US Cannabis Legalization Contexts 2015–2021:

Cannabis Use by Edible, Smoking, Vaping and Perceived Risks Among Adolescents

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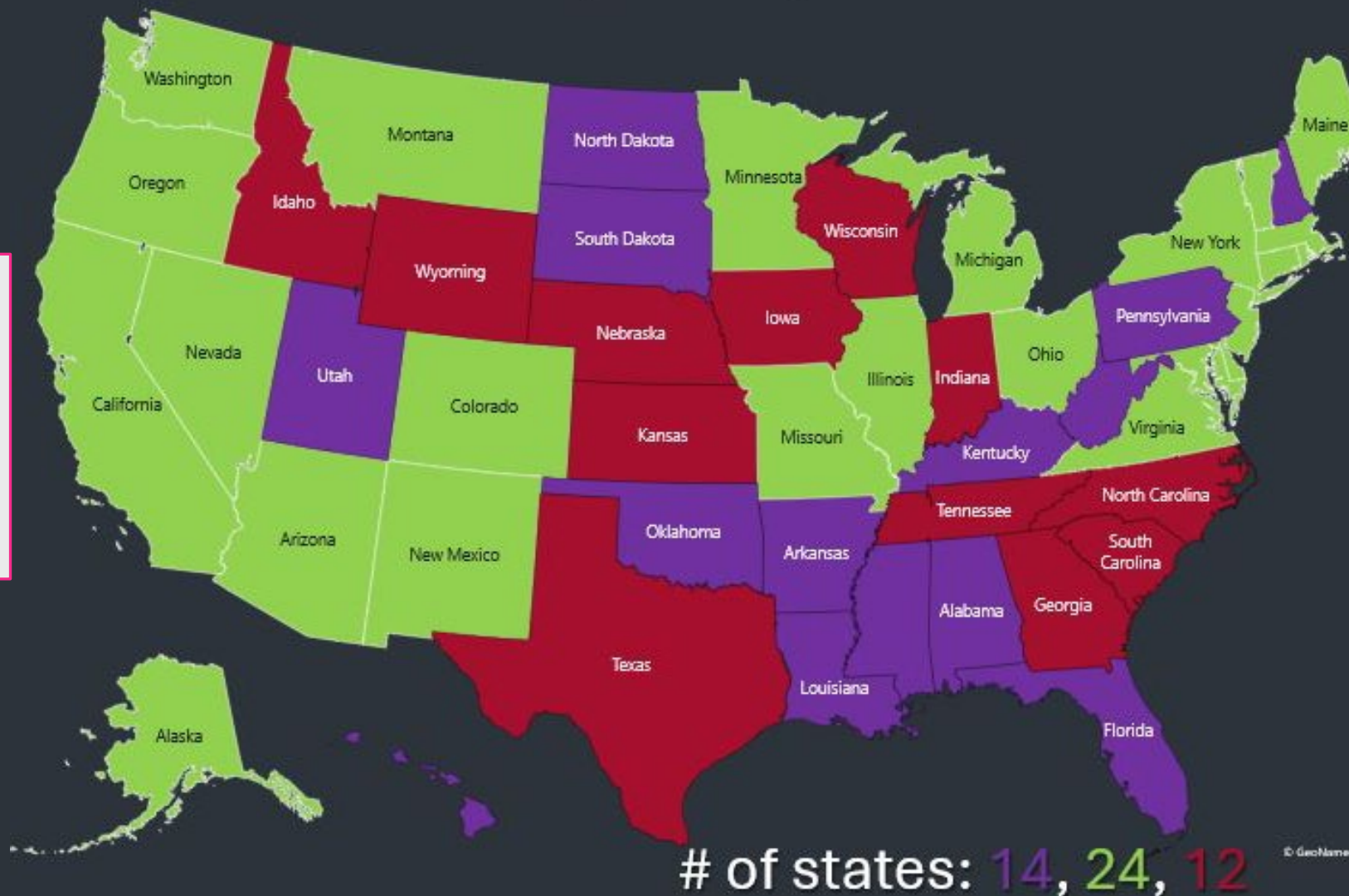
Doctoral Candidate

Introduction [1/3]

Legalization Contexts

- Medical-only
- Adult use

Cannabis Policy in the United States as of January 1st 2024
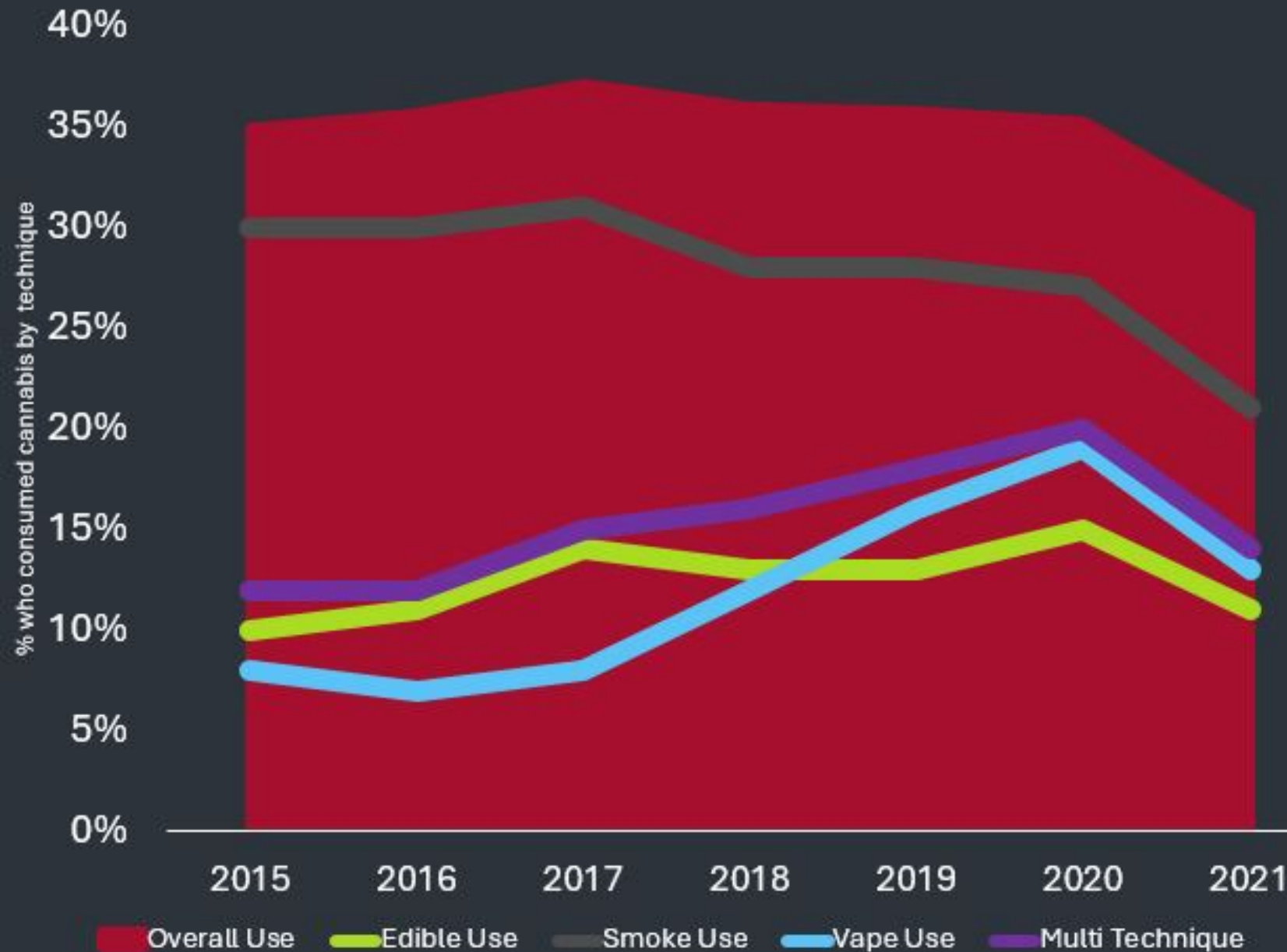■ medical-only ■ adult use ■ prohibited

# of states: 14, 24, 12

Introduction [2/3]

Cannabis Techniques

- Edibles
- Smoking
- Vaping

Cannabis use among US 12th grade students surveyed by Monitoring the Future 2015- 2021

% who consumed cannabis by technique

Overall Use — Edible Use — Smoke Use — Vape Use — Multi Technique
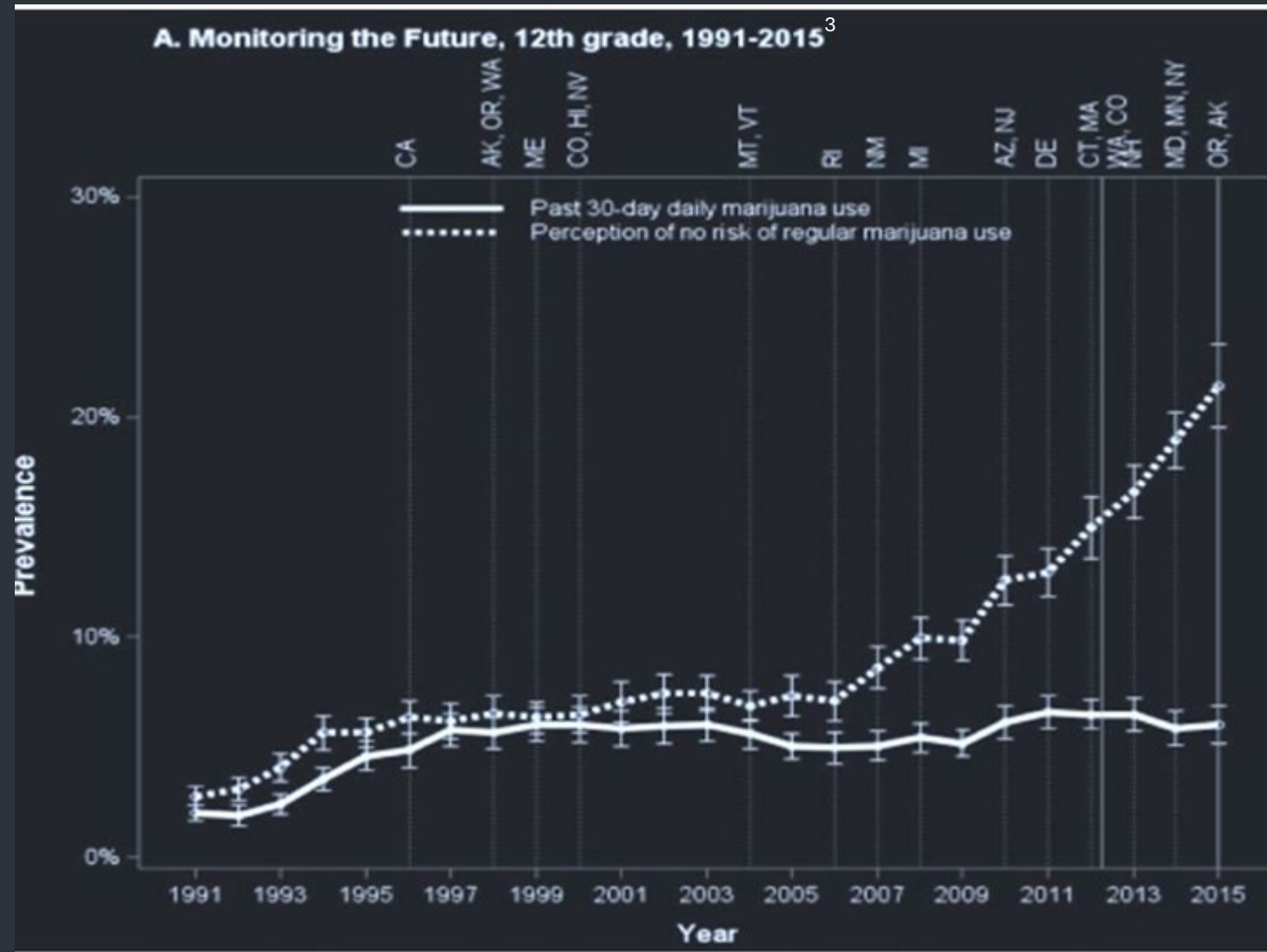
Introduction [3/3]

Legalization and Perceived Risks

- Compared to their earlier counterparts, adolescents perceived cannabis as **less risky** [1]
- Until recently, **trends** in cannabis use and associated risks **paralleled** one another. These trends **diverged** in the late 2000s [2]

A. Monitoring the Future, 12th grade, 1991-2015 [3]

[1] Cerdá et al. 2017; Fleming et al. 2016; Miech, Johnston, and O'Malley 2017; Sarvet, Wall, Fink, et al. 2018; Waddell 2022

[2] Fleming et al. 2016; Miech et al. 2017; Sarvet, Wall, Keyes, et al. 2018

[3] Figure from Sarvet, Wall, Keyes, et al. 2018

Literature Review [1/2]

Medical Legalization and Adolescent Use

- **Little** to **no change** in the prevalence of cannabis **use** [4]
- **Decreased** in prevalence of **use** for **younger**, rather than older, adolescents (e.g., 8th versus 12th graders) [5]

Adult Use Legalization and Adolescent Use

- **No difference** in prevalence of **use** [6]
- **Decrease** in prevalence of **use** [7]
  - But **see** [8]

Legal Contexts and Consumption Techniques

- Legal contexts were associated with an **increase** in the prevalence of **edible** and **vape use**.
  - in one's lifetime [9]
  - in the past year [10]

[9] Borodovsky et al. 2017;Nicksic et al. 2020
[10] Maynard and Schwartz 2023

Research Question:

What is the relationship between legal contexts and cannabis use, by technique, among adolescents?

In the previous year, compared to high school seniors in a prohibited state, **those** within **legal contexts** will be **more likely** to have**:**

| H1: vaped cannabis | H2: used edibles | H3: used cannabis via two or more techniques. | H4: perceived fewer risks |

Data

- **Monitoring the Future** (MTF): A Continuing Study of American Youth
  - **Nationally representative** survey on youth
  - Sampling and strata weights

Current Study

- Examined years **2015-2021**
- Analyzed restricted use version (included identifiers)
- Population: **US 12th graders** (n≈10,000)

Survey Structure

- **Core**
  - Questions included were asked of all adolescents
- **Form 1**
  - One of six possible forms **appended** to the core questionnaire
  - Each form contains a subset of additional questions
  - Randomly distributed

Dependent Variables

- Edible Use
- Smoking
- Vaping
- Multi-Technique Use(2+ Techniques)

- **Dichotomized** (0, 1) for any **past-year use**

Independent Variables

- Legal Context
  - Prohibited*, Medical-only, Adult use
- Perceived Risk
  - None*, Slight, Moderate, Great

* Indicates reference category

Control Variables

- Sex
  - Male*, Female
- Race
  - White*, Black, Latine/x, Other/Multi

* Indicates reference category

Descriptive statistics

- **Frequencies** and **crosstabulations**, employing **z-tests** to **identify significant differences** across legal contexts in adolescents' **perceptions of the risks** associated with regular cannabis use.

Multivariate logistic regressions

- **Allows** for a nuanced **understanding** of the **association** between **legalization** and **consumption techniques**, while **accounting** for potential **confounding factors**.
- **Justified** by its ability to **model binary outcomes** and **control** for covariates simultaneously.
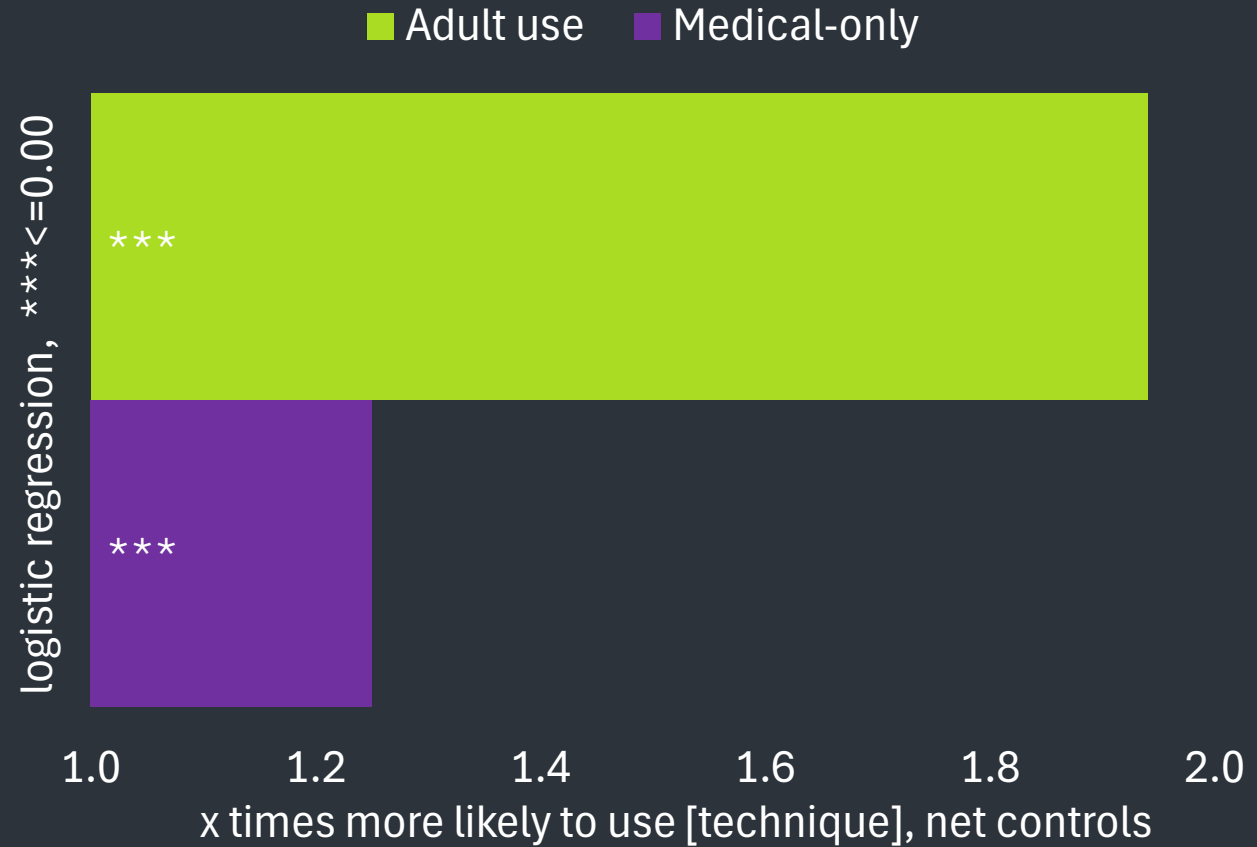
Hypothesis 1 Result:
Compared to 12th grade students in prohibited contexts,
those in legal cannabis contexts were more likely to **vape** cannabis in the previous year
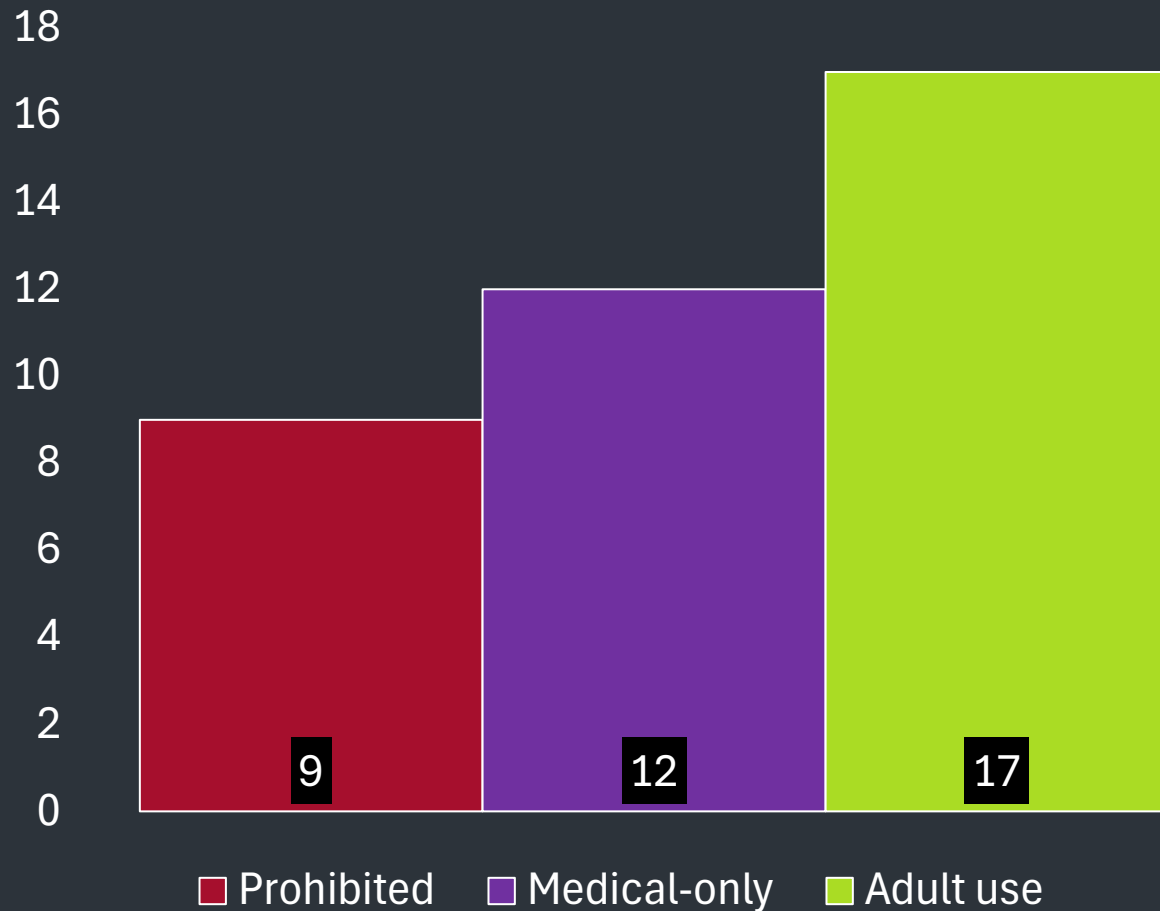
% of 12th graders who vaped cannabis by legal context
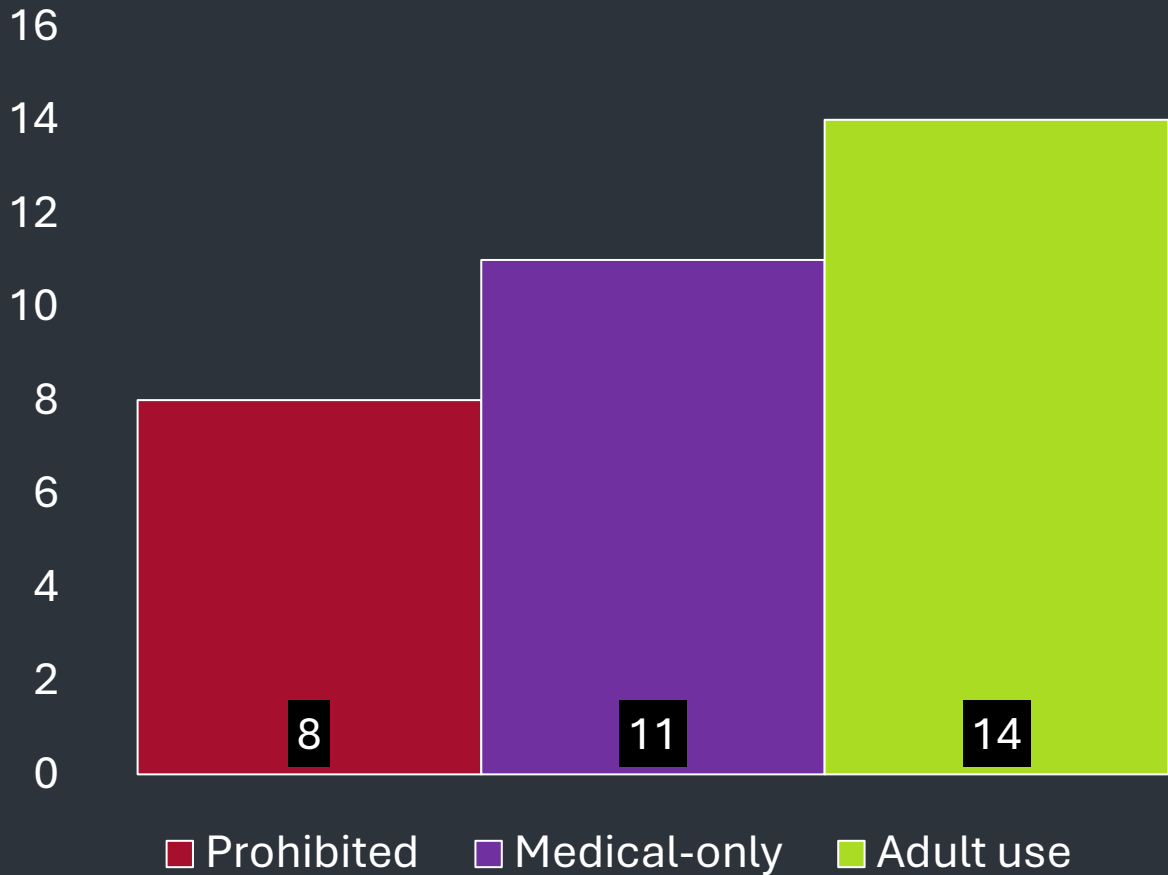
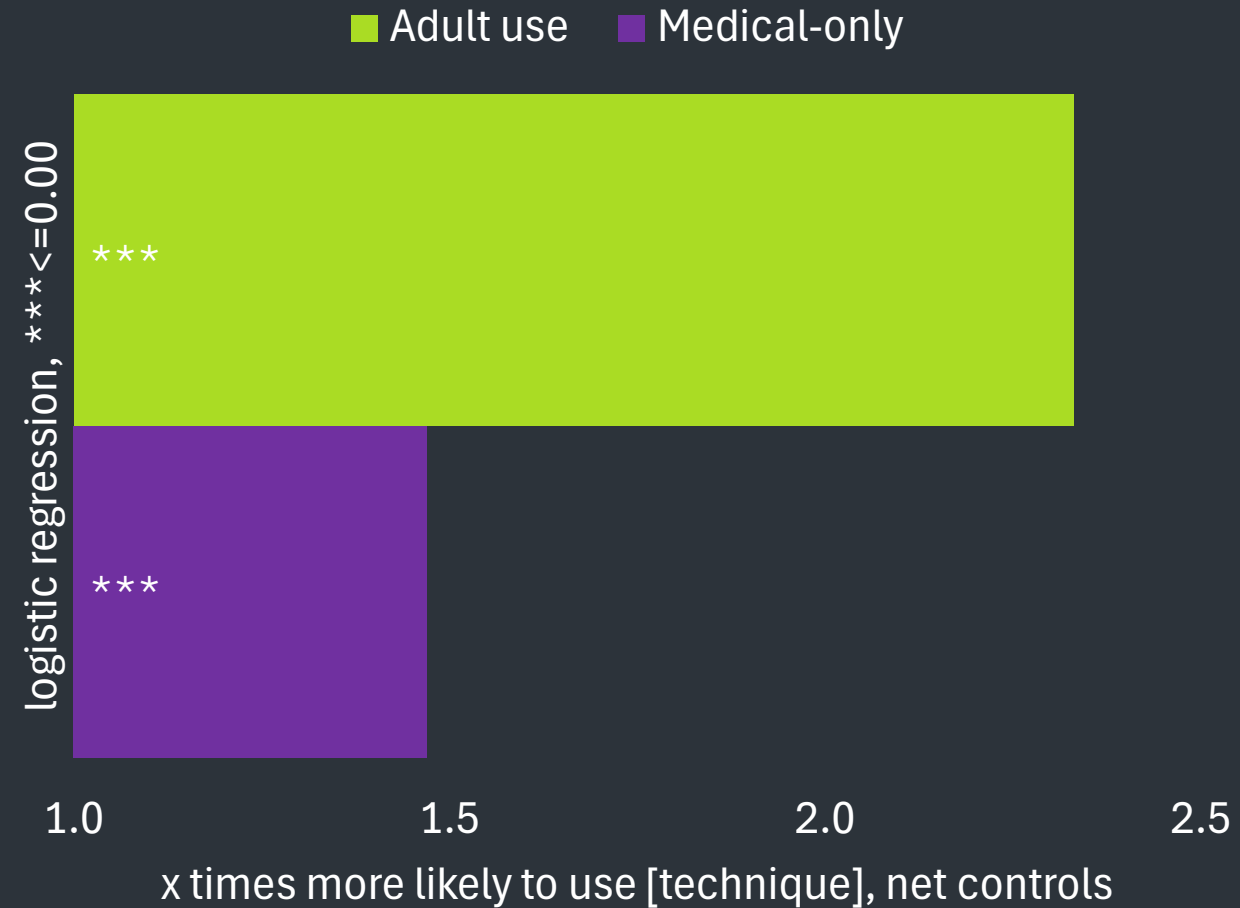Odds of past-year vaping for 12th graders in legal contexts compared to a prohibited context

■ Adult use ■ Medical-only

logistic regression, ***<=0.00

***

***

x times more likely to use [technique], net controls

□ Prohibited □ Medical-only □ Adult use

Hypothesis 2 Result:
Compared to 12th grade students in prohibited contexts,
those in legal cannabis contexts were more likely to use **edibles** in the previous year

% of 12th graders who used edibles by legal context

Odds of past-year edible use for 12th graders in legal contexts compared to a prohibited context

■ Adult use   ■ Medical-only

logistic regression, ***<=0.00

***

***

9   12   17

1.0   1.5   2.0   2.5

□ Prohibited   □ Medical-only   □ Adult use

x times more likely to use [technique], net controls

Hypothesis 3 Result:

Compared to 12th grade students in prohibited contexts, those in legal cannabis contexts were more likely to use **two or more techniques** in the previous year.
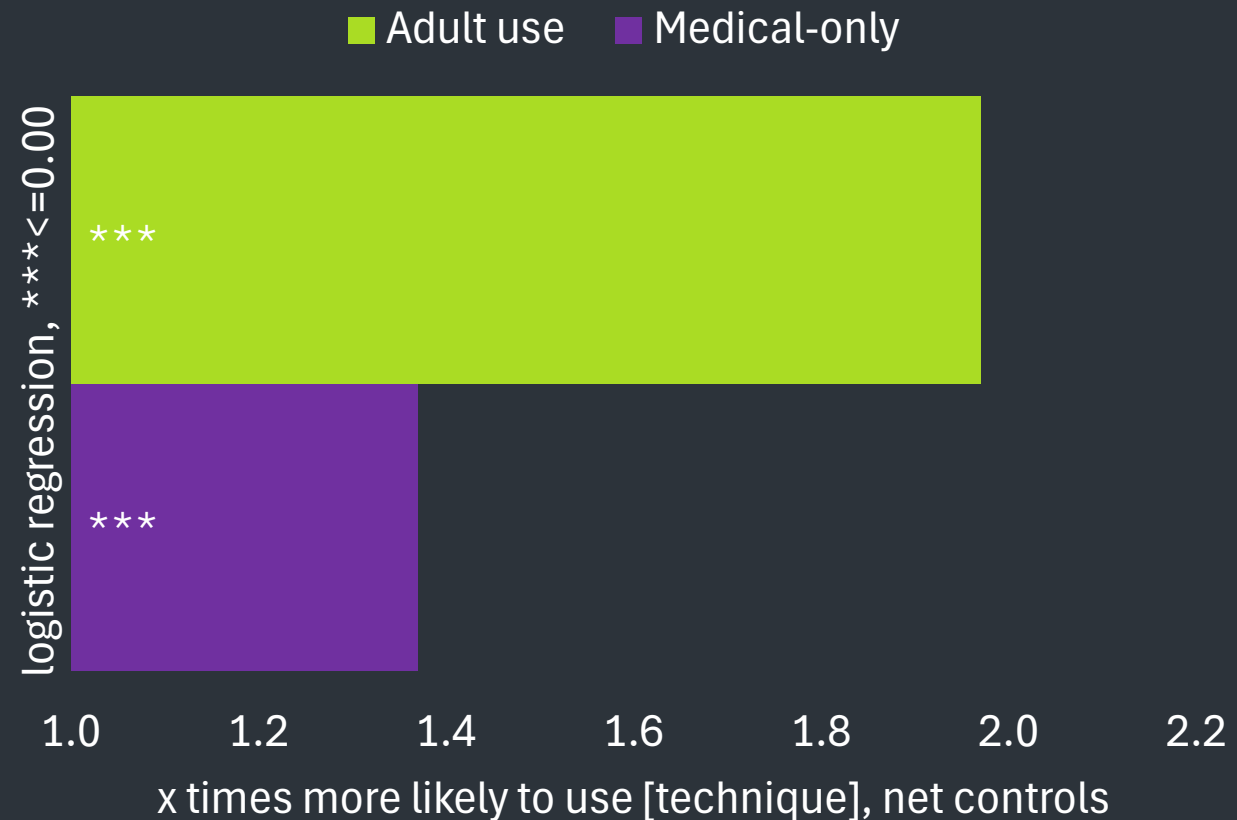

% of 12th graders who used two+ techniques by legal context

25
20
15
10
5
0

11   15   20

■ Prohibited   ■ Medical-only   ■ Adult use
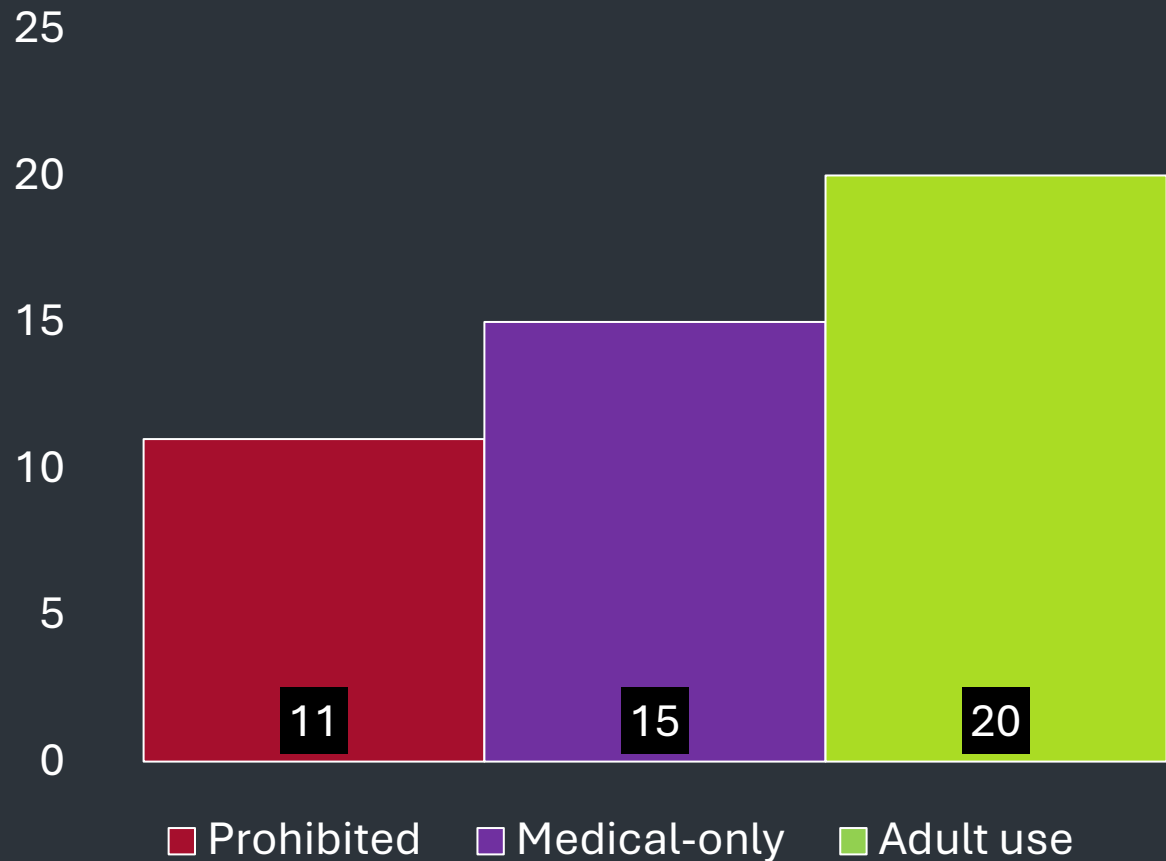
Odds of past-year two+ technique use for 12th graders in legal contexts compared to a prohibited context

■ Adult use   ■ Medical-only

logistic regression, ***<=0.00

***

***

1.0   1.2   1.4   1.6   1.8   2.0   2.2

x times more likely to use [technique], net controls

Hypothesis 4 Result:
Little difference across contexts among adolescents for perceptions of risk

Prohibited | **Medical-only** | **Adult use**

% of students by legal context and perceived risk

	No Risk	Slight Risk	Mod. Risk	Great Risk
Prohibited	23	21	23	33
Medical-only	21	24	24	32
Adult use	18	26	26	30
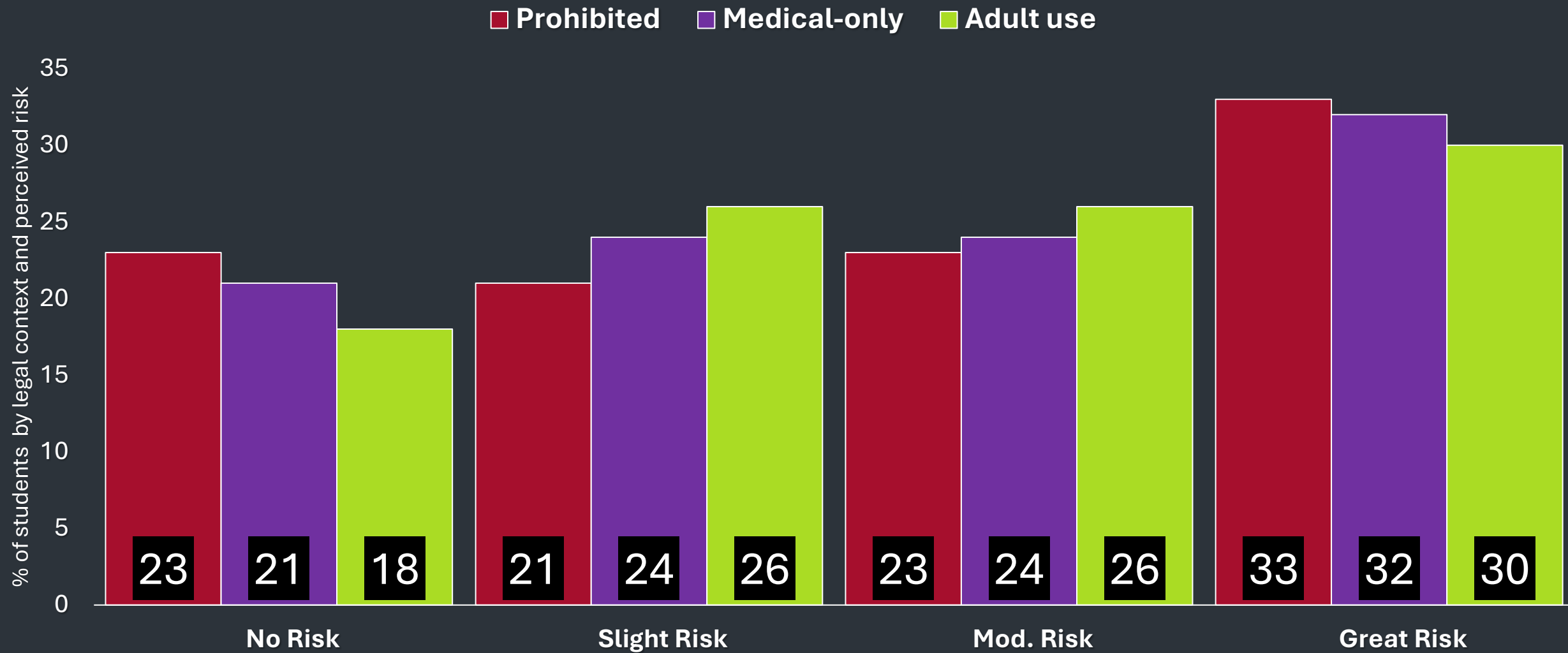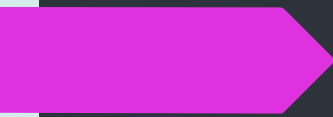
Note: Differences across contexts by risk level were significant (p<=0.05)

Use Techniques

- In the previous year, compared to high school seniors attending school in prohibited contexts, those in legal contexts were more likely to have:
  - **Vape** cannabis[11].
  - Consume **edibles**
    - Used **two or more** techniques
      - Limited research [13]
        - Findings on Canadian youth suggest that eating and vaping cannabis may be more common in legal contexts.

Perceptions of Risk

- Little meaningful difference across contexts

[11] Borodovsky et al. 2017, Nicksic et al. 2020

[12] Borodovsky et al. 2017

[13] Doggett et al. 2019

Discussion and Conclusion [2/2]

Limitations

- Generalizability
  - US 12th graders in the US from 2015-2021
- Cross-sectional survey design
  - Causal inferences cannot be made
- Question wording for perceived risk
  - asked about "smoking" regularly
  - Perceived risks for the same drug may differ based on the technique used [14]

Future Research

- Examine other mechanisms associated with adolescent cannabis use
  - Availability
    - Operating commercial sales
      - Often commence several years after initial legalization [15]
      - Storefronts act as a pivotal part of cannabis legalization, spurring awareness [16]
        - Within legal contexts, often, local governments can prohibit commercial sales

[14] Zinberg 1986

[15] Marjuana Policy Project

[16] Wexler 2023

Thank you for your time!

References, Logistic Regression Charts

- Scan QR Code

Questions/Thoughts?

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