

Cannabis use, attitudes, and diversion in two adolescent and young adult clinical populations following medical cannabis legalization in Massachusetts

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INTRODUCTION

Cannabis:

- Is the substance most frequently reported by adolescents entering substance use treatment^{2,3}
- Poses serious health risks for youth, including harm to brain development and risk for psychiatric disorder, and motor vehicle injury due to driving impairment⁴⁻⁷

MA's Medical Marijuana Law (MML):

- Went into effect on January 1, 2013; the 18th state to pass a MML
- Allowed patients with "debilitating" health conditions to become registered cardholders, with the recommendation of a certified health care provider
- Permitted registered cardholders to possess up to 10oz per 60 days
- Did not specify a minimum age for obtaining a card

OBJECTIVES

- To examine cannabis-related attitudes and behaviors, including the use of someone else's medical cannabis (**diversion**), among youth seen in clinical settings who use cannabis, in the years following MA's MML
- To characterize youth who used vs. did not use diverted medical cannabis

METHODS

Data and Population

- Collected from 2013 to 2016, when recreational cannabis was legalized
- Sample: Patients of 1) outpatient adolescent substance use treatment program (ASUTP), and 2) adolescent medicine clinic study (AMCS) to reduce cannabis use
- Aged 13 to 24, not medical cannabis cardholders, reported either any past-year cannabis use (ASUTP) or using ≥ 3 times per week (AMCS)
- Self-report survey on paper or computer

Analyses

- Multiple logistic regression (MLR; $\alpha=0.05$) comparing cannabis-related **behaviors** and **attitudes** across data collection years (ref. year=2013), adj. for clinic, race/ethnicity, age, # of parents at home, parent education, and gender
- MLR comparing **demographic** and **behavior traits** between those who used and did not use diverted cannabis, adj. for clinic

RESULTS

Table 1. Characteristics of total sample

	N (%)
Total respondents	273
Clinic	
AMCS	70 (25.6)
ASUTP	203 (74.4)
Age, under 18 years	131 (48.0)
Female	88 (32.4)
Race/ethnicity	
White non-Hispanic	157 (57.7)
Black non-Hispanic, Hispanic, or other race	115 (42.3)
Drove after cannabis use	129 (47.8)
Rode with driver who used cannabis^a	161 (80.1)

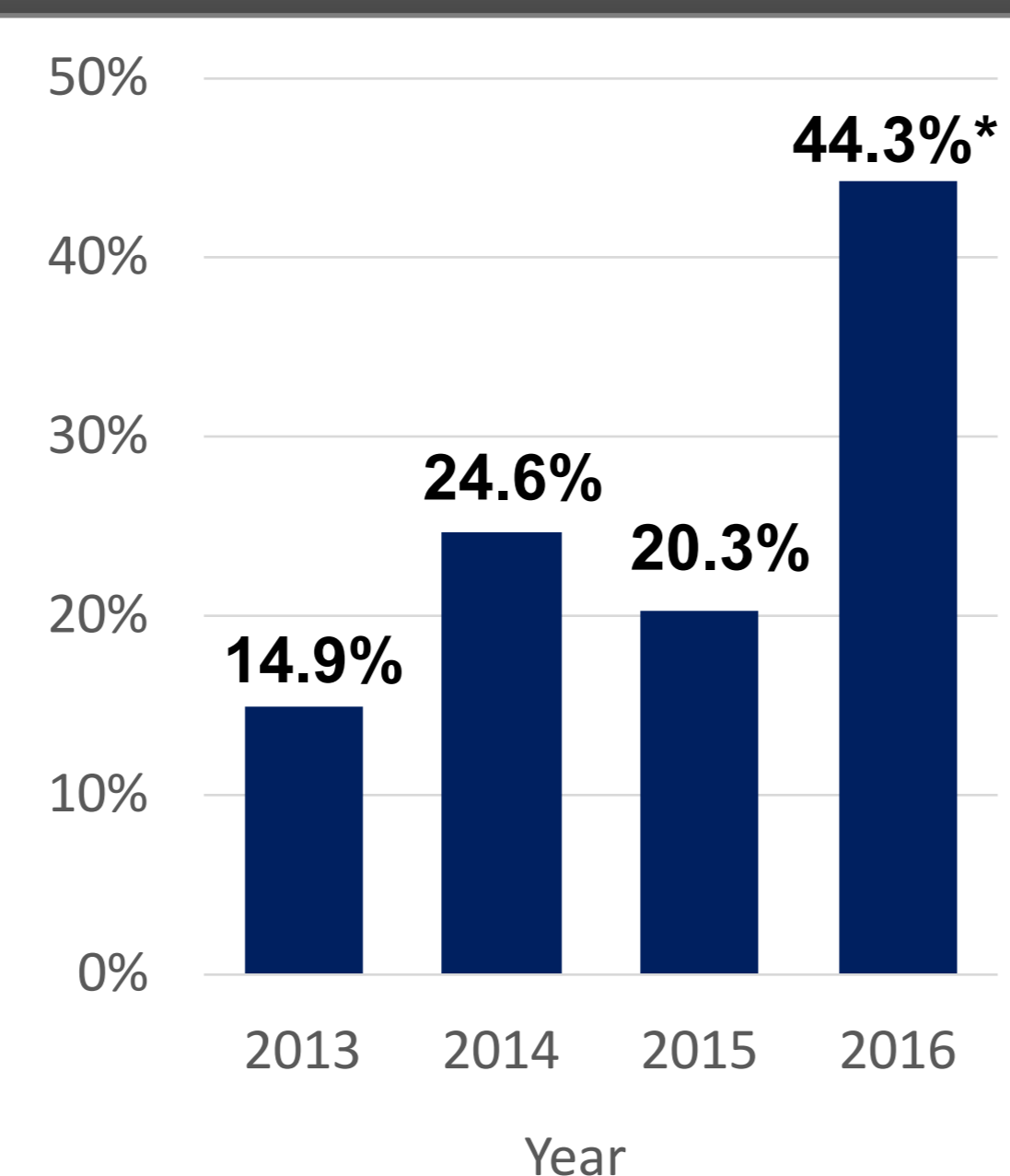
^aASUTP only.

Table 2. Change across years (2013-2016) in youth cannabis-related attitudes^a

Perception	2016 vs. 2013 aOR (95% CI)
Decreased price	0.5 (0.1, 1.5)
Increased ease of obtaining	1.5 (0.5, 4.5)
Increased potency	1.2 (9.5, 2.9)
Decreased likelihood of getting caught	1.3 (0.5, 3.1)
Fairly/very easy availability	0.8 (0.1, 9.4)
No/slight risk of harm from occasional use	1.9 (0.5, 7.8)
No/slight risk of harm from regular use	1.6 (0.6, 4.2)

^aASUTP only.

Figure 1. Change across years in percent reporting use of cannabis obtained from a cardholder



*2016 compared to 2013, adjusted odds ratio (aOR): 4.66 (95% CI: 1.81, 11.95), $p<0.001$.

Table 3. Characteristics of youth who used vs. did not use diverted medical cannabis

	No: n (%)	Yes: n (%)	aOR ^a
Total respondents	199 (74.5)	68 (25.4)	-
Clinic			
AMCS	59 (29.6)	11 (16.2)	Ref.
ASUTP	140 (70.4)	57 (83.8)	2.2 (1.1, 4.5) *
Age, under 18 years	90 (45.2)	37 (54.4)	1.5 (0.8, 2.5)
Female	68 (34.2)	18 (26.9)	0.7 (0.4, 1.3)
Race/ethnicity			
White non-Hispanic	112 (56.3)	41 (61.2)	Ref.
Black non-Hispanic, Hispanic, or other race	87 (43.7)	26 (38.8)	0.8 (0.5, 1.4)
Drove after cannabis use	81 (40.7)	46 (67.7)	3.0 (1.7, 5.3) ***
Rode with driver who used cannabis^b	103 (74.6)	53 (93.0)	4.5 (1.5, 13.3) **

^aAdj. for clinic where relevant. ^bASUTP only. * $p<0.05$ ** $p<0.01$ *** $p<0.001$

RESULTS

- Cannabis-using youth did not demonstrate changes in cannabis-related attitudes and perceptions across data collection years
- Compared to 2013, increased diversion in 2016, but not in 2014 or 2015

Youth who used diverted cannabis:

- Were significantly more likely to have reported driving after cannabis use, and riding with driver who had used cannabis
- Were significantly more likely to obtain it from other young people (≤ 21) if under 18 themselves (64.7%)
- Were most likely to obtain it from someone in MA (76.5%), but also reported obtaining it from sources from other states (incl. nearby states like RI, NH, ME; further states like CA, CO)

DISCUSSION

- Increased diversion mirrors statewide figures in # of dispensaries (0 in 2013 vs. 4 in 2016) and # of registered cardholders (0 in 2013 vs. 18,476 in 2016)⁸

Limitations

- Small sample from 1 Northeastern healthcare setting; findings not generalizable
- Cross-sectional design prevents inference of causality

CONCLUSION

Among cannabis-using youth in MA, use of diverted medical cannabis increased over the years following medical cannabis legalization. Those using diverted medical cannabis reported higher risk for cannabis-related traffic injury.

REFERENCES

- National Institute on Drug Abuse. Monitoring the Future 2017 Survey Results. Published December 12, 2017. Accessed April 21, 2020. <https://www.drugabuse.gov/related-topics/trends-statistics/infographics/monitoring-future-2017-survey-results>
- Substance Abuse and Mental Health Services Administration, Office of Applied Studies. Treatment Episode Data Set (TEDS) Highlights - 2007; 2009. Accessed March 3, 2020. <https://www.samhsa.gov/dast/2007-teds-highlights-rpt.pdf>
- Mariell M, Sahker E, Arndt S. Trends of Youth Marijuana Treatment Admissions: Increasing Admissions Contrasted with Decreasing Drug Involvement. Subst Use Misuse. 2017;52(13):1778-1783. doi:10.1080/10826084.2017.1311349
- National Institute on Drug Abuse. What are marijuana's long-term effects on the brain? Accessed March 2, 2020. <https://www.drugabuse.gov/publications/research-reports/marijuana/what-are-marijuanas-long-term-effects-brain>
- National Institute on Drug Abuse. Is there a link between marijuana use and psychiatric disorders? Accessed March 2, 2020. <https://www.drugabuse.gov/publications/research-reports/marijuana/there-link-between-marijuana-use-psychiatric-disorders>
- Hartman RL, Huestis MA. Cannabis Effects on Driving Skills. Clin Chem. 2013;59(3). doi:10.1373/clinchem.2012.194381
- Rogeberg O, Elvik R. The effects of cannabis intoxication on motor vehicle collision revisited and revised. Addict Abingdon Engl. 2016;111(8):1348-1359. doi:10.1111/add.13347
- Massachusetts Department of Public Health. Medical Use of Marijuana Program monthly dashboards. Mass.gov. Accessed April 21, 2020. <https://www.mass.gov/lists/medical-use-of-marijuana-program-monthly-dashboards>