Three Years Into Marijuana Legalization:
Prevention Challenges, Opportunities, and
Lessons Learned from a Legal State

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Major components of Initiative 502
(source: Liquor Control Board)

• Legalized system of producing, processing and retailing
  marijuana for adults 21 and older
• Decriminalizes possession of one ounce of marijuana
  ▫ 1 ounce of useable marijuana for smoking
  ▫ 16 ounces in solid form
  ▫ 72 ounces in liquid form

Major components of Initiative 502
(source: Liquor Control Board)

• Creates system of licensing, regulation, and taxation
  ▫ Producer license (grower)
  ▫ Process license (prepares for retail)
  ▫ Retail license
• Public safety and education
  ▫ Establishes per se limit for DUI
    • 5 ng THC/ml blood for 21+
    • Any positive amount for <21
  ▫ Limits store locations, advertising, and number of
    outlets
  ▫ Earmarks revenue for healthcare, research, and
    education
The Voters’ Pamphlet for the November 6, 2012 election dedicated 9 pages to I-502 and reviewed all major highlights.

The initiative passed by over 350,000 votes and an 11.4% margin, setting the stage for legalization to begin on December 6, 2012.

Do people know what they voted for?

- Sample of 819 young adults residing in WA
  - 56.5% identified as female
  - Mean age of 19.8 years
- Tested knowledge of six components:
  - Legalization status at federal or state level
  - Whether legalization was for medical and/or recreational use & was for those over 18 vs. 21
  - How much a person could possess
  - Criteria for DUI
  - Where people can use MJ
  - Where and how people can purchase MJ

Knowledge of I-502 components

1) Which of the following statements is true?
   a) I-502 legalizes possession and use of marijuana at the federal, but not state level.
   b) I-502 legalizes possession and use of marijuana at the federal and state level.
   c) I-502 legalizes possession and use of marijuana at the state, but not federal level.

   92.4% of participants correctly answered this item

Knowledge of I-502 components

2) Which of the following statements is true?
   a) I-502 has legalized marijuana possession and use for medical purposes for those 18 and older
   b) I-502 has legalized marijuana possession and use for medical purposes for those 21 and older
   c) I-502 has legalized marijuana possession and use for recreational purposes for those 18 and older
   d) I-502 has legalized marijuana possession and use for recreational purposes for those 21 and older
   e) I-502 has legalized marijuana possession and use for recreational and medical purposes for those 18 and older
   f) I-502 has legalized marijuana possession and use for recreational and medical purposes for those 21 and older

   20.7% of participants correctly answered this item

Knowledge of I-502 components

3) Under I-502, how much marijuana is a person of legal age able to possess for smoking?
   a) One ounce
   b) Two ounces
   c) Five ounces
   d) Ten ounces
   e) There is no limit on how much an individual can possess

   58.3% of participants correctly answered this item
Knowledge of I-502 components

4) Under I-502, what amount of THC (the ingredient in cannabis responsible for the “high”) in the bloodstream will meet the legal criteria/definition of driving under the influence (DUI)?
   a) Any positive amount, regardless of age.
   b) 5 nanograms of THC per milliliter of blood, regardless of age.
   c) 5 nanograms of THC per milliliter of blood for those 18 and older, and any positive amount for those under 18.
   d) 5 nanograms of THC per milliliter of blood for those 21 and older, and any positive amount for those under 21.

   44.7% of participants correctly answered this item

Knowledge of I-502 components

5) Which of the following statements about where people can use marijuana is true?
   a) A person of legal age can use marijuana wherever he or she would like, private or public.
   b) A person of legal age can use marijuana in his or her private residence.
   c) In addition to his/her private residence, a person of legal age can use marijuana in public, as long as it is not near a school or playground.

   75.8% of participants correctly answered this item

Knowledge of I-502 components

6) Under I-502, where/how will people be able to legally purchase marijuana?
   a) However they have been obtaining it thus far (e.g., individual dealers, buying from friends, etc.).
   b) From their doctor or prescribing provider.
   c) Wherever hard alcohol is sold.
   d) From state licensed stores that will open in Washington.

   85.7% of participants correctly answered this response
Do people know what they voted for?

- Overall, only 5.5% of participants correctly understood all six components of the law.
- Another 5.5% either knew none of the components or only one component.
- 38.8% of participants knew less than half of the guidelines.

Percentage correct by lifetime marijuana use

<table>
<thead>
<tr>
<th>Item</th>
<th>No lifetime use</th>
<th>Lifetime marijuana use</th>
</tr>
</thead>
<tbody>
<tr>
<td>State or Federal?</td>
<td>89.63%</td>
<td>94.64%</td>
</tr>
<tr>
<td>18 or 21, plus medical or recreational?</td>
<td>14.33%</td>
<td>26.11%</td>
</tr>
<tr>
<td>Amount one can possess?</td>
<td>48.14%</td>
<td>65.89%</td>
</tr>
<tr>
<td>DUI criteria?</td>
<td>36.07%</td>
<td>52.24%</td>
</tr>
<tr>
<td>Where use?</td>
<td>72.00%</td>
<td>78.97%</td>
</tr>
<tr>
<td>Where purchase?</td>
<td>81.77%</td>
<td>88.58%</td>
</tr>
</tbody>
</table>

Policy guidelines and relationship to marijuana use

- In general, participants who reported past year marijuana use compared to those who did not use had higher knowledge scores
- Those with past year marijuana use perceived the initiative more favorably than non-users
- Those with past year marijuana use had more opposition to enforcement of the initiative than non-users
Washington Young Adult Health Survey: Data from our 18-25 year olds

What did we do?

- UW Center for the Study of Health and Risk Behaviors (CSHRB) partnered with DBHR
- Internet based survey done May through early July 2014
- Got input from multiple experts, state offices, and tried to use questions with established reliability, validity, and/or normative reference groups
- Participants recruited using a combination of direct mail advertising to a random sample, as well as online advertising (Facebook, Craigslist, Amazon Mechanical Turk, study website, Facebook fan page)

What did we do?

- Assessed demographics on an ongoing basis and modified strategies to recruit under-represented groups
- Convenience sample, not a random sample
- To improve generalizability, used state census data to weight the sample to more accurately reflect the demographic and geographic diversity of Washington
- Weighted results closely mirror the unweighted results
Mean age: 21.44 years (S.D. = 2.26 years)

Mean age: 21.39 years (S.D. = 2.25 years)

Marijuana Use

- **WEIGHTED**
  - Recreational use
    - 43.51% at least once/past year
    - 43.27% of 18-20 year olds
    - 43.67% of 21-25 year olds

- **WEIGHTED**
  - Medical use
    - 14.74% at least once in the past year
    - 14.02% of 18-20 year olds
    - 15.20% of 21-25 year olds
**Norms**

Social norms: Perception versus reality

- People are influenced by their subjective interpretation of a situation rather than by the actual situation (Lewin, 1943).
- We are influenced by our perception of others’ attitudes, behaviors, and expectations rather than by their actual attitudes, behaviors, or expectations.
- Our perceptions and interpretations are often inaccurate.

Source: Neighbors & Kilmer (2008)

**Norms Clarification**

- Examines people’s perceptions about:
  - Acceptability of excessive behavior
  - Perceptions about the prevalence of use among peers
  - Perception about the rates of use by peers
NORM PERCEPTION

- In survey of 5990 participants, 67.4% of students said they hadn’t used MJ in the past year
  - Thus, “most” students don’t use marijuana
- Only 2% of students got this right!
  - 98% of students perceived the typical student to use at least once per year
- Misperceptions were related to use and consequences

Kilmer, et al. (2006)

- Although 56% do not use marijuana, only 2% get this correct. Over half (53%) estimate the typical person their age uses marijuana at least weekly

ACTUAL USE

PERCEIVED USE BY SAME AGE GROUP

Perceived risk
Perceived Risk: Regular Use

<table>
<thead>
<tr>
<th>BINGE DRINKING ON A WEEKEND</th>
<th>REGULAR CANNABIS USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Risk of Physical Harm</td>
<td>Perceived Risk of Physical Harm</td>
</tr>
<tr>
<td>Low</td>
<td>Great Risk</td>
</tr>
<tr>
<td>4%</td>
<td>64%</td>
</tr>
<tr>
<td>High</td>
<td>Great Risk</td>
</tr>
<tr>
<td>3%</td>
<td>43%</td>
</tr>
</tbody>
</table>

Perceived Risk and Relationship to Use

- Cannabis use is strongly, negatively correlated with:
  - Perceived physical risk from occasional use
    - WEIGHTED: (r=-.3943, p<.001)
  - Perceived physical risk from regular use
    - WEIGHTED: (r=-.4265, p<.001)
  - Perceived psychological risk from occasional use
    - WEIGHTED: (r=-.3836, p<.001)
  - Perceived psychological risk from regular use
    - WEIGHTED: (r=-.3847, p<.001)

Driving after use
Impaired driving and duration of effects

- Effects on the brain
  - Authors of I-502 set DUI at 5 ng THC/ml of blood for those over 21 (any positive value for those under 21)
  - Why 5 ng? Similarities in impairment to .08% for alcohol
  - How long does it take to drop below 5 ng?
  - Grotenhermen, et al., (2007) suggest it takes 3 hours for THC levels to drop to 4.9 ng THC/ml among 70 kg men
  - From a public health standpoint, Hall (2013) recommends waiting up to 5 hours after use before driving

Driving (among those who reported using at least once in the past 30 days)

Next steps?
- Just completed follow-up with existing cohort and recruited a new cohort
- Added items of interest that surfaced
Other “current events” and emerging questions

Considering withdrawal (and management of withdrawal)

Motivations for Use

- Research team utilized qualitative open-ended responses for using marijuana among incoming first year college students to identify which motivations were most salient to this population

Lee, Neighbors, & Woods (2007)
## Motivations for Use

<table>
<thead>
<tr>
<th>Motive Category</th>
<th>Percentage of Frequency of Use</th>
<th>Percentage of General Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enjoyment/fun</td>
<td>20.6%</td>
<td>20.6%</td>
</tr>
<tr>
<td>Social enhancement</td>
<td>15.9%</td>
<td>15.9%</td>
</tr>
<tr>
<td>Boredom</td>
<td>15.8%</td>
<td>15.8%</td>
</tr>
<tr>
<td>Altered perception</td>
<td>15.7%</td>
<td>15.7%</td>
</tr>
<tr>
<td>Activity enhancement</td>
<td>15.3%</td>
<td>15.3%</td>
</tr>
<tr>
<td>Relaxation (to relax, sleep)</td>
<td>15.1%</td>
<td>15.1%</td>
</tr>
<tr>
<td>Coping (depressed, relieve stress)</td>
<td>14.7%</td>
<td>14.7%</td>
</tr>
<tr>
<td>Anxiety reduction</td>
<td>14.2%</td>
<td>14.2%</td>
</tr>
<tr>
<td>Medical use (physical pain)</td>
<td>14.1%</td>
<td>14.1%</td>
</tr>
<tr>
<td>Habit</td>
<td>13.5%</td>
<td>13.5%</td>
</tr>
<tr>
<td>Food motives</td>
<td>13.1%</td>
<td>13.1%</td>
</tr>
</tbody>
</table>

Lee, Neighbors & Woods (2007)
Mental Health

Withdrawal: Cannabis

Cannabis Use Associated with Risk of Psychiatric Disorders (Hall & Degenhardt, 2009; Hall, 2009; Hall 2013)

- Schizophrenia
  - Those who had used cannabis 10+ times by age 18 were 2.3 times more likely to be diagnosed with schizophrenia
  - “13% of schizophrenia cases could be averted if cannabis use was prevented (Hall & Degenhardt, 2009, p. 1388)”

- Depression and suicide
  - “Requires attention in cannabis dependent” (Hall, 2013)

- Screening suggestions
  - Revised CUDIT-r
Emergence of more visible “open-air drug market”

Impact of advertisements needs to be assessed

Media

Potential role of media

- Impact of media exposure related to alcohol (including television, advertisements, and movie content)
  - In a review of 13 studies, 12 of the 13 showed media exposure was associated with increased likelihood of:
    - Initiating drinking among abstainers
    - Increased consumption among those already drinking


Impact to minors, including sales to minors, and to children

Washington State Impact Report (mfiles.org)
Average potency (nation) = 11.16%
Average potency (Seattle) = 21.24%
Concentrates average potency (nation) = 55.45%
Concentrates average potency (Seattle) = 72.76%

From the date of legalization to the date of commercial sales starting, poison center calls increased 54.26%; for those under 20, calls increased 80%

Opportunities and lessons learned:

How you talk about marijuana matters...a lot!
Discussing marijuana...word choice matters

- “Do you smoke marijuana?”
  - A person who uses edibles daily can honestly say “no”
  - If screening with a yes/no, consider “do you use marijuana?”
- “Do you use marijuana?” or “have you used marijuana?” followed by, “What does your marijuana use look like?”

Finding potential hooks: An Example

- “What are the good things about ___________ use for you?”
- “What are the ‘not-so-good’ things about ___________ use?”
- “What would it be like if some of those not-so-good things happened less often?”
- “What might make some of those not-so-good things happen less often?”

What are the unwanted effects associated with college student marijuana use?
MARIJUANA CONSEQUENCES MEASURES

• Most college student marijuana consequence measures adapted from established alcohol measures
• May not adequately capture experiences of students
• Particularly important to capture unwanted effects if hoping to provide feedback on “consequences” in motivational enhancement programs.
• Students (n=207) were asked to identify up to five effects of marijuana use that “may not have been so good”
  ▫ 805 separate effects identified
  ▫ 193 students listed at least one consequence/effect
  ▫ 88% of these listed 3 or more consequences

Sample list of consequences offered by students in open-ended survey

<table>
<thead>
<tr>
<th>Top 10 Endorsed Marijuana Consequences: Study 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Eating (e.g., eating too much)</td>
</tr>
<tr>
<td>2. Sleep problems</td>
</tr>
<tr>
<td>3. Productivity, apathy, motivation issues, or boredom</td>
</tr>
<tr>
<td>4. Cognitive abilities, attention, or concentration problems</td>
</tr>
<tr>
<td>5. Memory problems</td>
</tr>
<tr>
<td>6. Problems with lungs or coughing</td>
</tr>
<tr>
<td>7. Feeling antisocial or experiencing social awkwardness</td>
</tr>
<tr>
<td>8. Physical difficulties outside of lungs, cough, mouth, or throat (e.g., feeling dizzy, sick, uncoordinated, etc.)</td>
</tr>
<tr>
<td>9. Not getting things done</td>
</tr>
<tr>
<td>10. Spending too much money</td>
</tr>
</tbody>
</table>

Notes: Preliminary analyses suggested that among the top ten types of consequences generated by participants, only five (not getting things done and financial impact) were reflected in items from the RMPI, and these two were the ninth and tenth most mentioned consequences.

Walter, Kilmer, Logan, & Lee (2012)
Lee, Kilmer, Neighbors, Walters, Garberson, & Logan (in prep)

MEASURE DEVELOPMENT

• 22 item College Marijuana Consequence Scale was developed
• Compared responses to the 18-item Rutgers Marijuana Problem Index (RMPI)
• 410 students who used marijuana at least once in the past 30 days

<table>
<thead>
<tr>
<th>College Marijuana Consequence Scale</th>
<th>Rutgers Marijuana Problem Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 376 listed at least one consequence</td>
<td>• 290 listed at least one consequence</td>
</tr>
<tr>
<td>• 85.3% listed 3 or more consequences</td>
<td>• 56.9% listed 3 or more consequences</td>
</tr>
<tr>
<td>• Average number of consequences = 6.8</td>
<td>• Average number of consequences = 3.3</td>
</tr>
</tbody>
</table>
Parents and communities matter, too

Future directions and needs

- Opportunity for education about driving risks and even the ins and outs of the new law
Brief Interventions and Alcohol Impaired Driving
• Teeters, Borsari, Martens, & Murphy (2015)
• Published 9/28/15
• "Counselor-administered BMIs that include descriptive normative feedback are associated with significant reductions in AI driving compared with control."

As we move forward...
• How do we effectively increase knowledge of what people are voting for...
  ◦ Prior to an election?
  ◦ Once election has occurred?
• Impact to abstainers and/or those in recovery?
• What message about enforcement are people getting (and are they seeing mixed messages)?
  ◦ Consistent enforcement of laws associated with behavior impact
• What is impact of advertisements?
• What opportunities are there to impact social norms?
• Utilize brief motivational interventions to impact driving under the influence?

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