

Cannabis Use by Young Adults: Trends and Considerations

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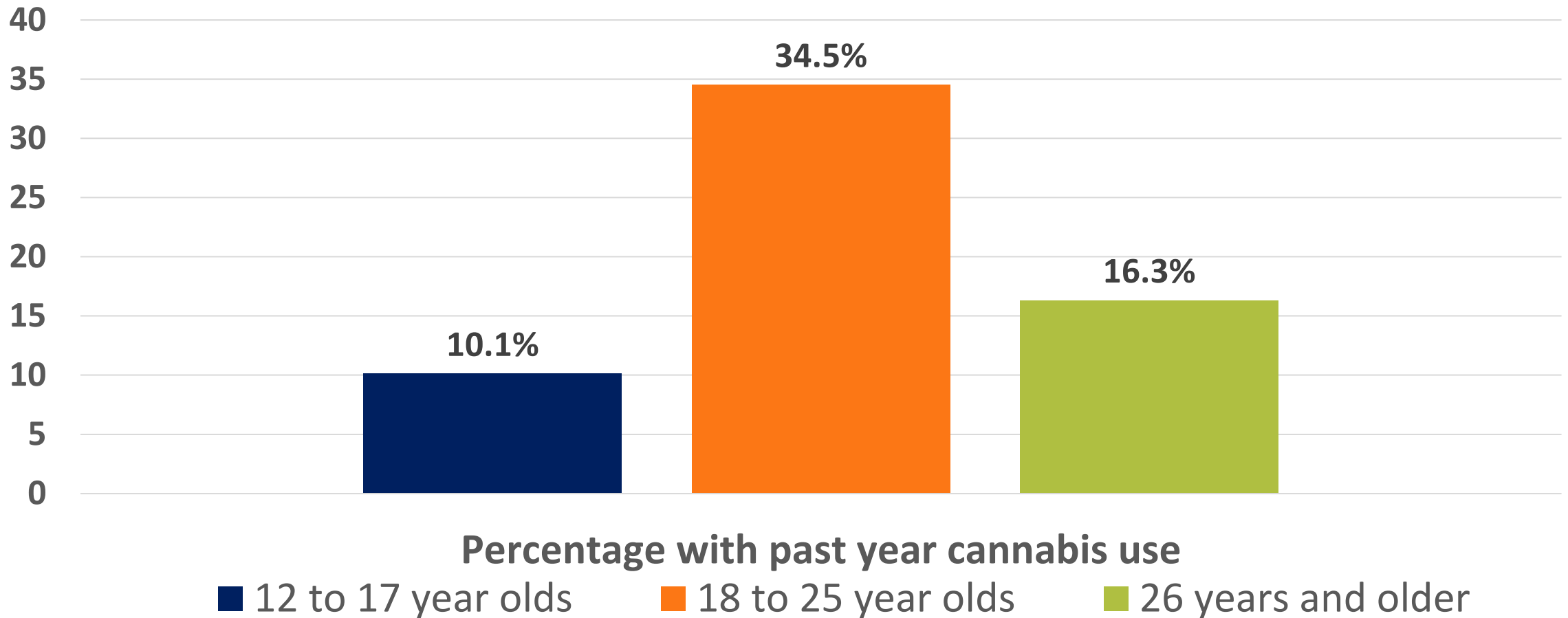
Acknowledgements

- Thank you to Dr. Bia Carlini and Lexi Nims for the invitation to present to today
- Thank you to CSHRB researchers I've had the honor of collaborating with who continue to advance the science related to cannabis use in a way that impacts the "real world":
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 - Katarina Guttmannova
 - Isaac Rhew
 - Charlie Fleming
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 - Jennifer Cadigan
 - Jason Ramirez
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 - Scott Graupensperger
 - Katherine Walukevich-Dienst
 - Brian Calhoun
 - Connor McCabe
 - Nicole Fossos-Wong
 - Mary Larimer

**Why conduct research with young adults
between the ages of 18-25?**

Past year cannabis use by age group

Source: SAMHSA 2020 National Survey on Drug Use and Health



Washington Young Adult Health Survey (YAHS)

- Funded by Division of Behavioral Health & Recovery (DBHR):
 - Sarah Mariani
 - Sandy Salivaras
- Young Adult Health Survey Team:
 - Jason Kilmer
 - Mary Larimer
 - Isaac Rhew
 - Alice Yan
 - Rose Lyles-Riebli

Washington State Health Care Authority (Division of Behavioral Health and Recovery) (PI: Kilmer).

Young Adult Health Survey Recruitment

- Aimed to collect all Year One data before the first store opened in July 2014
 - 69.3% collected before the first store opened
 - Remaining 30.7% collected into August 2014
 - Only 18 stores had opened statewide in July
 - Only 31 stores had opened by August

Young Adult Health Survey Recruitment

- Participants recruited using a combination of direct mail advertising to a random sample from DOL, as well as online advertising (Facebook, Craigslist, Instagram, study web site, etc.)
- Assessed demographics on ongoing basis and modified strategies to recruit under-represented groups
- Convenience sample, not a random sample

Post-stratification weighting and analyses

- To improve generalizability, used post-stratification weights based on gender, race, and geographic region
- Weighted results are consistently very similar to non-weighted

Young Adult Health Survey

- Each year we collect data from a new cohort of 18-25 year olds

Sample sizes over time

• Cohort 1 (2014):	2,101
• Cohort 2 (2015):	1,675
• Cohort 3 (2016):	2,493
• Cohort 4 (2017):	2,342
• Cohort 5 (2018):	2,412
• Cohort 6 (2019):	1,942
• Cohort 7 (2020)	1,643
• <u>Cohort 8 (2021):</u>	<u>1,756</u>
• TOTAL:	16,364

Young Adult Health Survey

- Each year we follow up with previous cohorts
- Our 9th year of data collection is underway (and the cohort we recruited as 18-25 year olds in 2014 is now 26-33)
- Dr. Katarina Guttmannova applied for and obtained a secondary data analysis grant (NIDA grant R01DA047996, PI: Guttmannova)



Original article

Trends in Alcohol, Cigarette, E-Cigarette, and Nonprescribed Pain Reliever Use Among Young Adults in Washington State After Legalization of Nonmedical Cannabis



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Keywords: Alcohol; Cannabis; Tobacco; E-cigarettes; Pain relievers; Young adults; Cannabis legalization



Associations of cannabis retail outlet availability and neighborhood disadvantage with cannabis use and related risk factors among young adults in Washington State



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Cannabis Use Among Young Adults in Washington State After Legalization of Nonmedical Cannabis

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Objectives. To examine changes in prevalence of cannabis use and of cannabis use disorder symptomatology among young adults from 2014 to 2019 in Washington State, where nonmedical (or “recreational”) cannabis was legalized in 2012 and retail stores opened in July 2014.

Kilmer, J.R., Rhew, I.C., Guttmannova, K., Fleming, C.B., Hultgren, B., Gilson, M.S., Cooper, R.L., Dilley, J., & Larimer, M.E. (2022). Cannabis use among young adults in Washington State after legalization of nonmedical cannabis. *American Journal of Public Health*, 112, 638-645.

- n=12,963 young adults in Washington over 6 time points
- Included covariates for:
 - Sex assigned at birth
 - Race
 - Ethnicity
 - Geographic region of the state
 - Age
 - Attending 4 year college
 - Full time employment status
- Computed post-stratification weights to further control for distribution across the samples

Cannabis Use Among Young Adults in Washington State After Legalization of Nonmedical Cannabis

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Objectives. To examine changes in prevalence of cannabis use and of cannabis use disorder symptomatology among young adults from 2014 to 2019 in Washington State, where nonmedical (or “recreational”) cannabis was legalized in 2012 and retail stores opened in July 2014.

Methods. We used 6 years of cross-sectional data collected annually from 2014 (premarket opening) to 2019 from 12 963 (~2000 per year) young adults aged 18 to 25 years residing in Washington. Logistic regression models estimated yearly change in prevalence of cannabis use at different margins and related outcomes.

Results. Prevalence of past-year, at least monthly, at least weekly, and daily use of cannabis increased for young adults, although increases were driven by changes among those aged 21 to 25 years. There was also a statistically significant increase in prevalence of endorsing at least 2 of 5 possible symptoms associated with cannabis use disorder.

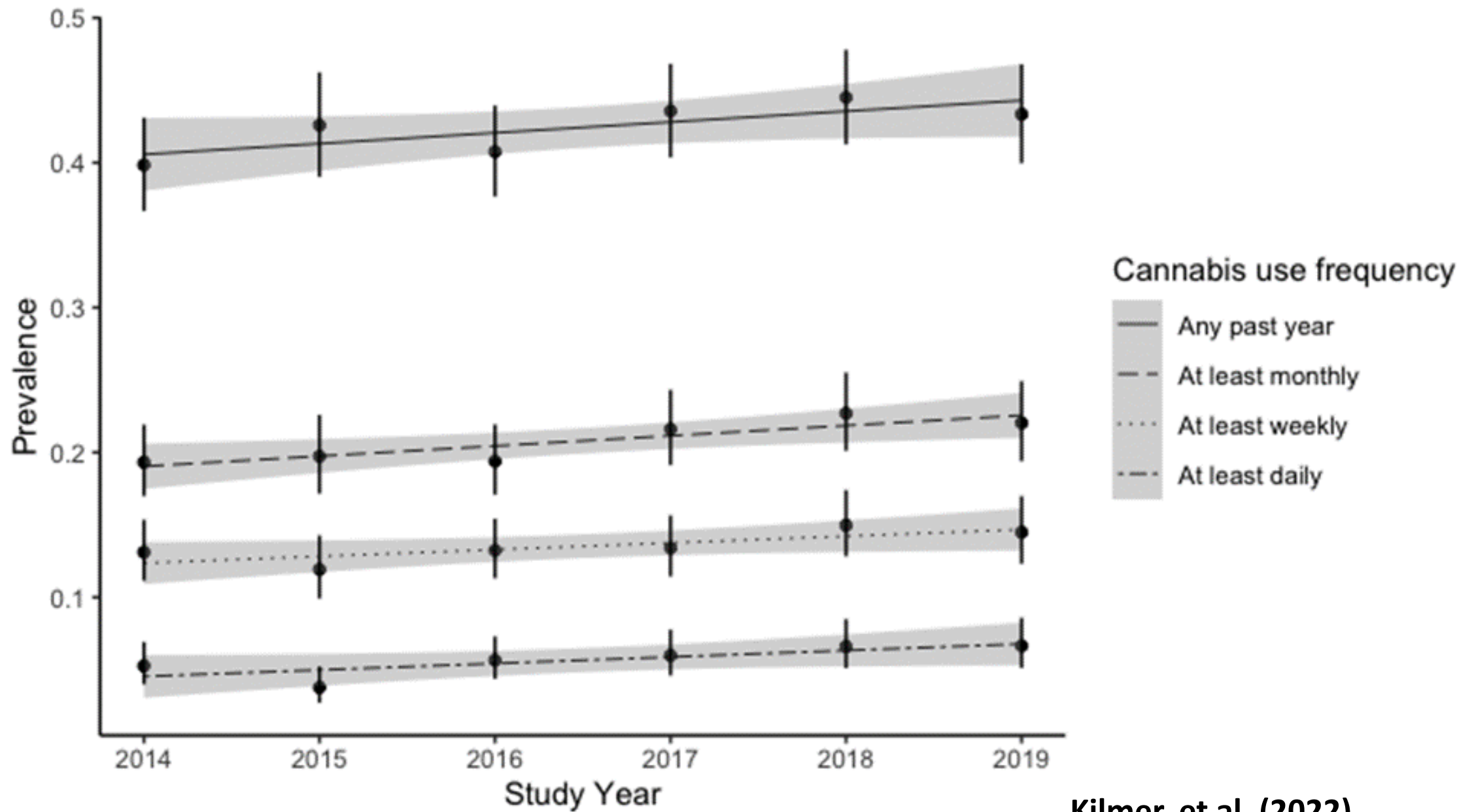
Conclusions. Among young adults in Washington, particularly those of legal age, prevalences of cannabis use and cannabis use disorder symptomatology have increased since legalization. This trend may require continued monitoring as the nonmedical cannabis market continues to evolve. (*Am J Public Health*. 2022;112(4):638–645. <https://doi.org/10.2105/AJPH.2021.306641>)

Over the past 2 decades, cannabis use prevalence has increased among young adults in the United States. Data from the National Survey on Drug Use and Health (NSDUH) showed an increase in the prevalence of any past-year cannabis use among young adults aged 18 to 25 years from 29.8% in 2002 to 35.4% in 2019.¹ This increase is concerning because cannabis use among young adults is associated with adverse short- and long-term consequences, including cognitive deficits,² poorer academic outcomes,^{3–5} impaired driving,⁶ worse mental health,⁸ and addiction.⁹ In 2019, 5.8% of those aged 18 to 25 years met

diagnostic criteria for past-year cannabis use disorder (CUD).⁹

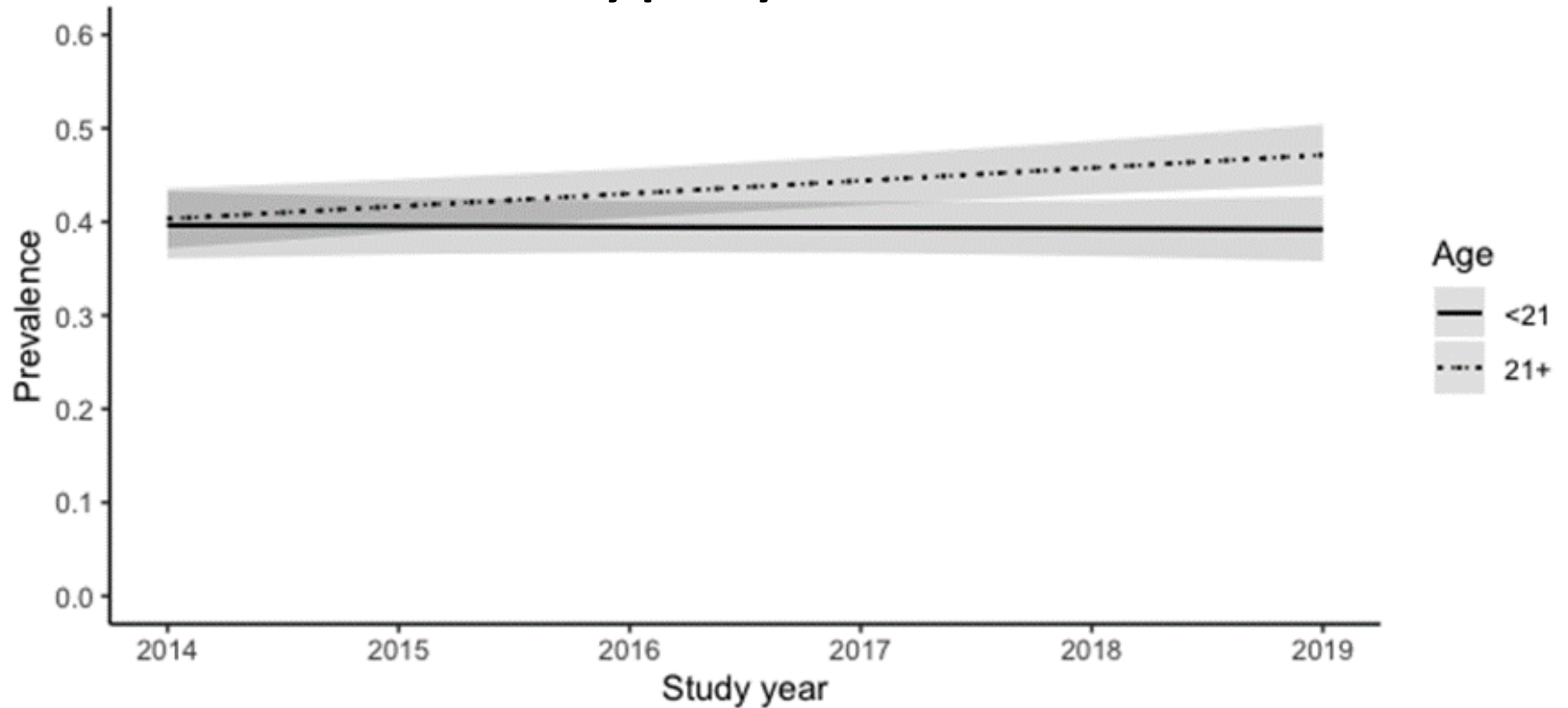
As of August 2021, 18 states and Washington, DC, have legalized cannabis for nonmedical (or “recreational”) use, and, in November 2012, Washington State was 1 of the first 2 states to legalize it.¹⁰ Although cannabis use and possession for people older than 21 years were permitted 30 days after the election, the first state-licensed retail cannabis stores did not open until July 2014. Thus, there was a period of 19 months when use and possession were legal, but there were no legal means of buying or selling nonmedical cannabis. In addition to the illicit market,

there was access through weakly regulated medical dispensaries.^{11,12} It was not until 2015 that strong state-level regulation phased out the original medical cannabis dispensaries and incorporated the medical market into the regulated system.¹³ Initially, even after July 2014, the number of nonmedical (or “retail”) stores was small and prices could not compete with the illegal and medical cannabis markets.¹⁴ Prices of pretax cannabis flower in retail stores dropped, however, from as high as \$30 per gram in 2014 to less than \$7 per gram in late 2017.¹⁵ Along with dropping prices, the number of retail outlets in the state increased.¹⁶ Also, the variety



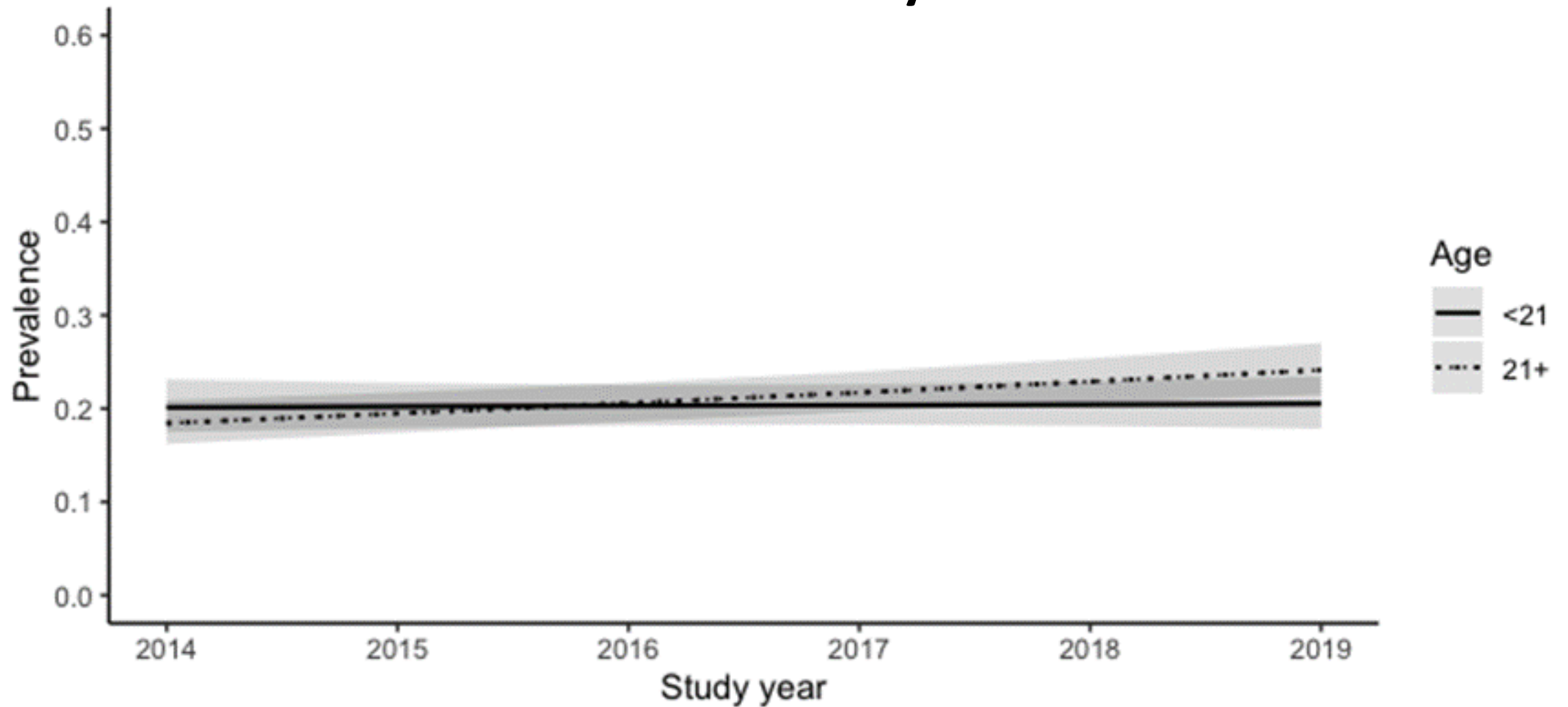
Kilmer, et al. (2022)

Any past year cannabis use



Kilmer, et al. (2022)

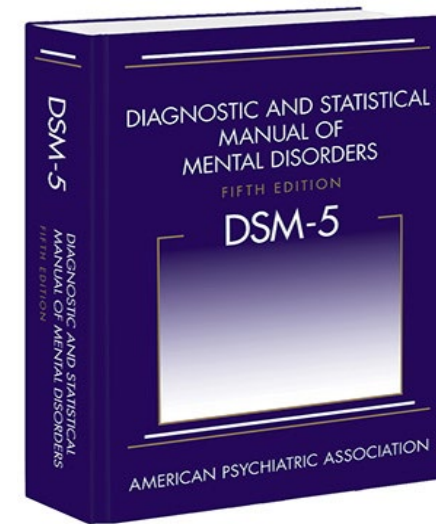
At least monthly cannabis use



Kilmer, et al. (2022)

Criterion	DSM-IV substance dependence	DSM-5 substance use disorder
Tolerance	✓	✓
Withdrawal	✓	✓
Taken more/longer than intended	✓	✓
Desire/unsuccessful efforts to quit use	✓	✓
Great deal of time taken by activities involved in use	✓	✓
Use despite knowledge of problems associated with use	✓	✓
Important activities given up because of use	✓	✓
Recurrent use resulting in a failure to fulfill important role obligations		✓
Recurrent use resulting in physically hazardous behavior (e.g., driving)		✓
Continued use despite recurrent social problems associated with use		✓
Craving for the substance		✓

DSM-5 Cannabis Use Disorder Criteria

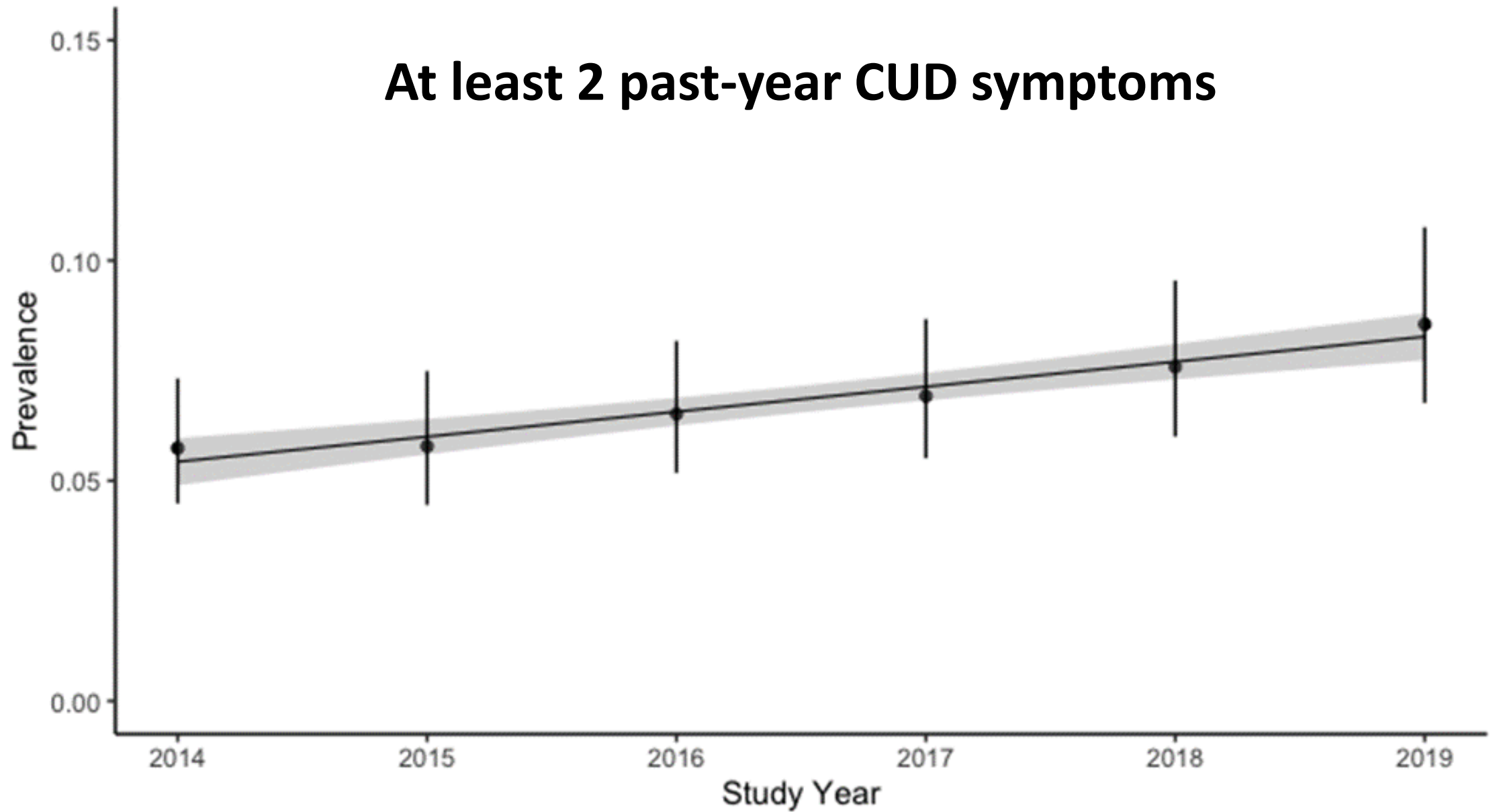


Mild: 2-3 symptoms

Moderate: 4-5 symptoms

Severe: 6+ symptoms

At least 2 past-year CUD symptoms



Kilmer, et al. (2022)

What have trends looked like in the two years that followed?

Any past year "recreational"/non-medical/personal use: Final five cohorts higher than cohort 1

	Cohort 1 (2014)	Cohort 2 (2015)	Cohort 3 (2016)	Cohort 4 (2017)	Cohort 5 (2018)	Cohort 6 (2019)	Cohort 7 (2020)	Cohort 8 (2021)	Total across 8 years
18-20	43.27%	44.82%	40.94%	43.41%	44.42%	43.68%	40.39%	44.89%	43.24%
21-25	43.67%	47.09%	46.55%	49.75%	50.87%	49.61%	52.29%	55.21%	49.15%
TOTAL	43.51%	46.29%	44.76%	47.43%	48.49%	47.24%	47.94%	51.19%	46.99%

Regression models:

Cohort 1 vs. Cohorts 2-8:

Compared to Cohort 1, significantly higher prevalence for

- Cohort 4 (t=2.29, p<.05; odds ratio = 1.171)
- Cohort 5 (t=2.96, p<.01; odds ratio = 1.222)
- Cohort 6 (t=2.11, p<.05; odds ratio = 1.163)
- Cohort 7 (t=2.41, p<.05; odds ratio = 1.196)
- Cohort 8 (t=4.19, p<.001; odds ratio = 1.361)

Source: Young Adult Health Survey,
Preliminary Data Report to DBHR, Kilmer (PI)

Any past year "recreational"/non-medical/personal use: Increasing over time

	Cohort 1 (2014)	Cohort 2 (2015)	Cohort 3 (2016)	Cohort 4 (2017)	Cohort 5 (2018)	Cohort 6 (2019)	Cohort 7 (2020)	Cohort 8 (2021)	Total across 8 years
18-20	43.27%	44.82%	40.94%	43.41%	44.42%	43.68%	40.39%	44.89%	43.24%
21-25	43.67%	47.09%	46.55%	49.75%	50.87%	49.61%	52.29%	55.21%	49.15%
TOTAL	43.51%	46.29%	44.76%	47.43%	48.49%	47.24%	47.94%	51.19%	46.99%

Regression models:

Linear trend from Cohort 1 to Cohort 8:

Significant (t=4.27, p<.001)

Odds ratio = 1.030 (odds of recreational marijuana use are 3.0% higher with each successive year/cohort)

Age by cohort interaction:

Significant (t=2.65, p<.01)

Source: Young Adult Health Survey,
Preliminary Data Report to DBHR, Kilmer (PI)

Any past year "recreational"/non-medical/personal use: Increasing over time

	Cohort 1 (2014)	Cohort 2 (2015)	Cohort 3 (2016)	Cohort 4 (2017)	Cohort 5 (2018)	Cohort 6 (2019)	Cohort 7 (2020)	Cohort 8 (2021)	Total across 8 years
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TOTAL	43.51%	46.29%	44.76%	47.43%	48.49%	47.24%	47.94%	51.19%	46.99%

Model split by over/under 21

18-20:

No significant linear trend

21-25:

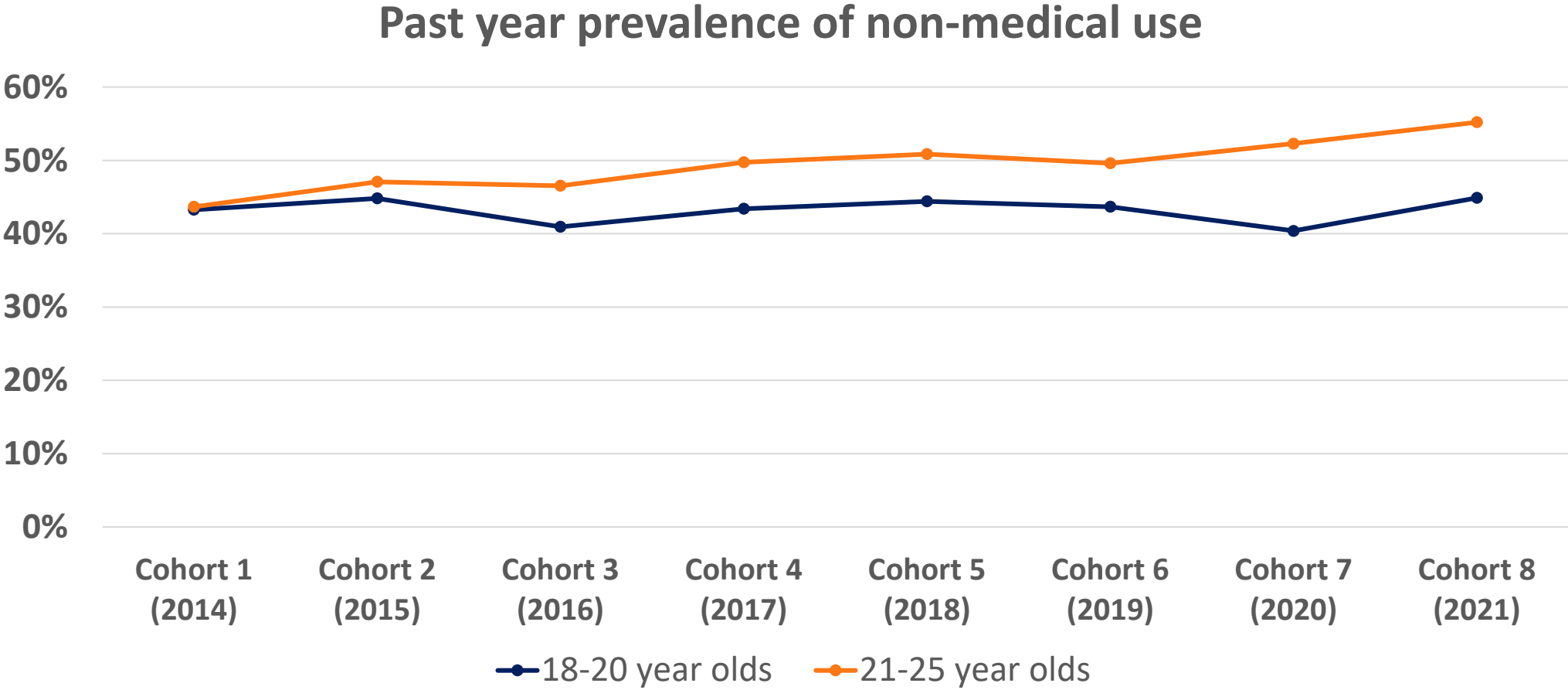
Significant increasing trend over time ($t=5.46$, $p<.001$)

Odds ratio = 1.058 (odds of recreational marijuana use are 5.8% higher with each successive year/cohort)

Source: Young Adult Health Survey,
Preliminary Data Report to DBHR, Kilmer (PI)

Source: Young Adult Health Survey,
Preliminary Data Report to DBHR, Kilmer (PI)

Non-medical (or “recreational”) use in the past year by age group



At least monthly "recreational"/non-medical/personal use: Final four cohorts higher than cohort 1

	Cohort 1 (2014)	Cohort 2 (2015)	Cohort 3 (2016)	Cohort 4 (2017)	Cohort 5 (2018)	Cohort 6 (2019)	Cohort 7 (2020)	Cohort 8 (2021)	Total across 8 years
18-20	24.08%	24.88%	21.19%	23.56%	27.06%	23.24%	23.17%	24.16%	23.95%
21-25	23.63%	23.56%	25.12%	28.07%	27.88%	29.55%	33.81%	33.86%	27.87%
TOTAL	23.81%	24.03%	23.84%	26.46%	27.62%	27.09%	29.99%	30.11%	26.45%

Regression models:

Cohort 1 vs. Cohorts 2-8:

Compared to Cohort 1, significantly higher prevalence for

- Cohort 5 (t=2.56, p<.01; odds ratio = 1.221)
- Cohort 6 (t=2.08, p<.05; odds ratio = 1.189)
- Cohort 7 (t=3.73, p<.001; odds ratio = 1.365)
- Cohort 8 (t=3.88, p<.001; odds ratio = 1.379)

Source: Young Adult Health Survey,
Preliminary Data Report to DBHR, Kilmer (PI)

At least monthly "recreational"/non-medical/personal use: Increasing over time

	Cohort 1 (2014)	Cohort 2 (2015)	Cohort 3 (2016)	Cohort 4 (2017)	Cohort 5 (2018)	Cohort 6 (2019)	Cohort 7 (2020)	Cohort 8 (2021)	Total across 8 years
18-20	24.08%	24.88%	21.19%	23.56%	27.06%	23.24%	23.17%	24.16%	23.95%
21-25	23.63%	23.56%	25.12%	28.07%	27.88%	29.55%	33.81%	33.86%	27.87%
TOTAL	23.81%	24.03%	23.84%	26.46%	27.62%	27.09%	29.99%	30.11%	26.45%

Regression models:

Linear trend from Cohort 1 to Cohort 8:

Significant (t=5.53, p<.001)

Odds ratio = 1.053 (odds of recreational marijuana use are 5.3% higher with each successive year/cohort)

Age by cohort interaction:

Significant (t=3.90, p<.001)

Source: Young Adult Health Survey,
Preliminary Data Report to DBHR, Kilmer (PI)

At least monthly "recreational"/non-medical/personal use: Increasing over time

	Cohort 1 (2014)	Cohort 2 (2015)	Cohort 3 (2016)	Cohort 4 (2017)	Cohort 5 (2018)	Cohort 6 (2019)	Cohort 7 (2020)	Cohort 8 (2021)	Total across 8 years
18-20	24.08%	24.88%	21.19%	23.56%	27.06%	23.24%	23.17%	24.16%	23.95%
21-25	23.63%	23.56%	25.12%	28.07%	27.88%	29.55%	33.81%	33.86%	27.87%
TOTAL	23.81%	24.03%	23.84%	26.46%	27.62%	27.09%	29.99%	30.11%	26.45%

Model split by over/under 21

18-20:

No significant linear trend

21-25:

Significant increasing trend over time ($t=6.82$, $p<.001$)

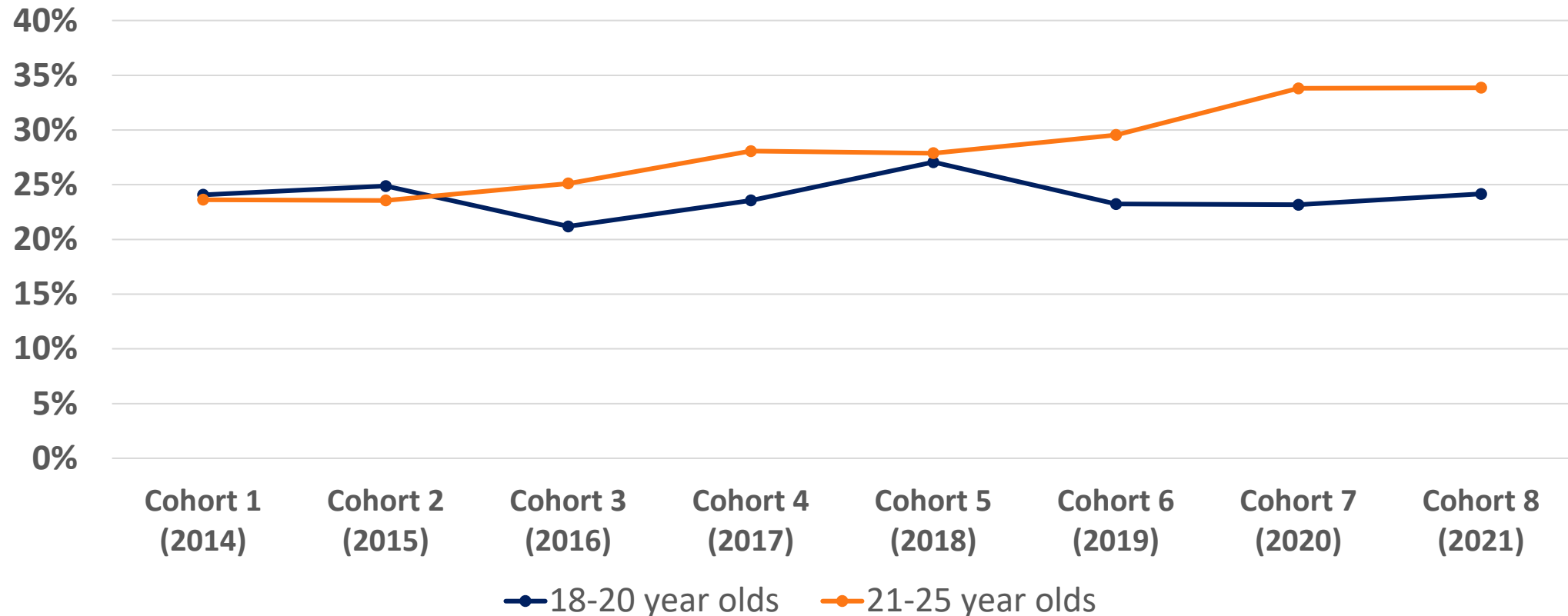
Odds ratio = 1.083 (odds of recreational marijuana use are 8.3% higher with each successive year/cohort)

Source: Young Adult Health Survey,
Preliminary Data Report to DBHR, Kilmer (PI)

Source: Young Adult Health Survey,
Preliminary Data Report to DBHR, Kilmer (PI)

At least monthly non-medical (or “recreational”) use by age group

At least monthly prevalence of non-medical use



At least weekly "recreational"/non-medical/personal use: Final two cohorts higher than cohort 1

	Cohort 1 (2014)	Cohort 2 (2015)	Cohort 3 (2016)	Cohort 4 (2017)	Cohort 5 (2018)	Cohort 6 (2019)	Cohort 7 (2020)	Cohort 8 (2021)	Total across 8 years
18-20	16.51%	13.43%	13.30%	15.40%	18.56%	14.41%	15.21%	16.86%	15.57%
21-25	16.86%	16.21%	18.55%	18.42%	19.22%	21.39%	24.07%	24.59%	19.67%
TOTAL	16.72%	15.23%	16.85%	17.37%	19.03%	18.59%	20.84%	21.62%	18.18%

Regression models:

Cohort 1 vs. Cohorts 2-8:

Compared to Cohort 1, significantly higher prevalence for

- Cohort 7 (t=2.86, p<.01; odds ratio = 1.311)
- Cohort 8 (t=3.37, p<.001; odds ratio = 1.374)

Source: Young Adult Health Survey,
Preliminary Data Report to DBHR, Kilmer (PI)

At least weekly "recreational"/non-medical/personal use: Increasing over time

	Cohort 1 (2014)	Cohort 2 (2015)	Cohort 3 (2016)	Cohort 4 (2017)	Cohort 5 (2018)	Cohort 6 (2019)	Cohort 7 (2020)	Cohort 8 (2021)	Total across 8 years
18-20	16.51%	13.43%	13.30%	15.40%	18.56%	14.41%	15.21%	16.86%	15.57%
21-25	16.86%	16.21%	18.55%	18.42%	19.22%	21.39%	24.07%	24.59%	19.67%
TOTAL	16.72%	15.23%	16.85%	17.37%	19.03%	18.59%	20.84%	21.62%	18.18%

Regression models:

Linear trend from Cohort 1 to Cohort 8:

Significant (t=4.95, p<.001)

Odds ratio = 1.055 (odds of recreational marijuana use are 5.3% higher with each successive year/cohort)

Age by cohort interaction:

Significant (t=2.00, p<.05)

Source: Young Adult Health Survey,
Preliminary Data Report to DBHR, Kilmer (PI)

At least weekly "recreational"/non-medical/personal use: Increasing over time

	Cohort 1 (2014)	Cohort 2 (2015)	Cohort 3 (2016)	Cohort 4 (2017)	Cohort 5 (2018)	Cohort 6 (2019)	Cohort 7 (2020)	Cohort 8 (2021)	Total across 8 years
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21-25	16.86%	16.21%	18.55%	18.42%	19.22%	21.39%	24.07%	24.59%	19.67%
TOTAL	16.72%	15.23%	16.85%	17.37%	19.03%	18.59%	20.84%	21.62%	18.18%

Model split by over/under 21

18-20:

No significant linear trend

21-25:

Significant increasing trend over time ($t=5.62$, $p<.001$)

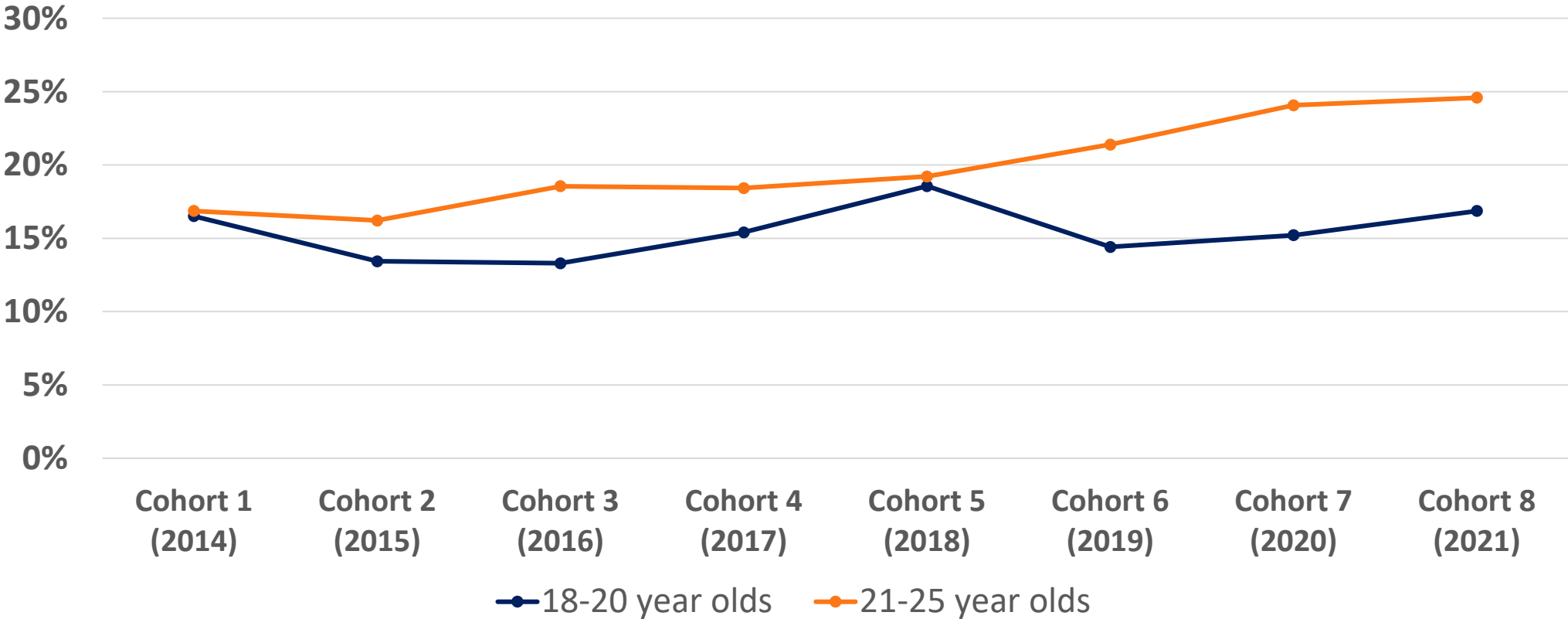
Odds ratio = 1.078 (odds of recreational marijuana use are 7.8% higher with each successive year/cohort)

Source: Young Adult Health Survey,
Preliminary Data Report to DBHR, Kilmer (PI)

Source: Young Adult Health Survey,
Preliminary Data Report to DBHR, Kilmer (PI)

At least weekly non-medical (or “recreational”) use by age group

At least weekly prevalence of non-medical use



Perceptions of non-medical cannabis use

	Cohort 1	Cohort 2	Cohort 3	Cohort 4	Cohort 5	Cohort 6	Cohort 7	Cohort 8
	2014	2015	2016	2017	2018	2019	2020	2021
Never	2.41%	2.42%	1.61%	2.31%	2.06%	1.50%	2.38%	1.92%
Once a year	1.82%	2.10%	1.74%	1.92%	1.27%	0.75%	1.32%	1.15%
2 to 3 times a year	8.22%	10.12%	6.73%	6.40%	3.89%	3.31%	2.23%	3.87%
Every other month	6.98%	7.29%	5.32%	4.59%	3.14%	3.90%	4.42%	3.48%
Once a month	9.74%	11.15%	10.41%	9.07%	6.88%	5.51%	6.39%	7.07%
2-3x/month	17.98%	19.68%	19.83%	18.91%	13.47%	13.93%	14.32%	14.04%
Once per week	12.65%	12.72%	15.43%	13.89%	14.28%	12.91%	12.64%	14.11%
More than 1x/wk	22.08%	20.70%	21.42%	23.94%	27.12%	25.90%	28.57%	29.17%
Every other day	9.27%	6.87%	8.56%	8.65%	11.10%	12.25%	13.10%	10.45%
Every day	8.84%	6.95%	8.96%	10.31%	16.79%	20.03%	14.62%	14.75%

Although
21.62%
use at
least
weekly
(meaning
most
don't),
68.48%
think the
typical
person
their age
uses
weekly

*** In ordinal logistic models, Cohort 4 ($t=2.57$, $p<.01$), Cohort 5 ($t=10.66$, $p<.001$), Cohort 6 ($t=12.35$, $p<.001$), Cohort 7 ($t=9.72$, $p<.001$), and Cohort 8 ($t=9.02$, $p<.001$) have higher perceived recreational marijuana norms compared to cohort 1; but cohort 2 has lower norms compared to cohort 1 ($t= -3.35$ $p<.001$) ***

*** Overall, a significant increasing linear trend over time ($t=18.28$, $p<.001$) ***

	Cohort 1 2014	Cohort 2 2015	Cohort 3 2016	Cohort 4 2017	Cohort 5 2018	Cohort 6 2019	Cohort 7 2020	Cohort 8 2021
From friends	72.86%	76.24%	69.68%	77.40%	63.75%	60.74%	66.87%	65.62%
Gave money to someone	23.29%	26.47%	34.72%	41.45%	39.29%	43.17%	40.55%	39.80%
Got it from someone w/ medical mj. card	17.60%	14.12%	4.30%	5.24%	2.79%	2.82%	4.27%	4.58%
Got it from a med. dispensary	13.65%	18.99%	5.58%	4.72%	6.50%	8.28%	8.41%	12.03%
Got it at a party	22.99%	22.14%	23.08%	24.92%	20.12%	22.91%	8.82%	24.67%
Got it from family	5.65%	5.18%	11.75%	9.75%	11.24%	10.92%	13.49%	7.09%
Got it some other way	11.64%	4.12%	6.12%	9.02%	7.30%	6.21%	5.04%	6.24%
Bought from retail store	0.99%	4.58%	1.73%	1.92%	2.03%	3.55%	1.58%	1.03%
Got it from parents w/ permission	5.75%	6.02%	12.33%	10.44%	11.69%	12.91%	13.08%	13.91%
Grew it themselves	1.91%	1.15%	1.65%	0.23%	1.47%	2.78%	1.64%	0.42%
Stole it from store/dispensary	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.16%	2.40%

Where people get cannabis For 18-20 year olds...

Decreasing

- * Getting it from friends
- * Getting it from someone with a medical marijuana card

Increasing

- * Giving money to someone
- * Getting it from parents with permission
- * Stole it from a store/dispensary

	Cohort 1 2014	Cohort 2 2015	Cohort 3 2016	Cohort 4 2017	Cohort 5 2018	Cohort 6 2019	Cohort 7 2020	Cohort 8 2021
From friends	67.50%	54.89%	42.78%	36.51%	33.80%	25.72%	20.26%	26.44%
Gave money to someone	19.87%	10.72%	8.10%	5.64%	4.97%	3.63%	5.08%	4.61%
Got it from someone w/ medical mj. card	18.85%	9.41%	2.53%	2.02%	0.17%	0.65%	0.27%	0.62%
Got it from a med. dispensary	20.65%	13.03%	12.60%	9.96%	10.15%	14.23%	14.71%	15.62%
Got it at a party	11.81%	10.76%	10.93%	8.06%	6.54%	5.76%	1.57%	7.12%
Got it from family	11.48%	8.26%	4.08%	7.04%	5.76%	4.37%	4.02%	5.52%
Got it some other way	5.13%	6.68%	3.29%	3.41%	3.71%	3.71%	1.24%	2.13%
Bought from retail store	8.80%	51.86%	72.60%	76.31%	80.06%	78.03%	77.27%	74.42%
Got it from parents w/ permission	4.56%	3.50%	2.02%	4.28%	4.47%	3.15%	2.75%	4.75%
Grew it themselves	1.51%	3.01%	1.49%	1.82%	1.81%	0.71%	1.11%	1.74%
Stole it from store/dispensary	2.84%	0.17%	0.60%	0.29%	0.17%	0.11%	0.97%	0.43%

Where people get cannabis For 21-25 year olds...

Decreasing

- * Getting it from friends
- * Gave money to someone
- * Getting it from someone with a medical marijuana card
- * Getting it at a party
- * Getting it from family
- * Getting it some other way

Increasing

- * Bought from a retail store

Driving after cannabis use

“During the past 30 days, how many times did you drive a car or other vehicle within three hours after using cannabis (e.g., marijuana, hashish, edibles)?”

	Cohort 1 <u>2014</u>	Cohort 2 <u>2015</u>	Cohort 3 <u>2016</u>	Cohort 4 <u>2017</u>	Cohort 5 <u>2018</u>	Cohort 6 <u>2019</u>	Cohort 7 <u>2020</u>	Cohort 8 <u>2021</u>
Never	50.59%	55.29%	58.19%	58.56%	58.73%	61.80%	65.00%	66.38%
1 time	14.13%	13.13%	12.50%	12.85%	12.11%	8.32%	9.56%	10.25%
2-3 times	13.28%	12.34%	11.97%	11.98%	10.59%	11.66%	11.24%	10.51%
4-5 times	6.43%	4.35%	3.48%	4.48%	6.04%	4.00%	4.51%	4.39%
6 or more times	15.57%	14.88%	13.85%	12.12%	12.52%	14.21%	9.69%	8.47%

**Clinical and practical considerations
(with this age group in mind)**

(3) Academic outcomes for those in an academic setting (or hoping to go to college)

Cannabis and cognitive abilities



- **Effects on the brain**
 - **Hippocampus**
 - Attention, concentration, and memory
 - **Research with college students shows impact on these even 24 hours after last use (Pope & Yurgelun-Todd, 1996)**
 - **After daily use, takes 28 days for impact on attention, concentration, and memory to go away (Pope, et al., 2001)**
 - **Hanson et al. (2010):**
 - Deficits in verbal learning (takes 2 weeks before no differences with comparison group)
 - Deficits in verbal working memory (takes 3 weeks before no difference with comparison group)
 - Deficits in attention (still present at 3 weeks)

Relationship Between Cannabis Use and Academic Success

- **More frequent cannabis use associated with lower grade point average, skipping more classes, less current enrollment, and being less likely to graduate on time (Arria, et al., 2013, 2015; Suerken, et al., 2016; Meda, et al., 2017)**

(2) Possible concerns related to suicide risk

Screening

- Screening suggestions
 - Cannabis Use Disorder Identification Test-Revised (CUDIT-R)
 - <http://www.warecoveryhelpline.org/wp-content/uploads/2018/04/CUDIT.pdf>

The Cannabis Use Disorder Identification Test - Revised (CUDIT-R)

Have you used any cannabis over the past six months? Yes _____ No _____

If you answered "Yes" to the previous question, please answer the following questions about your cannabis use. Circle the response that is most correct for you in relation to your cannabis use over the *past six months*.

1. How often do you use cannabis?

Never	Monthly or less	2-4 times a month	2-3 times a week	4+ times a week
0	1	2	3	4

2. How many hours were you "stoned" on a typical day when you had been using cannabis?

Less than 1	1 or 2	3 or 4	5 or 6	7 or more
0	1	2	3	4

3. How often during the past 6 months did you find that you were not able to stop using cannabis once you had started?

Never	Less than monthly	Monthly	Weekly	Daily/almost daily
0	1	2	3	4

4. How often during the past 6 months did you fail to do what was normally expected from you because of using cannabis?

Never	Less than monthly	Monthly	Weekly	Daily or almost daily
0	1	2	3	4

5. How often in the past 6 months have you devoted a great deal of your time to getting, using, or recovering from cannabis?

Never	Less than monthly	Monthly	Weekly	Daily/almost daily
0	1	2	3	4

6. How often in the past 6 months have you had a problem with your memory or concentration after using cannabis?

Never	Less than monthly	Monthly	Weekly	Daily or almost daily
0	1	2	3	4

7. How often do you use cannabis in situations that could be physically hazardous, such as driving, operating machinery, or caring for children?

Never	Less than monthly	Monthly	Weekly	Daily/almost daily
0	1	2	3	4

8. Have you ever thought about cutting down, or stopping, your use of cannabis?

Never	Yes, but not in the past 6 months	Yes, during the past 6 months
0	2	4

This questionnaire was designed for self-administration and is scored by adding each of the 8 items:

Question 1-7 are scored on a 0-4 scale

Question 8 is scored 0, 2, or 4

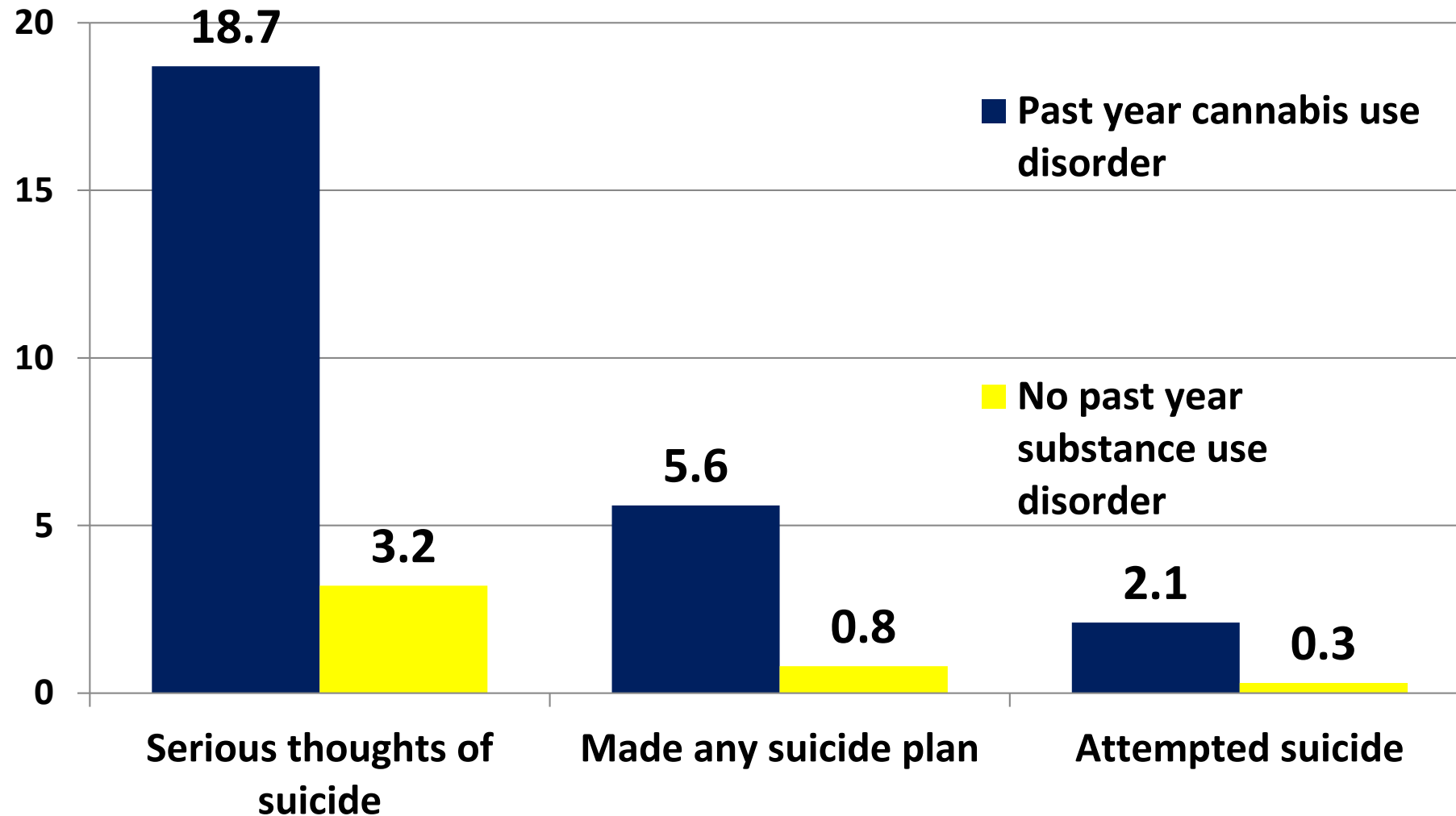
Score: _____

Scores of 8 or more indicate hazardous cannabis use, while scores of 12 or more indicate a possible cannabis use disorder for which further intervention may be required.

Adamson SJ, Kay-Lambkin FJ, Baker AL, Lewin TJ, Thornton L, Kelly BJ, and Sellman JD. (2010). An Improved Brief Measure of Cannabis Misuse: The Cannabis Use Disorders Identification Test – Revised (CUDIT-R). *Drug and Alcohol Dependence* 110:137-143.

Source:
Washington
Recovery
Helpline

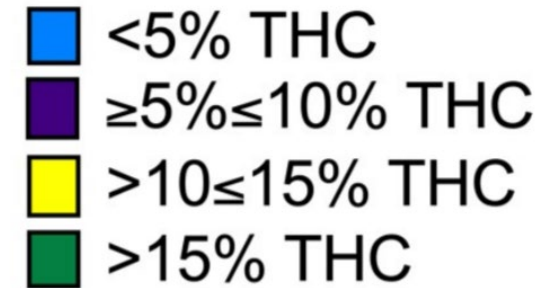
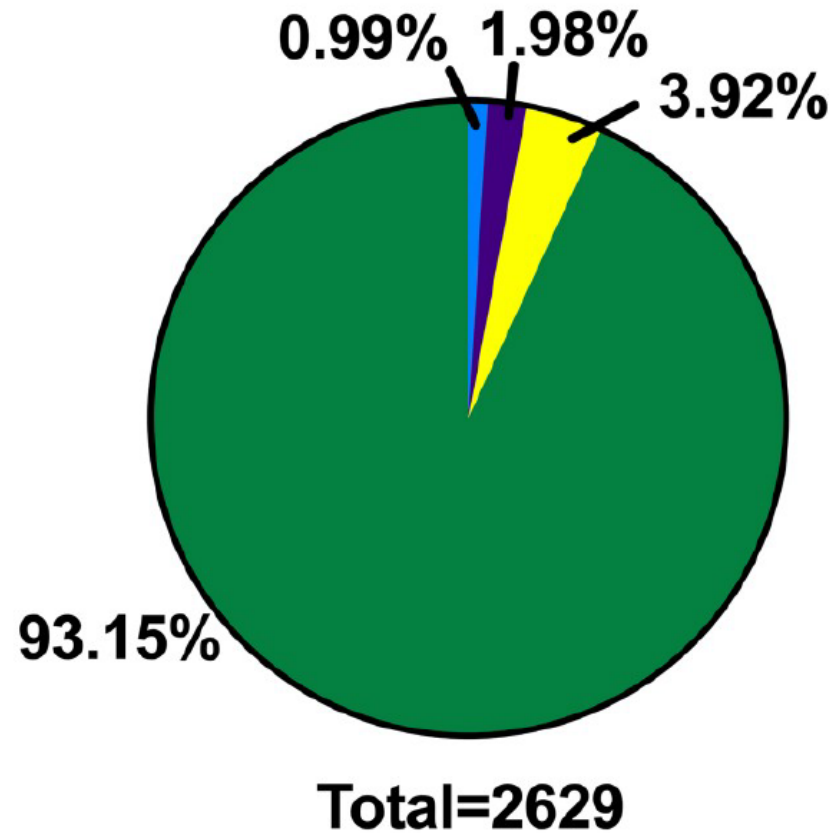
Percentage endorsing item as a function of having a past year cannabis use disorder or no past year substance use disorder



Source: SAMHSA, 2021, Table 8.61B

(1) Addiction risk and withdrawal

WA Recreational



97.07% of Washington market is “high potency” cannabis

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. <https://doi.org/10.1371/journal.pone.0230167>

Report Findings

- **Young people are particularly vulnerable.** There is strong evidence of the detrimental impact of THC use during adolescence, and negative impacts may be exacerbated for those who use high potency cannabis or use more frequently.
- **The risk of developing cannabis use disorder or addiction,** particularly among adolescents, is higher with use of high potency cannabis products.

Cannabis Research & Education

🏠 > [Research](#) > [Cannabis Research & Education](#) > High-Potency Cannabis

High-Potency Cannabis

With a legal market of cannabis products has come the wide distribution of manufactured products containing much higher levels of THC than what has been historically found in the plant.

Cannabis Research & Education



High-Potency Cannabis

Medicinal Cannabis and Chronic Pain

<https://adai.uw.edu/research/cannabis-research-education/high-potency-cannabis/>

Motivations for Use

Motive Category	Proportion of participants endorsing motive	Proportion of primary motives
Enjoyment/fun (e.g., be happy, get high, enjoy feeling)	52.14%	24.03%
Conformity (e.g., peer pressure, friends do it)	42.81%	16.40%
Experimentation (e.g., new experience, curiosity)	41.25%	29.36%
Social enhancement (e.g., bonding with friends, hang out)	25.71%	8.66%
Boredom (e.g., something to do, nothing better to do)	25.08%	4.15%
Relaxation (e.g., to relax, helps me sleep)	24.64%	6.97%
Coping (e.g., depressed, relieve stress)	18.14%	5.10%
Availability (e.g., easy to get, it was offered)	13.74%	2.23%
Relative low risk (e.g., low health risk, no hangover)	10.88%	0.95%
Altered perception or perspectives (e.g., to enhance experiences, makes things more fun)	10.58%	1.81%
Activity enhancement (e.g., music sounds better, every day activities more interesting)	5.68%	0.80%
Rebellion (e.g., rebelling against parents, thrill of something illegal)	5.21%	0.32%
Alcohol intoxication (e.g., I was drunk)	4.42%	0.47%
Food enhancement (e.g., enjoy good food, food tastes better)	3.79%	0.00%
Anxiety reduction (e.g., be less shy, feel less insecure)	3.31%	0.00%
Image enhancement (e.g., to be cool, to feel cool)	2.85%	0.32%
Celebration (e.g., special occasion, to celebrate)	1.26%	0.16%
Medical use (e.g., alleviate physical pain, have a headache)	1.26%	0.16%
Habit (e.g., feeling was addictive, became a habit)	0.95%	0.00%

Lee, Neighbors & Woods (2007)

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	Social enhancement (e.g., bonding with friends, hang out)	25.71%	8.66%
Relaxation (includes helping w/sleep)	Boredom (e.g., something to do, nothing better to do)	25.08%	4.15%
	Relaxation (e.g., to relax, helps me sleep)	24.64%	6.97%
	Coping (e.g., depressed, relieve stress)	18.14%	5.10%
Coping (includes when depressed)	Availability (e.g., easy to get, it was offered)	13.74%	2.23%
	Relative low risk (e.g., low health risk, no hangover)	10.88%	0.95%
	Altered perception or perspectives (e.g., to enhance experiences, makes things more fun)	10.58%	1.81%
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Lee, Neighbors & Woods (2007)

Withdrawal: Cannabis

Diagnostic Criteria

292.0 (F12.288)

- A. Cessation of cannabis use that has been heavy and prolonged (i.e., usually daily or almost daily use over a period of at least a few months).
- B. Three (or more) of the following signs and symptoms develop within approximately 1 week after Criterion A:
 - 1. Irritability, anger, or aggression.
 - 2. Nervousness or anxiety.
 - 3. Sleep difficulty (e.g., insomnia, disturbing dreams).
 - 4. Decreased appetite or weight loss.
 - 5. Restlessness.
 - 6. Depressed mood.
 - 7. At least one of the following physical symptoms causing significant discomfort: abdominal pain, shakiness/tremors, sweating, fever, chills, or headache.
- C. The signs or symptoms in Criterion B cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.
- D. The signs or symptoms are not attributable to another medical condition and are not better explained by another mental disorder, including intoxication or withdrawal from another substance.



Original Investigation | Psychiatry

Effect of Medical Marijuana Card Ownership on Pain, Insomnia, and Affective Disorder Symptoms in Adults

A Randomized Clinical Trial

Jodi M. Gilman, PhD; Randi M. Schuster, PhD; Kevin W. Potter, PhD; William Schmitt, BA; Grace Wheeler, BA; Gladys N. Pachas, MD; Sarah Hickey, BSN; Megan E. Cooke, PhD; Alyson Dechert, BA; Rachel Plummer, BA; Brenden Tervo-Clemmens, PhD; David A. Schoenfeld, PhD; A. Eden Evins, MD, MPH

Abstract

IMPORTANCE Despite the legalization and widespread use of cannabis products for a variety of medical concerns in the US, there is not yet a strong clinical literature to support such use. The risks and benefits of obtaining a medical marijuana card for common clinical outcomes are largely unknown.

OBJECTIVE To evaluate the effect of obtaining a medical marijuana card on target clinical and cannabis use disorder (CUD) symptoms in adults with a chief concern of chronic pain, insomnia, or anxiety or depressive symptoms.

DESIGN, SETTING, AND PARTICIPANTS This pragmatic, single-site, single-blind randomized clinical trial was conducted in the Greater Boston area from July 1, 2017, to July 31, 2020. Participants

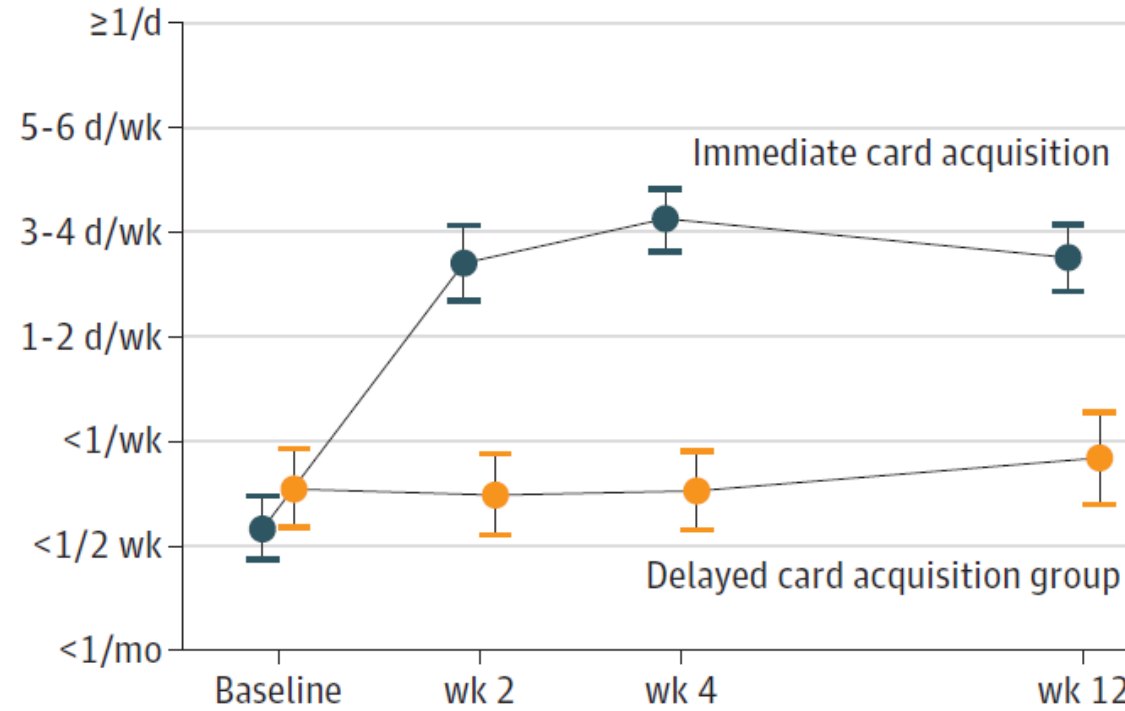
Key Points

Question What are the risks and benefits of obtaining a medical marijuana card for adults who seek medical marijuana for pain, insomnia, and anxiety or depressive symptoms?

Findings In this randomized clinical trial involving 186 participants, immediate acquisition of a medical marijuana card increased the incidence and severity of cannabis use disorder (CUD) and resulted in no significant improvement

Gilman, et al. (2022) (released 3/18/2022)

A Frequency of cannabis use in immediate card acquisition group vs delayed card acquisition group



No. at risk

Immediate card
acquisition group
Delayed card
acquisition group

105

101

102

100

81

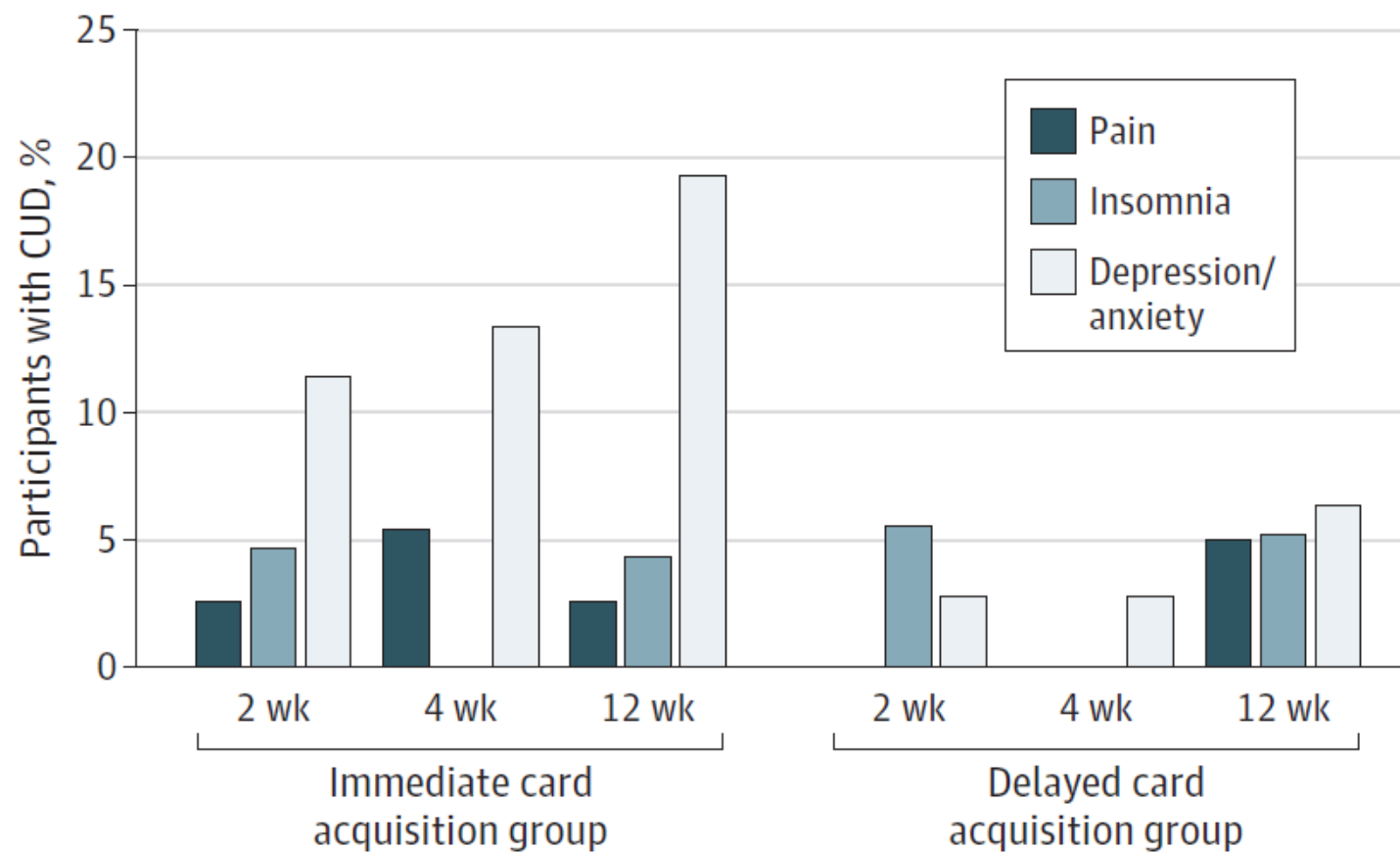
80

78

74

Gilman, et al. (2022) (released 3/18/2022)

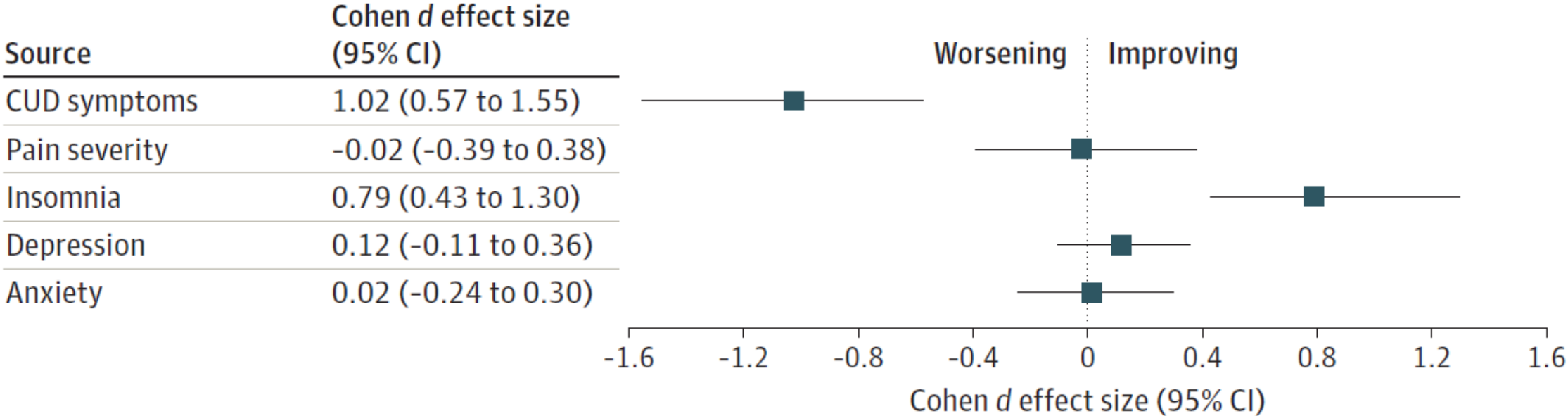
B Incidence of CUD by randomization group and primary complaint



Gilman, et al. (2022) (released 3/18/2022)

Figure 3. Effect Sizes for Primary, Secondary, and Exploratory Outcomes

A Primary outcomes



“There were no observed benefits of obtaining a medical marijuana card for pain, anxiety, or depressive symptoms. (p. 11)”

Gilman, et al. (2022) (released 3/18/2022)

Wrapping up

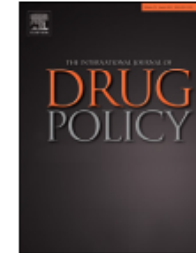
- Screen for Cannabis Use Disorder
- Brief motivational-enhancement interventions show promise (e.g., Dr. Christine Lee's individual College Health for Alcohol and Marijuana Program, iCHAMP)
- Consult about motives/reasons for use
- Educate about withdrawal
- Consider added focus on prevention/intervention efforts for those 21-25 years of age
- Be aware of guidelines for “lower risk” use, including instances in which use might be outright contraindicated



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Review

Lower-Risk Cannabis Use Guidelines (LRCUG) for reducing health harms from non-medical cannabis use: A comprehensive evidence and recommendations update



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General Precaution A:

“There is no universally safe level of cannabis use; thus, the only reliable way to avoid any risk for harm from using cannabis is to abstain from its use.”

Among other recommendations:

- People who use cannabis should use low potency cannabis products
- “Overall, there is no categorically ‘safe’ route of use for cannabis and each route option brings some level of distinct risks that needs to be taken into account for use. “ That said, smoking is particularly risky.
- Keep use occasional (no more than 1 or 2 days a week, weekend only)
- If a person notices impacts to cognitive performance, “consider temporarily suspending or substantially reducing the intensity (e.g., frequency/potency) of their cannabis use.”
- Avoid driving while under the influence (waiting at least 6-8 hours after inhaling, 8-12 hours after use of edibles)

Fischer, et al. (2022)

Recommendation #11: *Some specific groups of people are at elevated risk for cannabis use-related health problems because of biological pre-dispositions or co-morbidities. They should accordingly (and possibly on medical advice as required) avoid or adjust their cannabis use.* Higher risks for harm extend to individuals with a genetic predisposition (e.g., a first-degree family or personal history) for, or an active psychosis, mood (e.g., depressive) disorder, or substance use disorder.

Thank you!

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- Lexi Nims

- CSHRB:

- Dr. Christine Lee
- Dr. Katarina Guttmannova
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- Charlie Fleming
- Dr. Brittney Hultgren
- Dr. Mike Gilson
- Dr. Mary Larimer
- Rachel Cooper
- Daniela Acuna

- DBHR:

- Sarah Mariani
- Sandy Salivaras

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