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# Regulating Cannabis for Public Health

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<https://healthpolicy.usc.edu/research/federal-regulations-of-cannabis-for-public-health-in-the-u-s/>

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# Conflicts of Interest

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**I have no conflicts of interest to report.**

# Project Overview

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- **Globally, cannabis policies are becoming more liberalized.**
  - **Germany and the U.S. are considering legalization proposals.**
  - **Malta passed a law on “responsible use of cannabis” in December 2021.**
  - **The Netherlands and Switzerland recently passed laws to regulate scientific experiments on cannabis.**
- **Countries will look to first moving jurisdictions – Uruguay, Canada, and U.S. states, to model their regulations.**
- **We examine the extent to which first moving jurisdictions have adopted policies that promote moderate use and public health goals.**

# Background: Long-term or heavy use of cannabis is associated with adverse health consequences

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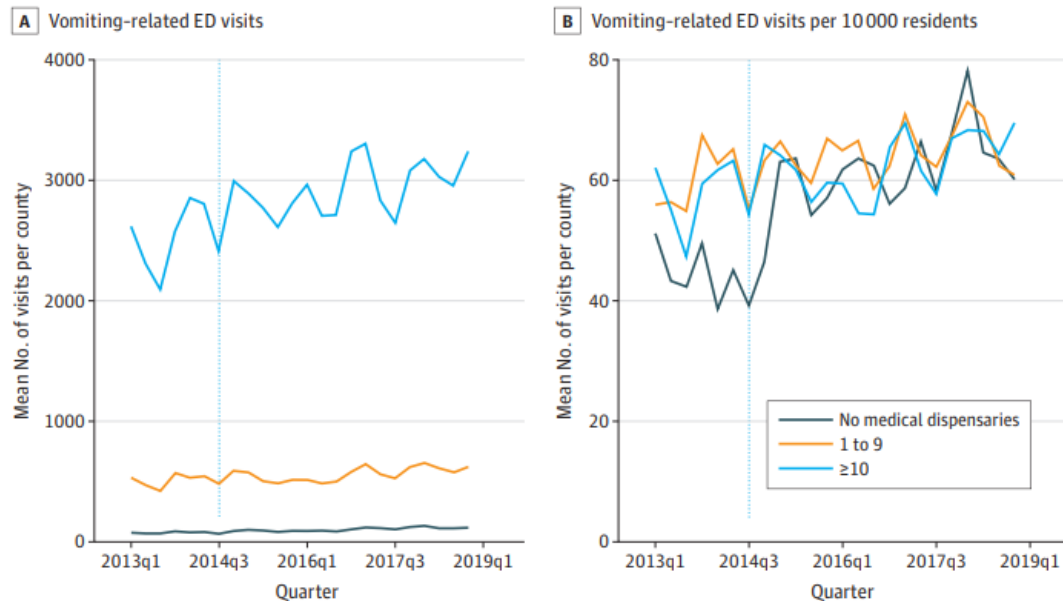
- **Impaired short-term memory, motor coordination**
- **Increased risk of cannabis use disorder**
- **Impaired cognitive function**
- **Altered brain development**
- **Increased risks of anxiety, depression, and psychosis in certain populations**
- **Lower educational attainment**

Sources: Preuss, U. W., M. A. Huestis, M. Schneider et al. (2021). Cannabis Use and Car Crashes: A Review. *Frontiers in Psychiatry*, 12 (May): 643315; Hall, W., and M. Lynskey. (2020). Assessing the Public Health Impacts of Legalizing Recreational Cannabis Use: The US Experience. *World Psychiatry*, 19 (2): 179-86; Colizzi, M., M. Ruggeri and S. Bhattacharyya. (2020). Unraveling the Intoxicating and Therapeutic Effects of Cannabis Ingredients on Psychosis and Cognition. *Frontiers in Psychology*, 11 (May 14); Volkow, N. D., J. M. Swanson, A. E. Evins et al. (2016). Effects of Cannabis Use on Human Behavior, Including Cognition, Motivation, and Psychosis: A Review. *JAMA Psychiatry*, 73 (3): 292-97.

# In Colorado, there has been a rise in the number of ED Visits and hospitalizations related to cannabis

## Vomiting Related ED Visits

Figure 1. Changes in Vomiting-Related Emergency Department (ED) Visits Over Time, by Baseline Medical Dispensary Exposure



## Cannabis-Involved Pregnancy Hospitalizations

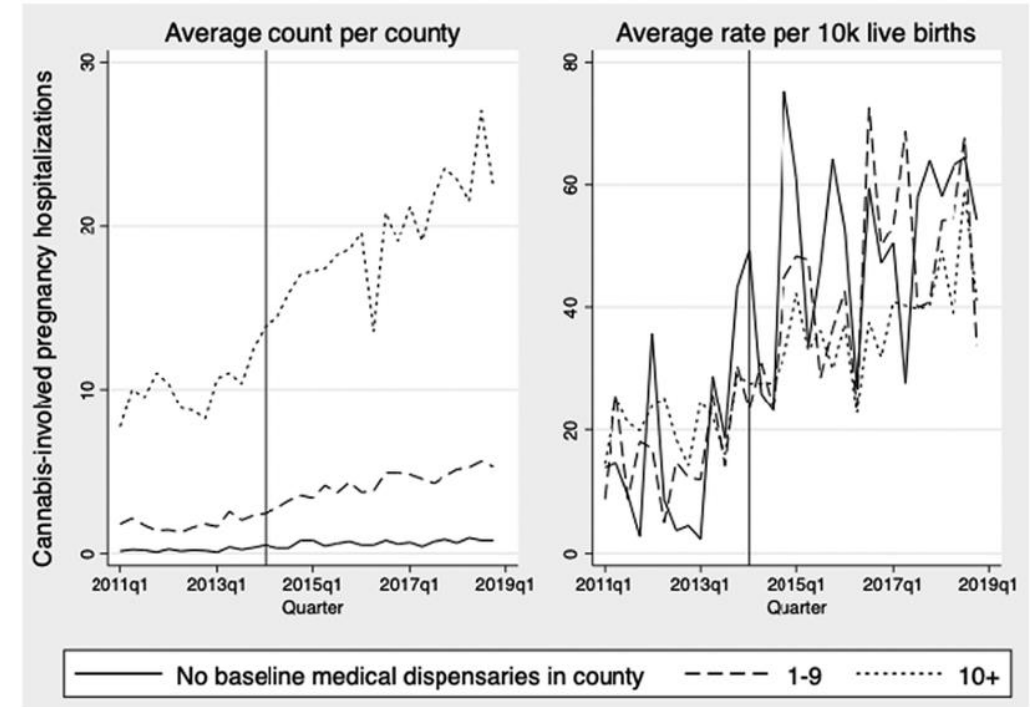


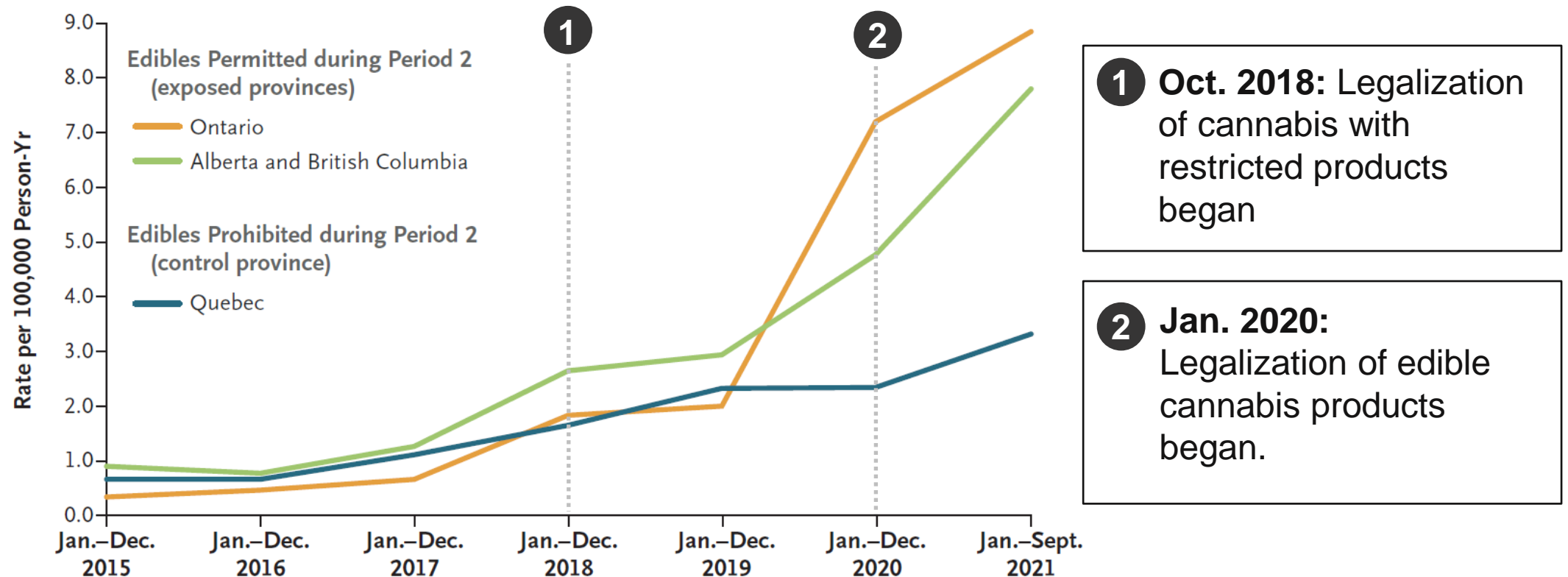
Fig. 1. Cannabis-Involved Pregnancy Hospitalizations Reported to the Colorado Hospital Association, 2011–2018. Note: The vertical line at quarter 1 of 2014 marks the start of recreational cannabis sales in Colorado. We classified counties according to their baseline level of medical dispensary exposure (no medical dispensaries; 1–9; and 10+) in 2012. The right panel is adjusted for the number of live births per county per year.

JAMA Network Open. 2021;4(9):e2125063. doi:10.1001/jamanetworkopen.2021.25063

Sources: Wang GS, Buttorff C, Wilks A, Schwam D, Tung G, Pacula RL. Changes in Emergency Department Encounters for Vomiting After Cannabis Legalization in Colorado. JAMA Netw Open. 2021;4(9):e2125063. doi:10.1001/jamanetworkopen.2021.25063; Wang, G. S., Buttorff, C., Wilks, A., Schwam, D., Metz, T. D., Tung, G., & Pacula, R. L. (2022). Cannabis legalization and cannabis-involved pregnancy hospitalizations in Colorado. Preventive Medicine, 156, 106993.

# A clear graduation in harm with introduction of higher potency products – first with youth

Changes in rates of hospitalization for unintentional cannabis poisoning in children 0 to 9 years of age in four Canadian Provinces, 2015-2021



# Methods

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- **We conducted primary and secondary data collection of laws**
- **Focus on policies U.S. states with legal nonmedical adult use, Canada, and Uruguay from January 2020 through May 2022**
- **Policies considered:**
  1. **Capping potency of delta-9-tetrahydrocannabinol (THC)**
  2. **Instituting sales limits**
  3. **Taxation based on potency of THC**



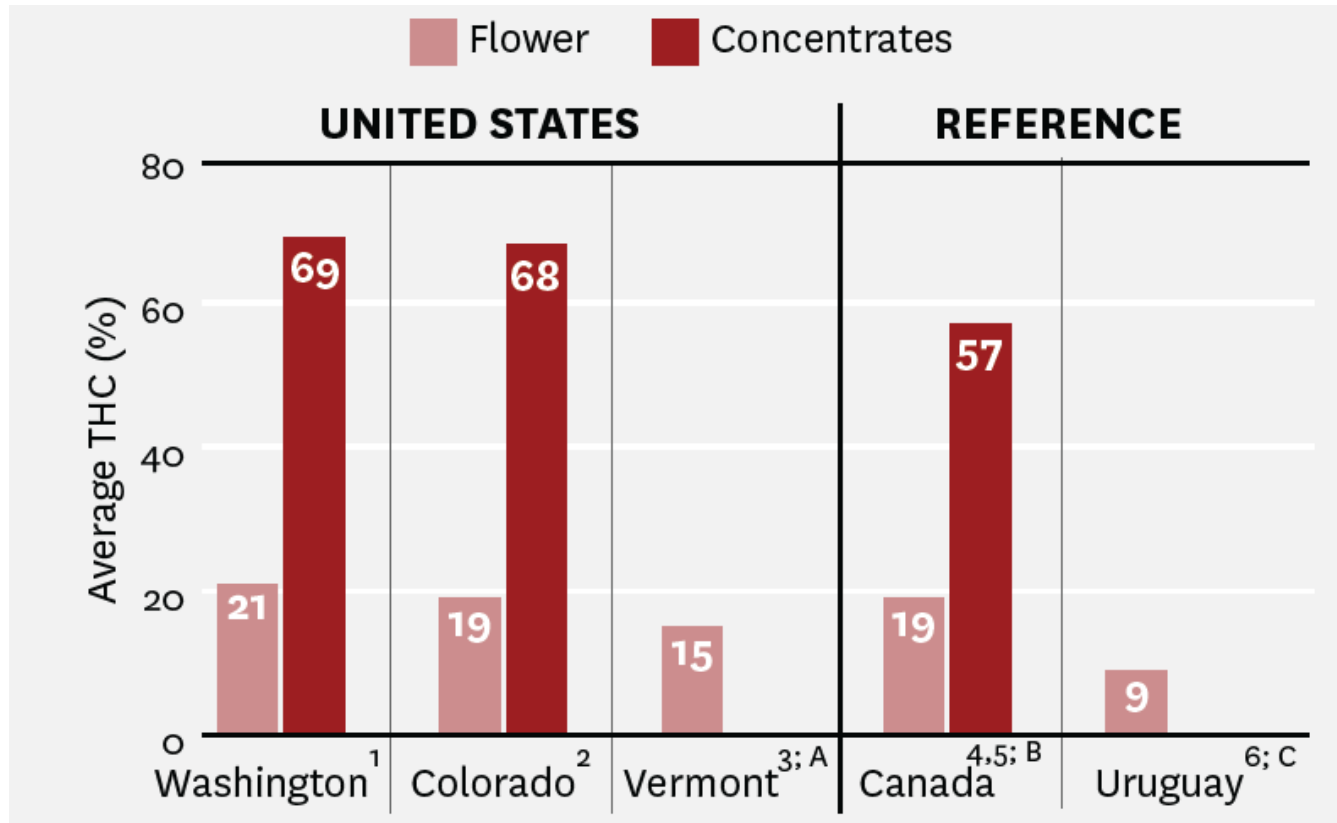
# Findings:

## Capping potency of delta-9-tetrahydrocannabinol (THC)

	Uruguay (2013)	Canada (2020)	Washington State (2020)
Maximum THC Content	Flower: THC $\leq$ 9%  Edibles, concentrates, oils are prohibited	Edibles: <b>10 mg of THC/package</b>  Extract: <b>1000 mg of THC/unit</b>  Oil: <b>1000 mg of THC/mL</b>	Edibles: <b>100 mg THC/package</b>  No other caps

**Only VT and CT** have placed potency caps on both flower (30% THC) and solid concentrates (60% THC), but it is not specified in total units.

# Potency for both flower and concentrates in U.S. markets surpasses that of other countries



- A. Vermont: There is currently no data available on the average potency for concentrates.
- B. Canada: Potency of flower refers to British Columbia; potency for concentrates is self-reported.
- C. Uruguay: 9% THC represents the maximum for purchases from retail pharmacies; pharmacies are prohibited from selling concentrates.

Sources: 1. Smart, R., Caulkins, J. P., Kilmer, B., Davenport, S., & Midgette, G.. (2017). Variation in cannabis potency and prices in a newly legal market: evidence from 30 million cannabis sales in Washington state. *Addiction*, 112(12), 2167–2177. <https://doi.org/10.1111/add.13886> 2. MPG Consulting & University of Colorado Boulder Leeds School of Business. 2020 Regulated Marijuana Market Update. Available on the Web: <https://sbg.colorado.gov/sites/sbg/files/2020-Regulated-Marijuana-Market-Update-Final.pdf>. 3. Cash, M. C., Cunnane, K., Fan, C., & Romero-Sandoval, E. A. (2020). Mapping cannabis potency in medical and recreational programs in the United States. *PLoS one*, 15(3), e0230167 4. Naimi, T., Vallance, K., Churchill, S., Callaghan, R., Stockwell, T. & Farrell, A. (2021). Sales and Revenue from Regulated Cannabis Products: British Columbia, October 2018-December 2020. Victoria, BC: Canadian Institute for Substance Use Research, University of Victoria. 5. Hammond, D. & Goodman, S. (2020). Cannabidiol Levels Among Cannabis Consumers in the United States and Canada. *Cannabis and Cannabinoid Research*. <https://doi.org/10.1089/can.2020.0092> 6. United Nations Office on Drugs and Crime. (2021, June). *Drug Market Trends: Cannabis Opioids*. 2021 World Drug Report.

# Findings:

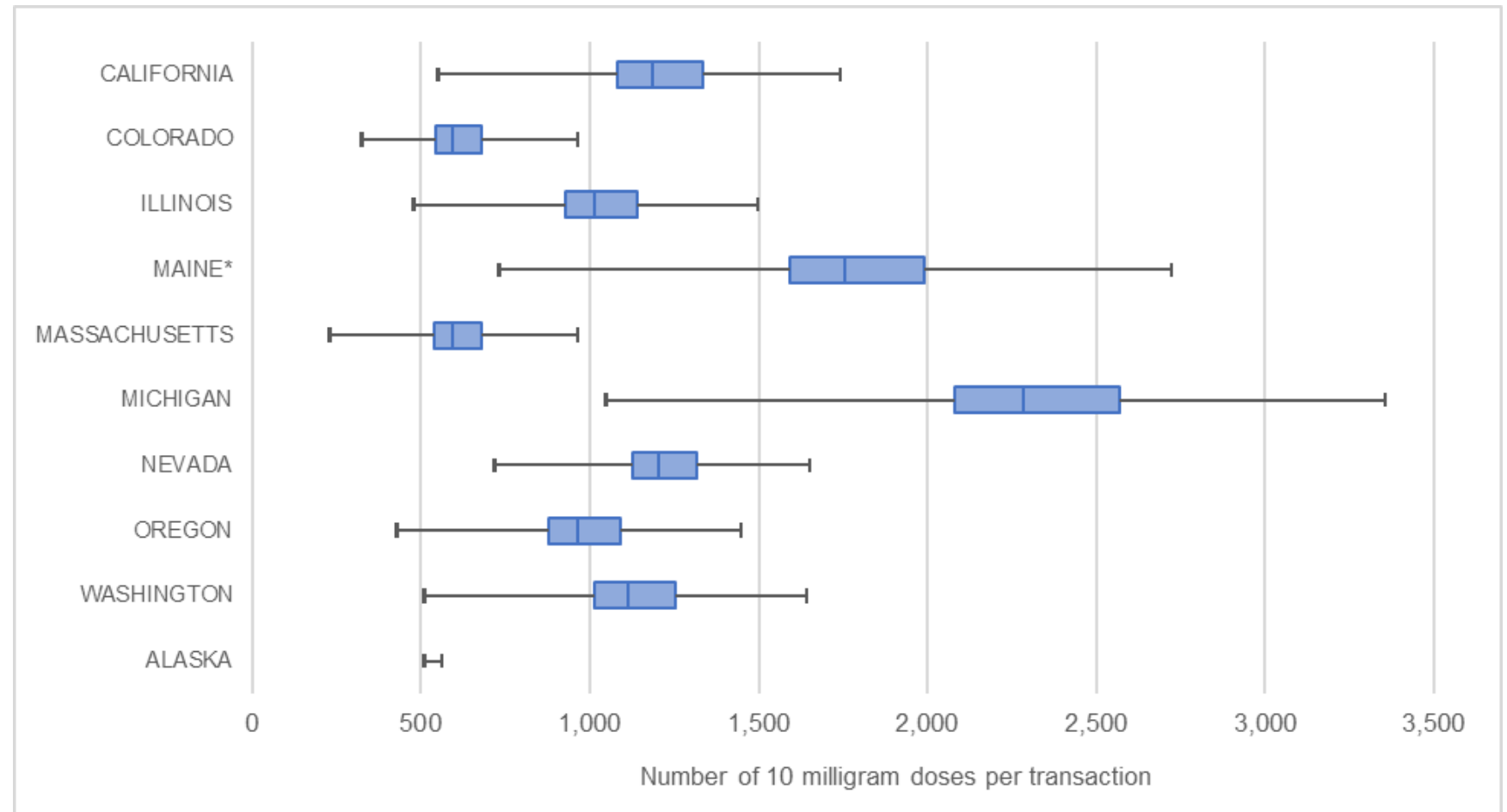
## Instituting sales or purchase limits

	Uruguay (2013)	Canada (2018)	Washington State (2020)
Sales or purchase limits	Only licensed pharmacies regulated federally by IRCCA. <b>40 gram cap per month / 10 gram per week</b>	Varies by province but mostly <b>30 gram cap of dried cannabis or equivalent per sale</b>	Allows sale from private licensed establishments, maximum amounts per transactions: <b>1 oz flower + 7 grams concentrate + 16 oz edibles + 72 fl oz (liquids)</b>

Source: UNODC (2021). *World Drug Report 2021* and Pacula et al (2021) “Current U.S. State Cannabis Sales Limits Allow Large Doses for Use or Diversion.” *American Journal of Preventive Medicine*, 60(5), 701-705.

# Implied ranges of 10 milligram THC doses associated with U.S. state sales limits per transaction in Jan 2020

**Point of comparison:**  
A keg of beer in the US holds 165 12-oz servings of alcohol



# Findings:

## Taxation based on potency of THC

	Uruguay (2013)	Canada (2018)	Washington State (2020)
Potency tax	Edibles, concentrates, oils are not permitted.	<b>1 cent per milligram of total THC for edible cannabis, cannabis extracts and cannabis topicals</b> (except for Manitoba).	Not applicable.

**Only NY and CT** have instituted plans to tax based on potency. IL has adopted price taxes using potency thresholds. The majority of U.S. states tax based on price only.

Sources: Walsh, J. & Ramsey, G. (2016). Uruguay's drug policy: Major innovations and major challenges. Improving Global Drug Policy: Comparative Perspectives and UNGASS 2016 policy brief; Government of Canada. (2022). Cannabis duty – Calculate the excise duty on cannabis. Retrieved from <https://www.canada.ca/en/revenue-agency/services/tax/businesses/topics/excise-duties-levies/collecting-cannabis.html>; Alcohol Policy Information System (2021). Recreational Use of Cannabis: Volume 1. Retrieved from <https://alcoholpolicy.niaaa.nih.gov/cannabis-policy-topics/recreational-use-of-cannabis-volume-1/104>

# Discussion

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- **Policymakers in Uruguay and Canada explicitly state the protection of public health as a goal of their cannabis policies**
- **US states have not adequately considered public health and federal proposals currently fail to do so as well. The stated goals include criminal justice reform, raising tax revenue, eliminating the illegal market, investing in communities harmed by drug prohibition, all of which are important and have implications for public health**
- **More can be done to directly address public health concerns, especially when it comes to high-potency products**

# The current regulatory environment in U.S. states is leading to:

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- **Large increases** in average potency of the cannabis plant
- **Large declines** in purity adjusted price
- **Rapid proliferation** of new products
  - new higher potency derivatives from the plant
  - growing number of products that are attractive to youth

# Industry is developing a variety of new products



MOTA CBD Fruit Jellies -  
200mg CBD  
**\$18.00**



Herbivores Gummies -  
150mg THC  
**\$17.00**



Herbivores Pastries - 150mg  
THC  
**\$17.00**



Herbivores Chocolate Bar -  
100mg THC  
**\$15.00**

## Two California Entrepreneurs Launch CBD And THC Ice Cream



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*I cover the business of cannabis.*

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# Policy Options

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Countries looking to legalize cannabis can design regulations to generate overall net benefits in the long run if policymakers carefully consider potential public health effects of high potency products:

1. Cap the amount of THC and its psychoactive analogs that can be contained in legal products.
2. Limit the types of products that can have cannabis/ THC infused in them.
3. Consider instituting a potency-based sales limits.
4. Tax based on potency, not price alone.

# Thank you!

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