

Title: Risk and Protective Factors Associated with Cannabis Use in Massachusetts Youth

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Funding

This work was funded by the Commonwealth of Massachusetts.

Abstract

Cannabis policies are continuously evolving, over half of U.S. youth now live in a state with a form of legalized cannabis. Monitoring risk and protective factors is critical to ensure evidence-based youth prevention in this post cannabis-prohibition era. Massachusetts has enacted and implemented three forms of legalization: (1) Decriminalization (2008), (2) medical cannabis (2012), and (3) adult-use cannabis (2016). This study used state Youth Risk Behavior Survey (YRBS) data of participants in grades 9-12 from 2007-2017 (N=17,691). Logistical regression models were run to assess effects of varying cannabis policy and risk or protective behaviors on cannabis use outcomes: (1) Lifetime use; (2) Past 30-day; and (3) Past 30-day heavy use. The



enactment of cannabis policies were not associated with greater odds of youth reporting Lifetime and Past 30-day cannabis use behaviors. Any adult-support [heavy use OR=0.43 (95% CI=0.37,0.50), $p<.001$], better grades [heavy use OR=0.25 (95% CI=0.21,0.29), $p<.001$], and being heterosexual [heavy use OR=0.42 (95% CI=0.34,0.51), $p<.001$] were associated with lower odds of all cannabis use outcomes. Multiple risk factors broadly categorized under: risky sexual behaviors, non-heterosexual orientation, weapon carrying/exposure, hopelessness and suicidality behaviors, driving behaviors, and disability were associated with greater odds of cannabis use. Sensitivity analyses showed only one risk behavior was moderate by cannabis policy enactment. Results suggest that cannabis prevention efforts should not occur in a silo, rather evidence-based models for reducing risky behaviors generally may have the largest impact. Building and supporting relationships with trusted adults for youth at higher risk should be emphasized.



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Background

Cannabis policies are continuously evolving, over half of U.S. youth now live in a state with a form of legalized cannabis. Monitoring risk and protective factors is critical to ensure evidence-based youth prevention in this post cannabis-prohibition era.

Massachusetts Legalization Timeline



All waves of Massachusetts cannabis legalization were enacted via ballot initiatives and not all provisions were immediately implemented.

Methods

- Utilized Youth Risk Behavior Survey (YRBS) data for Massachusetts students in grades 9-12 from 2007-2017 (N=17,691).
- Logistic regression models were run to separately assess effects of: (1) Cannabis policy enactment (Table 1) and (2) Individual cannabis-use risk and/or protective behaviors (Table 2) on cannabis use outcomes: (1) Lifetime use; (2) Past 30-day; and (3) Past 30-day heavy use.
- Sensitivity analyses were run to examine if policy enactment affected associations between risk/protective factors and cannabis use outcomes (not shown).

Results

Multiple risk factors are associated with Massachusetts youth cannabis use; the majority are not sensitive to cannabis policy enactment.

Table 1. Policy Impact on Cannabis Use

Cannabis Policy	Decriminalization	Medical Cannabis Policy	Adult-Use Cannabis Policy
	Adjusted ^a OR (95% CI)	Adjusted ^a OR (95% CI)	Adjusted ^a OR (95% CI)
Lifetime cannabis use	1.00 (0.85-1.19)	0.92 (0.82-1.04)	0.85 (0.73-0.98)
Past 30-day cannabis use	1.08 (0.89-1.31)	0.92 (0.83-1.02)	0.92 (0.80-1.05)
Past 30-day heavy cannabis use	1.14 (0.88-1.46)	0.79* (0.66-0.95)	0.71** (0.56-0.89)
Past 30-day cannabis use at school	1.06 (0.85-1.31)	0.81* (0.69-0.96)	0.89 (.69-1.15)

p<0.05; *p<0.01; ***p<.001

Conclusion

Cannabis prevention efforts should not occur in a silo, rather evidence-based models for reducing risky behaviors generally may have the largest impact. Building and supporting relationships with trusted adults should be emphasized.

Table 2. Risk and Protective Factors

Green: Moderated by cannabis policy change

	Any Use	Past 30-Day Use	Past 30-Day Heavy Use (≥20 times) ^a
	Adjusted ^a OR (95%CI)	Adjusted ^a OR (95%CI)	Adjusted ^a OR (95%CI)
Disability			
Learning Disability	1.34*** (1.13-1.58)	1.33*** (1.14-1.56)	1.58** (1.20-2.07)
Physical Disability	1.14* (1.02-1.28)	1.12 (0.96-1.31)	1.26 (0.96-1.65)
Driving Behaviors			
Ride with driver who had been drinking (past 30-day)	3.91*** (3.58-4.27)	4.13*** (3.79-4.49)	4.62*** (4.04-5.29)
Drive after drinking alcohol (past 30-day)	2.15*** (1.95-2.39)	2.33*** (2.05-2.64)	3.07*** (2.59-3.65)
Text or email while driving (past 30-day)	3.67*** (3.22-4.18)	2.74*** (2.33-3.22)	2.28*** (1.80-2.90)
Talk on cell phone while driving (past 30-day)	3.25*** (2.74-3.86)	2.67*** (2.23-3.20)	2.11*** (1.63-2.74)
Weapon carrying/exposure, violence, and bullying			
Carry weapon (past 30-day)	3.59*** (3.22-4.01)	3.54*** (3.15-3.97)	4.33*** (3.73-5.02)
Carry weapon on school property (past 30-day)	4.61*** (3.61-5.89)	4.66*** (3.82-5.69)	5.72*** (4.75-6.89)
Carry gun (past 30-day)	4.48*** (3.44-5.84)	4.55*** (3.42-6.05)	6.69*** (4.99-8.98)
Threatened or injured with weapon on school property (past 12-month)	3.30*** (2.76-3.95)	3.29*** (2.68-4.04)	4.07*** (3.35-4.94)
Physical fight (past 12-month)	3.92*** (3.55-4.33)	3.82*** (3.50-4.18)	4.82*** (4.35-5.35)
Bullied on school property (past 12-month)	1.52*** (1.37-1.69)	1.49*** (1.32-1.69)	1.51*** (1.28-1.79)
Sexual and Dating Violence			
Physically forced to have sex (lifetime)	2.64*** (1.93-3.63)	2.43*** (1.83-3.21)	3.29*** (2.05-5.27)
Physically forced to have sex or physical dating violence (lifetime)	2.83*** (2.57-3.12)	2.28*** (2.24-2.74)	2.84*** (2.43-3.21)
Support, Hopelessness, and Suicide Behaviors			
Hopelessness (past 12-month)	2.22*** (2.01-2.46)	2.03*** (1.82-2.25)	2.42*** (2.11-2.79)
Consider suicide (past 12-month)	2.35*** (2.06-2.68)	2.32*** (2.05-2.62)	2.43*** (2.09-2.82)
Plan suicide (past 12-month)	2.08*** (1.86-2.33)	2.09*** (1.77-2.26)	2.13*** (1.77-2.55)
Attempt suicide (past 12-month)	2.72*** (2.29-3.23)	2.61*** (2.22-3.07)	3.15*** (2.61-3.81)
Treated for suicide attempt (past 12-month)	3.18*** (2.34-4.33)	3.05*** (2.32-4.02)	4.34*** (3.24-5.81)
Purposely hurt yourself (past 12-month)	2.34*** (2.10-2.59)	2.24*** (2.02-2.49)	2.48*** (2.05-3.01)
Sexual Orientation and Behaviors			
Sexual intercourse (lifetime)	7.20*** (6.52-7.95)	5.94*** (5.33-6.62)	8.10*** (6.55-10.02)
Age first sexual intercourse encounter	1.28*** (1.25-1.30)	1.22*** (1.20-1.25)	1.19*** (1.15-1.23)
Sex partners (past 90-days)	2.44*** (2.31-2.57)	2.03*** (1.93-2.13)	1.85*** (1.76-1.95)
Alcohol or drug use before sexual intercourse last time	12.26*** (10.22-14.70)	8.76*** (7.56-10.15)	9.46*** (8.13-11.01)
Condom use last sexual encounter	3.20*** (2.85-3.58)	2.63*** (2.37-2.92)	2.05*** (1.76-2.40)
Ever been or gotten someone pregnant (lifetime)	4.46*** (3.64-5.47)	3.20*** (2.70-3.79)	4.64*** (3.89-5.53)
Ever been tested for any Sexually Transmitted Disease(s) (STDs) (lifetime)	2.74*** (2.50-3.0)	2.24*** (2.00-2.50)	2.65*** (2.25-3.13)
Sexuality: Heterosexual ("straight")	0.48*** (0.42-0.55)	0.50*** (0.44-0.58)	0.42*** (0.34-0.51)
Sexuality: Gay, Lesbian, or Bisexual	2.08*** (1.81-2.39)	1.99*** (1.72-2.30)	2.39*** (1.96-2.91)
Other Risk/Protective Factors			
Any adult support (family or other)	0.58*** (0.50-0.67)	0.56*** (0.50-0.63)	0.43*** (0.37-0.50)
Physically active (past week)	0.95 (0.86-1.06)	0.97 (0.87-1.08)	0.68*** (0.57-0.81)
Sports team involvement (past 12-month)	0.94 (0.86-1.03)	0.89* (0.81-0.98)	0.60*** (0.52-0.69)
Play video games on average school day	0.89** (0.82-0.97)	0.95 (0.86-1.04)	0.86* (0.77-0.98)
Watch TV on average school day	0.95 (0.88-1.03)	0.93 (0.85-1.03)	0.86 (0.71-1.05)
Grades are A's and B's	0.34*** (0.34-0.38)	0.34*** (0.30-0.38)	0.25*** (0.21-0.29)

^aAdjusted for: (1) Year of data collection (2007-2017); (2) Sex (1- Female; 2- Male; Missing); and (3) Race/Ethnicity [1- American Indian/Alaska Native; 2- Asian; 3- Black or African American; 4- Native Hawaiian/Other PI; 5- White; 6- Hispanic/Latino; 7- Multiple-Hispanic; 8- Multiple-Non-Hispanic]

*p<0.05; **p<0.01; ***p<.001

^aNA refers to measures that were not included in survey instrument during one or more policy intervention (e.g. measure only included in post decriminalization survey years, 2013-2017)

