# What The Science Says About Cannabis and What It Means for Parents

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**Overview of this presentation** 

- Special thank you to:
- Laura Stack
- All of you for making the time for this webinar and doing what you're doing at such a stressful time

#### • What I said I would do:

 In this webinar for parents, research will be reviewed examining how cannabis has changed over the past few years and what this means about addiction potential, health, and mental health. Science will be summarized detailing the impacts of cannabis use on academic outcomes, driving risks, cognitive abilities, sleep, and more. Implications for parents will be discussed.

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First, we have to consider that research on cannabis needs to "catch up" with what people are actually using, since potency is at never before seen rates









ElSohly, M.A., Mehmedic, Z., Foster, S., Gon, C., Chandra, S., & Church, J.C. (2016). Changes in cannabis potency over the last 2 decades (1995-2014) – Analysis of current data in the United States. *Biol Psychiatry*, 79, 613-619.

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rs, and

Archival Report

## Changes in Cannabis Potency Over the Last 2 Decades (1995–2014): Analysis of Current Data in the United States Mahmoud A. ElSohiy, Zlatko Mahmedic, Susan Poster, Chandran Gon, Suna James C. Church

ATTENDED TO A CONTRACT OF A CO



El Sohly, M.A., Mehmedic, Z., Foster, S., Gon, C., Chandra, S., & Church, J.C. (2016). Changes in cannabis potency over the last two decades (1995-2014) – Analysis of current data in the United States. *Biol Psychiatry*, 79, 613-619.

Washington State Impact Report



www.mfiles.org

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Average potency (nation) = 13.18% Average potency (Seattle) = 21.62%

Concentrates average potency (nation) = 55.85% Concentrates average potency (Seattle) = 71.71%

#### ADDICTION RESEARCH REPORT

Variation in cannabis potency and prices in a newly legal market: evidence from 30 million cannabis sales in Washington state

SSA 10007/10150 doi:10.1111/add.13886

Rosanna Smart<sup>1</sup>, Jonathan P. Caulkins<sup>1,2</sup>, Beau Kilmer<sup>1</sup>, Steven Davenport<sup>1</sup> & Greg Midgette<sup>1</sup> RNID Corporatos Seta Monia, CA, UKA<sup>1</sup> and Heir Coles, Carego Motor University, Photory, PA, UKA<sup>1</sup>

#### ABSTRACT

Aims: To (1) assess trends and variation in the market share of product types and potency sold in a legal cannobis retail market and (2) estimate how potency and particular quantity influence price variation for cannabis flower. Design: Secondary analysis of publicly available data from Washington State's cannabis traceability system spunning. July 2014 to 10 Sectomber 2016, Described satisfication and more revensions assessed variation and trends in cannabis.

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Figure 3 Maket shares for cannotis flower products sold, by defa-9-tetrahydrocannobinol (THC) % category. Market share is calculated as a percent of total cannabis flower expenditures (excise-tax-inclusive). [Colour figure can be viewed at wileyoninelibrary.com]

Smart, R., Caulkins, J.P., Kilmer, B., Davenport, S., & Midgette, G. (2017). Variation in cannabis potency and prices in anewly legal market: Evidence from 30 million cannabis sales in Washington state. Addiction, 112, 2167-2177.

#### Why potency matters

DiForti, M., Quattrone, D., Freeman, T.P., Tripoli, G., et al. (2019). The contribution of cannabis use to variation in the incidence of psychotic disorder across. Europe [EU-GE]: A multicenter casecontrol study. *Lancet Psychiatry*, 6 (5), 426-436.



Increased risk of psychosis

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Hines, et al., (2020)

Increased risk of addiction and generalized anxiety disorder

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For concentrates/ extracts, more association with "problematic cannabis use, cannabis use, disorder, and mental health disorders." --Gabrys (2020) Second, we have to separate out placebo effects from pharmacological effects



Loflin, et al., 2017

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#### Loflin, et al. (2017)

- Asked participants to refrain at least 8 hours before study
- Told to plan for a variable end (1.5-6 hours depending on dose they would receive)
- Told they would be in one of three rooms (no dose, low THC, high THC)
- Cubicles (no interaction), and had to rate music and comedy clips, color designs, and compute math problems

Loflin, et al. (2017)

Used Hemp Pops
 Hemp seed oil (no active elements of THC or CBD), glucose syrup, citric acid, sugar, natural flavors, and colors #2 and #5



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Selection of 5 scientific findings relevant to parents, young adults, and adolescents

# (5) Impact on attention, concentration, and memory

#### Marijuana 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)

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#### America's Dropout Crisis:

# The Unrecognized Connection To Adolescent Substance Use

March 2013

"Of all the problems that contribute to dropping out, substance use is one of the easiest to identify and one of the most easily stopped by interventions including treatment."

"Research evidence shows that when adolescents stop substance abuse, academic performance improves."

http://www.cls.umd.edu/docs/AmerDropoutCrisis.pdf

# America's Dropout Crisis:

The Unrecognized Connection To Adolescent Substance Use

> Goose as bod that advaked and drags well wat ma Reducts, Lidven, R.B.C Balanci, M. (alaina, R.B.C Saino, S. DoPen, B.B.A.) Kathya, K. Yasawa, K.A.' Gorma, J. San, R.A.'

"The more severe the substance use, the more likely the impact on academic performance and risk for

dropout."

Substance using students are at increased risk for academic failure, including drop out

Marijuana has stronger negative relationship to GPA and other outcomes and risk for dropout than alcohol use

http://www.cls.umd.edu/docs/AmerDropoutCrisis.pdf

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### Relationship Between Cannabis Use and Academic Success

- More frequent marijuana use is associated with more discontinuous enrollment, skipping more classes, and lower GPAs (Arria, et al., 2013, 2015)
- Any marijuana use is associated with lower GPA, and decreasing and frequent marijuana use over time is associated with less current enrollment and being less likely to graduate on time (Suerken, et al., 2016)

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#### Relationship Between Cannabis Use, Alcohol Use, and Academic Success

- Alcohol and marijuana are both associated with lower GPA; when entered in same regression, effects of alcohol became non-significant (Bolin, Pate, McClintock, 2017)
- Students using both marijuana and alcohol at moderate to high levels have significantly lower GPAs over two years (Meda, et al., 2017)
  - Students who moderate or curtail substance use improved GPA (Meda, et al., 2017)

#### **Health and Mental Health** n =30,084 students in the undergraduate reference group from 58 colleges/universities in Fall 2019

• Of 51 possibilities, the top student-identified factors

affecting academic performance:

• 46.8% • 40.2% Procrastination Stress 29.3% Anxiety

- 23.6% - 23.0% Sleep difficulties Depression



• 2.2% Alcohol use (tied for 32<sup>nd</sup> of 51 factors with concussion/TBI) American College Health Association, 2020

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(4) Impact of substance use on sleep quality (and subsequent effects)

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# Sleep, Sleepiness, and Alcohol Use

TIMOTHY ROEHES, PH.D., AND THOMAS ROTH, PH.D.

why of alcubal's effects on sleep dates back to the late 1930s. Since then, an extra tree has described alcubal's effects on the sleep of healthy, moulcoholde people (be, statifies found that in moulcoholdes; who occasionally use alcohold, bath biles ones of alcubal initially improve sleep, although high alcubal dones can result in hances during the second half of the non-turnal sleep period. Teathermore, people dy develop loterance in the sedative effects of alcubal, Researchers have investigate its full distribution with the set development of the sequence of the test full distribution of the set of the set of the set of the set of the effect of the set of the distribution of the set of the set of the set of the set of the distribution of the set of the distribution of the set of the distribution of the set of the distribution of the set of the distribution of the set of the distribution of the set example, low dose rapidly dev p disorder; e); REM (raj rep; NREM (nonrap id eye m id eye i

http://pubs.niaaa.nih.gov/publications/arh25-2/101-109.pdf

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Time to get back to .000%
```

• .08%?

```
    □ 5 hours

            (.080%....064%....048%....032%....016%....000%)

• .16%?
```

```
□ 10 hours
(.160%....144%....128%....112%....096%....080%...
...064%....048%....032%....016%....000%)
```

• .24%?

```
24%:

15 hours

(.240%....224%....208%....192%....176%....160%...

.144%....128%....112%....096%....080%....064%...

.048%....032%....016%....000%)
```

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#### Health and Mental Health n =30,084 students in the undergraduate reference group from 58 colleges/universities in Fall 2019

• Of 51 possibilities, the top student-identified factors

affecting academic performance: - 46.8% Procrastination - 40.2% Stress - 29.3% Anxiety - 23.6% Sleep difficulties - 23.0% Depression



• 1.7% Cannabis/marijuana use (40th of 51 factors)

American College Health Association, 2020

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Angarita, et al., 2016





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#### (3) Factors associated with health and mental health (not already addressed earlier)

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#### Cannabis Use Associated with Risk of Psychiatric Disorders (Hall & Degenhardt, 2009; Hall, 2009; Hall 2013)

#### Schizophrenia

- Those who had used cannabis 10+ times by age 18 were 2-3 times more likely to be diagnosed with schizophrenia
- "13% of schizophrenia cases could be averted if cannabis use was prevented (Hall & Degenhardt, 2009, p. 1388)"



- Depression and suicide
- "Requires attention in cannabis dependent" (Hall, 2013)

#### 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)

1	Have you used any came	whis over the past six mont	hs? YES/NO				
1	If YES, please answer the n relation to your cannal	e following questions about y is use over the past six month	osr cantabis une. Circ is	le the response that is	most correct for you		
	How offen do you use	canabic?					
	Never	Monthly or law	2-4 times	2-3 times	4 or more time		
	0	1	2	3	4		
	Here many hours war	tion "storied" on a region de	or when the had been	miner consultion?			
	Less than 1	1 m 2	3 10 4	3 or 6	7 or more		
		3	. 3	3	4		
	How often during the	past 6 months did you find th	at you were not able to	mp using cannabis o	rece you had started?		
	Never	Less than monthly	Monthly	Weekly	Duily or almost daily		
		1	3	3	4		
	How others during the part 6 months did you fail to do what was normally expected from you because of using cantabi						
	Never	Los that nonthly	Monthly	Wankly	Duily or stream duily		

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	8	How often in the pase connabis?	h months have you devoted a	great deal of your tim	e to preing, using, or	recovering from			
		Never	Less than monthly	Monthly	Weekly	Daily or almost daily			
			1	2	3	4			
	6.	How often in the past	5 months have you had a prof	tiers with your memory	ry or concentration aft	er using carnabis?			
		Never	Loss than monthly	Monthly	Weekly	Daily or denote daily			
			1	2	3	4			
	7.	How often do you use or saring for children	cannahis in situations that co	uld be physically hars	ardoos, such as driving	, operating machinery,			
		Never	Less than monthly	Monthity	Weekly	Daily or almost daily			
			1	2	3	4			
	L	Have you over though Never 0	about cutting down, or stopp Ye	ing, your use of came s, but not in the past 6 menths 2	abin? 6	Yes, during the past 6 months 8			
	This scale is in the public domain and is free to use with appropriate citation:								
		ily BJ, and Sellman orders Identification	JD. (2010). An Test – Revised						
Source: Washington Recovery Helpline		This questionnaire 3 items: Question 1-7 are i Question 8 is son Scores of 8 or more possible cannabia i	was designed for self a scored on a 0-4 scale ed 0, 2 or 4. indicate hazardous c se disorder for which	administration an annabis use, whi further interventio	id is scored by a le scores of 12 c on may be requir	dding each of the r more indicate a red.			

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https://www.samhsa.gov/data/sites/default/files/NSDUH-DR-FFR3-2015/NSDUH-DR-FFR3-2015.pdf

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#### MARIJUANA USE – effects after use

- With high doses, may experience acute toxic psychosis
- Hallucinations
- Delusions
- Depersonalization
- Seem more likely when person takes too much or potency is high

NIDA (2019)

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AJPH POLICY

#### Lower-Risk Cannabis Use Guidelines: A Comprehensive Update of Evidence and Recommendations

Broadde Finler, FeD, Carley Barel, MA, Davide Sabieni, FeD, Hirs van der Briek, MD, FeD, Broard Le FeR, MD, FeD, Jagen Reles, FeD, and Refes Boos, FeD

Bedgework: Controls uses is controls to test hereits, a special printing party pering, and a summation with a real stress market and the stress data and the pering begins of the summation and the stress stress markets and the stress bedgeworks and the stress stress markets and the stress stress and the summation and the stress stress markets and the stress stress and the characterist between stress and the stress stress and the stress stress and the stress stress and the stress stress stress and the stress stress and the stress stress and the stress stress stress and the stress stress and the stress stress and the stress stress stress and the stress stress and the stress stress stress and the stress stress stress stress stress stress and the stress stress stress stress stress and the stress stres Colorations. To systematically inview, update, and quality-grade evidence on ter-thickoral factors determining adverse health outcomer hem cannable that may be used on the second seco

"Recommendation #1: The most effective way to avoid any risks of cannabis use is to <u>abstain from use</u>. Those who decide to use need to recognize that they incur risks of a variety of – acute and long-term – adverse health and social autcomes. These risks will vary in their likelihood and severity with user characteristics, use patterns, and product qualities, and so may not be the same from user to user or use episode to another."

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Recommendation #9: Refrain from use if you are actively dealing with psychosis or substance use issues (or have a first-degree family history)

excommendation 9: There are some populations at probable higher risk for carnatios valued adverse effects who should refrain flow the cannable. These include individuals with prediception for on a first despere high history of, pupulations and valutance was described as anyonant women (primarly to avoid adverse effects on the fetus or newborn). These recommendations, in part, are based on precasionary in the second second

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(2) COVID-19

COVID-19: Potential Implications for Individuals with Substance Use Disorders 

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COVID-19 diagnosis 5x greater for people who vape, 7x greater for people who vape and smoke  $({\sf Galha}, {\sf Cheng}, \& {\sf Halpern-Feisher}, 2020)$ 



### (1) Addiction risk

#### MaCoun (2013), Frontiers in Psychiatry

Criterion	DSM-IV substance dependence	DSM-5 substance use disorder
Tolerance	√	~
Withdrawal	~	~
Taken more/longer than intended	~	1
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		~





Mild: 2-3 symptoms Moderate: 4-5 symptoms Severe: 6+ symptoms

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Documented solidly in the science with "high" confidence

#### Addiction

- 9% who experiment become addicted
- 17% who begin in adolescence
- 25-50% of those with daily use
- Compared to those who begin using in adulthood, those who begin in adolescence are 2-4 times as likely to develop cannabis dependence within 2 years

Volkow, N.D., Baler, R.D., Compton, W.M., & Weiss, S.R.B. (2014). Adverse health effects of marijuana use. The New England Journal of Medicine, 370 (23), 2219-2227.

A quick word about medical cannabis use (particularly if people are declining referrals for counseling or health consultations)

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Doctors should think twice before prescribing medical marijuana: guideline Source: CTVNews.com

New guideline warns pain benefits of medical cannabis overstated University of Alberta led guideline warns health risks may outweigh benefits, provides guidene on when (and hold prescribe.

Canadian Doctors Warn Medical Pot Is Overhyped Source: Gizmodo.com



Only are recommending for neuropathic pain, palliative and end-of-life pain, chemotherapyinduced nausea and vomiting, and spasticity due to multiple sclerosis or spinal cord injury...

If tried traditional therapies/treatments first...

AND

Allan, et al. (2018)

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"This study suggests that oral CBD does not alter responses to emotional stimuli, or produce anxiolytic-like effects in healthy human subjects. (p. 112)"  $$_{\rm Arndt \& de Wit [2017]}$$ 

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Separating reported medical use from management of withdrawal

#### **Motivations for Use**

	Motive Category	Proportion of participants endorsing motive	Proportion of primary motives
joyment/fun	Chroymenthan (s.g., be happy, get high, enjoy feeling)	52.14%	24.03%
	Conformity (e.g., peer pressure, friends do it)	42.81%	18.40%
Social	Experimentation (e.g., new experience, curiosity)	41.25%	29.36%
hancement	Social enhancement e.g., bonding with friends, hang out)	25.71%	8.66%
Boredom	Boredom b.g., something to do, nothing better to do)	25.08%	4.15%
boredom	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%
Altered	Relative low risk (e.g., low health risk, no hangover)	10.88%	0.95%
perception	Altered perception perspectives (e.g., to enhance experiences, making things motive tun)	10.58%	1.81%
Activity	Activity enhancement is g., music sounds better, every day activities more more sting)	5.68%	0.80%
in an occurrent	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%
1	Anxiety reduction (e.g., be less shy, feel less insecure)	3.31%	0.00%
mage	Image enhancement e.g., to be cool, to feel cool)	2.85%	0.32%
nnancement	Celebration e.g., special occasion, to celebrate)	1.26%	0.16%
Celebration	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%

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#### **Motivations for Use**

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	Image enhancement (e.g., to be cool, to feel cool)	2.85%	0.32%
Medical use (physical	Celebration (e.g., special occasion, to celebrate)	1.26%	0.16%
pain, have headache)	Medical use (e), alleviate physical pain, have a headache)	1.26%	0.16%
Habit	Habit (e.g., feeing was addictive, became a habit)	0.95%	0.00%
		Lee, Neighbors &	Woods (2007

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#### Withdrawal: Cannabis

Diagnostic Criteria	292.0 (F12.288)						
<ol> <li>Cessation of cannabis use that has been heavy an daily use over a period of at least a few months).</li> </ol>	d prolonged (i.e., usually daily or almost						
<ol> <li>Three (or more) of the following signs and sympton after Criterion A:</li> </ol>	Three (or more) of the following signs and symptoms develop within approximately I week after Criterion A:						
1. Irritability, anger, or aggression.							
2. Nervousness or anxiety,							
Sleep difficulty (e.g., insomnia, disturbing dream	ns).						
Decreased appetite weight loss.							
5. Restlessness.							
6. Depressed mood.							
<ol> <li>At least one of the following physical symptoms abdominal pain, shakiness/tremors, sweating, f</li> </ol>	causing significant discomfort:						

- C. The signs or symptoms in Oritorion B cause clinically significant distress or impairment in social, ecospational, or other impairment sets of functioning. D. The signs or symptoms are not extribusable to another medical condition and are not better explained by another mental disorder, including intoxication or withdrawal from another subtance.

### Wrapping up: Parents are unbelievably influential

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Examining role of parents and peers

- Fairlie, Wood, & Laird (2012) collected data during summer before starting college, 10 month follow-up (spring semester of first year), and 22 month follow-up (spring semester of second year)
   Looked at social modeling (e.g., # of close friends who drink heavily, perceived friend approval of drinking and getting drunk) and parental permissiveness

Property











Decreasing trend significat	nt					
Increasing trend significan						
		R-30 year olds				
WHERE DO PEOPLE GET N	Cohort 1 2014	Cohort 2 2015	Cohort 3 2016	Cohort 4 2017	Cohort 5 2018	Cohort 2019
From friends	72.86%	76.24%	69.68%	77.40%	63.75%	60.74
Gave money to someone	23.29%	26.47%	34.72%	41.45%	39.29%	43.17
Got it from someone						
w/medical mj. card	17.60%	14.12%	4.30%	5.24%	2.79%	2.829
Got it from a med. disp.	13.65%	18.99%	5.58%	4.72%	6.50%	8.289
Got it at a party	22.99%	22.14%	23.08%	24.92%	20.12%	22.93
Got it from family	5.65%	5.18%	11.75%	9.75%	11.24%	10.92
Got it some other way	11.64%	4.12%	6.12%	9.02%	7.30%	6.219
Bought from retail store	0.99%	4.58%	1.73%	1.92%	2.03%	3.559
Got it from parents						
with permission	5.75%	6.02%	12.33%	10.44%	11.69%	12.93
Grew it themselves	Q.91%	1.15%	1.65%	0.23%	1.47%	2.789
Stole it from store/disp.	0.00%	0.00%	0.00%	0.00%	0.00%	0.005





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#### Recommendations

- Begin talking together about substance use
- Set clear rules, and agree on appropriate consequences for breaking these rules
- Enforce consequences when the rules are broken
- Discuss short-term and long-term risks of substance use
- · Help plan for social pressure to use
- Work with other parents and community leaders to
- make and enforce policies that keep substances away from underage youth

Adapted from recommendations made by Rob Turrisi, Ph.D. for MADD

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#### Recommendations

- Express a no use attitude
- Start early
- Teach and practice skills to refuse drug offers
- Set clear guidelines
- Keep track of your child
- Keep lines of communication open
- Monitor your own behavior

 $Source: \ learnabout marijuana wa.org/parent prevention booklet {\tt 2013.pdf}$ 



Parent Handbook for Talking with Teens About Alcohol Madd.org/powerofparents

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Special thank you to Laura Stack

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