Medical Decision-Making Processes and Online Behaviors Among Cannabis Dispensary Staff

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ABSTRACT

BACKGROUND: Most cannabis patients engage with dispensary staff, like budtenders, for medical advice on cannabis. Yet, little is known about these interactions and how the characteristics of budtenders affect these interactions. This study investigated demographics, workplace characteristics, medical decision-making, and online behaviors among a sample of budtenders.

METHODS: Between June and September 2016, a cross-sectional Internet survey was administered to budtenders in the San Francisco Bay Area and Greater Los Angeles. A total of 158 budtenders fully responded to the survey. A series of comparisons were conducted to determine differences between trained and untrained budtenders.

RESULTS: Among the 158 budtenders, 56% had received formal training to become a budtender. Several demographic differences were found between trained and untrained budtenders. For workplace characteristics, trained budtenders were more likely to report budtender as their primary job (74% vs 53%), practice more than 5 years (34% vs 11%), and receive sales commission (57% vs 16%). Trained budtenders were significantly less likely to perceive medical decision-making as very important (47% vs 68%) and have a patient-centered philosophy (77% vs 89%). Although trained budtenders had significantly lower Internet usage, they were significantly more likely to exchange information with patients through e-mail (58% vs 39%), text message (46% vs 30%), mobile app (33% vs 11%), video call (26% vs 3%), and social media (51% vs 23%).

CONCLUSIONS: Budtenders who are formally trained exhibit significantly different patterns of interaction with medical cannabis patients. Future studies will use multivariate methods to better determine which factors independently influence interactions and how budtenders operate after the introduction of regulations under the newly passed Proposition 64 that permits recreational cannabis use in California.

KEYWORDS: Cannabis, marijuana, dispensary, budtender, medical decision-making, Internet

Introduction

Individuals who use cannabis for medical purposes represent a complex and diverse population. Among the 29 states and District of Columbia that currently permit medical cannabis in the United States,[1] individuals may receive physician recommendations to use cannabis for approved medical conditions. As such, medical cannabis patients frequently report daily use to alleviate conditions such as chronic pain, sleep problems, headaches, nausea, and psychological distress.[2–4] Patients can also purchase and consume a myriad of low to high potency products through networks of cannabis dispensaries, some of which adopt pharmacy pickup models, offer delivery services, provide health and social services, and permit on-site consumption.[4–6]

Yet, the lack of federal regulation of these diverse networks prevents the establishment of health systems that formalize processes related to medical examinations, distribution of identification cards, and the sale of properly dosed products.[7] As a result, most cannabis patients engage with dispensaries for medical advice on cannabis,[7,8] with evidence that certain patient populations avoid discussions about cannabis with their primary care physicians and health care providers.[9–11] In the context of arriving at informed decisions about cannabis, interactions at dispensaries therefore represent key opportunities for patients to consult dispensary staff, like budtenders, about product choices and the therapeutic potential of cannabis.[12,13]

Moreover, the growing visibility of dispensaries and budtenders on the Internet suggests that social networks and mobile applications represent emergent platforms that may facilitate engagement with patient populations.[14] Through these platforms, budtenders may make health claims about cannabis, directly advertise retail products, and guide patients to dispensary websites, including large online marketplaces that streamline delivery and pickup services.[14,15] Although such behaviors may

shift patients away from illicit markets, the unregulated nature of online interactions between dispensary staff and cannabis patients has considerable public health implications, including direct-to-consumer advertising of cannabis that may strongly influence decisions to purchase high-potency products.[16]

Thus, this pilot study investigated medical decision-making processes and patterns of information exchange among a sample of budtenders from two major metropolitan areas in California. For the purposes of the study, an Internet survey was administered during summer 2016 to measure budtender demographics, professional training, and dispensary practices. The survey also captured perceived barriers to medical decision-making and budtender-patient interactions.[17,18] In addition, several online behaviors were included to measure social media usage (eg, Facebook, Twitter, Instagram) among budtenders and digital information exchange with medical cannabis patients through multiple mediums (eg, e-mail, social media).[19] Along with descriptive statistics for these measures, a series of comparative analyses were performed to explore bivariate differences between professionally trained and untrained budtenders.

Methods

Study sample

Targeted sampling methods were adapted to recruit a sample of budtenders in the San Francisco (SF) Bay Area and Greater Los Angeles (LA) for an Internet survey administered from June to September 2016.[20,21] Potential survey respondents were reached through private listservs of dispensaries and budtenders, automated social media posts, syndicated blog posts, and direct intercept at local industry events, all of which provided an infographic with the study description and hyperlink to an online eligibility screen. Budtenders were eligible to proceed to the main survey if they were at least 18 years old, currently had a medical cannabis card or referral letter from a physician, and currently worked as a budtender, either part-time or full-time, at a cannabis dispensary in SF or LA. Budtenders who fully completed the survey were given $25 Amazon Gift Cards. The study protocol was approved by the RTI International Institutional Review Board. The final study sample included 158 budtenders who fully completed the survey.

Study measures

The primary survey instrument consisted of items for budtender demographics, workplace characteristics, dispensary practices, patient interactions, and online behaviors. Budtenders completed a checklist of health conditions that patients commonly report experiencing and popular types of products available for purchase at their dispensaries.

Demographics

The following demographic factors were included in the study: sex (male or female), age (18-24, 25-34, and 35+ years), race/ethnicity (non-Hispanic [NH] white, NH black, Hispanic, and other), educational attainment (high school graduate/some college, vocational/technical school, college graduate and more), health insurance type (none, employer, spouse, public, and other), current employment (full-time, part-time), and past-year unemployment (yes, no).

Workplace characteristics

Budtenders reported their cannabis market (SF, LA) and answered a series of questions regarding formal training, number of coworkers, and dispensary practices. For employment status, budtenders indicated whether they ever completed any formal training to become a budtender (yes, no), whether being a budtender was their primary job (yes, no), years in practice as a budtender (≤2, 3-5, 6+), and total number of budtenders on staff (1-5, 6-9, 10+). Budtenders also reported average patient spending per transaction ($11-$50, $51-$100, $100+), whether they receive sales commissions from their dispensary (yes, no), and whether they make strain recommendations (yes, no).

Medical decision–making processes

Budtenders were asked the perceived importance of sharing the decision-making process with patients about which products to purchase and consume (less important, very important). Another question asked budtenders to specify their general philosophy about involving patients in medical decisions. The patient-centered philosophy was described as a process where it is better to have patients involved in medical decisions about marijuana, even if they do not follow product recommendations from the budtender. Conversely, the budtender-centered philosophy was defined as a process where patients defer to budtenders about product choices. An additional 11 questions (yes, no) were asked about perceived barriers to patient interactions (eg, poorly informed, lack education, and attitudes/beliefs).

Online behaviors

Budtenders reported the frequency of their Internet usage (almost constantly, several times a day, daily, or less). A checklist of 11 social networks (eg, Facebook, Twitter, Instagram) was completed. Finally, budtenders reported whether they exchanged information with patients in the past 30 days through five digital mediums (e-mail, text message, mobile app, video call, and social media).

Statistical analyses

Descriptive statistics were calculated for the common health conditions and popular product choices among patients at dispensaries. The formal training variable was used as the main comparison group of interest for the demographics, workplace

characteristics, patient interactions, and online behaviors. Bivariate tests of significance between trained and untrained budtenders were derived from the cross-tabulations using χ² statistics. A 2-tailed *P* value less than or equal to .05 was considered statistically significant. Stata 14.2 was used for all analyses.

Results

The 158 budtenders in this study indicated that anxiety (81%), chronic pain (80%), cancer (74%), sleep problems (70%), and depression (64%) were the most common health conditions that patients want to treat with cannabis (Figure 1). Budtenders reported that flowers and buds (83%), edibles (78%), waxes (60%), oils (47%), and topicals (46%) were the most popular choices among patients at their dispensary (Figure 2).

Demographics

The average age of budtenders was 32 years (SD = 7.2), with a range of 21 to 58 years. As shown in Table 1, the most common age groups were 25- to 34-year olds (52.2%), followed by 35- to 58-year olds (34.4%). The budtenders were 53% men and 46% reported their race and ethnicity as NH white. Nearly half of the budtenders were single (48%), graduated from college (47%), and had health insurance through their employer (47%). Approximately 22% of budtenders indicated that they were unemployed in the past year.

Among the 158 respondents, 56% had received formal training to become a budtender. Among the trained budtenders (n = 88), 67% reported that their training was through their dispensary and 65% took an online course. Several demographic differences were found between trained and untrained budtenders for age, sex, race/ethnicity, marital status, and health insurance coverage.

Workplace characteristics

About 60% of the budtenders were from SF, 65% reported that being a budtender was their primary job, and 75% were in practice at least 5 years (Table 2). There was a fairly equal distribution for total number of budtenders on staff, whereas 46% indicated that patients spend $11 to $50 on average and 39% reported that they receive sales commission. Most of the budtenders (81%) also reported that they commonly make strain recommendations to patients.

Several significant differences were found between untrained and trained budtenders. Trained budtenders were more likely to report budtender as their primary job (74% vs 53%), practice more than 5 years (34% vs 11%), receive sales commission (57% vs 16%), and report average patient spending of $11 to $50 (58% vs 32%). They were also less likely to work in dispensaries with 10+ budtenders (20% vs 53%).

Medical decision-making processes

Table 3 shows the distribution of medical decision-making, overall philosophy, and barriers among the budtenders. Slightly
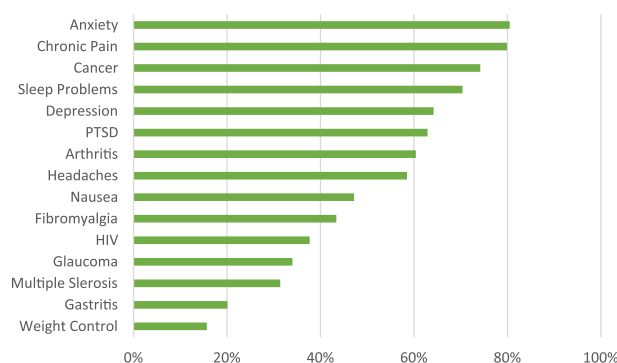

Figure 1. Most common medical conditions among medical cannabis patients. Abbreviations: HIV, human immunodeficiency virus; PTSD, posttraumatic stress disorder.
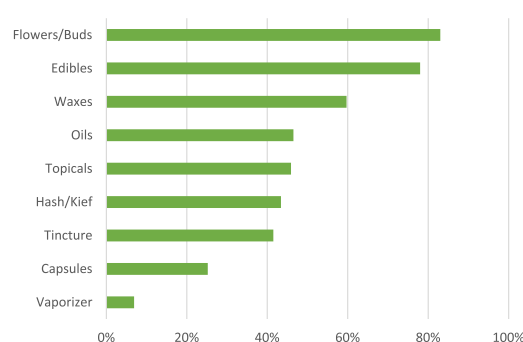

Figure 2. Most popular products among medical cannabis patients.

over half of budtenders (56%) perceived medical decision-making to be very important, whereas most of them (82%) indicated that their overall philosophy was patient-centered. The barriers ranged from 13% for transportation and language barriers to 70% for lack of information.

Compared with untrained budtenders, trained budtenders were less likely to perceive medical decision-making as very important (47% vs 68%) and have a patient-centered philosophy (11% vs 23%). Trained budtenders were significantly more likely to indicate legal issues (42% vs 11%) and lack of patient trust (39% vs 23%) as barriers and significantly less likely to indicate lack of information (63% vs 79%).

Online behaviors

Most (92%) of the budtenders used Internet at least several times a day (Table 4). The most common social networks were Facebook (82%), Instagram (72%), YouTube (56%), and Twitter (51%). About half of budtenders (49%) exchanged information about medical cannabis via e-mail in the past 30 days, while 39% used text messages and social media.

Compared with untrained budtenders, trained budtenders were less likely to use the Internet almost constantly (24% vs 54%). Trained budtenders were significantly more likely to use Twitter (65% vs 34%), Pinterest (31% vs 17%), and other social media sites such as Tumblr and Vine (32% vs 16%). In addition, they were significantly more likely than untrained budtenders

Table 1. Demographic characteristics of budtenders.

DEMOGRAPHICS	UNTRAINED (N=70)	TRAINED (N=88)	TOTAL (N=158)	$X^2_{(DF)}$, *P* VALUE
	NO. (%)	NO. (%)	NO. (%)	
Age groups				$7.47_{(2)}$, .024
18-24	15 (21.4)	6 (6.9)	21 (13.4)	
25-34	35 (50.0)	47 (54.0)	82 (52.2)	
35+	20 (28.6)	34 (39.1)	54 (34.4)	
Gender				$4.38_{(1)}$, .036
Male	29 (43.3)	53 (60.2)	82 (52.9)	
Female	38 (56.7)	35 (39.8)	73 (47.1)	
Race/ethnicity				$10.31_{(3)}$, .016
NH White	29 (41.4)	44 (50.0)	73 (46.2)	
NH Black	8 (11.4)	8 (9.1)	16 (10.1)	
Hispanic	14 (20.0)	28 (31.8)	42 (26.6)	
Other	19 (27.1)	8 (9.1)	27 (17.1)	
Marital status				$22.96_{(2)}$, .001
Single	42 (60.9)	33 (37.9)	75 (48.1)	
Married/partnership	18 (26.1)	53 (60.9)	71 (45.5)	
Divorced/widowed	9 (13.0)	1 (1.1)	10 (6.4)	
Education				$3.02_{(2)}$, .22
GED/some college	30 (43.5)	32 (36.4)	62 (39.5)	
Tech. grad.	6 (8.7)	16 (18.2)	22 (14.0)	
College grad.+	33 (47.8)	40 (45.5)	73 (46.5)	
Health insurance				$10.70_{(4)}$, .03
No insurance	12 (17.1)	10 (11.4)	22 (13.9)	
Employer	30 (42.9)	44 (50.0)	74 (46.8)	
Spouse	4 (5.7)	15 (17.0)	19 (12.0)	
Public	13 (18.6)	15 (17.0)	28 (17.7)	
Other	11 (15.7)	4 (4.5)	15 (9.5)	
Employment				$0.02_{(1)}$, .878
Full-time	43 (61.4)	53 (60.2)	96 (60.8)	
Part-time	27 (38.6)	35 (39.8)	62 (39.2)	
Unemployment				$0.01_{(1)}$, .974
No	53 (77.9)	68 (78.2)	121 (78.1)	
Yes	15 (22.1)	19 (21.8)	34 (21.9)	

Abbreviations: GED, general education development; tech., technical school; grad., graduate; NH, non-Hispanic; tech., technical; $\chi^2_{(df)}$, chi-squared (degrees of freedom). Values in parentheses indicate column percentages. Differences in column totals are due to missing data.

Table 2. Workplace characteristics of budtenders.

CHARACTERISTICS	UNTRAINED (N=70)	TRAINED (N=88)	TOTAL (N=158)	$\chi^2_{(DF)}$, *P* VALUE
	NO. (%)	NO. (%)	NO. (%)	
Cannabis market				$2.02_{(1)}$, .155
SF Bay Area	46 (65.7)	48 (54.5)	94 (59.5)	
Greater LA	24 (34.3)	40 (45.5)	64 (40.5)	
Budtender primary job				$7.36_{(1)}$, .007
No	32 (47.1)	23 (26.1)	55 (35.3)	
Yes	36 (52.9)	65 (73.9)	101 (64.7)	
Years in practice				$15.69_{(2)}$, .001
≤2	41 (58.6)	27 (30.7)	68 (43.0)	
3-5	21 (30.0)	31 (35.2)	52 (32.9)	
6+	8 (11.4)	30 (34.1)	38 (24.1)	
Total budtenders on staff				$18.37_{(2)}$, .001
1-5	16 (25.0)	28 (33.3)	44 (29.7)	
6-9	14 (21.9)	39 (46.4)	53 (35.8)	
10+	34 (53.1)	17 (20.2)	51 (34.5)	
Average spending				$9.99_{(2)}$, .007
$11-$50	21 (31.8)	49 (57.7)	70 (46.4)	
$51-$100	32 (48.5)	25 (29.4)	57 (37.7)	
$101+	13 (19.7)	11 (12.9)	24 (15.9)	
Sales commission				$26.29_{(1)}$, .001
No	54 (84.4)	37 (43.0)	91 (60.7)	
Yes	10 (15.6)	49 (57.0)	59 (39.3)	
Strain recommendations				$0.38_{(1)}$, .535
No	11 (16.9)	17 (21.0)	28 (19.2)	
Yes	54 (83.1)	64 (79.0)	118 (80.8)	

Abbreviations: SF, San Francisco; LA, Los Angeles; $\chi^2_{(df)}$, chi-squared (degrees of freedom).
Values in parentheses indicate column percentages. Differences in column totals are due to missing data.

to exchange information about medical cannabis with patients through all of the digital mediums.

Discussion

Among the 158 budtenders who completed an online survey, we found that more than half (56%) reported that they received formal training, two-thirds of whom indicated dispensaries and online courses as the primary sources. Several demographic and workplace differences were also found between trained and untrained budtenders, with trained budtenders having more established careers as cannabis professionals compared with their untrained counterparts. In contrast, untrained budtenders tended be ethnically diverse young adults who interact with patients in dispensaries with larger workforces and sales volume, suggesting that dispensary size and practices may influence the types of interactions patient experience with budtenders.[22,23]

With regard to decision-making about cannabis, most of the budtenders in our study (82%) favored a patient-centered philosophy whereby patient preferences are prioritized in medical decisions about marijuana, even if they do not follow product recommendations from the budtender.[24] However, trained and untrained budtenders did not consider medical decision-making to be equally important. Surprisingly, trained budtenders were less likely to consider medical decision-making as very important and prefer a patient-centered philosophy. Trained

Table 3. Patient interactions and preferences for medical decision-making among budtenders.

PATIENT INTERACTIONS	UNTRAINED (N=70) NO. (%)	TRAINED (N=88) NO. (%)	TOTAL (N=158) NO. (%)	$\chi^2_{(DF)}$, P VALUE
Medical decision-making				6.89$_{(1)}$, .009
Less important	22 (31.9)	46 (52.9)	68 (43.6)	
Very important	47 (68.1)	41 (47.1)	88 (56.4)	
Overall philosophy				3.81$_{(1)}$, .05
Patient-centered	58 (89.2)	67 (77.0)	125 (82.2)	
Budtender-centered	7 (10.8)	20 (23.0)	27 (17.8)	
Barriers				
Bad information	41 (58.6)	46 (52.3)	87 (55.1)	0.63$_{(1)}$, .429
Lack information	55 (78.6)	55 (62.5)	110 (69.6)	4.76$_{(1)}$, .029
Family and friend influence	40 (57.1)	39 (44.3)	79 (50.0)	2.57$_{(1)}$, .109
Cost or economic burden	42 (60.0)	51 (58.0)	93 (58.9)	0.07$_{(1)}$, .795
Time constraints	13 (18.6)	25 (28.4)	38 (24.1)	2.07$_{(1)}$, .151
Patient attitudes and beliefs	34 (48.6)	56 (63.6)	90 (57.0)	3.61$_{(1)}$, .057
Transportation and geography	9 (12.9)	12 (13.6)	21 (13.3)	0.02$_{(1)}$, .886
Language barriers	12 (17.1)	9 (10.2)	21 (13.3)	1.62$_{(1)}$, .203
Expectation too high	20 (28.6)	36 (40.9)	56 (35.4)	2.59$_{(1)}$, .107
Legal issues	8 (11.4)	37 (42.0)	45 (28.5)	17.94$_{(1)}$, .001
Patients lack trust	16 (22.9)	34 (38.6)	50 (31.6)	4.49$_{(1)}$, .034

Abbreviation: $\chi^2_{(df)}$, chi-squared (degrees of freedom).
Values in parentheses indicate column percentages. Differences in column totals are due to missing data.

budtenders were also more likely to indicate lack of trust and legal issues among patients as barriers to decision-making, which may partially explain why some trained budtenders prefer to control their interaction by encouraging patients to follow their advice. In addition, trained budtenders may consider medical decision-making to be less important through experiences with training programs that de-emphasize aspects of patient-centered care that could hold dispensaries liable for providing unsolicited medical advice.[24,25]

For the online behaviors, trained budtenders had slightly less Internet usage overall, which may be indicative of differences in how certain budtenders broadly integrate online engagement and information exchange into their daily lives. Although these differences in overall Internet usage may have been influenced by age, trained budtenders were more likely to exchange health-related information with patients through 5 types of digital mediums. Similarly, trained budtenders were more likely to use Twitter, Pinterest, Tumblr, and Vine, which can all influence the rapid dissemination of cannabis-related information to patient populations across social networks, forums, microblogs, and e-commerce platforms.[26,27] Together, the higher rates of information exchange and social media

usage among trained budtenders suggest a pattern of online behavior that may help grow their social networks and connect more patients to information about retail products, including online cannabis marketplaces that allow users to personalize their preferences, geolocate products, and make purchases.[14]

The growing popularity of such platforms, however, could represent an alarming trend of dispensary and workforce behaviors that occur outside of state regulations. In California, the newly passed adult-use law, Proposition 64, only sets guidelines for advertising recreational cannabis in community settings (eg, billboards, schools, youth centers) and on-site at brick and mortar dispensaries, but does not directly address online advertising and communications.[28] Similarly, some dispensaries have started to partner with digital platforms such as HelloMD and PrestoDoctor to directly connect qualified patients to physicians, although California law makes no explicit distinctions about how physicians can advertise their recommendation services online.[29] As some dispensaries and budtenders may use these digital platforms to transcend regulatory boundaries through the Internet, the findings from this study demonstrate the need for continued surveillance of the cannabis industry workforce and large online marketplaces that streamline retail purchases.[30]

Table 4. Online behaviors and information exchange among budtenders.

ONLINE BEHAVIORS	UNTRAINED (N=70)	TRAINED (N=88)	TOTAL (N=158)	$X^2_{(DF)}$, *P* VALUE
	NO. (%)	NO. (%)	NO. (%)	
Internet use				$15.22_{(2)}$, .001
Almost constantly	37 (53.6)	21 (23.9)	58 (36.9)	
Several times a day	29 (42.0)	57 (64.8)	86 (54.8)	
Daily and less	3 (4.3)	10 (11.4)	13 (8.3)	
Social media usage				
Facebook	54 (77.1)	75 (85.2)	129 (81.6)	$1.70_{(1)}$, .192
Twitter	24 (34.3)	57 (64.8)	81 (51.3)	$14.50_{(1)}$, .001
Instagram	53 (75.7)	60 (68.2)	113 (71.5)	$1.09_{(1)}$, .297
Google+	18 (25.7)	34 (38.6)	52 (32.9)	$2.95_{(1)}$, .086
Snapchat	33 (47.1)	40 (45.5)	73 (46.2)	$0.05_{(1)}$, .833
YouTube	38 (54.3)	51 (58.0)	89 (56.3)	$0.21_{(1)}$, .644
Pinterest	12 (17.1)	27 (30.7)	39 (24.7)	$8.84_{(1)}$, .05
Other[a]	11 (15.7)	28 (31.8)	39 (24.7)	$5.44_{(1)}$, .02
Information exchange				
E-mail	27 (38.6)	51 (58.0)	78 (49.4)	$5.86_{(1)}$, .015
Text message	21 (30.0)	40 (45.5)	61 (38.6)	$3.93_{(1)}$, .047
Mobile app	8 (11.4)	29 (33.0)	37 (23.4)	$10.07_{(1)}$, .002
Video call	2 (2.9)	23 (26.1)	25 (15.8)	$15.86_{(1)}$, .001
Social media	16 (22.9)	45 (51.1)	61 (38.6)	$13.15_{(1)}$, .001

Abbreviation: $\chi^2_{(df)}$, chi-squared (degrees of freedom).
Values in parentheses indicate column percentages. Differences in column totals are due to missing data.
[a]Other social media sites include Tumblr and Vine.

Limitations

Several limitations of this study are acknowledged. First, the exploratory nature of this small cross-sectional study precludes our ability to generalize our findings to budtenders at large. As the patient symptoms and popular products reported by budtenders in this study were comparable with larger California studies, representative samples from other medical and adult-use states will be necessary to determine how variations in state and regional policies affect workplace practices.[31] Second, the significant differences found among trained and untrained budtenders represent preliminary bivariate results that require further refinement through sensitivity analyses and multivariate methods. Based on the pervasive differences in training status for dispensary practices, our follow-up work will more closely examine associations with specific types of training sources such as books, manuals, certifications, and emergent online budtender schools, such as THC University and the Cannabis Training Institute.

Third, the budtender survey was administered during the 6 months leading up to the passage of California's Proposition 64. Although we cannot make inferences about recreational cannabis use, the findings from this study provide an empirical foundation for the systematic evaluation of medical decision-making processes and online behaviors that occur in dispensaries throughout the United States. Similarly, it is likely that shifts in consumer populations will continue to pose new challenges for comparing the regulatory frameworks for separate medical and adult-use markets. Studies that more rigorously classify qualified patient populations from multiple states will be necessary to further disentangle medical processes from recreational use and understand the extent to which these processes unfold in adult-use dispensaries.

Finally, a wide range of online behaviors and mediums that budtenders use to engage with patients on the Internet were examined, although the nature of these questions limited our ability to conduct content analyses of textual data from budtenders' communications. Without access to the content of the communications, we were not able to fully determine whether budtenders were directly advertising products and services or linking patients to online recommendation platforms and cannabis marketplaces. As the results from this study found clear

distinctions in the frequency of Internet usage as well as the type of social media sites and mediums used by budtenders, longitudinal studies that incorporate more detailed measures of cannabis-related online behavior will be better suited to determine the content of dispensary advertisements and flow of information from budtenders over time.[32–34]

Implications

Taken together, the results from this study provide key information on decision-making processes and information exchange among budtenders in California leading up to the passage of Proposition 64. With the new law projected to take effect in early 2018, several regulations will specifically address and enforce misinformed advice, selling tainted products, and other activities that harm patient and consumer populations.[35,36] Dispensaries and budtenders in California will also have to comply with cultivation, packaging, and labeling requirements for products, including pesticide testing and disclosure.[37–39] In addition, product packages and labels will be required to include specified textual warnings that disclose product ingredients, discourage access to children and animals, explain potential delays in psychoactive effects, and advise against driving or using machinery while intoxicated.[40,41]

Although there are currently no state or local laws that require formal training or qualifications to practice as a budtender, it is likely that awareness of these labeling and quality control practices will increase among dispensary staff. However, the licensing application of a medical dispensary in California can be rejected on the basis of criminal history, including cannabis-related offenses.[42] Similarly, 22% of budtenders in this study reported that they were unemployed in the past year, which demonstrates an additional system-level barrier that may affect how budtenders maintain stable employment and engage in professional development. To reduce these barriers, state courts will implement reclassification and expungement programs for common cannabis-related offenses (eg, possession, production, distribution) as a component of Proposition 64.[43] Integrative approaches that bridge substance use, criminal justice, and health equity research will therefore be necessary to evaluate the policy effects of training and reclassification programs among certain members of the industry workforce,[44,45] especially populations that disproportionately experience cannabis-related arrests, social marginalization, and work strain.[46–48]

In addition to state laws, the federal landscape in the United States has continued to shift despite cannabis remaining as a Schedule I drug with no accepted medical use in treatment. In August 2016, the Ninth Circuit Court ruled that the Department of Justice cannot spend money to prosecute medical cannabis use that complies with state laws, although patients do not possess immunity from prosecution, and policymakers must annually revise the amendment to reflect newly legalized programs.[49] More recently, The Path to Marijuana Reform was introduced by the Congressional Cannabis Caucus in March 2017 as a bipartisan package of three bills aimed at strengthening existing state laws and creating a framework for federal regulation, including descheduling and decriminalization of cannabis.[50] With more than two-thirds of the United States now living in jurisdictions that have legalized medical or adult use of cannabis,[50] federal and state laws that regulate the industry workforce represent an emergent area of interest for policy evaluation and substance use research.

Our study is the first to examine decision-making processes and online behaviors among budtenders working in medical cannabis dispensaries. The next steps include measure refinement and scaling to larger samples across the United States, including integration with a cross-state network designed for the epidemiologic surveillance of cannabis use. Point of sale data and consumer purchase records also represent novel data-driven targets to investigate how retail practices in the cannabis industry may influence impulsive purchases of newly branded and labeled products among consumer populations.[51] Recent trends in product diversification further demonstrate the growing demand for concentrates, edibles, and vaporizer products,[52,53] all of which have significant implications for evaluating cannabis-related morbidity with state and community data. Moving forward, the measures developed in this study provide new opportunities to longitudinally investigate cannabis use and inform state surveillance systems.

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Author Contributions

NP and CG developed the research questions and led the writing of this article. NP and AM drafted the statistical analysis plan and conducted the analyses. AR and NR executed the sampling procedures, coordinated study recruitment, and provided critical feedback to the manuscript. All authors commented on each draft and approved the final version of the article.

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