Cannabis Potency: Measurement & Regulatory Issues

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Roadmap

• Trends
• Evidence
• Policy options
Availability of high-potency products increasing

• Data from surveys and social media
  – E.g., Schauer et al., 2014; Cavazos-Rehg et al., 2016

• Suggestive data from seizures
  – ElSohly et al., 2016

• Sales data from legalization states
Flower with <15% THC small share of WA market

Source: Smart, Caulkins, Kilmer et al., 2017. Addiction
Extracts account for growing share of WA market

Source: Updated from Smart, Caulkins, Kilmer et al., 2017. *Addiction*
Less is known about THC consumption

• Minimal info about quantity/products consumed

• THC obtained NOT the same THC consumed
  – E.g., THC recovered more efficiently by dabbing than smoking a joint (Hadener et al., 2019)

• Very few studies of THC titration
  – Freeman et al. 2014; van der Pol et al. 2014
Correlational evidence on high-potency flower

• A few studies find higher-potency cannabis associated with negative mental health outcomes
  – Englund et al., 2017, Lancet Psychiatry
  – “However, most of these studies have not measured THC and cannabidiol content directly”

• More recent studies find association with time until first CUD symptom, youth treatment uptake
  – Arterberry et al., 2018 (US); Freeman et al, 2018 (NL)
Even less research on dabbing/butane-hash oil

• Paucity of data
  – Stronger & Miller, 2015; Russel et al. 2018

• Russel et al. (2018) report “vaporizing cannabis concentrates can result in distinct acute risks”
  • e.g., excessive impairment, injuries

• BHO use associated with greater physiological dependence on cannabis
  – Meier, 2017
Paucity of data – Strong & Miller, 2015; Russel et al. 2018

Russel et al. (2018) report "vaporizing cannabis concentrates can result in distinct acute risks" e.g., excessive impairment, injuries.

BHO use associated with greater physiological dependence on cannabis – Meier, 2017

However, Meier (2017) noted:

"[L]ongitudinal research is needed to determine if cannabis users with higher levels of physiological dependence seek out BHO and/or if BHO use increases risk for physiological dependence."

– Meier, 2017
Must consider other cannabinoids, especially CBD

• CBD may attenuate some effects of THC, but more evidence is needed on THC:CBD ratios
  – Englund et al., 2017

• “Frequent cannabis users may show a blunted anti-psychotic response to CBD”
  – Morgan et al., 2018 (N=48)

• Low doses of CBD with THC enhanced intoxication, while high doses of CBD with THC reduced it
  – Solowij et al., 2019 (N=36)
At least four different policy options on potency

1. Education campaigns
2. Ban certain products
3. Cap THC levels
4. Potency tax
Another option: THC tax

• Set tax as function of THC content
  – Pacula & Hall, 2003; MacCoun, 2010; Caulkins et al., 2015
  – A progressive THC tax could nudge users toward lower potency

• Critical implications for revenues & equity

• Somewhat similar to how we tax other drugs
  – Federal tax on liquor is based on alcohol content
  – Some jurisdictions now taxing liquid nicotine (e.g., NJ)
“Develop strategies to encourage consumption of less potent cannabis, including a price and tax scheme based on potency to discourage purchase of high-potency products”
Thinking critically about how to tax flower by THC

- If labels are accurate, this is not difficult
  - This is a big if
  - Letting suppliers choose testers is asking for trouble

- Need to think about lot/batch size, sampling

- Could base tax on upper value of the 95% confidence interval for batch THC
Even with accuracy/gaming issues, can still tax THC

- **Base flower tax on labelled THC**
  - With large penalties for significant deviations
  - A producer who wants to dodge taxes cannot claim high potency in its marketing

- **Could impose alternative minimum tax**
  - Kilmer, 2016
  - Tax that would be paid would be the larger of (1) the tax computed using the weight and (2) the tax computed using the labelled THC
Concluding thoughts

- Given paucity of data, cautious decision makers may want to be more restrictive
- Must acknowledge tradeoffs
- Excited for more research on THC:CBD ratios
- Regulations/taxes need not be permanent