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Marijuana sources in a medical marijuana environment: dynamics in access and use among a cohort of young adults in Los Angeles, California

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Abstract

While a range of sources exist for marijuana users to acquire marijuana for medical or personal use, prior research on marijuana sources primarily focused on single sources. In this analysis, we longitudinally examined characteristics of multiple sources selected by marijuana users, motivations to use sources, and how a blend of marijuana sources accommodated users' needs. Young adult marijuana users (n=60) in Los Angeles, CA, where marijuana has been legal for medical use since 1996, completed two annual qualitative interviews on marijuana use practices and sources between 2014 and 2016. Approximately two-thirds were medical marijuana patients and one-third were non-patient users. Participants reported acquiring marijuana from the following primary sources across two interviews: dispensaries and delivery services, private sellers in the illicit market, friends and family, and marijuana events/conferences. While patients with legal medical access to marijuana typically purchased marijuana from dispensaries or delivery services, they often supplemented from other illicit sources. Non-patients often accessed marijuana through dispensary diversion but also other sources. As patients became non-patients and vice versa during the study period, source type changed too. Broad access to marijuana via legal and illicit sources in this sample is indicative of societal trends towards normalization of marijuana use.

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Contributors

Authors Lankenau, Iverson, and Wong designed the study and wrote the protocol. Authors Reed, Ataiants, Kioumarsi, and Fedorova conducted analysis. Author Reed conducted literature searches. Author Reed wrote the first draft of the manuscript and all authors contributed to and have approved the final manuscript.

Declaration of interest

All authors declare no conflicts of interest.

Keywords

cannabis; marijuana sources; medical marijuana; young adults; qualitative research

Introduction

Marijuana has been legalized for medical purposes in some states in the U.S. since California enacted legislation in 1996. As of 2018, 31 states, plus the District of Columbia (D.C.), have legalized the use of marijuana for medical purposes while use for recreational purposes has been legalized in 7 states plus D.C. (National Conference of State Legislatures, 2018). Young adults, who consume marijuana at the highest rate of any age group (Substance Abuse and Mental Health Services Administration (SAMHSA), 2016), comprise an important proportion of medical marijuana patients. Despite marijuana being legal in some states for medical purposes for over 20 years, few studies have reported on marijuana sources among young adults who use marijuana in a medicalized environment, including factors that influence choice of source and whether sources remain static or change over time. Gaining access to a steady source of marijuana is crucial to becoming a regular user of marijuana for recreational (Becker, 1953) or medical purposes (Lankenau et al., 2018), and characteristics of sources may influence the manner in which the marijuana is used. Environments in which there is increased access to and availability of a drug influence the normalization, or destigmatizing, of drug use among young adults (Parker, Williams, & Aldridge, 2002).

In California, as in most states with laws governing the sale and use of medical marijuana, users legally access marijuana from three primary sources: dispensaries, delivery services, or personal cultivation (National Conference of State Legislatures, 2018). Dispensaries provide marijuana legally to patients with a doctor's recommendation, which are updated frequently, often annually, by visiting a doctor for renewal. Surveys of medical marijuana patients indicate a preference for purchasing marijuana from dispensaries as opposed to other methods of acquisition, e.g., friends, personal cultivation, or street sources (Capler et al., 2017; Grella, Rodriguez, & Kim, 2014). Significantly, medical marijuana dispensaries are primary sources for persons who do not have legal access to marijuana, such as adolescents (Nussbaum, Thurstone, McGarry, Walker, & Sabel, 2014; Thurstone, Lieberman, & Schmiege, 2011; Wilkinson, Yarnell, Radhakrishnan, Ball, & D'Souza, 2016). In general, diversion from dispensaries is acknowledged but rarely quantified or explored in detail (Davis et al., 2016; Martins et al., 2016). Marijuana is also accessed through medical marijuana delivery services, which operate similarly to dispensaries (Lankenau et al., 2017). Like dispensaries, only persons with a medical marijuana recommendation can legally purchase from a medical marijuana delivery service. However, most research to date on delivery services focuses on illicit delivery services in non-medical marijuana states (Curtis & Wendel, 2000, 2007; Sifaneck, Ream, Johnson, & Dunlap, 2007). Another source of marijuana is personal cultivation (Lankenau et al., 2017), which may be undertaken to control the potency or effects of marijuana, for personal control over supply, or to sell to others, among other reasons (Hakkarainen et al., 2017). Growing marijuana for medical use is commonly allowed in states where marijuana has been legalized and guidelines indicate

the amount of marijuana that may be grown (National Conference of State Legislatures, 2018). Most research on marijuana cultivation focuses on professional operations rather than individuals growing for personal consumption (Decorte, 2010; Nguyen & Bouchard, 2010; Weisheit, 1990). Little is known about cultivation for medical use, particularly among medical marijuana patients.

The black or illicit market is a primary source of marijuana in the United States. In 2016, marijuana users in North America spent approximately $46 billion on marijuana from illicit markets (ArcView Market Research, 2017). Marijuana users obtain marijuana from a diversity of illicit sources, which may include one-time anonymous street purchases, an established commercial relationship with a seller, or a “social supply” within a friendship network (Caulkins & Pacula, 2006; Coomber & Moyle, 2014; Sifaneck et al., 2007). Research on the illicit marijuana market has also focused on networks of illicit sellers (Fader, 2016a, 2016b). Overall, research is limited on users or consumers of marijuana markets – particularly medical marijuana markets - including whether medical marijuana patients engage the illicit market despite having legal access to medical marijuana dispensaries. Although there is a rich literature on marijuana sources overall, prior research has primarily focused on aspects of single sources of marijuana, e.g., personal cultivation, friends and family, or private vendors. Notably, literature on marijuana sources primarily provides profiles of those sources without a broader analysis of user motivations to select one source over another and how their choices influence their use.

While we have previously reported on diverse sources of marijuana in a quantitative analysis of young adult marijuana users (Lankenau et al., 2017), no analysis has qualitatively assessed the range of sources for marijuana users or developed profiles of sources in a state where marijuana is legalized for medical use. Similarly, there has not been longitudinal tracking of how marijuana sources vary over time among medical marijuana patients and non-patient users. It is important to understand where and how young adults access marijuana and the extent to which this changes over time because 1) where young adults get their marijuana has implications for their practices (including amount of use, types, and modes of administration), 2) inform us about their attitudes toward marijuana use, and 3) can inform policy intended to restrict use among young adults. As a result, the research questions guiding this qualitative analysis were: What are the characteristics of marijuana sources for young adult marijuana users, patients and non-patients, living in a state with legal access to medical marijuana? What is the relationship between marijuana sources and transitions in patient status, including marijuana practices, and over time?

Methods

Sample

A qualitative sample of 62 participants was selected from a larger quantitative sample (n=366) for a study on young adult users of marijuana in Los Angeles, California (Lankenau et al., 2017). The larger study used a four-year longitudinal design and was comprised of marijuana users between the ages of 18 to 26 at baseline who lived in Los Angeles, spoke English, and had used marijuana at least 4 times in the previous month. Participants were recruited through targeted sampling (Watters & Biernacki, 1989) in neighborhoods and

college campuses across Los Angeles, medical marijuana dispensaries, Craigslist advertisements (a local website that connects users to housing, goods for sale, and jobs), and the use of chain referral from some enrolled participants. Young adults were selected for qualitative interviews who exhibited variability on three criteria: frequency of marijuana use, the absence or presence of different types of chronic health conditions, and scores on a measure that assessed different dimensions of how participants manage negative affect/emotions (the Emotion Regulation Questionnaire), which has been found previously to be associated with different patterns of substance use (Gross & John, 2003; Wong et al., 2013). At the baseline interview, approximately two-thirds of the qualitative subsample possessed a doctor's recommendation for medical marijuana, which enabled them to legally purchase marijuana from licensed dispensaries. Doctor's recommendations need to be renewed periodically, so some participants who were patients at baseline later transitioned to non-patient status at follow-up, and vice versa. The longitudinal design of the study allowed for an exploration of participant motivations for transitions between patient status and decision-making for marijuana purchases, including marijuana sources.

Data Collection

For this analysis, participants were interviewed twice between June 2014 and December 2016. Baseline interviews were conducted in 2014–2015 and follow-up interviews occurred between 2015–2016 so that approximately 12 months elapsed between interviews. Sixty out of 62 participants completed both interviews. Marijuana became legal for recreational use in California in November 2016 but was not available for recreational sale until January 2018. Hence, all interviews occurred before legal sales began while 7 follow-up interviews happened after the legalization initative passed. All interviews were conducted using a semi-structured interview protocol and interviews typically lasted 60 to 90 minutes. Three trained interviewers conducted interviews in private (e.g., project office) and semi-private locations convenient to participants such as coffeeshops or parks. Participants received $30 and $35 cash upon completion of the baseline and follow-up interviews, respectively. The study was approved by Institutional Review Boards at Children's Hospital of Los Angeles and Drexel University. In addition, a Certificate of Confidentiality was obtained from the National Institutes of Health by the investigators to further protect study participants. All interviewers had training in and experience with conducting interviews on sensitive topics such as drug use.

Measures

The interview protocol for both baseline and follow up interviews was designed to capture participant experiences of past and current marijuana practices, physical and psychological health, and motivations for marijuana use. Baseline interviews focused on participant patterns of use since initiation. Participants were asked about the following domains: marijuana use history and current practices, health histories, decisions around procuring a doctor's recommendation for marijuana, access to dispensaries, other drug use, perceptions of risk associated with marijuana use, and social support.

Follow-up interviews focused on changes in health and marijuana practices in the previous year. Information was gathered on accessing marijuana from dispensaries and other sources,

reasons to obtain or keep a doctor's recommendation, transitions into and out of medical marijuana patient status, marijuana culture and group membership, and other topics related to health and drug use.

Participants were asked in both interviews about the manner in which they obtained marijuana ("What is your favorite or preferred dispensary that you go to for medical marijuana?" and "Tell me about other places where you get marijuana other than a dispensary over the past year, such as growing your own, getting it from another grower, friends, etc."). During follow-up interviews, participants who transitioned from medical marijuana patients to non-patients were asked: "Where did you get marijuana from when [your recommendation] expired? How did the way you used marijuana change when it expired?"

Data Analysis

The two participants who did not complete both the baseline and follow up interview were excluded from the analysis resulting in a final qualitative sample of 60 interviews. The analysis used baseline and follow up data to maximize content on marijuana sources. Interviews were recorded digitally and transcribed verbatim. Data analysts created a participant timeline profile for each participant to capture and summarize life events, marijuana use, and health. Transcripts were uploaded to Atlas.ti version 7.5.3. An initial set of codes was based on domains and questions from the interview protocol. These initial codes were supplemented by an iterative set of codes developed by the research team after free coding transcripts. The final coding scheme, which consisted of 36 codes for baseline interviews and 35 codes for follow-up interviews, was applied using Atlas.ti by six data analysts. For this analysis, key codes such as "Marijuana Practices: Network", "Marijuana Practices: Patterns of Use" and "Dispensary: Buy/Features" were used to extract primary themes. After features of sources were outlined, original transcripts were re-analyzed to contextualize the role of sources among participants. The research team met regularly to review coded material and to verify inter-coder reliability. Participants in this analysis have been assigned pseudonyms.

Results

Demographic and Background Characteristics

The qualitative subsample was 60% male, 74.6% heterosexual, primarily non-Hispanic White (36.2%) or Hispanic/Latino (34.5%), and college educated (83.3%). A greater proportion of non-patients were male (70.5%), Hispanic/Latino (47.1%), and employed (64.7%) compared to patients. Patients reported greater 90-day marijuana use than non-patients (71.4 days compared to 55.6 days) and more frequently reported a chronic health condition (60.5%) than non-patients (41.2%) (see Table 1).

Among patients enrolled at baseline, 60.4% remained patients at the follow-up interview (half of this group reported a lapse in their medical marijuana recommendation ranging from several days to several months); 39.5% did not renew their recommendation by follow-up.

Among non-patients enrolled at baseline, 70.6% remained non-patients at the follow-up interview; 29.4% acquired a medical marijuana recommendation by follow-up.

Marijuana Sources, Trajectories of Use, and Changes Related to Patient Status

Participants reported acquiring marijuana from the following sources across two waves of interviews: dispensaries and delivery services, private sellers participating in the illicit market, friends and family, and marijuana events and conferences. In addition, marijuana was sourced from commercial farms in the United States, personally cultivated plants, or unknown origins. Notably, legalization of marijuana for recreational use, which occurred late during the second wave of interviews, did not emerge as a factor impacting marijuana sources for patients or non-patients.

Changes in patient status between baseline and follow-up interviews were often related to changes in marijuana sources (see Table 2). Consistent patients (who mostly used dispensaries) and consistent non-patients (who mostly acquired marijuana from friends or private sellers) used a smaller variety of sources between baseline and follow-up interviews. Patients who transitioned to non-patients at follow-up commonly shifted from accessing dispensaries to using friends and private sellers while non-patients who transitioned to patients at follow-up reported greater use of dispensaries. A number of consistent non-patients indicated a decrease or cessation of marijuana use at follow-up and reported fewer sources. With the exception of marijuana conferences and events, which only patients reported as a source, each type of participant acquired marijuana from all of the sources detailed above. Across all participants was a tendency to report fewer sources of marijuana overall, regardless of patient status, between baseline and follow-up. For some, this meant less variety of sources (e.g., only purchasing from friends as opposed to purchasing from friends and street sellers); for others, this meant less variety within a source (e.g., a patient who at baseline reported buying from multiple dispensaries had a primary dispensary for all purchases at follow-up).

Acquiring Marijuana from Dispensaries

Dispensaries sold a wide selection of flower marijuana as well as concentrated forms (e.g. “wax” or “shatter”), edibles (e.g. drinks or candy), and equipment (e.g. bongs, pipes, rolling papers, oil rigs), according to participants. “Budtenders” were available to answer questions about different marijuana strains or to guide patients in selecting a strain for its desired physical or mental effect. The atmosphere inside dispensaries varied; some allowed customers to smell or touch marijuana flower prior to making a purchase while others sold pre-packaged bags of marijuana.

Participants often distinguished between establishments viewed as professional and those perceived as “sketchy”, or disreputable. Characteristics of professional establishments included clean, well-lit stores with friendly staff, marijuana that could be seen and smelled and/or touched prior to purchasing, security staff on the premises, and an established presence in a “nice” neighborhood. Professional dispensaries were viewed as knowing their marijuana sources or suppliers and not being solely profit-driven. “Sketchy” dispensaries

often did not check recommendations, were in neighborhoods viewed as unsafe or affiliated with gang activity, and were sometimes open past the legal closing time.

Patients were the primary users of dispensaries and all patients reported visiting dispensaries to purchase marijuana. Many dispensaries offered free samples of marijuana flower, edibles or concentrates or lower prices for “first-time patients” to draw in new marijuana patients. Over time, many patients reported having a preferred dispensary. After two years as a patient, Michael (male, white, 19) settled in on a dispensary with an easy sign-in process and high-quality marijuana. Initially, he preferred exploring dispensaries with deals for new patients:

> [I tried other dispensaries] when I was going around the first time when I got my card. We went around to a whole bunch of different places. But, after to going to about 100 or so different shops, this one definitely has stayed the best.

Non-patients, in a few cases, found dispensaries that did not check for recommendations and reported purchasing marijuana directly from these dispensaries. However, non-patients gained a majority of their marijuana from other sources. Non-patients who later became patients over the course of the study reported an increase in their marijuana consumption, which they attributed to greater access via dispensaries. Often, their use spiked immediately after getting their recommendation. Ben (male, white, 23) noted how his use of marijuana increased when his access became easier via dispensaries after becoming a medical marijuana patient:

> The rec made it a lot more convenient for me to get it and have it. It’s cheaper, so you can have larger quantities of it. My consumption has gotten worse since I got my rec, yes. Before I’d have maybe $10 in my pocket and go to a street dealer every couple of days. Having that large quantity on me constantly – it’s just there.

Acquiring Marijuana from Delivery Services

Delivery services were often found on websites, such as Weedmaps, which provided information on medical marijuana dispensaries, doctors, and delivery services. Extensive menu options, which included strains and forms, were posted on Weedmaps or by the delivery services themselves, such as Speedweed, Green Guys, and Eaze. Delivery services usually offered fewer marijuana product options compared to dispensaries. Generally, participants accepted the options that were presented, but found that quality was sometimes lacking. Flower was most commonly purchased from a delivery service, though wax and vape cartridges were also sold.

Delivery services were used more frequently by patients than non-patients. To initiate marijuana delivery, a patient typically texted a photo of their recommendation and state-issued identification to the service. Delivery drop-off varied by service. Some drivers required customers to sit in their car to make the purchase, while other drivers came into the patient’s home and displayed marijuana options, such as strain or form. In addition to charging higher prices for marijuana products than storefront dispensaries, most services charged a delivery fee, required a minimum order, and expected gratuities. Wait times,

which could range from 45 minutes to three hours, were described as one negative aspect of marijuana delivery.

Convenience was a primary motivation to use delivery services, particularly for patients who worked late hours and were not able to purchase marijuana from dispensaries during business hours. Not driving or having access to a car were other motivations to use a delivery service. Nicole (female, black, 21) did not own a car and used delivery services to avoid the cost and time of taking public transportation to a dispensary.

> [The delivery service] told me to look at Weedmaps and find out, you know, what area you live and they were going to give me a call after they verified [my medical marijuana doctor's recommendation] and to know what I want. They told me the minimum. They were charging $2 for delivery and the minimum you have to spend was $30. This was just really convenient – it took about 30 minutes. Sometimes it took an hour. Sometimes it can take 2 hours.

A majority of delivery services were operating legally and only offered to patients, according to participants. For a few patients, delivery services were their main source of marijuana. Most patients had tried delivery once or twice but preferred to visit dispensaries in person. Some preferred the convenience of delivery, but found the additional cost burdensome and viewed a delivery service as a special treat or a luxury. Sam (male, white, 24) used delivery services with his ex-girlfriend and found the process convenient, but he did not like the overall experience of negotiating a purchase via phone with strangers.

> Being in person alleviates that and makes it feel less of a taboo when you're there in person [inside a dispensary]. Sometimes delivery feels kind of shady. You get the 'what do you want?' guy on the phone, and then you have to make the purchase in the street from some dude in his car. It just feels sketchy.

Some delivery services sold to non-patients under certain circumstances. Kim (female, black, 21) developed a personal relationship with employees at a delivery service as a patient and continued buying marijuana from them after her recommendation expired because "they trust us and we're cool, he's cool."

Acquiring Marijuana from Friends or Family

Friends and family members were a common source of marijuana for both patients and non-patients, with most participants reporting that their marijuana originated at a dispensary. Generally, friends were a more frequent source of marijuana than family for ongoing use. For many non-patients, a majority of marijuana was sourced from a friend or family member, who often possessed a medical marijuana recommendation and then purchased marijuana for them at a dispensary. In these cases, participants were commonly expected to pick up the friend, drive him or her to the dispensary, pay in advance, and wait in the car while the friend purchased marijuana. In some cases, orders for particular strains or forms were requested after viewing menus online. When the friend returned to the car, the participant often shared their newly purchased marijuana with the friend, generally by getting him or her high. Joe (male, white, 24), a non-patient, noted the ritual among his friends when obtaining marijuana in this manner:

> I'm the driver. Then, there's the guy with the [medical marijuana] card who sits in the front seat. Then, there's the other guy who just hangs with us and smokes, sits in the back … I drive us to the dispensary. [My friend] already knows what to get, honestly. He just goes to the shop. He knows what to get. He gets the amount I want. It's unspoken, at this point.

For patients, friends often supplemented marijuana obtained from dispensaries. In particular, friends played an important role in maintaining consistent marijuana access when a patient's doctor's recommendation lapsed. Luis (male, multiracial, Hispanic, 26) obtained marijuana from a variety of sources, each of which had its own appeals and drawbacks. He supplemented more heavily from friends and family prior to receiving a doctor's recommendation and again when his recommendation had lapsed.

> My sister, because she works at a dispensary. It's a really good one, but it's in Orange County [adjacent to Los Angeles County]. I don't see her too often. It's two hours round-trip to go visit her. It's like, is it really that worth it? In two hours, I could call up five friends [who always have it].

Significant others often played a major role in marijuana acquisition, which was especially pronounced among patients who had a temporary lapse in their recommendations. For instance, a romantic partner with a recommendation could offer continuous marijuana access during a lapse. Relationship status was sometimes a factor in deciding whether or not to renew a medical marijuana recommendation. Since marijuana purchases were often made together, couples that lived together or saw one another regularly sometimes chose to "share" a recommendation. Jordan (male, black, 20) strategized with his girlfriend on marijuana access, recommendation acquisition, and marijuana purchasing.

> I have [let my recommendation lapse], but then I renewed it because my girlfriend also had her medical card but she didn't enjoy going into the shop to get it. I wanted her to get it so that she could go into the shops with me and get some of the deals, which generally means more marijuana.

Participants used the term "friend" in the conventional sense to refer to social relationships in which marijuana acquisition played only a minor role. They also referred to "friends" when discussing an acquaintance whose sole connection to the participant was marijuana-related. Other times, dispensary sellers were referred to as "friends," even when that relationship was based primarily on the sale of marijuana. In some respects, friendships were more important than one's status as patient or non-patient since some participants who became "friends" to dispensary or delivery service staff reported purchasing marijuana regardless of patient status.

Acquiring Marijuana from Private Sellers

Participants reported purchasing marijuana from three types of sellers: street sellers, dispensary diversion sellers, and "pharm to table" sellers. Non-patients and patients whose recommendations lapsed were the primary users of private sellers, though some patients did use private sellers as a non-primary source.

"Street sellers" sold marijuana in the black market or illicit economy, such as street or public settings. Only non-patients reported accessing marijuana from street sellers. Participants referred to these sellers as "dealers", "pharmacists", "florists", "flower men", "connects" and "weed men". The origin of marijuana purchased in this manner was often unknown to participants. While many believed they received a better price from a street seller than from a dispensary, others thought they paid more than dispensary pricing. All stressed how easy it was to access marijuana from street sellers even though purchases were often made from strangers. Carlos (male, Hispanic, 19), a non-patient, frequently sourced marijuana from street sellers, either strangers on the street or by known street sellers via phone, but indicated finding someone to buy from was always easy.

> There are always people around. Even when you're not looking for it, you could just be walking down the street and somebody'd be like, "Hey man, hit me up. I got that good stuff." If that doesn't happen, if I still have the number from somebody like that I'll probably end up just calling them up.

Dispensary diversion sellers bought directly from dispensaries using their medical marijuana recommendations and resold the marijuana to others for a profit. This arrangement was similar to the dynamic between non-patients who accessed marijuana from friends with medical marijuana recommendations, but typically was of a more transactional nature. Nonetheless, aspects of these relationships sometimes included elements of camaraderie. Morgan (male, black, 26), a non-patient, reported better quality marijuana at a better price from the dispensary seller and trusted him more than the staff at brick and mortar dispensaries.

> I feel like I have a relationship with my weed man … He's probably gonna hook my sack up a little bit more than a dispensary. I feel like at a dispensary if I buy an eighth they're probably gonna give me 3.5 on the dot, that's it. I feel like if I get an eighth from him it's gonna be like 3.6, 3.7, 3.8.

"Pharm to table" sellers sold directly to individuals from a cultivated source of marijuana. This source was usually a private crop of marijuana grown with the intent of selling to others as opposed to a larger, commercialized grow operation. A number of participants purchased occasionally from others who grew it but none indicated that it was their primary source. Jason's (male, Hispanic, 24) friend sold high-quality, homegrown marijuana to people who preferred not to get a doctor's recommendation.

> I have a lot of friends that sell in Englewood but they grow their own stuff. They don't sell to dispensaries; they sell to their own patients. They have their own people. I got this friend that grows in his backyard. It's really good stuff and old people will buy from him. People who don't want to get a recommendation will buy from him.

Jessie (female, white, 24) felt a spiritual connection with marijuana and regarded the origin of her marijuana as a serious consideration, including whether it was grown with pesticides and the culture of the dispensary. She supplemented her dispensary-purchased marijuana with cultivated marijuana.

> I still have friends that grow and they'll bring some home. And they'll be like 'try this out'. That's also like a luxury. They're just offering you, they're not trying to sell it to you, because dispensaries have definitely changed.

Acquiring Marijuana through Personal Cultivation

A number of participants indicated an interest in growing marijuana for medicinal or recreational use. Several had attempted to grow after purchasing a clone from a dispensary or by saving seeds from marijuana flower buds, but found growing and harvesting too difficult. The experience of growing was described as an experiment or novelty that was undertaken out of curiosity. No participants reported homegrown marijuana as a primary source; rather, it served to supplement marijuana received in other ways. Most who had attempted to grow were medical marijuana patients.

Only one patient (Jessie, female, white, 24) discussed ongoing growing and harvesting of her own plants, but was new to the process. She knew multiple people who grew marijuana organically for medical purposes and began growing over the next year. The experience of growing had been spiritually fulfilling and made her feel more connected to her medicinal use of marijuana.

> Well, I got a little clone – a little plant from [a dispensary known for their organic products]. I was able to buy a strain that I've tried from them, and then I got to grow it even to a bigger plant. I bought multiple. Only one of them lived at the end of it, but that's all I needed. It was a beautiful experience. I loved it in my garden.

No non-patients had seriously attempted to cultivate marijuana as a viable source.

Marijuana Events and Conferences

A less common source of marijuana was events that focused on marijuana use and culture, which were only reported during the follow-up interviews. While sometimes known among non-patients, only patients reported attending formal marijuana conferences and events where they browsed and purchased products. Only one participant indicated that these events were a significant marijuana source. Two primary types were described: marijuana-centered events and parties; and trade shows with vendor booths.

Marijuana events and parties were seen as exclusive or for those more closely connected to a culture of marijuana users. Access to these events was limited to persons with recommendations but participants described them as having a recreational atmosphere. Some events featured marijuana "open bars" with a range of marijuana to consume by smoking, vaping, etc. Attendees often identified as feeling connected to a broader culture of marijuana users. These participants used marijuana-centered websites such as Leafly and Weedmaps to learn about dispensaries and marijuana strains, and some used social media such as Instagram to connect to other marijuana users.

Sylvia (female, Hispanic, 21) preferred to bypass intermediaries for marijuana access and purchase marijuana directly from the source. She accessed marijuana primarily from these events.

> I go to a lot of cannabis events. That's where I mainly do my purchases. They do wholesale prices, and it's directly from the people who make it. I can be skeptical. I can see for myself who makes it … There was one Saturday and Sunday. I went to both, but the Sunday one was a private party … That one was really, really exclusive. It had catering and games. It was really awesome.

Some attended more formal, marijuana industry-oriented events that resembled trade shows or conferences. These events were opportunities for companies to showcase their products, such as tinctures, bongs, and new marijuana strains and allowed participants to buy directly from these sellers. Sylvia discussed the benefits of attending what he called a "weed farmer's market".

> You get it cheaper, because you get it wholesale-priced. You get it at the price that they would give it to the shop, or maybe even cheaper. It's a lot more convenient. It's more of a sneak peek and better deals than what you would do at a retail corner shop.

Discussion

Our analysis found that young adult marijuana users accessed marijuana from a variety of both legal and illicit sources; no participants had only a single source of marijuana over the two-year period of interviews. This is in line with surveys of medical marijuana users who also report multiple sources of marijuana (Capler et al., 2017). All patients reported purchasing marijuana from dispensaries and delivery services while non-patients were largely unable to directly access these sources. However, patients also relied on other sources, such as friends and private sellers.

Contrary to what might be expected, patients did not exclusively buy marijuana from dispensaries and non-patients did not solely acquire marijuana from private sellers. Even when certain marijuana sources became less accessible (e.g., dispensaries, friends), no participant reported difficulty in obtaining marijuana (Harrison, Erickson, Korf, Brochu, & Benschop, 2007). One unanticipated finding from the qualitative interviews was the role of marijuana festivals and events in patient acquisition of marijuana, which was not captured in our larger quantitative study (Lankenau et al., 2017), and may have foreshadowed an emerging marijuana culture ahead of recreational sales in California. When located in a city with legal marijuana access, these events become more commercial in nature (Skliamis & Korf, 2017), indicating that festivals may play a larger role in the future as marijuana legalization expands.

Our findings indicate that marijuana sources and the availability of marijuana more broadly influenced trajectories of use over the study period. Between the baseline and follow-up interviews, study participants futher refined their preferences for marijuana characteristics, including aspects of how they acquired marijuana (Becker, 1953). In general, participants reported fewer types of sources overall as well as less variety within a source, which could note a reduction in use and be a sign of maturing out (Winick, 1962) of marijuana use. At the same time, some patients who used dispensaries indicated refining their use, rather than reducing it. Patients who purchased from a dispensary were able to choose specific strains or

forms and tailor purchases to create a desired physical or mental effect (Lankenau et al. 2018). In contrast, buying from a street or a diverted source was less conducive to experimentation or fine tuning preferences because buyers had less control over the product or its origin. Overall, consistent access to marijuana regardless of source, as well as the emergence of new sources such as marijuana conferences, points to broader destigmatization and normalization of marijuana in this sample of young adults (Parker et al., 2002). Accessibility is a key dimension of normalization; the ease with which participants acquired marijuana and the emergence of novel sources over the course of the study suggest increased normalization of marijuana use among this sample of young adults.

Similar to other studies (Boyd, Veliz, & McCabe, 2015; Thurstone et al., 2011; Wilkinson, Radhakrishnan, & D'Souza, 2016), our research found that marijuana diverted from dispensaries was a common source of marijuana for both patients and non-patients. Non-patients regularly accessed marijuana from dispensaries, either directly by visiting dispensaries in person, or more commonly by purchasing marijuana from friends, family, or private sellers. This pattern of diversion mirrors the phenomenon of "pharmaceutical leakage" whereby prescription drugs are diverted from a pharmacy or doctor to someone without a prescription (Lovell, 2006; Vrecko, 2015). Through a kind of pharmaceutical leakage, marijuana was legally obtained from dispensaries by patients and became part of a new type of black market when it was sold by dispensary sellers or friends. Similar to prescription drugs, these products often had the markings and packaging of a particular medical marijuana dispensary, which could increase legitimacy and sense of quality. Interestingly, patients – those who had direct, legal access to dispensaries -- often obtained marijuana from a blend of sources, including diverted marijuana. This is an important finding given changing laws and shifting access to marijuana in the United States. Our results suggest that diversion is likely to continue in environments where marijuana is controlled in some manner. The influence of these changes on patterns of marijuana acquisition and use will likely vary for young adults who are below the minimum age for legally purchasing marijuana.

Friendship played an important role in marijuana sourcing. Acquisition of marijuana from a friend within a network often resembled a traditional friendship that transcended marijuana use. Friendships also referred to more casual relationships in which norms of marijuana use were enacted, including the buying and selling of marijuana. This is in line with other research on the role of friendship networks and marijuana use (Belackova & Vaccaro, 2013; Caulkins & Pacula, 2006). Reciprocity was a valued component of marijuana culture within friend networks. Overall, the distribution of marijuana within friendship networks is part of the social supply of marijuana whereby sales are often driven by reciprocity and strength of relationships rather than being financially motivated (Coomber, Moyle, & South, 2016).

Most participants in this study who attempted to grow marijuana largely grew for experimentation and enjoyment purposes, but were unable to harvest the plant for consumption. Marijuana cultivation was typically undertaken in a casual manner and without investing much time or resources. Those who cultivated marijuana often had a deeper connection to marijuana culture or found the role of marijuana to be more meaningful in their other relationships (Maggard & Boylstein, 2014). While only a handful

attempted to grow, they interacted with others who were cultivating marijuana in small quantities to sell and a few participants had purchased or been gifted marijuana grown by "pharm to table" growers.

Implications

The laws regulating marijuana in the United States continue to shift on a state-by-state basis. As marijuana is legalized by degrees – ranging from decriminalization to medical marijuana laws to legal recreational marijuana use – marijuana sources will be impacted. In a state where marijuana is legal for medical purposes, young adult marijuana users were readily able to access marijuana from both licit and illicit sources. Non-patients without access to legal marijuana were nonetheless able to access marijuana intended for those with doctors' recommendations. At the same time, patients with medical marijuana access continued to acquire marijuana from other sources, such as friends or street sellers, despite the legal protection afforded by dispensary access. In this environment, the marijuana industry, which has historically been part of the informal economy (Gettman & Kennedy, 2014), is able to legally operate and market brands to different demographics, including young adults. Changing legislation regarding marijuana is due in part to decreased stigma around marijuana use and increased legal access to marijuana contributing to the normalization of the drug (Coomber et al., 2016; Parker et al., 2002). This normalization of marijuana consumption paves the way for further development of both new and traditional sources of marijuana. For instance, while traditional sources of marijuana, such as the black market, will continue to operate, novel sources of marijuana, such as marijuana events, will expand. Marijuana sources will likely continue to impact patterns of marijuana use among young adults as legal access to marijuana shifts and policy dictates what forms are available.

Limitations

This study has some important limitations. Interviews were conducted with young adults living in an urban city within a state with medical marijuana laws. Our findings may not be generalizable to older adults or those who live elsewhere, especially in states with different patterns of marijuana legalization and law enforcement. Due to recruitment strategies, the sample was predominantly enrolled in college, so results may not be generalizable to all young adults. Although all participants were interviewed twice by study personnel and rapport was established, due to the stigmatized nature of drug use, results are subject to social desirability bias. Marijuana was legalized for recreational use for one to two months during the second wave of interviews, which could have impacted sources, e.g., diversion from dispensaries, for some participants (after 7 out of 60 participants were interviewed after the law change). However, our results did not reveal any direct impact of legalization on marijuana sources during this short period of time.

Conclusion

In a setting where medical marijuana has been legal since 1996, young adult marijuana users obtained marijuana from both licit and illicit sources. While patients with legal access to marijuana typically purchased from dispensaries or delivery services, they often supplemented with marijuana from other sources. Non-patients often accessed marijuana through dispensary diversion but also reported purchasing marijuana from private sellers and

other sources. Friendships played an important role as a means to access marijuana for both patients and non-patients. Changes in marijuana sources were often associated with changes in patient status, trajectories of use, or marijuana practices. As patients became non-patients and vice versa, source type transitioned as well. Broad access to marijuana via legal and illicit sources is indicative of societal trends towards normalization of marijuana use.

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Table 1.

Demographic Characteristics (n = 60).

Variable	Patient at Baseline n=43 n (%)	Non-Patient at Baseline n= 17 n (%)	Total n=60 n (%)
Age, mean (sd)	21.8 (2.50)	21.6 (2.67)	21.8 (2.53)
Gender/Sex at birth Male	24 (55.8)	12 (70.6)	36 (60.0)
Sexual identity[a] Heterosexual	30 (71.4)	14 (82.4)	44 (74.6)
Race[b]			
Non-Hispanic White	16 (39.0)	5 (29.4)	21 (36.2)
Non-Hispanic Black/ AfricanAmerican	8 (19.5)	1 (5.9)	9 (15.5)
Non-Hispanic Multiracial	4 (9.8)	2 (11.8)	6 (10.3)
Non-Hispanic Asian/Pacific Islander	1 (2.4)	1 (5.9)	2 (3.4)
Hispanic/Latino	12 (29.3)	8 (47.1)	20 (34.5)
Education/			
Some college or above	37 (86.0)	13 (76.5)	50 (83.3)
Currently in school/ educational program	32 (74.4)	12 (70.6)	44 (73.3)
Employed	25 (58.1)	11 (64.7)	36 (60.5)
90 Day Marijuana Use, mean (sd)	71.4 (23.63)	55.6 (31.61)	66.9 (26.84)
Emotional Regulation Questionnaire, mean (sd)			
Cognitive appraisal	5.4 (1.22)	4.7 (1.82)	5.2 (1.44)
Suppression	3.5 (1.38)	3.2 (1.40)	3.4 (1.38)
Chronic Health Condition (yes)	26 (60.5)	7 (41.2)	33 (55.0)

[a] 1 refuse to answer for non-patient

[b] 2 refuse to answer for patients

Table 2.

Marijuana Sources by Patient Status and Transitions between Status

Consistent Patients (n=13)	
Baseline	Sources included dispensaries, delivery services, social networks, private sellers, but primarily dispensaries.
Follow-up	Dispensaries and delivery services were primary sources. Used smaller variety of sources as they became more experienced patients and were more likely to name a primary dispensary.
Consistent Patients with a Lapse in Coverage (n=13)	
Baseline	Sources included dispensaries, delivery services, social networks, and private sellers, but primarily dispensaries. Several discussed attempts or aspirations to grow marijuana. Two indicated prior lapses of their recommendations.
Follow-up	Continued to access a variety of sources. None indicated having difficulty accessing marijuana during a lapse.
Transition from Patients to Non-Patients (n=17)	
Baseline	Sources included dispensaries, delivery services, social networks, private sellers, but primarily dispensaries.
Follow-up	Most accessed marijuana via dispensary diversion through social networks (e.g., friends, significant others). None had difficulty accessing marijuana, but some noted fewer choices of marijuana strain since they were depending on others for access.
Transition from Non-Patients to Patients (n=5)	
Baseline	All indicated access to dispensaries or delivery, either by accessing directly or through friends. Primary sources included dispensary diversion (from friends or sellers) or street sellers.
Follow-up	Continued accessing a range of sources, but primarily accessed dispensaries. Some noted an increase in their marijuana use once they were able to legally access marijuana.
Consistent Non-Patient (n=12)	
Baseline	All indicated access to dispensaries or delivery, either by accessing directly or through friends. Primary sources included dispensary diversion (from friends or sellers) or street sellers. None grew marijuana.
Follow-up	Accessed fewer sources, which primarily consisted of accessing dispensaries without a recommendation via diversion. Some had ceased or heavily limited their marijuana use.