The Policy Implications of Internet Behaviors Among Cannabis Dispensary Staff

Nicholas C. Peiper, PhD, MPH
RTI International
National Cannabis Summit
August 28, 2017
Conflicts of Interest

• None to declare.
• This work was funded through an Independent Research and Development Grant at RTI International.
Overview

• Current policy landscape
• Cannabis and the Internet
• California as an applied example
• Learning objectives
  – Study 1: Budtenders on the Internet
  – Study 2: Dispensaries on Twitter
• Group discussions
Current Policy Landscape [1]

• November 2016 ballot
  – 4 recreational states (CA, MA, NV, ME)
  – 4 medical states (FL, AK, MO, ND)

• New in 2017
  – WV (SB 386)
  – 29 states, DC, Guam, and Puerto Rico
  – Two-thirds of US now in legal state

Cannabis and the Internet \(^{2-4}\)

- Emergence of digital physician recommendation platforms
- Exposure to advertising common among users
- Dispensaries & collectives have strong online presence
- Linkage with online marketplaces

Implications of Internet Behaviors [5,6]

• Variability in state and local laws:
  – Deceptive or fraudulent claims in digital communications
  – Age limitations online (at least 70% expected to be over 21)

• Direct-to-consumer advertising remains largely unregulated

• Limited enforcement of online marketplaces

Internet-Mediated Research [7-9]

- Increased popularity in drug use epidemiology studies
- Advantages compared to face-to-face, telephone, or postal research
- Online surveys efficient way to reach hidden populations
- Social network data for population identification & classification

The Example of California \(^{10,11}\)

- Largest market in US (Population: 39M)
- 3M current cannabis users
- $1.1B in sales in 2015
- 20 year history with Prop 215
- Strong consumer base & dispensary workforce

\(^{10}\)Center for Behavioral Health Statistics and Quality. 2013-2014 NSDUH State Estimates of Substance Use and Mental Disorders. December 16, 2015.

Formative Work [12]

- 2015 mixed-methods study
- Timeline Follow Back (TLFB)
- 50 patients for TLFB & survey
- Two focus groups (n=9 each)

I don’t get to discuss with my doctor too much about cannabis. The only thing, “Are you still smoking?” “Yeah.” You know, that’s it.

Do your own research and ask the budtenders. Because they’re the ones back there looking at all of [the products] in between customers ...so they’re smelling it, they know which product to use, and stuff like that.

As long as you tell them like what you’re looking for... what your symptoms are at the time, they can make some recommendations.


14https://vine.co/v/5hgP2rrzJth
Study 1 Objectives

• Characterize the types of training programs budtenders have received
• Examine demographics and Internet behaviors among budtenders
• Determine differences in online behaviors based upon training status
• Explore dispensary practices on the Internet
California Budtender Survey [16]

• **Targeted Sample (N=158)**
  – Summer 2016 in Bay Area and Greater LA
  – $25 incentive
  – Self-administered survey

• **Core Analyses**
  – Descriptive statistics for training & online behaviors
  – Bivariate tests based on training status

Budtender Training

Have you ever received any formal training or certifications to be a budtender?

56% answered yes

Type of Training Program (n=88)

- 67% dispensary
- 65% online course
- 41% book/manual
- 30% certificate
- 27% budtender school
Budtender Demographics

**Age**
- 18-24: 13%
- 25-34: 52%
- 35+: 34%

**Gender**
- Male: 53%
- Female: 47%

**Race**
- NH White: 60%
- NH Black: 20%
- Hispanic: 17%
- Other: 13%

**Practice**
- <3 years: 43%
- 3-5 years: 24%
- 6+ years: 33%
Budtender Internet Behaviors

Overall Internet Usage

- Almost Constantly: 37%
- Several Times a Day: 55%
- Daily or Less: 8%

Exchanged health information about cannabis with a patient in the past 30 days via...

- Email: 49%
- Facebook, Instagram, Twitter, Google+: 39%
- Video: 16%
- SMS: 39%
- Apple App Store, Google Play: 23%
Budtender Internet Behaviors

Overall Internet Usage***

- Almost Constantly
  - Trained: 24%
  - Untrained: 54%
- Several Times a Day
  - Trained: 42%
  - Untrained: 65%
- Daily or Less
  - Trained: 4%
  - Untrained: 11%

Exchanged health information about cannabis with a patient in the past 30 days

- **58%**
- **39%**
- **51%**
- **23%**
- **26%**
- **3%**

*p<0.05  **p<0.01  ***p<0.001
Dispensary Internet Behaviors

Dispensary or collective has a social media account

73% answered yes
(n=116)

What sorts of posts in the past 30 days?

- 77%
- 52%
- 72%
- 30%
Discussion Topics \textsuperscript{[17,18]}

- Study design, generalizability
- Types of training programs
- Community health worker or salesperson?
- CA Medicinal & Adult-Use Cannabis Regulation & Safety Act
  - SB94: Merge AUMA and MCRSA
  - Quality assurance, risk disclosure, liability
  - Regulation of online advertising

Dispensaries on Social Networks \[19,20]\n
- Branding & sharing economy
- Direct-to-consumer advertising
- Linked coupons & promotions
- Engagement with followers & potential clients

Study 2 Objectives

• Characterize common Twitter behaviors among dispensaries in CA
• Describe the network structure of dispensaries in CA that share followers
• Evaluate the relationship between Twitter behaviors and network structure
• Verify the findings in two geographically separated cannabis markets
  – Bay Area
  – Greater LA

Targeted Sample

Medical Dispensary Program

Cannabis Regulatory Commission

Medical Cannabis Commission

Medical Marijuana ID Program
Final Sample

• Derive Account Metadata
  – N=119, (n=61 in Bay Area; n=58 in LA)
  – Twitter API
  – Last 3,200 Tweets from each account
  – Account-level and follower metrics

• Core Analyses
  – Factor analysis of metadata
  – Network analysis of shared followers
  – Community detection & classification
### Metadata

#### Twitter Tenure
1. Account Age
2. Percent days tweeting
3. Total days tweeting

#### Tweet Frequency
4. Tweets collected
5. Max tweets per day
6. Average tweets per day
7. Median absolute deviation

#### Tweet Composition
8. Hashtag
9. Mention
10. Retweet
11. Media
12. URL
Factor Analysis [22]

• Principal components analysis (PCA)
• Reduce 12 metadata into dimensions
• Eigenvalues $\geq 1.0$
• Factor loadings $\geq 0.40$

Extracted Behavioral Dimensions

1. Longevity
2. Daily Activity
3. Engagement
4. Referencing
5. Hyperlink
Network Analysis \[23\]

![Network Diagram](image)

Legend:
- **Twitter User**
- **Dispensary Twitter Account**
- **User follows dispensary**
- **Potential Shared Followers**

Projection Function:

\[
\Gamma(i) = \text{followers of } i \\
weight(i, j) = \frac{|\Gamma(i) \cap \Gamma(j)|}{\min(|\Gamma(i)|, |\Gamma(j)|)}
\]

Network Structure [24]

<table>
<thead>
<tr>
<th>Property</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Node Size</td>
<td>Total Followers</td>
</tr>
<tr>
<td>Edge Weight</td>
<td>Shared Follower Potential</td>
</tr>
<tr>
<td>Color</td>
<td>Community Membership</td>
</tr>
</tbody>
</table>

Color Bay Area (n=61)
- Community 1 (n=23)
- Community 2 (n=13)
- Community 3 (n=25)

Color Greater LA (n=58)
- Community 1 (n=22)
- Community 2 (n=10)
- Community 3 (n=26)

Network Structure [24]

<table>
<thead>
<tr>
<th>Property</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Node Size</td>
<td>Total Followers</td>
</tr>
<tr>
<td>Edge Weight</td>
<td>Shared Follower Potential</td>
</tr>
<tr>
<td>Color</td>
<td>Community Membership</td>
</tr>
</tbody>
</table>

Color Bay Area (n=61)
- Community 1 (n=23)
- Community 2 (n=13)
- Community 3 (n=25)

Color Greater LA (n=58)
- Community 1 (n=22)
- Community 2 (n=10)
- Community 3 (n=26)

75% (n=46/61)

71% (n=41/58)

Examples for Discussion

GREEN FRIDAY
SHOP SMALL
SATURDAY SALE:

5% off orders $45-$65
10% off $70-$95
15% off $100-$115
20% off $120 and above

KINDLAND @thekindland - Aug 3
Free weed is the best, so we teamed up with @FlowKana, Miwok Junior, and @BrightCellars to give you $1k in goods. buff.ly/2vOTzU7
Examples for Discussion

KushMart @KushMartEvt · 5 Nov 2016
Harmony Farms half ounces are on point! These dank nugs of weed come in a variety of strains. Come through and grab a jar today! – at Kushmart

KINGKUSH @KINGKUSH5919 · Feb 1
Hey are you free?
Jetty is here at King Kush hooking people up with dabs
Ends at 7pm so hurry!
5919 S Broadway
$5 OFF Mind Tricks Edibles
Examples for Discussion

Garden Of Eden @goe_menu · 27 Oct 2016
California's Proposition 64 is 62 pages long and aims to regulate the entire cannabis industry, from seeds to pipe. Here are highlights

PCC Staff @BerkeleyPCC · Jul 27
Holiday Weekend Price Drops! - mailchi.mp/patientscareco...

HERBcollective @HERBcollective · 25 Nov 2016
What doesn’t it do?! #cannabis #cannabisresearch #californiacollective #cannabiscommunity #cannabislife ow.ly/bPo8306t6MR
Future Directions [25-29]

- Budtender: lay health worker or salesperson?
  - New apprenticeships: pharmacy technicians
  - New workplace practices & policies
  - Consumer influence: public health impacts

- Dispensary diversification
  - From brick & mortar to delivery & online
  - Vertical integration, geographic distribution
  - Cross-platform advertising

Acknowledgments

• RTI Senior Scientists
  – Gary Zarkin, PhD
  – Gayle Bieler, MS
• Research Computing Division
  – Chris Siege, MS
• Center for Data Science
  – Peter Baumgartner, MS
  – Rob Chew, MS
  – Ian Thomas, BS
• Survey Research Division
  – Patrick Hsieh, PhD
• Public Health Research Division
  – Camille Gourdet, JD, MA
  – Jane Allen, MA
• Behavioral Health & Criminal Justice Research Division
  – Angelica Meinhofer, PhD
  – Elizabeth Ball, BA
  – Sarah Duhart-Clark, BA
• Alcohol Research Group, Public Health Institute
  – Amanda Reiman, PhD, MSW
• Department of Psychology, UCLA
  – Nicco Reggente, MA