysis was conducted to identify salient themes from the interviews. **Results:** The three primary themes and subthemes included: (1) Successes of Prop 64 (quality control, justice reform, stigma reduction), (2) Shortcomings of Prop 64 (high cost, licensing, bureaucracy, social inequity), and (3) Recommendations for improvement of Prop 64 (need for research, policy change, the transformation of business model).

Conclusions: The implementation of cannabis legalization in California had a broad impact on many key stakeholders. While demonstrating some success, SME described key areas for improvement of Prop 64. A multidisciplinary approach with support from government, state, and local municipalities is necessary to facilitate proper regulation, provide timely support, and reduce social injustice, harm, and unforeseen consequences of use. Updating federal regulations (e.g., Schedule I status) might be an important step to allow for improving regulation and operations (e.g. banking) within the cannabis industry, further research and education, and greater cross-state consistency regarding law enforcement/regulation of cannabis. *Public Health Implications:* The information gathered will help inform public policy, as well as help health professionals design new health education campaigns for the general public.

Key words: = cannabis legalization; California; Proposition 64; stigma reduction; justice reform; subject matter experts

Cannabis is a plant-based product that existed 5000 years ago and has been widely used in the United States since 1850 (Holland, 2010; The

University of Sydney, 2024). Through the “Marihuana Tax Act of 1937,” and “The Controlled Substance Act of 1970 (CSA),” cannabis was

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federally restricted with severe legal penalties for possession and use (Holland, 2010, Ortiz & Preuss, 2025). In 1996, with the enactment of the Compassionate Use Act (Proposition 215), and in 2016, through the Adult Use of Marijuana Act (Proposition 64), cannabis was approved for medicinal and recreational use in California, respectively (Compassionate Use Act, 2024; Proposition 64: The Adult Use of Marijuana Act, 2016). Implemented in 2018, Proposition 64 (Prop 64) allowed retail sales of adult cannabis use to adults aged 21+ (Proposition 64: The Adult Use of Marijuana Act, 2016; Roth et al., 2022).

Today, cannabis is the most widely used substance after alcohol and tobacco in the United States, and more states are moving towards cannabis legalization (Woodruff et al., 2021). Despite a federal DEA Schedule 1 status (indicating that cannabis has no medical benefit and a high risk of addiction), as of April 2023, 24 states have legalized both recreational and medicinal cannabis, 38 states allow medical cannabis use, and only 13 states remain without any form of legalization (American Nonsmokers' Rights Foundation, 2022; Roth et al., 2022; U.S. Drug Enforcement Administration, 2018). This is due to a shift in societal perception and acceptance of cannabis use, as well as the emerging medicinal benefits of FDA-approved cannabinoid medications such as Dronabinol, Nabilone, and Epidiolex (Gali et al., 2021; McGinty et al., 2017; Lutge et al., 2013; Smith et al., 2015; Kafil et al., 2018; Mücke et al., 2018; National Center for Complementary and Integrative Health, 2019).

Contrary to the emerging medicinal benefits and future promises of selected cannabinoids, most professional societies, such as the American Medical Association (AMA), American Board of Family Medicine (ABFM), and American Society of Addiction Medicine (ASAM) are opposed to the legalization of recreational cannabis use until "additional scientific research has been completed to fully document the public health, medical and economic consequences of its use" (American Society of Addiction Medicine 2020; Bailey, 2021 American Academy of Family Physicians, 2019). States that have legalized adult cannabis use also point out that "given that recreational cannabis has only recently been legalized, there is relatively little robust evidence of its impact, and the evidence that exists is inconclusive"

(Hammond et al., 2020; Sobesky & Gorgens, 2016). This is also true when it comes to California – several studies have been done related to public policy, health, and safety (Bailey, 2021; Santaella-Tenorio et al., 2020; Wang et al., 2022; Wang, et al., 2022; Wang et al., 2017, 2021; Zvonarev et al., 2019).

Numerous concerns related to the legalization of adult cannabis use have been raised. Using the Social-Ecological Model (SEM), a systems-level approach that is helpful to understand interactions at several levels, at the individual level, experts are concerned with decreased perception of harm of cannabis use, increased cannabis use, risk of co-use of other substances, psychosis, dependence/cannabis use disorder, worsened rates of cyclic vomiting syndrome, and anxiety (Borodovsky et al., 2016; Centers for Disease Control and Prevention, 2022; Hall & Lynskey, 2020;). At the interpersonal level, concerns include increased cannabis access to youth, changes in patient-provider relationships, as well as changes in the way individuals receive guidance (Rubin-Kahana et al., 2022; Sobesky & Gorgens, 2016). At the organizational level, concerns related to the justice system, work environment, regulation of cannabis retailers (i.e., dispensaries), health care, and educational systems are areas of interest/concern (Kan et al., 2020; Zhu et al., 2021). At the societal level, concerns include potential societal harm inflicted by driving under the influence (DUI), the risk for harm from second-hand smoking, inadequate public education, inappropriate advertisement and public safety from informal sales channels, and crime (Kruger et al., 2024; Steinberg et al., 2020). At the policy level, concerns include the risk of increasing tobacco/nicotine use, the proliferation of new products, cannabis monitoring, and federal and state regulations pertinent to changing those policies (e.g., Controlled Substance Act, Compassionate Use Act of 1996, Medicinal and Adult Use Cannabis Regulation and Safety Act).(Department of Cannabis Control California, 2025; Kruger et al., 2024; Steinberg et al., 2020).

With these concerns in mind, this preliminary study of the Impact 64 project aimed to better describe key concerns of cannabis stakeholders following the implementation of Proposition 64, especially as it relates to public health, safety, and policy. These findings were then used to inform

the full Impact 64 study, which aimed to investigate the impact of cannabis legalization in California.

METHODS

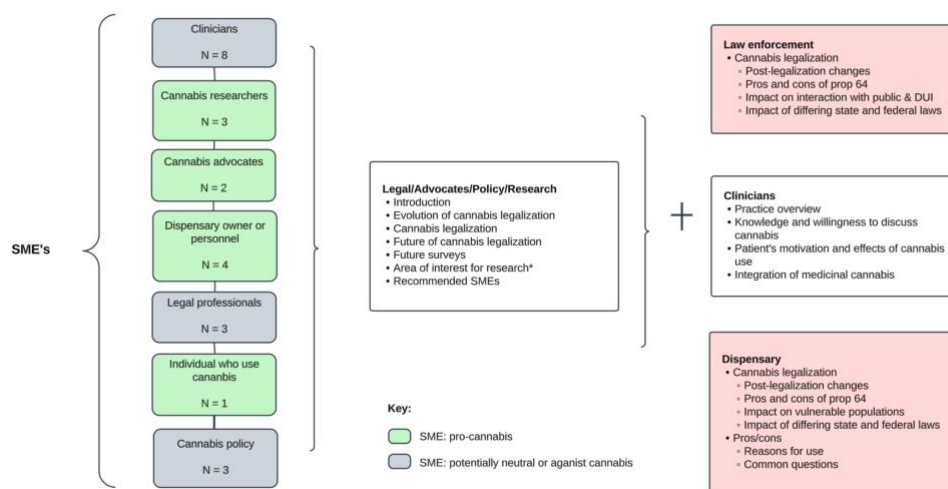
Participants and Recruitment

Key stakeholders representing a variety of sectors in California were identified and invited to participate through purposive sampling strategies. The study team sought to identify clinical, research, and legal subject matter experts, cannabis advocates, public health advocates, owners of cannabis retailers (i.e., dispensaries), and one self identified cannabis user. The initial group of stakeholders were known to the study team through prior collaboration networking, and professional societies. Snowball sampling (referrals from enrolled participants) was used to recruit additional participants, including three out of state SMEs who are “multi-state operators.” Potential participants were contacted through email to be considered for participation. Participant background, profession, expertise, and region of employment were all considered to ensure a diverse sample of SME. Participants who completed the interview were provided a \$100 gift card for their time.

Study Design

An exploratory qualitative study design grounded in thematic analysis (TA) was used to explore the perspective of stakeholders with varying backgrounds and interests in cannabis (Castleberry & Nolen, 2018). Prior to developing the semi-structured interview guide, a literature review was conducted by looking at previous measures and scales used to assess cannabis consumption, motivation, attitudes, perception of harm, and dependency to define key areas of interest across all stakeholders and SME categories, as well as develop specific learning objectives for each of the categories of SME, as shown in Figure 1. These included questions assessing the participant’s background and expertise, the demographic makeup of the populations they serve, and their perceptions of cannabis legalization (the successes/benefits and shortcomings/drawbacks of Prop 64) on their field of expertise and the population they serve. Clinicians were also asked to describe their knowledge of Prop 64, their experience with cannabis, the reasons their patient’s used cannabis, the effects cannabis had on their patients, their experience integrating medicinal cannabis into their practice, as well as any reasons they have not integrated medicinal cannabis into their practice. Each SME was also asked about any changes they would make to Prop 64 in future revisions. Interview guides are included in the Appendix.

Figure 1. *Impact 64: Stakeholders, Subject Matter Experts (SME) & Interview Guide*



Data Collection

Participants consented to the recording of interviews (60 minutes) through Zoom (Zoom video communications, inc, 2023) between January and March 2022. For all but five of the SME interviews, 5 or more Impact 64 team members were present at each interview. Transcriptions from Zoom recordings were directly imported into Dedoose software (Dedoose, 2021) for analysis. De-identified interview transcripts were stored on a password-protected server.

Data Analysis

Thematic analysis (TA) using both deductive and inductive approaches was conducted using Dedoose software (Dedose, 2021). TA is a widely used method in qualitative research that is used to “identify, analyze, and report patterns (themes) within data.” (Castleberry & Nolen, 2018). TA takes the open-ended responses from surveys and transcribed interviews to explore the context at a level of depth that quantitative analysis lacks. It also allows for flexibility and interpretation of data that can build a complex, holistic picture of the topic at hand.

Prior to the interviews, a predefined codebook was developed based on the literature review and the interview guide. This included the themes of the perceived successes and shortcomings of Proposition 64, as well as recommendations to revise Prop 64 as shown in Figure 1. During data cleaning and analysis, using an inductive approach new subthemes were included as part of

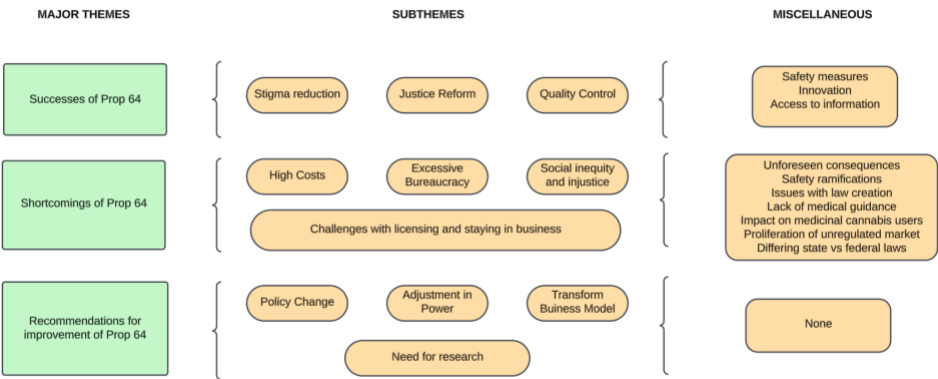
the data analysis which are presented in the results section. Two raters (DA, RD) independently assessed the data with a third person (JG) available to resolve any difference in categorization. Interrater reliability analysis was conducted by comparing coding manually between raters.

RESULTS

Study Sample

Out of fifty potential SME that were identified and contacted, twenty-two semi-structured Zoom interviews were completed. Reasons for not participating included non-response to the initial invitation and lack of availability. SME consisted of eight clinicians (two primary care, one pain management, two addiction specialists, three cannabis clinicians), three clinical cannabis researchers, two cannabis advocates, five dispensary owners/personnel, three legal professionals (lawyer/policy maker, judge, law enforcement), and one self-identified cannabis consumer (Figure 1). SME demographics were not specifically collected, but all were over 30 years old, had an almost equal distribution of gender, with racial/ethnicity distribution of White Non-Hispanic (17 out of 23), one Black/African American, one Latinx, and one of Middle Eastern origin. Their educational level included Bachelor, Masters, Ph.D., MD/DO, and Naturopathic Doctor (ND). Eleven were from San Diego, three from Los Angeles, one each from Humboldt County, Santa Clara, Central California, and Ohio, and two from Denver, Colorado.

Figure 2. Impact 64: SME Interview Themes and Subthemes



Emerging Themes

During qualitative thematic analysis, themes were grouped into 3 major areas based on themes that had the highest count of similar content based on the pre-defined topics as shown in Figure 2: (1) Successes of Prop 64, (2) Shortcomings of Prop 64, and (3) Recommendations for improvement of Prop 64.

Successes of Prop 64

“Successes of Prop 64” refers to descriptions of the benefits of legalization of adult cannabis use through Prop 64. Three main subthemes were identified: stigma reduction, quality control, and justice reform. Following the narratives below, specific quotations are found in Table 1.

Stigma reduction. The SME noted that after Prop 64 implementation, there was a shift toward acceptance of cannabis, which contributed to stigma reduction. It also legitimized the use of medicinal cannabis among former non-users. Initially, fears surrounding legalization centered on perceptions that cannabis use would increase significantly and that it would cause harm to public health and safety. SME noted these fears did not come to fruition. Clinicians were now able to focus on the benefits and harms of cannabis use instead of arguing about the ethics of legalization. Patients also did not feel like they were consuming unregulated drugs..

Quality control. SME communicated that Prop 64 instituted requirements that improved cannabis product quality and testing. Every cannabis product was being tracked from “Seed to Sale.” Products were tested for strict dosage, ingredient composition, and pesticide/preservative content, and packaged and labelled correctly. There was an emphasis on quality, which increased trust in the products available. Clinical SME with more knowledge about cannabis described an increase in comfort level after Prop 64, noting the ability to recommend specific products, titrate the dose, and avoid adverse effects, particularly in older adults, and the risk of intoxication or possible development of a cannabis use disorder.

Justice reform. According to SME, legalization extensively helped individuals who were incarcerated for cannabis-related offenses. They were released the “next day, and ankle bracelets were immediately taken off.” This also was evident for individuals whose cannabis-related offenses were dismissed while waiting for trial. Law enforcement SME also reported that they no longer pursued cannabis-related encounters just because they smelled cannabis. It helped reduce unnecessary interactions and possible altercations with the public, especially given recent increases in mistrust by the public.

Other successes of Prop 64 that are considered minor themes are shown in Table 1 without a detailed discussion.

Table 1. *Success of Prop 64 Themes and Subthemes with SMEs Statements*

Themes	Subthemes	SMEs statement
Successes of Prop 64	Stigma reduction	“The attitudes were not as negative. Because with the legalization came a shift in attitudes with judges and juries.” – legal professional
		“Walking into a store that didn't make people feel like they were about to do drugs.” – cannabis clinician
		“The main lesson of Prop 64 is that people told us this sky was going to fall and nobody is going to go to work, and nobody is going to be motivated. And that did not happen. And any of those sorts of ancillary harms have not happened.” – addiction specialist/PCP
		“There's just more people who are willing to talk about it now.” – policy
	Quality Control	“The real beauty of this recent legalization was the product testing and consistency.”- cannabis clinician
		“The quality control of cannabis is at a higher level than any other supplement you could buy on a shelf in a store.” – cannabis clinician
		“You can measure and give exact milligram dosing; it makes it look more like a medicine “– cannabis clinician

	Justice Reform	“Decriminalization, to some extent, has removed another source of oppression from members of my community.” – addiction specialist/PCP
		“She had one of those ankle bracelets on and they took that off the next day and people got out of jail” – cannabis advocate
		“The felons were around, as I recall, 15,013 thousand a year, even in the last years of Prop 215 when things were loosening up, and now I think they're probably under 2000 or 1000.” – cannabis researcher
Other successes of prop 64	Safety Measures	“Senior groups - they want to be able to dose in very controlled ways, and the regulations have been good for that.” – cannabis clinician
		“There's added security because of it. That was an unexpected bonus.” – policy
	Innovation – Proliferation of products	“A lot more products developed in the last few years, which is nice.” – cannabis clinician
	Increased access to information	“Now we're knowing something about people consumption habits.” – legal professional
		“You know the ability to read a label and educate them about the potency of what to shop for has been a game changer.” – cannabis Advocate

Shortcomings of Prop 64

SME also described the drawbacks and unintentional, negative consequences of Prop 64. These fell under four subthemes: the high cost of products, challenges with licensing and staying in business, excessive bureaucracy, and social inequity and injustice. Following the narratives below, specific quotations are found in Table 2.

High cost of products. SME noted that Prop 64 introduced high tax rates, forcing dispensaries to increase the sale price of cannabis products. Individuals are thus paying more than they used to, waiting for promotions, or perhaps turning back to the unregulated market for less expensive products. This is impacting the end user, as described by the SME.

Challenges with licensing and staying in business. SME noted many barriers to entering and staying in the regulated cannabis industry, including cost and regulatory challenges. Financially, SME noted high tax rates including state, excise, local, distribution, and manufacturing taxes. Dispensary locations can be charged high rent, “two, three, four times” the market value. It takes 2-3 years to obtain a license, given the many bureaucratic steps required, frequently deemed excessive by the SME. A dispensary owner must have a location/store secured before even applying for a license, requiring them to pay rent while waiting for licensure approval and before generating

income. Every product is tracked from “seed to sale,” which SME noted to be hard to maintain. With most dispensaries desiring to be vertically integrated, produce and sell cannabis, this has been challenging and expensive, per SME.

Excessive bureaucracy. According to dispensary SME, cannabis is the “most regulated legal crop; the testing requirements are more stringent than the food we eat,” one dispensary owner mentioned. A mixed cannabis-food product failed testing due to pesticides that are allowed in food. In addition, environmental impact reviews are time-consuming and expensive. Moreover, additional regulation by local jurisdictions leads to varying rules and fees, and the inability to have products and services in certain areas. For instance, only 36 licenses were planned to be issued at the start of Prop 64, and only 20 had been approved as of 2021, per dispensary owners.

Social inequity and injustice. SME described the significant impact legalization had on the ‘mom and pop’ retailer shops, farmers, and communities with historic medicinal cannabis sales. Policymakers reported that equity was not considered at the beginning of the planning phase of the legalization of Prop 64. SME felt that the high cost of entering and sustaining legal business created inequities in who can be in the industry, giving an unfair advantage to those who established and well-financed groups such as tobacco and alcohol companies. Individuals who are cannabis users in multitenant homes were

also facing restrictions that were discriminatory and unjust, per SME.

Table 2. *Shortcomings of Prop 64 Themes and Subthemes with SMEs Statements*

Themes	Subthemes	SMEs statement
Shortcomings of Prop 64	High costs of products	"The immediate impact of Prop 64 was on average cannabis price went up 40%." – clinician
		"Everyone immediately started paying a 15% state excise tax, local excise tax (additional 8%) , and cultivation manufacturing and distribution taxes." – dispensary owner
	Challenges with Licensing & Staying in Business	"You can't be within 100 feet of a church, 1000 feet from school, or residential. This is actually the hardest part of the business." - dispensary owner.
		"...not to mention the 280A taxation amount from the IRS. You can't write off rent, labor, arm guards. It's ridiculous." dispensary owner
		"People are paying 2,3, or 4 times the average rents...my arm guard bill was over \$300 grand a year." – dispensary owner
		"It costs me about \$70,000 just for city staff time." – dispensary owner
	Excessive Bureaucracy	"They want to know what batch, what clone that came from, they trace it all the way back and that's a lot." – dispensary owner
		"I think over 75%, maybe even over 80% of all licensed cannabis facilities in CA do not have final licenses." – cannabis advocate.
		"Now I have to pay all this money in rent and the process can take literally two or three years." – dispensary owner
	Social Inequity & Injustice	"We [legislators] did not consider social equity at all." – dispensary owner
		"Not a fan of banning things in your own home. That is bringing the 'Drug War' 2.0 straight into people's houses." – cannabis advocate
		"The pain department won't even refer people to me that they know can't afford it." – clinician
Other shortcomings of prop 64	Unforeseen consequences	"Some people are now taking the legal CBD and creating these high-powered new products that are much more impairing" – legal professional
		"They tend to think that high THC content is going to sell the best and pack their shelves with it" – addiction specialist
	Safety ramification	"There's no real cap on the potency of the drug." – cannabis researcher
		"Everybody's perception is that oh it's OK to do this no matter what now. And that's where we've seen the big, uptake in DUIs" – law enforcement
		"Everybody's perception is that oh it's OK to do this no matter what now. And that's where we've seen the big, uptake in DUIs" – law enforcement
	Issues with law creation	"There was stronger representation of corporate and wealthy people and less representation of public health people" – dispensary owner
		"In most cities, they all copy each other when it comes to these ordinances, ... the problems just keep getting duplicated."-dispensary owner
	Lack of medical guidance	"They're practicing medicine without a license, absolutely." – addiction specialist
		"I'm not going to send him out with this prescription that says go pick up whatever variety of blood pressure medication you'd like to take and use as much of it as you think you need to feel alright, like I would never do that." – cannabis clinician

	Impact on medicinal cannabis users	"Patients now go through the public health office and spend an additional 50 to \$100 per year in LA. It's really like 10 to 15% off a 30% tax" – cannabis clinician
		"Some products evaporated – I called the marketplace my Achilles heel." - cannabis clinician
		"Older people can't even get into some of these containers" – cannabis clinician
	Proliferation of unregulated market	"Now black-market dealers are going to deliver to you." -Dispensary owner
		"Did they expect the black market to just disappear - it takes 2 years and at least \$300,000. "– dispensary owner
	Differing state vs federal laws	"We're a border town and so 50 miles out from any international border is really federal jurisdiction." – cannabis researcher
		"We need the federal government to allow banking." – dispensary owner

In addition to the four major themes outlined above, SME interviews also revealed three minor themes regarding shortcomings of Prop 64.

On the consumer side, there was an unforeseen increase in potent (high THC) products, as well as derivatives. SME also noted an increase in cannabis being marketed toward youth, with attractive and disguisable products—for example, a vaping device disguised to look like a calculator, or edibles packaged to look like candy.

SME also reported safety-related changes after implementation of Prop 64. There was general frustration about the differing state and federal laws, noting its impact on transportation and banking. SME noted that dispensaries, working as a cash-only business, saw an increase in robberies, which may be avoided if there were alternate banking options available. A law enforcement SME reported an increase in DUIs and noted lack of guidance about driving and cannabis use.

Finally, SME noted an unanticipated trend away from programs that support medicinal cannabis users. For example, elimination of the compassion programs, which provide free or reduced cost cannabis to severely ill medical card holders. Budtenders were increasingly being seen as 'medical experts.' During Prop 64 planning and implementation, SME reported inadequate representation of public health and medical experts, whose involvement may have mitigated these unintended changes. The unregulated market partly proliferated due to excessive regulation, taxation, and business challenges, in addition to changes in amount and area of enforcement. Finally, the increase in potency and

decrease in product selection was also noted to disproportionally have a negative impact on medicinal users.

Recommendations for Improvement of Prop 64

"Recommendations for improvement of Prop 64" summarizes SME perceptions on how Prop 64 could be revised. Under this theme, four subthemes were identified: Policy Change, Need for Research, Adjustment in Power, and Transform Business Model. The details are presented in Table 3.

Policy changes. There were several recommendations for direct changes to Prop 64. A policy maker emphasized that regulation efforts for cannabis should not be reduced or stopped. SMEs suggested lowering taxes and fees, setting potency limits, revising licensing procedures, and addressing bureaucratic hurdles. Potential changes to licensing and policy could involve shortening the wait time for licensing, simplifying the requirement to own rental property before obtaining a license, and lowering the associated fees. Social equity support packages and inclusion of stakeholders with diverse backgrounds could facilitate more equitable involvement in the cannabis industry. This could be in providing guidance and/or financial support in the initial phases of starting the business or a transition from a "mom and pop" shop to a large cannabis business that can compete with the big companies. Clinical experts advocated for potency limits on cannabis products, particularly to safeguard vulnerable populations (e.g., youth, older adults). For medicinal cannabis patients, SMEs suggested reducing cost by reducing or

eliminating taxes, reinstating compassion programs, and providing insurance coverage. Furthermore, it was recommended that pharmacies be established for medicinal cannabis dispensation to ensure appropriate care delivery, and that medicinal users should be encouraged to get guidance from clinicians.

Need for research. Various SMEs identified areas for further research in the realm of cannabis. Legal professional SMEs (lawyer, judge, law enforcement) underscored the need to investigate the medicinal qualities of hemp derivatives like Cannabidiol (CBD), cannabinol (CBN), and Cannabichromene (CBC). Clinicians SMEs advocated for studies examining unintentional poisonings from edibles among children, while law enforcement emphasizes the necessity of establishing personal limits for driving under the influence of cannabis. The addiction specialist SME highlighted the absence of FDA-approved medications for treating cannabis use disorder. Furthermore, a cannabis researcher emphasized the dearth of research on the effects of cannabis on acute injuries, despite anecdotal reports from elite athletes regarding its potential benefits compared to opioids.

Adjustment in power. Various stakeholders have highlighted the necessity for adjustments in power dynamics regarding cannabis legalization policies and implementation. SMEs described the lack of diversity of stakeholders in the decision makers and promoted the need for change. A cannabis clinician expressed concerns about the

lack of representation for cannabis physicians in public health and the DCC, potentially leading to biases against cannabis. Dispensary owners emphasized the importance of proactively shutting down on unregulated cannabis activities. Furthermore, clinicians stressed the need for change from the top while also promoting initiatives from below, including comprehensive education on the endocannabinoid system in medical schools, to foster a more informed and balanced approach to cannabis-related discussions and policies.

Transform business model. SMEs proposed transformations in the business model surrounding cannabis distribution and manufacturing. Cannabis clinicians advocated for the segregation of medical cannabis and adult cannabis use dispensaries to ensure distinct and specialized services. A dispensary owner highlighted the importance of convenient accessibility to dispensaries, suggesting integration into shopping areas that people routinely frequent. Additionally, the idea of an incubator program was suggested by another dispensary owner, aiming to facilitate collaboration between property owners and equity applicants, thereby reducing costs and fostering mutual support within the cannabis industry. This was elaborated by how a more seasoned cannabis owner may serve as a guide or sponsor to support an equity applicant with knowledge, space, or financial means to diversify the industry.

Table 3. *Recommendation of Improvement of Prop 64 Themes and Subthemes with SMEs Statements*

Themes	Subthemes	SMEs statement
Recommendations for improvement of Prop 64	Policy Change	"Legalization of cannabis does not mean no more regulations of cannabis" - Policy
		"Need lowered taxes, revise licensing and bureaucratic challenges, and need federal rescheduling and safe banking act" - dispensary owner
		Increased social equity by providing equity support packages, involving representative stakeholders, and reducing cannabis use restriction.
		"we need to limit how high the potency of products can go, we need to look have precautions set for vulnerable populations" - clinician/advocate
		"For medicinal cannabis patients, reduce or eliminate tax. They also need insurance coverage... medical advices should not be given by non-clinicians and restore compassion program. Ideal, I would like a pharmacy for medicinal cannabis dispensation" - cannabis clinician
	Need for Research	"Hemp derivatives CBD, CBN, CBC, all of the minor derivatives and whether they have any kind of medicinal qualities." - legal professional

		"See if there have been unintentional poisonings from the edible in kids." - clinician
		"Biggest one, we have to find a personal limit for driving." - law enforcement
		"I don't have a medicine, an FDA approved medicine to give someone if they do indeed have a cannabis use disorder." – addiction specialist
		"There's absolutely no research on the effects of cannabis on acute injury. Even though elite athletes are reporting that it speeds up their recovery and they would rather use opioids – they want some science behind it." -cannabis researcher
	Adjustment in Power	"OK, at the public health level and the DCC, there is only one of twenty representatives, roughly speaking, and one physician. He's an addiction physician, which presumably would mean that he's against cannabis." – cannabis clinician
		"Shutting down the illicit is really important." -dispensary owner
		"So, it really needs to start at the top and in Med schools and starting to train people on the endocannabinoid system - they need to start looking at this from a different lens." -clinician
	Transform Business Model	"In my ideal world, medical cannabis would not be dispensed with recreational cannabis at all. They would be totally separate entities. I would like to have my own compounding pharmacist." –cannabis clinician
		"I think if it's near their regular shopping access, they're not making a special drive into some industrial park somewhere." -dispensary owner
		"Incubator program where a property owner could share the manufacturing space with an equity applicant and so they don't have to pay for the most expensive part, is a brilliant way to help each other in this space." -dispensary owner

DISCUSSION

The legalization of cannabis, a complex compound with multiple active ingredients, is a huge undertaking requiring a careful approach. Otherwise, individuals and societies can face negative, and possibly unintended, consequences, and it may take years of effort and financial spending to undo the damage done, as seen in the tobacco and alcohol industry. Vermont and Colorado are good examples of states that have either carefully planned the legalization of adult cannabis use or revised a proposition (Chen & Searles, 2017). In California, adult cannabis use was legalized in 2016 with the passage of Proposition 64: The Adult Use of Marijuana Act, and like in Vermont, California deliberately took 2 years before implementation in 2018 to build an adult cannabis use infrastructure. As part of the Impact 64 project, semi-structured qualitative interviews were conducted with 22 Stakeholders and Subject Matter Experts (SME) in the cannabis industry and identified significant perceived successes and shortcomings of Prop 64,

as well as specific recommendations for improvement.

Success of Prop 64

Stigma reduction. Stigma is a complex phenomenon with several domains (e.g. perceived, internalized, anticipated, enacted) that has profound social consequences impacting personal identity and has well-known deleterious health consequences in addition to widening health disparities (Pescosolido & Martin, 2015). American’s history of cannabis is complex with initial use of cannabis, to its criminalization of use since 1937, and progressive changes over the last century (*Marijuana Law*, 2024). Pre-legalization, Proposition 215 was the first law to allow the use of cannabis for medicinal purposes in CA (*Marijuana Law*, 2024). One of successes of Prop 64 identified during these interviews is stigma reduction at the societal level and legitimizing the use of cannabis for both medicinal and recreational purposes at the individual level. Societal stigma has reduced as shown in various studies although structural and interpersonal

stigma is still prominent. For instance, in the realm of the patient-provider relationship, nondisclosure was associated with anticipated stigma (Dahlke et al., 2024; King et al., 2024). Factors that allow for normalization of cannabis in addition to responsible use include availability/access, cannabis trying rates, regular use, social accommodations for use, cultural acceptance, nonproblematic rhetoric/action by government (Reid, 2020).

Quality Control. Similarly, Prop 215 had little effect to improve the quality of cannabis prior to legalization (Michael G. DeGroote Centre for Medicinal Cannabis Research, 2017). With Prop 64, quality control including the “Seed to Sale” model has increased trust in product dosage and composition at the organizational/community SEM level. California also instituted stringent testing and procedures on labels and packaging, although SME mentioned that labelling may be inconsistent. There is an increased perceived comfort among users and providers with cannabis use, with respect to avoiding contaminants, limiting adverse effects, and maximizing intended effects. On the other hand, studies report concerns for testing facilities lacking federal standards, having failed yeast/mold testing rates, and having inflated potencies (Department of Cannabis Control, 2022). As such, it is important to implement policy-level changes to make up for the nuances.

Justice reform. Pre-legalization there were high rates of case filings and arrest in many states such as Oregon, Washington, and qualitative data for California (Farley & Orchowsky, 2019). Per SMEs, legalization has freed many individuals of undue and historical oppression, based upon use of a substance that is perhaps not as harmful as most unregulated substances and also, regulated medical prescription substances such as opioids and benzodiazepines. It is important to note, SME’s are highlighting the most obvious changes and may miss other aspects of continued oppression such as in those seeking housing or employment that may have formally had a criminal justice violation on a criminal offender record information (CORI), or an adolescent caught with possession (*Fair Housing and Criminal History FAQ*, 2022).

Minor themes. There were some categories where SME identified partial successes of Prop 64 regulations. Limiting sales to adult-only outlets

seemed successful; however, while cannabis sales are restricted to adults, advertising is not, and many products on the market are designed to appeal to minors, such as by disguising cannabis products (Pechmann et al., 2024). A SME clinician who is a cannabis advocate mentioned that the kids have access to cannabis through older siblings or friends. Access to youth has mixed findings; however, overall trends show an increase in access to cannabis, particularly among those from disadvantaged backgrounds and those experiencing “chronic sadness” (*California Youth Cannabis Use Dashboard*, 2022; *Marijuana and California Youth*, 2025; Howard, 2023; Paschall et al., 2021). Special attention to address each SEM levels for such a subgroup will be important.

Shortcoming of Prop 64

The key identified themes of shortcomings of Prop 64 included high cost of cannabis products, regulatory and bureaucratic challenges to enter and stay in business, and social inequity. These categories were not mutually exclusive. Prior to legalization, during, and post legalization, state and local governments continue to be “cautious” on the control and use of cannabis. In that, SMEs noted that the unregulated cannabis market continued to thrive. Studies show mixed trend when it comes to pricing and that it changes from region to region (Padon et al., 2022). Stores also try to create promotional events to increase sales by lowering prices. Forum searches for the unregulated market price shows markedly low prices as low as 1/4 to 1/2 of retail price (Department of Cannabis Control California, 2025; Childers, 2024). The DCC also outlines the steps necessary to get a license, and has a fee waiver for minorities and disadvantages groups although that may not have been the case at the early stages of Prop 64 as described by SMEs (*Application and license fees*, 2025). Policies that minimize unnecessary regulation without compromising the safety and allow for procedures that allow integration of the unregulated market into the legal market will be paramount.

Minor Themes – DUI and medical cannabis users. SME noted the need for better methods of detecting impairment and impaired driving, as well as more DUI-related public education. Currently, there are no consensus to the level of cannabis to define impairment or a way to enforce

it (Fitzgerald et al., 2023; Wong et al., 2014). California has given each municipality the power to determine its rules in terms of sales, location/buffer zones, and advertising (Department of Cannabis Control California, 2025). Even though that can be helpful in some instances, it can lead to public confusion and variations in availability, which could increase DUI as consumers travel to other locations to access legal dispensaries, or the unregulated market

In regard to medicinal cannabis users, an unintended consequences included the elimination of the compassion program. Prior to legalization, cannabis growers and distributors donated cannabis to nonprofit collectives and later dispensaries to provide free cannabis to low-income medicinal patients (Howard, 2023; Kreidler, 2019). With legalization, every donation was to be taxed as high as 40%, eliminating such program, making it more difficult for a low-income medicinal patient to afford cannabis. Moreover, it takes multiple steps to get a Medical Marijuana Identification Card, and the tax benefits are too low (*Medical Marijuana Identification Card: How to Apply*, 2025). The lower availability and variety of low-THC products also affects this population (Cash et al., 2020). Policies that bring back such initiatives and create balance will be helpful.

Recommendations for Improvement of Prop 64

There were many recommendations for improving Prop 64 regulations and implementation. California might consider applying the lessons learned from Colorado, which used the Public Health Framework (PHF) to create infrastructure to understand the knowledge gaps related to cannabis legalization and develop policies to protect the public (Ghosh et al., 2016). The first recommendation is to assess and monitor health issues through population-based surveys, and hospital/ED/recreational incident tracking. The second is to develop policy through education and community partnerships. This is highlighted in the SME recommendations of having a multi-disciplinary approach to creating/revising Proposition 64, including social equity in the process, and having community engagement with stakeholders in each sector. Lastly, it is key to provide assurance by having regulations and enforcement that are reasonable

– improve labelling and safe packaging, continuing “seed to sale” tracking with an efficient system for dispensaries, and standardizing quality control regulations. It would also be beneficial to have a primary contact person at each county/city to facilitate communication with stakeholders, as desired by the SME.

Policy changes – challenges to licensing and pharmacy model. Recommendations to change specific policies were lowering taxes and revising licensing procedures in the cannabis industry. It is important to note implementation might be difficult given the decentralized local government structure of each province (Fitzgerald et al., 2023; Wong et al., 2014). Amendments at the higher SEM levels such as the justice reform may be easier as recently done in 2023 (Orange County Public Defender, 2025). Moreover, implementing a pharmacy model for medicinal patients might be more promising as such models exists in various states, and because California has made steps to allow cannabis use for terminally ill hospitalized patients as of 2021 (Pharmacists’ Cannabis Coalition of California, 2024)..

Need for research. Currently, researchers have to follow stringent rules and steps to conduct research and only with specific FDA approved cannabinoids and products (U.S. Food and Drug Administration, 2023). The CDC has created strategic plan to foster research and policies while the AJPH and the Canadian government outlines research gaps that are helpful to address (American Public Health Association, 2024; Canadian Centre on Substance Use and Addiction, 2023; Michael G. DeGroote Centre for Medicinal Cannabis Research, 2017). Per SME, with proliferation of potent product types and derivatives, research of their safety profile, dosing requirements, and treatment alternatives for cannabis use disorder, as well as driving limits with cannabis use were especially emphasized.

This study had several strengths. The inclusion of 23 SME with a variety of expertise and backgrounds participated in the semi-structured interviews, which contributed to well-rounded theme results, which adds qualitative complement to the current literature base. Each interview had several interviewers present during the interview which helped insure a consistent representation of the themes. The content of each interview was coded with two independent raters

and a third person to resolve any disputes and inter-rater reliability.

In terms of limitations, each SME subgroup consisted of only 2-3 individuals, and thus a possible constriction of viewpoints. This could be especially true when using a snowball sampling method after initially using a purposive sampling method. Despite including multiple stakeholder groups (cannabis dispensaries, cannabis clinicians, cannabis advocates, addiction doctors, pain management, law enforcement, judges, researchers), we did not sample pediatricians, school educators, religious/spiritual leaders and might have benefited from a higher number of primary care or addiction medicine physicians, and cannabis consumers. Three SMEs were from out of state although they were considered “multi-state operators.” These SME interviews informed a subsequent survey of 5,000 Californians regarding cannabis use attitudes and behaviours (results to be reported elsewhere).

Conclusion

The Stakeholder and SME interviews done as part of Impact 64 shows that the implementation of cannabis legalization has a broad effect on various sectors (individuals, professionals, institutions) as seen through the SEM model. A multidisciplinary approach is strongly suggested to improve regulation, provide timely support for each stakeholder, reduce social injustice, harm, and anticipate initially unforeseen consequences of use and legislative/regulatory changes. Input from government, state, and local municipalities, with key professional and lay stakeholders, is necessary. Reconsideration of the federal regulations (e.g., Schedule I status) as proposed by the FDA would be an important step to allow for proper research, education, and consistency in law enforcement/regulation of cannabis use.

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