AVAILABILITY OF RECREATIONAL MARIJUANA IN OREGON COUNTIES AND ADOLESCENTS' MARIJUANA USE AND BELIEFS

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OBJECTIVE

As of May 2019, sales and use of recreational marijuana is legal in 10 states and the District of Columbia. The liberalization of marijuana policies raises public health concerns, especially about potential effects on marijuana use and problems among adolescents.

In 2015, Oregon legalized the sale of and use of recreational marijuana by adults aged 21 years or older.

Cities and counties were allowed restrict or prohibit the operation of recreational marijuana producers, processors, wholesalers, and retailers.

This study investigated whether legalization of sales and retail availability of recreational marijuana at the county-level were associated with changes in marijuana use and beliefs among adolescents.

METHOD

SURVEY DATA

- Student Wellness Survey (SWS) data collected in 2010, 2012, 2014, 2016, and 2018
- Successive cross-sectional samples of 6th, 8th and 11th graders
- 241,799 students in 36 Oregon Counties

Student-Level Variables

- **Any Past 30 Day Marijuana Use:** (no/yes).
- **Perceived Availability of Marijuana:** "If you wanted to get some marijuana, how easy would it be for you to get some?" (4 point scale: very hard–very easy).
- **Perceived Risk of Using Marijuana:** "How much do you think people risk harming themselves (physically or in other ways) if they try marijuana once or twice?" (4 point scale: no risk–great risk).
- **Perceived Parent Approval of Marijuana Use:** "How wrong do your parents feel it would be for you to smoke marijuana?" (4 point scale: very wrong–not wrong at all).
- **Demographic characteristics:** Age, sex, Hispanic, and race (non-white vs. white).
- **Survey year:** Coded to 1-5 to represent the five survey years.
- **State Legalization:** Coded 0 before legalization in 2015 and 1 afterward.

COUNTY-LEVEL DATA

- **Marijuana Policy:** County allowed/did not allow sales of recreational marijuana beginning in 2015.
- **Retail Availability:** Number of licensed marijuana retail outlets per 10,000 county residents.
- **Population density:** Residents per square mile.

RESULTS

ANALYSES

- Multi-Level logistic and linear regressions accounting for nesting of students within counties, controlling for student demographics and county characteristics.

SAMPLE CHARACTERISTICS

- Sample characteristics are shown in Table 1.

LEGALIZATION OF RECREATIONAL SALES

Marijuana Use (Figure 1)

- Students living in counties allowing sales of recreational marijuana were more likely to have used marijuana, AOR = 1.27, 95% CI [1.10, 1.45], $p \leq .01$.
- This difference was observed before and after legalization.
- There was an increase in marijuana use in the year following state-level legalization, AOR = 1.15, 95% CI [1.05, 1.26], $p \leq .01$. This increase was similar for counties allowing and not allowing sales.

Perceived Availability (Figure 2)

- Students living in counties allowing sales of recreational marijuana perceived easier access, $b = .16$, 95% CI [0.08, 0.24], $p \leq .01$.
- This difference was observed before and after legalization.
- There was an increase in perceived availability following legalization, $b = .04$, 95% CI [0.02, 0.06], $p \leq .01$. This increase was equivalent for counties allowing and not allowing sales.

Perceived Risk (Figure 3)

- Students in counties allowing sales of recreational marijuana perceived less risk of marijuana use than those in countries not allowing sales, $b = -.11$, 95% CI [-0.17, -0.05], $p \leq .01$.
- This difference was observed both before and after legalization.
- The rate of decrease in perceived risk lessened after legalization in 2015, $b = .17$, 95% CI [0.15, 0.19], $p \leq .01$. This increase was equivalent for counties allowing and not allowing sales.

Perceived Parental Approval (Figure 4)

- Students in counties allowing sales of recreational marijuana perceived more parental approval, $b = .04$, 95% CI [0.02, 0.6], $p \leq .01$.
- This difference was observed before and after legalization.
- There was an increase in perceived parental approval of marijuana use after legalization, $b = .06$, 95% CI [0.04, 0.8], $p \leq .01$. This increase was similar for counties allowing and not allowing sales.

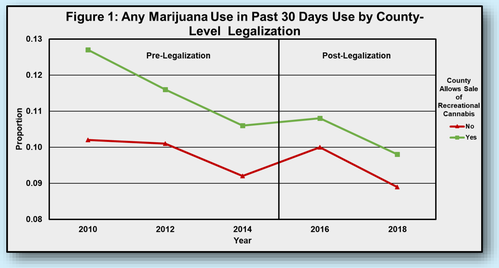
RETAIL AVAILABILITY OF MARIJUANA (OUTLETS/10,000 POPULATION)

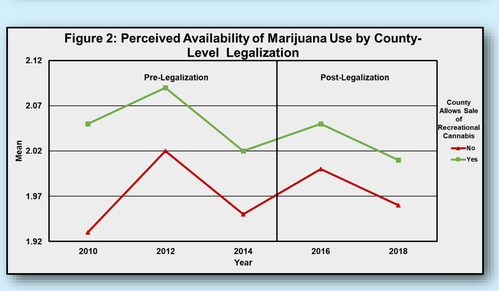
Marijuana Use (Figure 5)

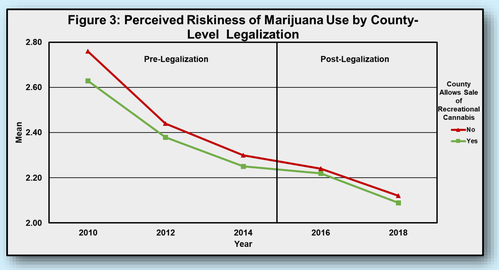
- We investigated whether differences in marijuana use between counties allowing and not allowing recreational marijuana could be accounted for by retail availability and beliefs using data from 2016 and 2018.
- Retail availability was associated with higher rates of marijuana use after controlling for county-level legalization and student-level demographics, AOR = 1.08, 95% CI [1.00, 1.16], $p \leq .05$. Allowing sales of recreational marijuana was no longer significant.
- Neither allowing sales of recreational marijuana nor retail availability was significant when perceived availability, risk, and parent disapproval were included in the model.

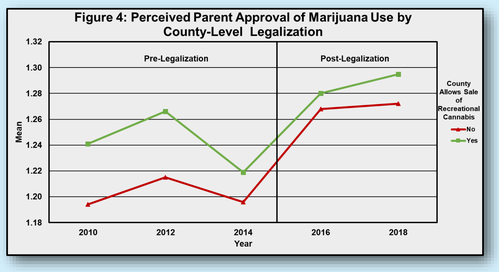
Table 1: Sample Characteristics

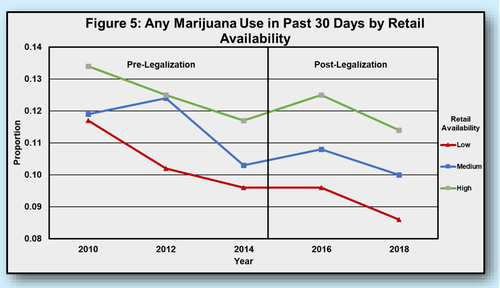
Variable	Total	County Allows Sale of Recreational Marijuana: Yes	No
County-Level	N = 36	N = 20	N = 16
Licensed Outlets/10,000 population[1]	1.24	1.87	.46
Population/Square Mile	108.33	176.10	23.63
Student-Level	N = 241,799	N = 198,160	N = 43,639
6th Grade	32.9%	32.8%	33.2%
8th Grade	37.7%	37.7%	37.9%
11th Grade	29.4%	29.5%	28.9%
Age (mean)	13.8	13.8	13.8
Female	50.6%	50.6%	50.5%
Hispanic	19.6%	17.5%	29.4%
White	68.5%	69.3%	64.7%
Past 30-Day Marijuana Use	10.7%	11.0%	9.8%
Perceived Availability of Marijuana (mean)	2.02	2.03	1.97
Perceived Risk of Marijuana Use (mean)	2.31	2.31	2.33
Perceived Parent Approval (mean)	1.26	1.26	1.23











CONCLUSIONS

- Overall, our results show that students living in Oregon counties that allowed recreational marijuana sales beginning in 2015 had higher rates of marijuana use and more favorable beliefs about marijuana than did students living in counties not allowing sales.
- These differences, however, were evident before legalization, suggesting that broader normative factors may be influencing both marijuana use and legalization at the county-level.
- Nonetheless, we found evidence that marijuana use increased after legalization.
- Although we expected to see greater increases in counties allowing sales, this was not the case. Similar increases were observed in counties that did and did not allow sales.
- State-level legalization may have encouraged marijuana use, regardless of the local context.
- The increase in use, however, appeared to dissipate by 2018. Any effects of legalization on use may have been temporary.
- Although the effect was small, legalization potentially contributed an additional 2,400 adolescent marijuana users to the state population in 2016.
- Similar patterns were observed for marijuana-related beliefs, notably parental approval of marijuana use.
- Similar results were obtained when we considered retail availability (i.e., number of outlets) more directly.
- Differences in marijuana use between counties allowing and not allowing sales of recreational marijuana were attenuated after controlling for outlet density and beliefs.

IMPLICATIONS

- Both legalization and retail availability of recreational marijuana were associated with increases in marijuana use and in beliefs favorable to marijuana use in the short-term.
- Given the increasing trend toward liberalization of marijuana laws, practitioners and public health advocates need to be aware of the potential effects these changes may have on adolescents.

LIMITATIONS

- County-level marijuana policies only applied to unincorporated areas. Incorporated cities could allow or restrict sales despite county policies. Unfortunately, because of concerns about confidentiality, we could not link the SWS data to specific communities.

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