
Marijuana Legalization Issues

Top 10 Messages Against Legalization

1. Marijuana legalization will usher in America's new version of "Big Tobacco."
 - Already, private holding groups and financiers have raised millions of start-up dollars to promote businesses that will sell marijuana and marijuana-related merchandise.
 - Cannabis food and candy is being marketed to children and are already responsible for a growing number of marijuana-related ER visits.¹ Edibles with names such as "Ring Pots" and "Pot Tarts" are inspired by common children candy and dessert products such as "Ring Pops" and "Pop Tarts."
 - Several, profitable vending machines containing products such as marijuana brownies are emerging throughout the country.²
 - The former head of Strategy for Microsoft has said that he wants to "mint more millionaires than Microsoft" with marijuana and that he wants to create the "Starbucks of marijuana."³

2. Marijuana use will increase under legalization
 - **Because they are accessible and available, our legal drugs are used far more than our illegal ones.** According to recent surveys, alcohol use is used by 52% of Americans and tobacco is used by 27% of Americans. Marijuana is used by 8% of Americans.⁴
 - When RAND researchers analyzed California's 2010 effort to legalize marijuana, they concluded that the price of the drug could **plummet and therefore marijuana consumption could increase.**⁵

3. Marijuana is especially harmful to kids and adolescents.
 - Marijuana contributes to psychosis and schizophrenia⁶, addiction for 1 in 6 kids who ever use it once⁷, and it reduces IQ among those who started smoking before age 18.⁸
 - According to data from the 2012 National Survey of American Attitudes on Substance Abuse, **alcohol and cigarettes were the most readily accessible substances for youth 12 to 17**, with 50% and 44%, respectively, reporting that they could obtain them within a day. Youth were *least* likely to report that they could get marijuana within a day (31%); **45% report that they would be unable to get marijuana at all.**⁹

4. Today's marijuana is NOT your Woodstock weed.
 - In the 1960s and '70s, THC levels of the marijuana smoked by baby boomers averaged around 1%, increasing to just under 4% in 1983, and almost tripling in the subsequent 30 years to around 11% in 2011.¹⁰

* Adapted from "Reefer Sanity: Seven Great Myths About Marijuana" by Dr. Kevin A. Sabet (Beaufort Books, 2013)

5. Marijuana legalization will increase public costs.

- **For every \$1 in alcohol and tobacco tax revenues, society loses \$10 in social costs, from accidents to health damage¹¹.** The Lottery and other forms of gambling have not solved our budget problems, either.
- Few people are currently in prison for marijuana possession (in fact, only 0.1% of prisoners with no prior offenses¹²) and **current alcohol arrest rates are over three times higher than marijuana arrest rates.**¹³

6. People are not in prison for small time marijuana use.

- Statistics on state-level prisoners reveal that **0.3% of all state inmates were behind bars for marijuana possession only** (with many of them pleading down from more serious crimes).¹⁴
- 99.8% of federal prisoners sentenced for drug offenses were incarcerated for drug **trafficking.**¹⁵
- The risk of arrest for each joint smoked is **1 in 12,000.**¹⁶

7. Drug cartels and the black market will continue to function under legalization.

- A recent RAND report showed that **Mexican drug trafficking groups only received a minority of their revenue (15-25%) from marijuana.** For them, the big money is found in illegal trade such as human trafficking, kidnapping, extortion, piracy, and other illicit drugs.¹⁷
- And we know from mining and other industries that illegal actors have a lot to do with so called legal industries. These cartels will only be helped with legalization and more addiction, not hurt.

8. Neither Portugal nor Holland provides any successful example of legalization.

- Independent research reveals that in the Netherlands, where marijuana was commercialized and sold openly at “coffee shops,” **marijuana use among young adults increased almost 300%.**¹⁸ Now, the Dutch are retreated from their loose policies.
- **There are signs that tolerance for marijuana in the Netherlands is receding.** They have recently closed hundreds of coffee shops, and today Dutch citizens have a higher likelihood of being admitted to treatment than nearly all other countries in Europe.¹⁹
- In Portugal, use levels are mixed, and despite reports to the contrary, **they have not legalized drugs.** In 2001, Portugal started to refer drug users to three person “panels of social workers” that recommend treatment or another course of action. As the European Monitoring Center’s findings concluded: “the country does not show specific developments in its drug situation that would clearly distinguish it from other European countries that have a different policy.”²⁰

9. Marijuana has medicinal properties, but we shouldn’t smoke the plant in order to derive those benefits, just like we do not smoke opium to get the benefits of morphine.

- In states with medical marijuana laws, the average user is a **male in his 30s with no terminal illness and a history of drug abuse.**²¹
- **Less than 2% of users have cancer or AIDS.**²²
- Residents of states with medical marijuana laws have abuse and dependence rates **almost twice as high as states with no such laws.**²³
- Research should be conducted to produce pharmacy-attainable, non-smoked

medications based on marijuana.

10. Experience from Colorado is not promising.

- Two independent reports released in August 2013 document how Colorado's supposedly regulated system is not well regulated at all.²⁴
- Teen use has increased in the past five years. **Currently, the marijuana use rate among Colorado teens is 50% above the national average.**²⁵
- Drug-related referrals for high school students testing positive for marijuana has increased.²⁶
- Medical marijuana is easily diverted to youth.²⁷
- While the total number of car crashes declined from 2007 to 2011, **the number of fatal car crashes with drivers testing positive for marijuana rose sharply.**²⁸

¹ Alface, I. (2013, May 27). Children Poisoned by Candy-looking Marijuana Products. *Nature World News*. Retrieved from <https://owl.english.purdue.edu/owl/resource/560/10/>; Jaslow, R. (2013, 28 May). Laxer marijuana laws linked to increase in kids' accidental poisonings *CBS News*. Retrieved from http://www.cbsnews.com/8301-204_162-57586408/laxer-marijuana-laws-linked-to-increase-in-kids-accidental-poisonings/

² Gruley, B. (2013, May 9). Medbox: Dawn of the Marijuana Vending Machine. *Bloomberg Businessweek*. Retrieved from <http://www.businessweek.com/articles/2013-05-09/medbox-dawn-of-the-marijuana-vending-machine>

³ Ex-Microsoft exec plans 'Starbucks' of marijuana. (2013, May 31). *United Press International*. Retrieved from http://www.upi.com/Top_News/US/2013/05/31/VIDEO-Ex-Microsoft-exec-plans-Starbucks-of-marijuana/UPI-41161369985400/

⁴ NSDUH, Summary of National Findings, 2012. Retrieved from <http://www.samhsa.gov/data/NSDUH/2012SummNatFindDetTables/NationalFindings/NSDUHresults2012.pdf>

⁵ Kilmer, B., Caulkins, J.P., Pacula, R.L., MacCoun, R.J., & Reuter, P.H. *Altered State? Assessing How Marijuana Legalization in California Could Influence Marijuana Consumption and Public Budgets*. Santa Monica, CA: RAND Corporation, 2010. http://www.rand.org/pubs/occasional_papers/OP315

⁶ Andréasson S, et al. (1987). Cannabis and Schizophrenia: A longitudinal study of Swedish conscripts. *Lancet*, 2(8574).

⁷ Anthony, J.C., Warner, L.A., & Kessler, R.C. (1994). Comparative epidemiology of dependence on tobacco, alcohol, controlled substances, and inhalants: Basic findings from the National Comorbidity Survey. *Experiential and Clinical Psychopharmacology*, 2.

⁸ Meier, M.H. (2012). Persistent cannabis users show neuropsychological decline from childhood to midlife. *Proceedings of the National Academy of Sciences*.

⁹ Adapted by CESAR from The National Center on Addiction and Substance Abuse at Columbia University (CASA), National Survey of American Attitudes on Substance Abuse XVII: Teens, 2012. Retrieved from <http://www.casacolumbia.org/upload/2012/20120822teensurvey.pdf>

¹⁰ Mehmmedic, Z., et al. (2010). Potency Trends of D9-THC and Other Cannabinoids in Confiscated Cannabis Preparations from 1993 to 2008. *The Journal of Forensic Sciences*, 55(5).

¹¹ Updating estimates of the economic costs of alcohol abuse in the United States: Estimates, update methods, and data. Report prepared for the National Institute on Alcohol Abuse and Alcoholism. Retrieved from <http://pubs.niaaa.nih.gov/publications/economic-2000/>; Urban Institute and Brookings Institution (2012, October 15). State and local alcoholic beverage tax revenue, selected years 1977-2010. *Tax Policy Center*. Retrieved from <http://www.taxpolicycenter.org/taxfacts/displayafact.cfm?Docid=399>; Saul, S. (2008, August 30). Government gets

-
- hooked on tobacco tax billions. *The New York Times*. Retrieved from http://www.nytimes.com/2008/08/31/weekinreview/31saul.html?em&_r=0; for Federal estimates, see Urban Institute and Brookings Institution (2012, October 15). State and local tobacco tax revenue, selected years 1977-2010. *Tax Policy Center*. Retrieved from <http://www.taxpolicycenter.org/taxfacts/displayafact.cfm?Docid=403>; Campaign for Tobacco-Free Kids (n.d.). Toll of tobacco in the United States of America. Retrieved from <http://www.tobaccofreekids.org/research/factsh>
- ¹² Bureau of Justice Statistics. (2004). Data collection: Survey of inmates in state correctional facilities (SISCF). Retrieved from <http://www.bjs.gov/index.cfm?ty=dcdetail&iid=275>
- ¹³ Federal Bureau of Investigation. (2011). Persons arrested. Retrieved from <http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2011/crime-in-the-u.s.-2011/persons-arrested>.
- ¹⁴ Bureau of Justice Statistics. (2004). Data collection: Survey of inmates in state correctional facilities (SISCF). Retrieved from <http://www.bjs.gov/index.cfm?ty=dcdetail&iid=275>
- ¹⁵ Ibid.
- ¹⁶ Kilmer, B., et al. "Altered State? Assessing How Marijuana Legalization in California Could Influence Marijuana Consumption and Public Budgets". Santa Monica, CA: RAND Corporation, 2010. http://www.rand.org/pubs/occasional_papers/OP315
- ¹⁷ Kilmer, B. Caulkins, J.P, Bond, B.M. & Reuter, P.H. "Reducing Drug Trafficking Revenues and Violence in Mexico: Would Legalizing Marijuana in California Help?" Santa Monica, CA: RAND Corporation, 2010. http://www.rand.org/pubs/occasional_papers/OP325.
- ¹⁸ MacCoun, R. & Reuter, P. (2001). Evaluating Alternate Cannabis Regimes. *The British Journal of Psychiatry*, 178.
- ¹⁹ MacCoun, R. (2010). What can we learn from the Dutch Cannabis Coffeeshop experience? *RAND Drug Policy Research Center*. Retrieved from http://www.rand.org/content/dam/rand/pubs/working_papers/2010/RAND_WR768.pdf
- ²⁰ European Monitoring Center for Drugs and Drug and Addiction. (2011). Drug Policy Profiles-Portugal. Retrieved from <http://www.emcdda.europa.eu/publications/drug---policyprofiles/portugal>
- ²¹ O'Connell, T.J. & Bou-Matar, C.B. (2007). Long term marijuana users seeking medical cannabis in California (2001–2007): demographics, social characteristics, patterns of cannabis and other drug use of 4117 applicants. *Harm Reduction Journal*, 4(16).
- ²² Colorado Department of Public Health and Environment. (2011)
- ²³ Cerda, M., et al. (2012). Medical marijuana laws in 50 states: Investigating the relationship between state legalization of medical marijuana and marijuana use, abuse and dependence. *Drug & Alcohol Dependence*, 120(1-3).
- ²⁴ Colorado Office of the State Auditor. (2013). & City of Denver Office of the Auditor. (2013).
- ²⁵ NSDUH, Summary of National Findings, 2012. Retrieved from <http://www.samhsa.gov/data/NSDUH/2012SummNatFindDetTables/NationalFindings/NSDUHresults2012.pdf>
- ²⁶ Rocky Mountain HIDTA. (2013). Legalization of Marijuana in Colorado: The Impact. Retrieved from <http://www.rmhidta.org/html/FINAL%20Legalization%20of%20MJ%20in%20Colorado%20The%20Impact.pdf>
- ²⁷ Salomonsen-Sautel, S., et al. (2012). Medical marijuana use among adolescents in substance abuse treatment. *Journal of American Academic Child & Adolescent Psychiatry*, 51(7).
- ²⁸ Rocky Mountain HIDTA. (2013). Legalization of Marijuana in Colorado: The Impact. Retrieved from <http://www.rmhidta.org/html/FINAL%20Legalization%20of%20MJ%20in%20Colorado%20The%20Impact.pdf>



Healthy Youth Survey Fact Sheet

Marijuana Use for Yakima School District, page 1 of 2

Year: 2014

Grade: 10

Gender: Both

Number of Students Surveyed: 750

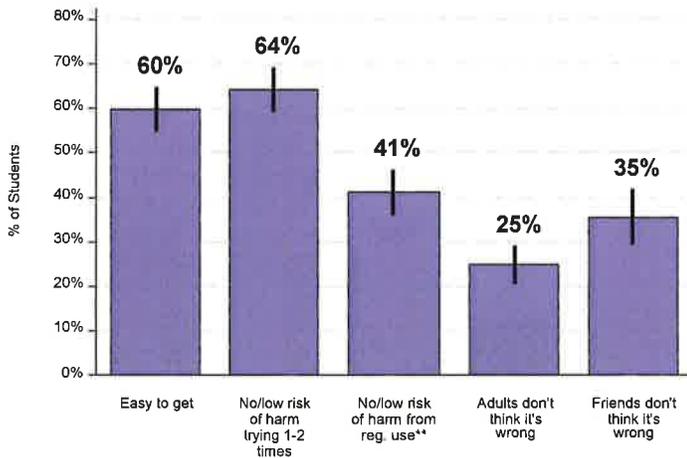
Background:

- Marijuana is addictive. Most teens who enter drug treatment programs report marijuana is the main drug they use.
- When teens use marijuana, anxiety and depression can get worse.
- Teens who use marijuana can have problems with learning and memory and are more likely to fail in school.

For More Information:

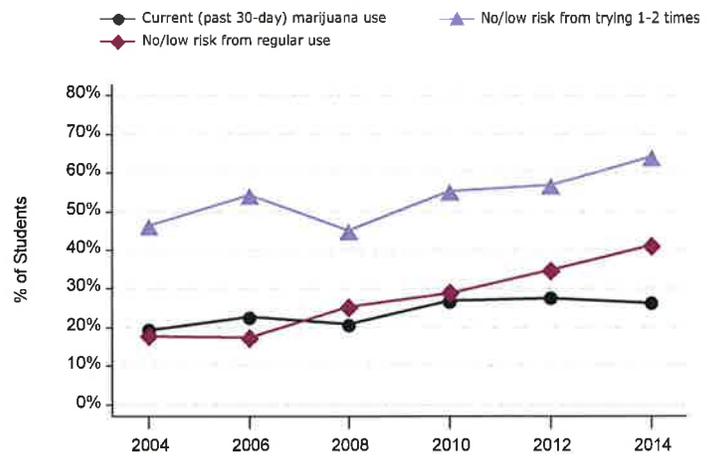
- Parents, schools, and communities can work together to keep youth healthy and safe.
- For prevention tips and to connect with a prevention coalition in your area, visit www.StartTalkingNow.org.
- For free printed guides on preventing alcohol and other drug use, visit the ADA Clearinghouse adaiclearinghouse.org or call (206) 221-8325.
- For 24 hour help for mental health, substance use and problem gambling, call 1-866-789-1511 or visit www.waRecoveryHelpLine.org.

**Attitudes about Marijuana Use
Grade 10, 2014**



In 2014, 41% of 10th graders in our school district thought there was little or no risk of using marijuana regularly.

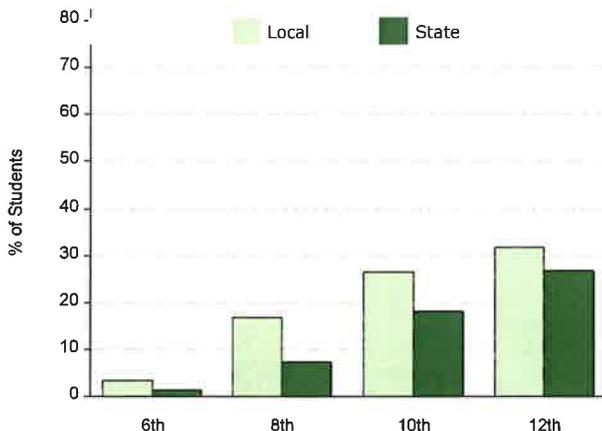
**Marijuana Use and Perception of Harm Trends
Grade 10**



Prevalence	2004	2006	2008	2010	2012	2014
Current (past 30-day) marijuana use	19% ±3	23% ±3	21% ±3	27% ±3*	28% ±4	26% ±3
No/low risk from trying 1-2 times	46% ±6	54% ±5*	45% ±5*	55% ±5*	57% ±6	64% ±5
No/low risk from regular use**	18% ±4	17% ±4	25% ±4*	29% ±5	35% ±6	41% ±5

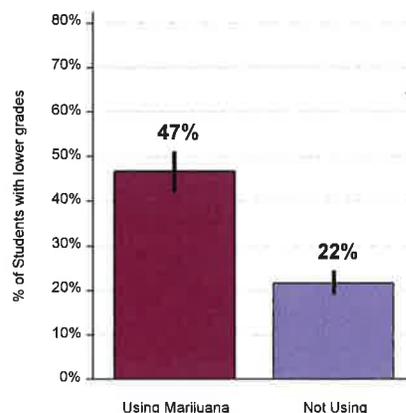
***"Smoked" marijuana regularly was changed to "Use" regularly in 2014. This may mark a break in the trend.*

**Current (past 30-day) Marijuana Use
Compared to the State, All Grades, 2014**



Prevalence	6th	8th	10th	12th
Local	3% ±1*	17% ±3*	26% ±3*	32% ±4*
State	1% ±0	7% ±1	18% ±2	27% ±2

**Statewide Relationship between
Lower Grades and Current (past 30-day) Marijuana Use
Grade 10, 2014**



Statewide, 10th graders who use marijuana are more likely to report lower grades in school (C's, D's or F's) compared to those who don't use.

Submitted:

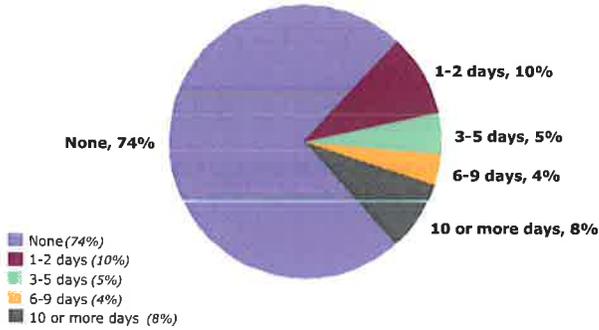
YPC Hearing - 6/16/16



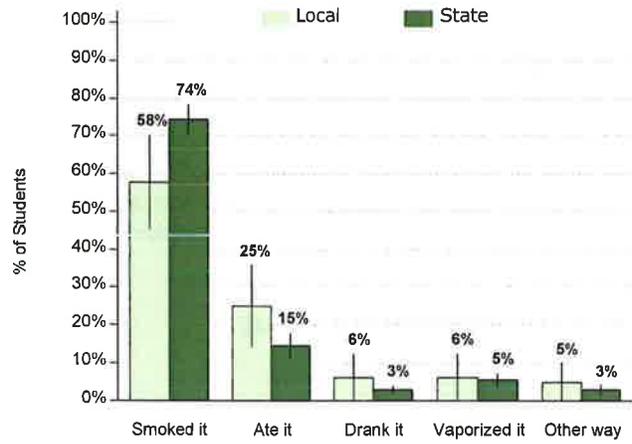
Healthy Youth Survey Fact Sheet

Marijuana Use for Yakima School District, page 2 of 2

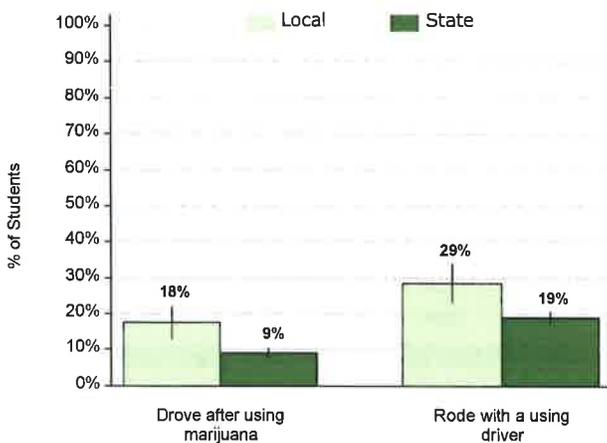
Level of Current (past 30-day) Marijuana Use
Grade 10, 2014



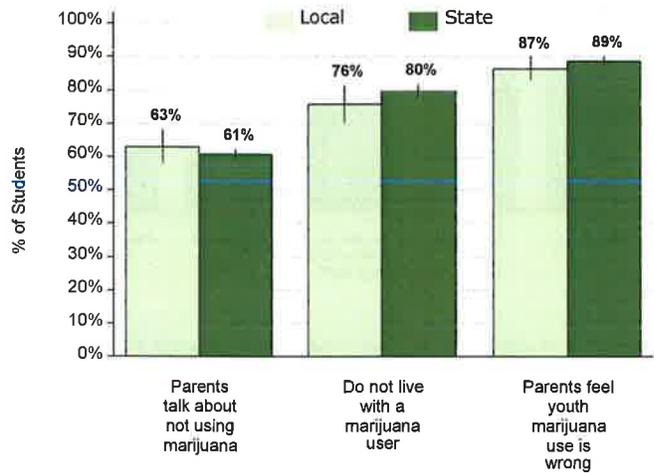
Type of Marijuana Used among Those Who Used It
Grade 10, 2014



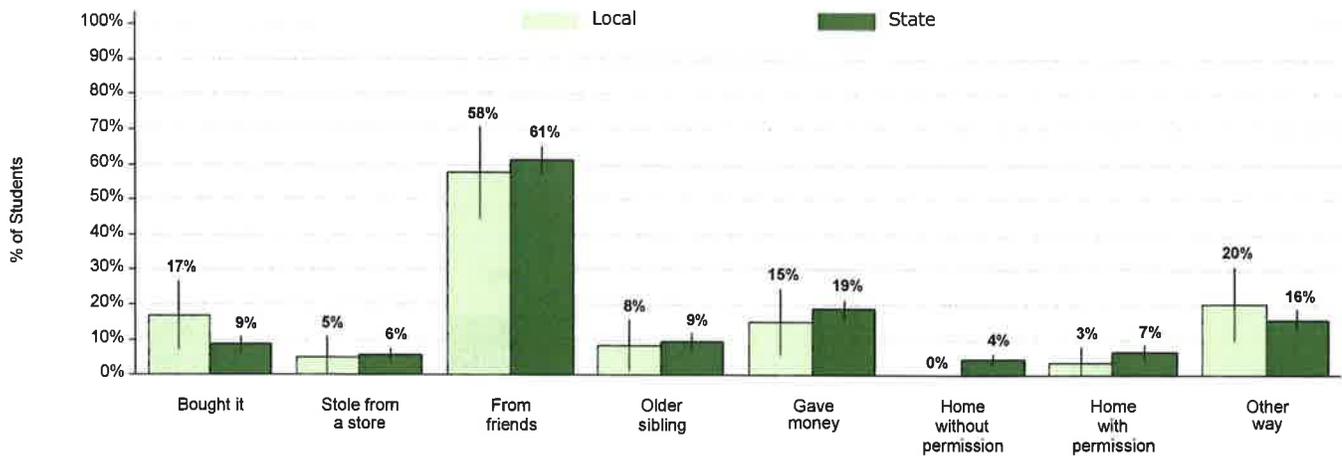
Marijuana Use and Driving/Riding
Grade 10, 2014



Family Environment, Grade 10, 2014



Source of Those who Got Marijuana, Grade 10, 2014



Prevalence is displayed with 95% confidence intervals (as ± or black bar |)
*indicates a significant change from the previous year or a significant difference between state and local results, p<0.05



Healthy Youth Survey Fact Sheet

Marijuana Use for Yakima School District, page 1 of 2

Year: 2014

Grade: 12

Gender: Both

Number of Students Surveyed: 604

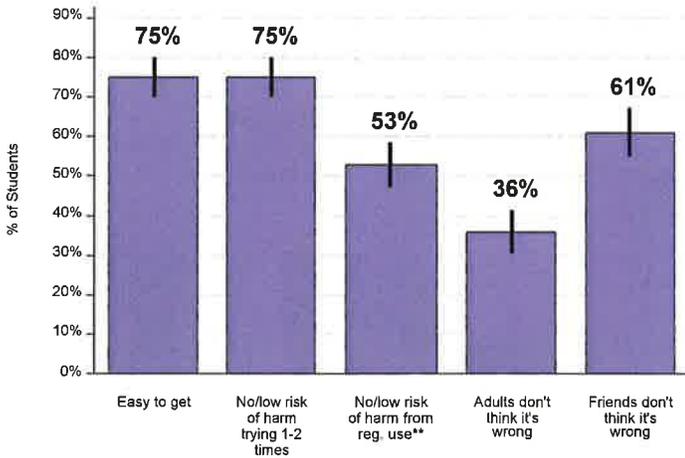
Background:

- Marijuana is addictive. Most teens who enter drug treatment programs report marijuana is the main drug they use.
- When teens use marijuana, anxiety and depression can get worse.
- Teens who use marijuana can have problems with learning and memory and are more likely to fail in school.

For More Information:

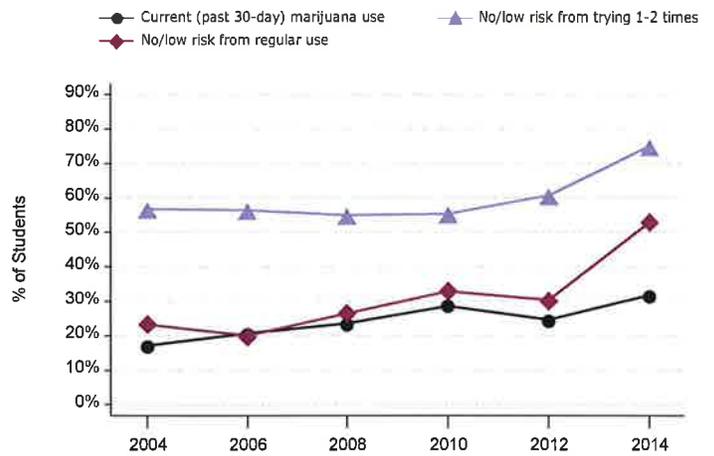
- Parents, schools, and communities can work together to keep youth healthy and safe.
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**Attitudes about Marijuana Use
Grade 12, 2014**



In 2014, 53% of 12th graders in our school district thought there was little or no risk of using marijuana regularly.

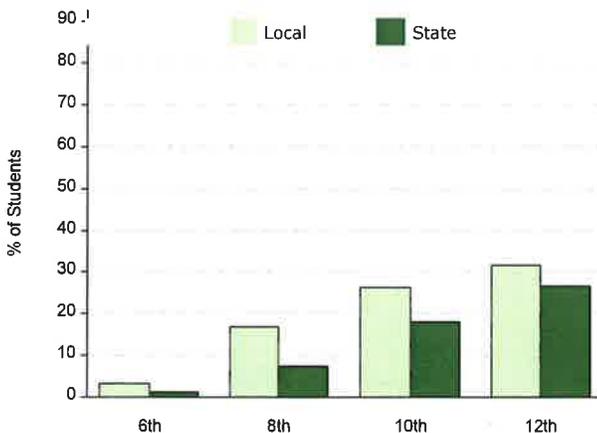
**Marijuana Use and Perception of Harm Trends
Grade 12**



Prevalence	2004	2006	2008	2010	2012	2014
Current (past 30-day) marijuana use	17% ±4	21% ±4	23% ±3	29% ±4*	24% ±4	32% ±4*
No/low risk from trying 1-2 times	57% ±7	57% ±6	55% ±6	55% ±6	61% ±6	75% ±5*
No/low risk from regular use**	23% ±6	20% ±5	26% ±5	33% ±5	30% ±5	53% ±6*

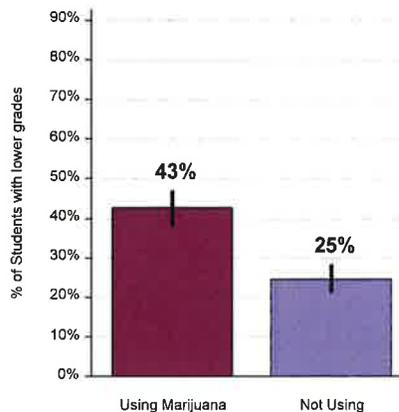
***"Smoked" marijuana regularly was changed to "Use" regularly in 2014. This may mark a break in the trend.*

**Current (past 30-day) Marijuana Use
Compared to the State, All Grades, 2014**



Prevalence	6th	8th	10th	12th
Local	3% ±1*	17% ±3*	26% ±3*	32% ±4*
State	1% ±0	7% ±1	18% ±2	27% ±2

**Statewide Relationship between
Lower Grades and Current (past 30-day) Marijuana Use
Grade 12, 2014**



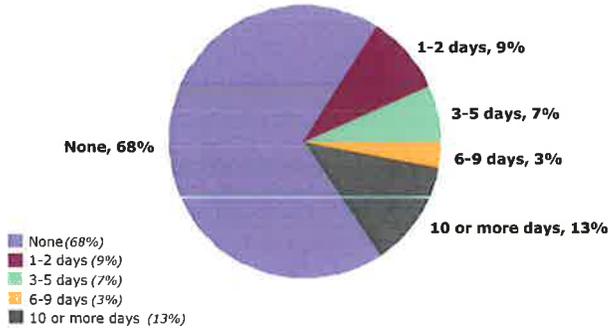
Statewide, 12th graders who use marijuana are more likely to report lower grades in school (C's, D's or F's) compared to those who don't use.



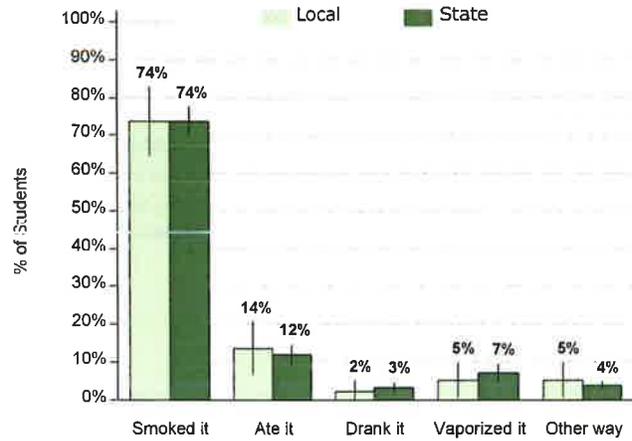
Healthy Youth Survey Fact Sheet

Marijuana Use for Yakima School District, page 2 of 2

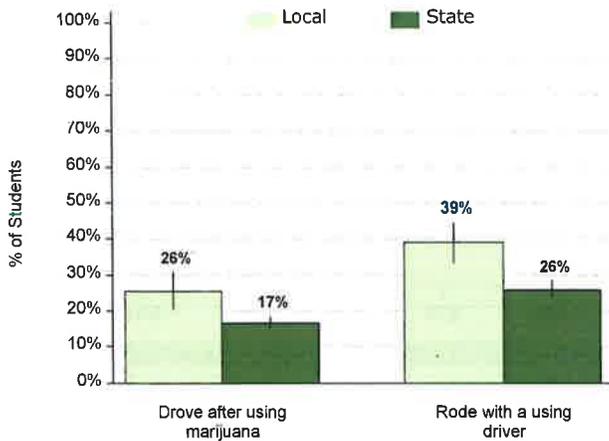
Level of Current (past 30-day) Marijuana Use
Grade 12, 2014



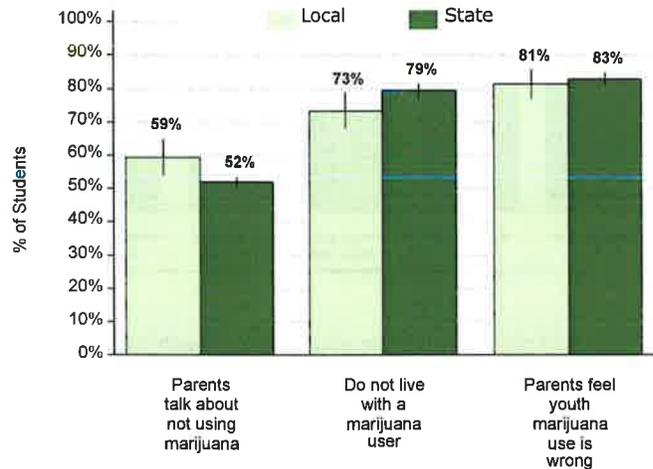
Type of Marijuana Used among Those Who Used It
Grade 12, 2014



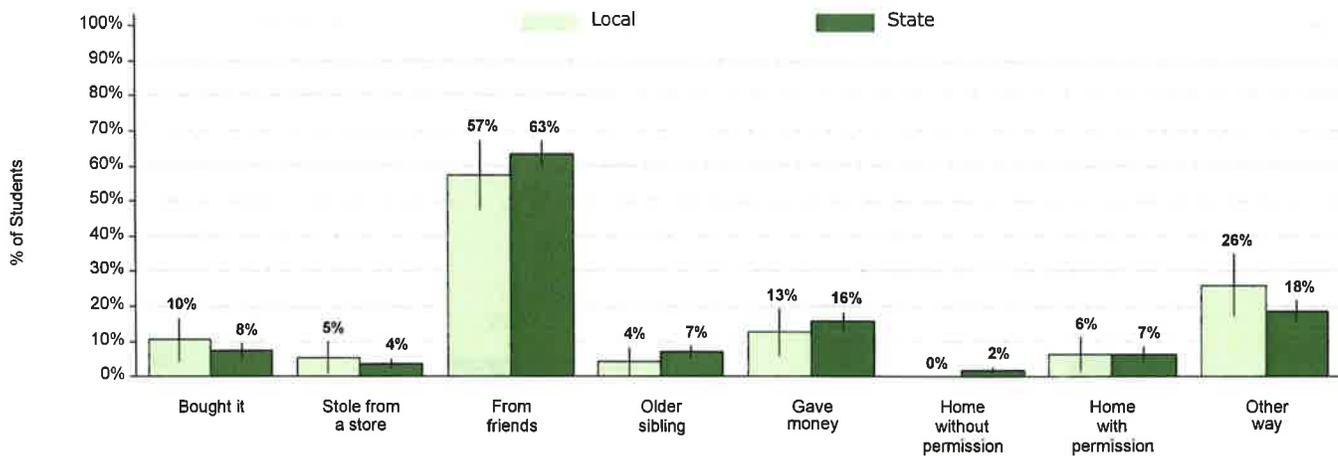
Marijuana Use and Driving/Riding
Grade 12, 2014



Family Environment, Grade 12, 2014



Source of Those who Got Marijuana, Grade 12, 2014



Prevalence is displayed with 95% confidence intervals (as ± or black bar)
*Indicates a significant change from the previous year or a significant difference between state and local results, p<0.05



Healthy Youth Survey Fact Sheet

Marijuana Use for Yakima School District, page 1 of 2

Year: 2014

Grade: 6

Gender: Both

Number of Students Surveyed: 965

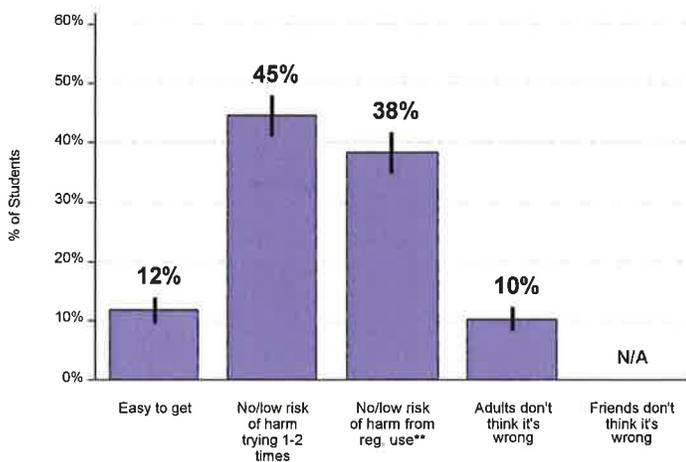
Background:

- Marijuana is addictive. Most teens who enter drug treatment programs report marijuana is the main drug they use.
- When teens use marijuana, anxiety and depression can get worse.
- Teens who use marijuana can have problems with learning and memory and are more likely to fail in school.

For More Information:

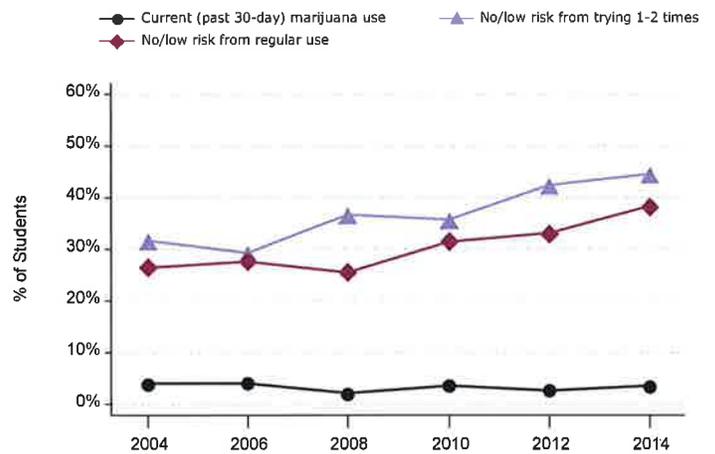
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**Attitudes about Marijuana Use
Grade 6, 2014**



In 2014, 38% of 6th graders in our school district thought there was little or no risk of using marijuana regularly.

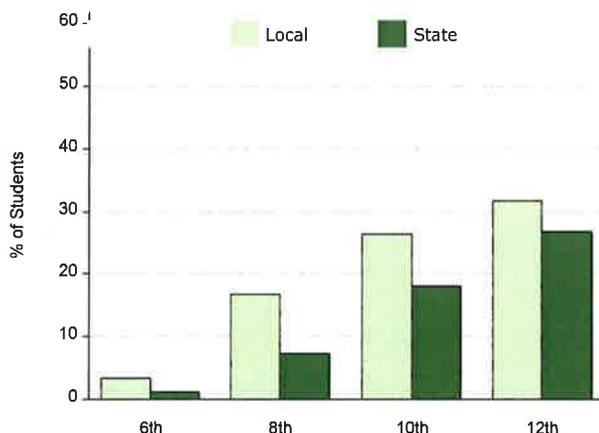
**Marijuana Use and Perception of Harm Trends
Grade 6**



Prevalence	2004	2006	2008	2010	2012	2014
Current (past 30-day) marijuana use	4% ±1	4% ±1	2% ±1*	4% ±1	3% ±1	3% ±1
No/low risk from trying 1-2 times	32% ±3	29% ±4	37% ±3*	36% ±3	42% ±3*	45% ±3
No/low risk from regular use**	26% ±3	28% ±4	26% ±3	31% ±3*	33% ±3	38% ±3*

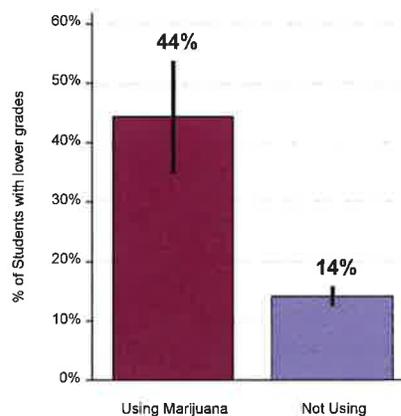
**"Smoked" marijuana regularly was changed to "Use" regularly in 2014. This may mark a break in the trend.

**Current (past 30-day) Marijuana Use
Compared to the State, All Grades, 2014**



Prevalence	6th	8th	10th	12th
Local	3% ±1*	17% ±3*	26% ±3*	32% ±4*
State	1% ±0	7% ±1	18% ±2	27% ±2

**Statewide Relationship between
Lower Grades and Current (past 30-day) Marijuana Use
Grade 6, 2014**



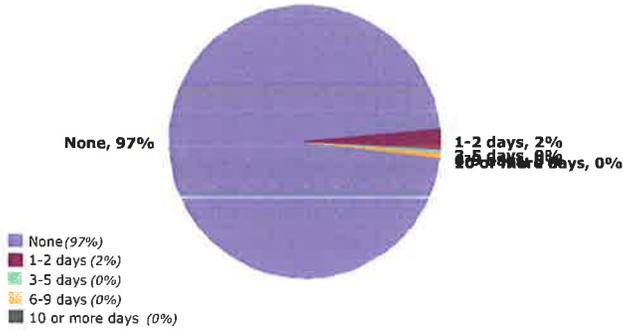
Statewide, 6th graders who use marijuana are more likely to report lower grades in school (C's, D's or F's) compared to those who don't use.



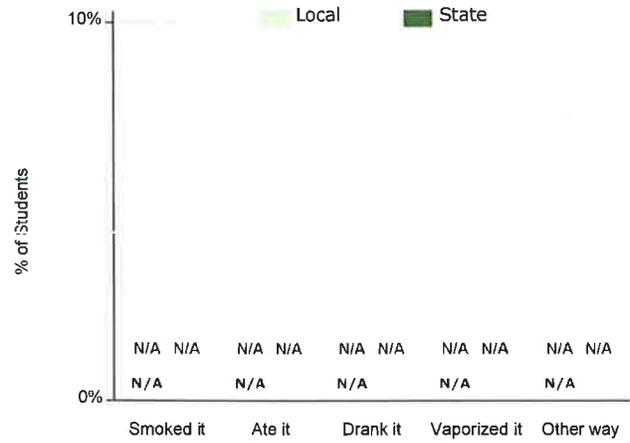
Healthy Youth Survey Fact Sheet

Marijuana Use for Yakima School District, page 2 of 2

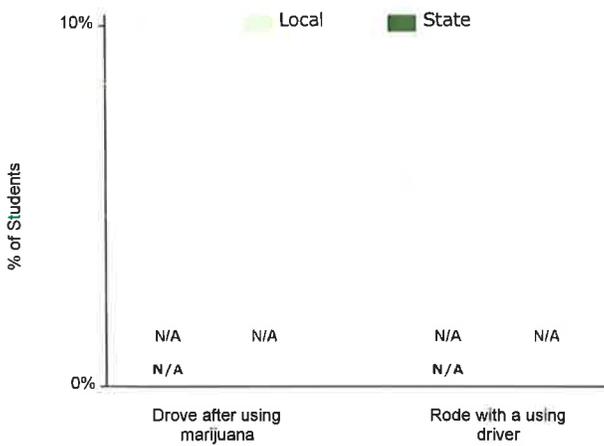
Level of Current (past 30-day) Marijuana Use
Grade 6, 2014



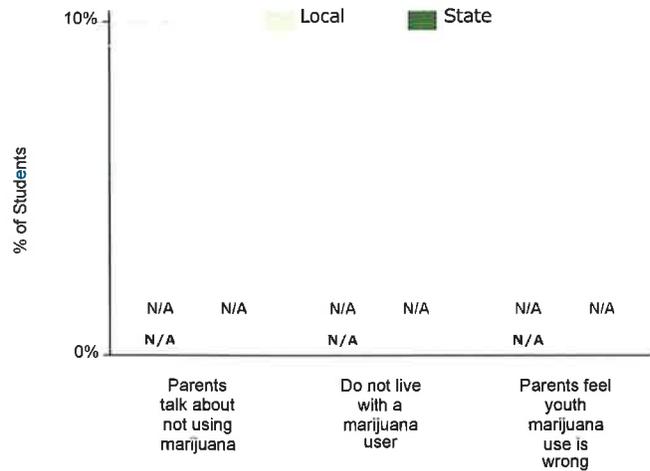
Type of Marijuana Used among Those Who Used It
Grade 6, 2014



Marijuana Use and Driving/Riding
Grade 6, 2014



Family Environment, Grade 6, 2014



Source of Those who Got Marijuana, Grade 6, 2014



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Healthy Youth Survey Fact Sheet

Marijuana Use for Yakima School District, page 1 of 2

Year: 2014

Grade: 8

Gender: Both

Number of Students Surveyed: 818

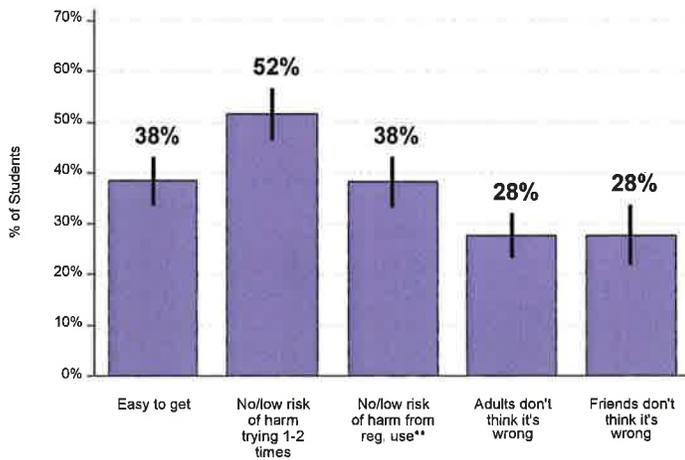
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- Teens who use marijuana can have problems with learning and memory and are more likely to fail in school.

For More Information:

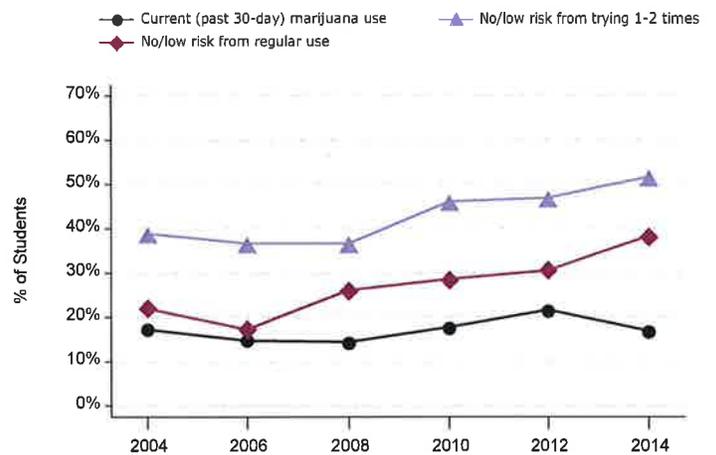
- Parents, schools, and communities can work together to keep youth healthy and safe.
- For prevention tips and to connect with a prevention coalition in your area, visit www.StartTalkingNow.org.
- For free printed guides on preventing alcohol and other drug use, visit the ADAI Clearinghouse adaiclearinghouse.org or call (206) 221-8325.
- For 24 hour help for mental health, substance use and problem gambling, call 1-866-789-1511 or visit www.waRecoveryHelpLine.org.

**Attitudes about Marijuana Use
Grade 8, 2014**



In 2014, 38% of 8th graders in our school district thought there was little or no risk of using marijuana regularly.

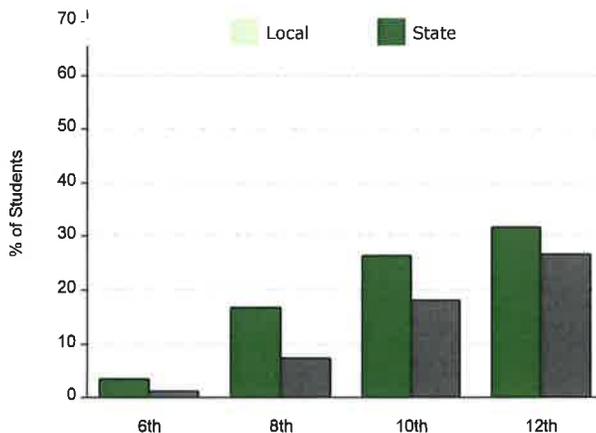
**Marijuana Use and Perception of Harm Trends
Grade 8**



Prevalence	2004	2006	2008	2010	2012	2014
Current (past 30-day) marijuana use	17% ±3	15% ±3	14% ±2	18% ±3	22% ±3	17% ±3*
No/low risk from trying 1-2 times	39% ±5	37% ±5	37% ±5	46% ±5*	47% ±5	52% ±5
No/low risk from regular use**	22% ±4	17% ±4	26% ±4*	29% ±5	31% ±5	38% ±5*

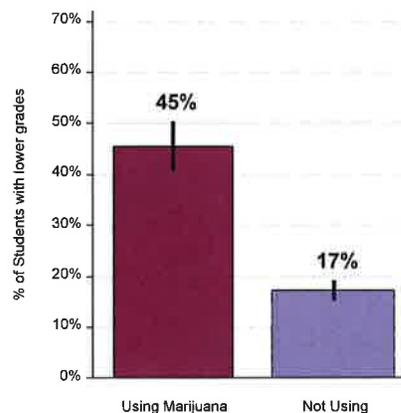
**"Smoked" marijuana regularly was changed to "Use" regularly in 2014. This may mark a break in the trend.

**Current (past 30-day) Marijuana Use
Compared to the State, All Grades, 2014**



Prevalence	6th	8th	10th	12th
Local	3% ±1*	17% ±3*	26% ±3*	32% ±4*
State	1% ±0	7% ±1	18% ±2	27% ±2

**Statewide Relationship between
Lower Grades and Current (past 30-day) Marijuana Use
Grade 8, 2014**



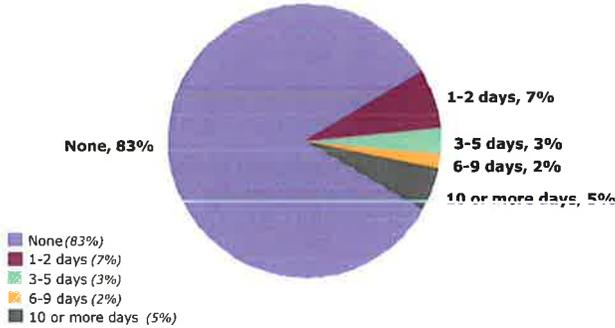
Statewide, 8th graders who use marijuana are more likely to report lower grades in school (C's, D's or F's) compared to those who don't use.



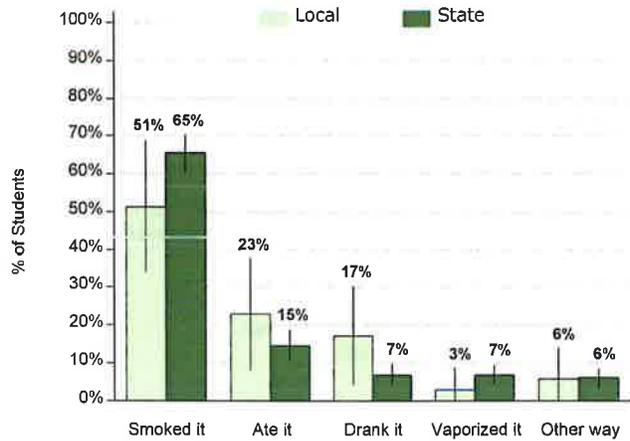
Healthy Youth Survey Fact Sheet

Marijuana Use for Yakima School District, page 2 of 2

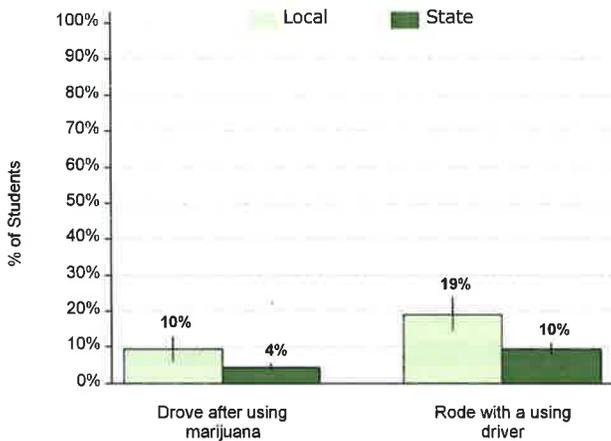
Level of Current (past 30-day) Marijuana Use
Grade 8, 2014



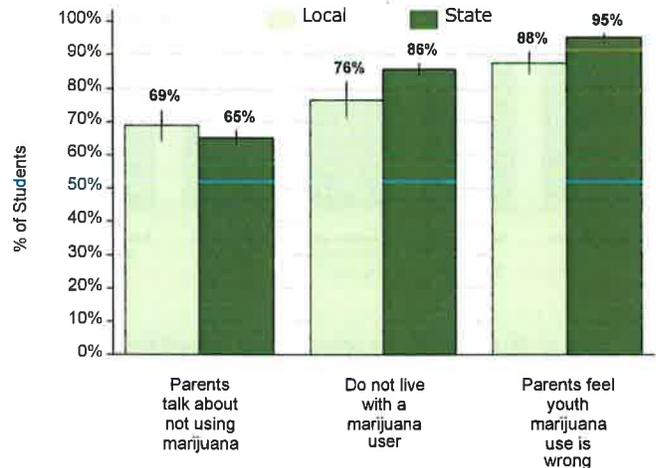
Type of Marijuana Used among Those Who Used It
Grade 8, 2014



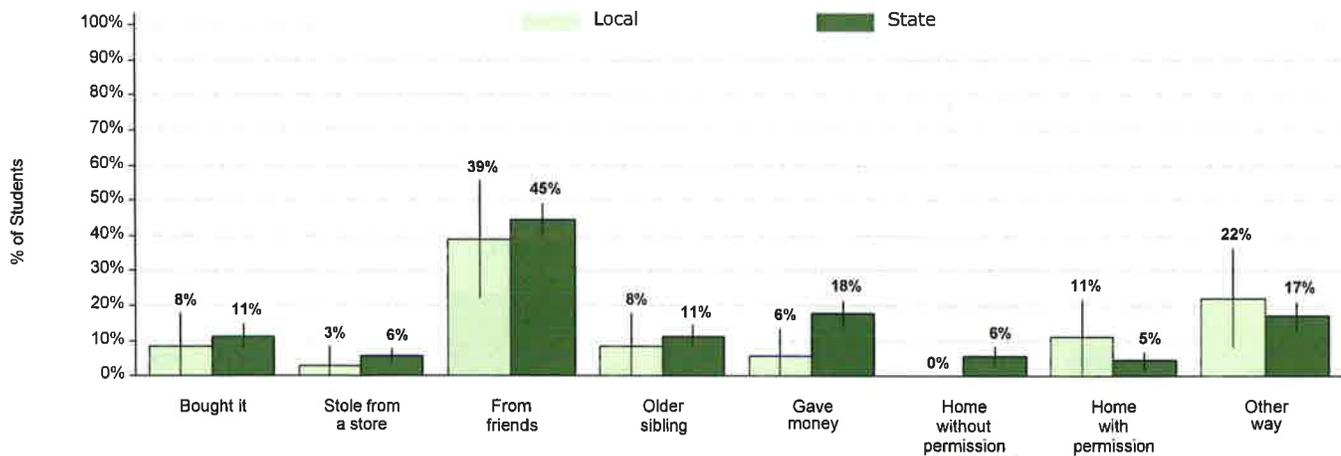
Marijuana Use and Driving/Riding
Grade 8, 2014



Family Environment, Grade 8, 2014



Source of Those who Got Marijuana, Grade 8, 2014



Prevalence is displayed with 95% confidence intervals (as ± or black bar |)
*indicates a significant change from the previous year or a significant difference between state and local results, p<0.05



What Do Yakima School District Youth Say about Marijuana in 2014?,

The data in these charts are based on the Healthy Youth Survey conducted in fall 2014. In Yakima School District, 965 6th graders, 818 8th graders, 750 10th graders and 604 12th graders completed the survey.

For more results from the 2014 Healthy Youth Survey, please visit www.AskHYS.net

Background:

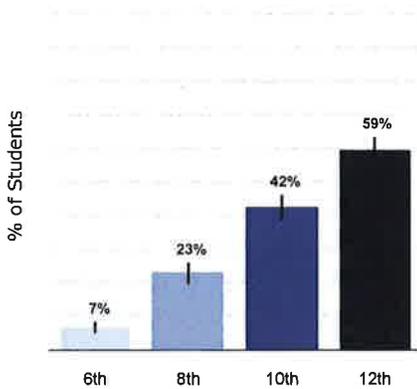
- Marijuana is addictive. Most teens who enter drug treatment programs report marijuana is the main drug they use.
- When teens use marijuana, anxiety and depression can get worse.
- Teens who use marijuana can have problems with learning and memory and are more likely to fail in school.

For More Information:

- Parents, schools, and communities can work together to keep youth healthy and safe.
- For prevention tips and to connect with a prevention coalition in your area, visit www.StartTalkingNow.org.
- For free printed guides on preventing alcohol and other drug use, visit the ADA! Clearinghouse adaiclearinghouse.org or call (206) 221-8325.
- For 24 hour help for mental health, substance use and problem gambling, call 1-866-789-1511 or visit www.waRecoveryHelpLine.org.
- For more information and references visit www.LearnAboutMarijuanaWA.org

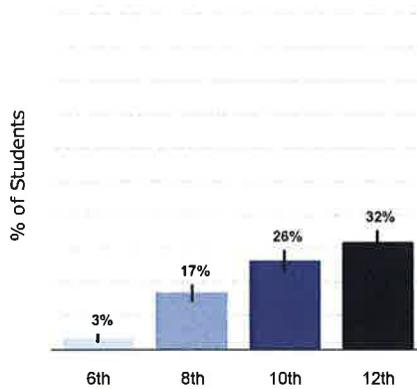
Lifetime Marijuana Use

"I have used marijuana at least once."



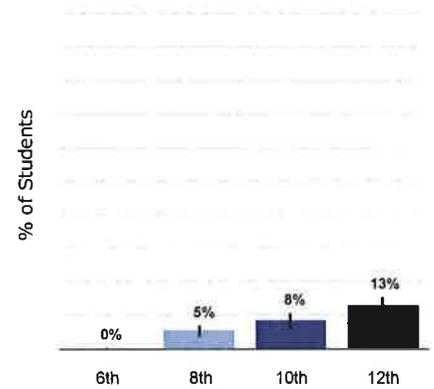
Current (past 30-day) Marijuana Use

"I have used marijuana at least once in the past month."

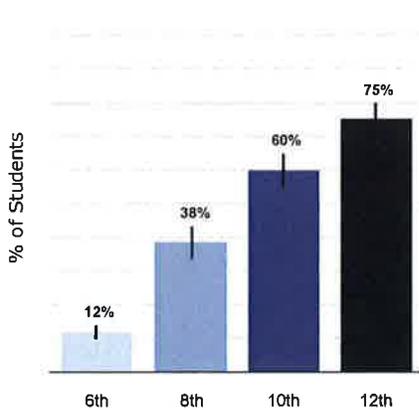


Heavy Marijuana Use

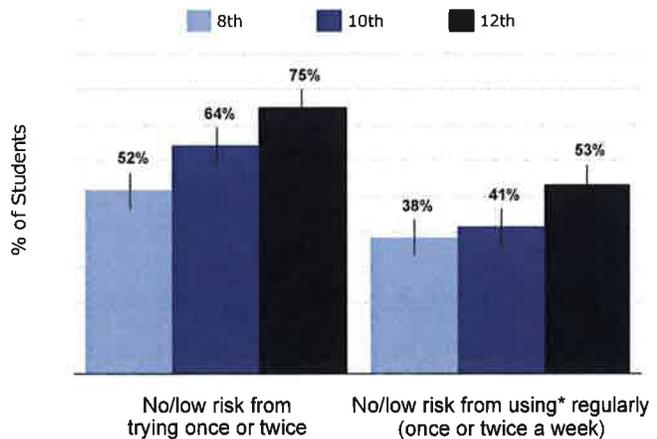
"I have used marijuana on 10 or more days in the past month."



Marijuana is Perceived as Easy or Very Easy to Get



Marijuana is Perceived as Not Harmful

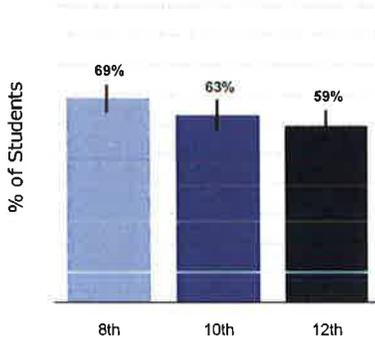


*"Smoked" regularly changed to "Used" regularly in 2014

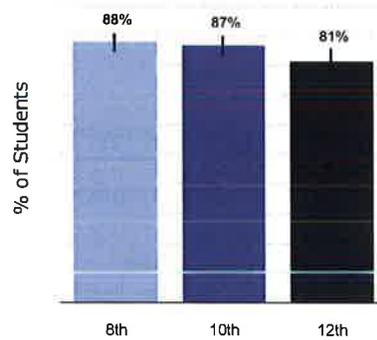


What Do Yakima School District Youth Say about Marijuana in 2014?

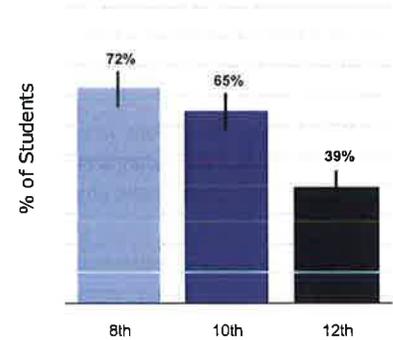
Parental discussion about not using marijuana



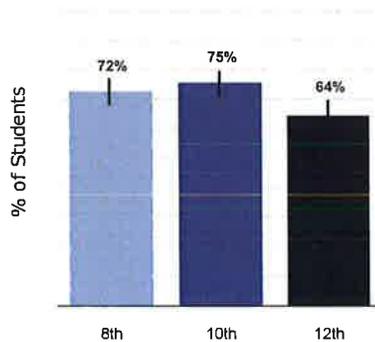
Parents think youth marijuana use is wrong



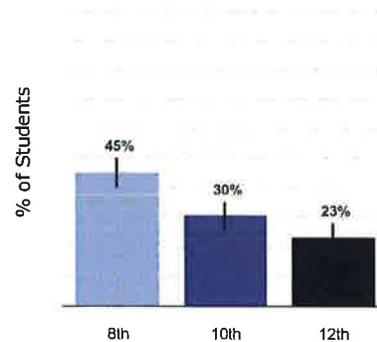
Peers think youth marijuana use is wrong



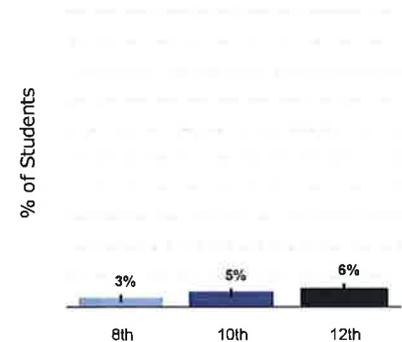
Community norm is marijuana use is wrong



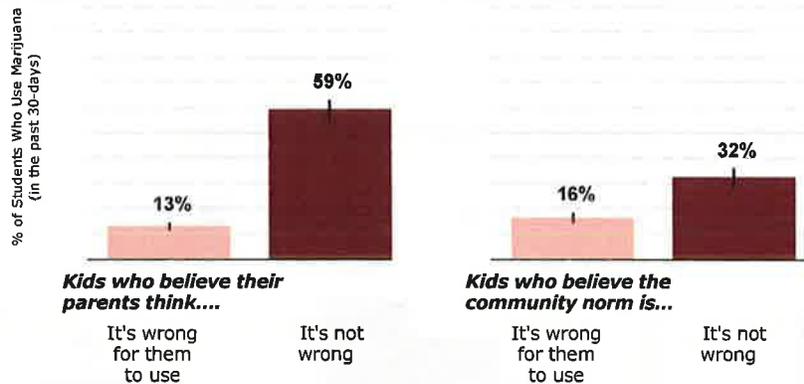
Police would catch me if I used marijuana



Marijuana use on school property in past month



Relationship between Marijuana Use and Perceived Parental and Community Norms, Grade 10, 2014



What does this chart say?

- Statewide, 10th graders are less likely to use marijuana if they believe their parents think it is wrong for them to use.
- Statewide, 10th graders are less likely to use marijuana if they believe their community thinks it is wrong for them to use.

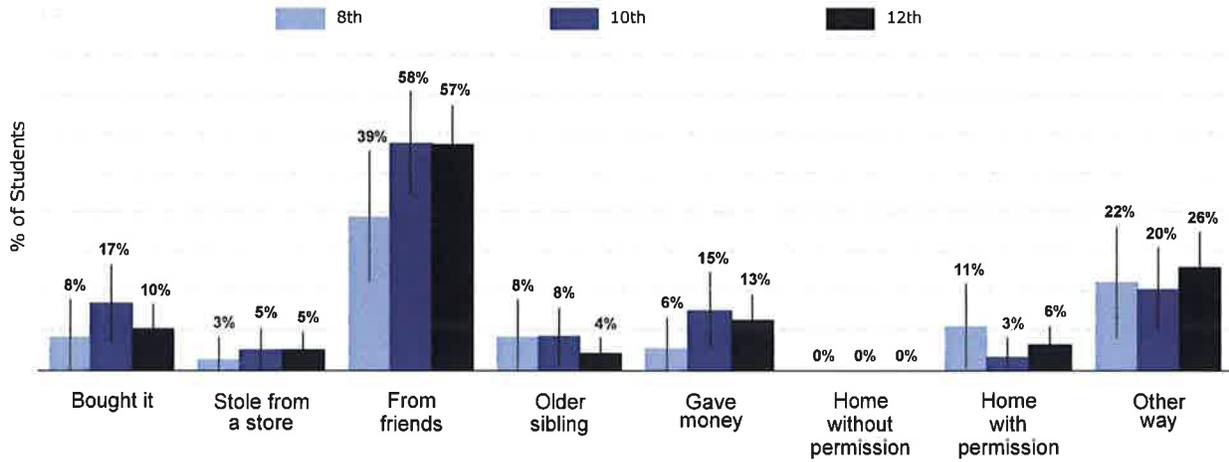
Tips for parents and guardians to help teens avoid alcohol, marijuana and other drugs

- Talk early and often about the risks. Get tips for how to talk with your child and stay better connected at www.Start.TalkingNow.org.
- Set clear rules against alcohol and drug use, and enforce reasonable consequences.
- Stay involved in your child's life: eat dinner together, know who their friends are, keep track of what they are doing.
- Be aware of the signs and take action if you think your teen is using. Talk to your school's counselor, or get information about other resources in your area by calling the Washington Recovery Help Line at 1-866-789-1511.
- For 24 hour help for mental health, substance abuse and problem gambling, call 1-800-789-1511 or visit www.waRecoveryHelpLine.org

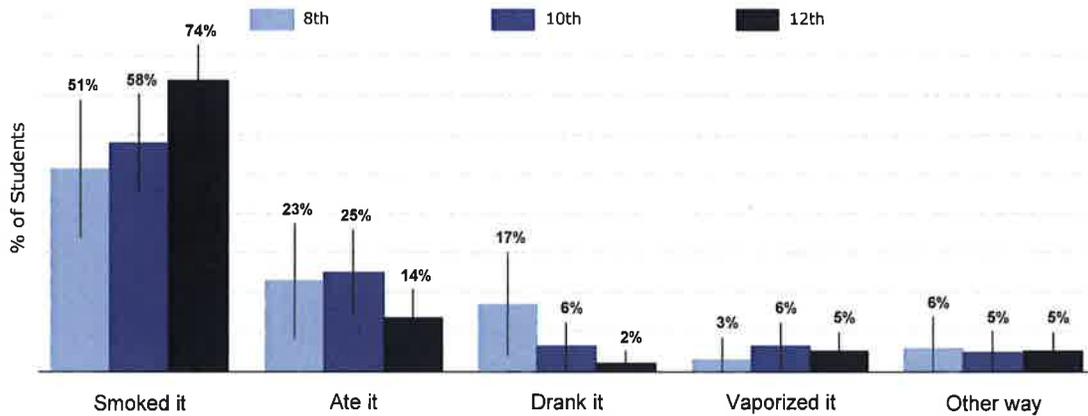


What Do Yakima School District Youth Say about Marijuana in 2014?,

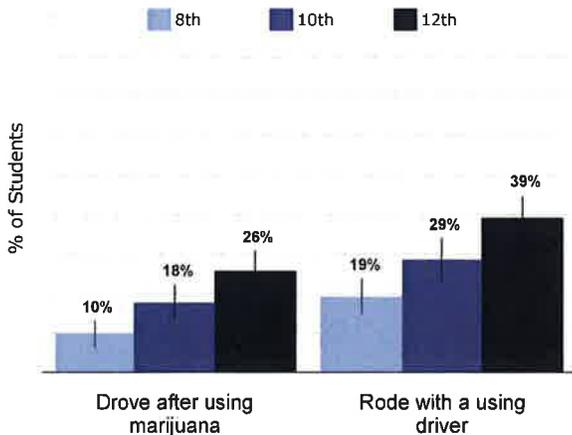
Source of Those who Got Marijuana



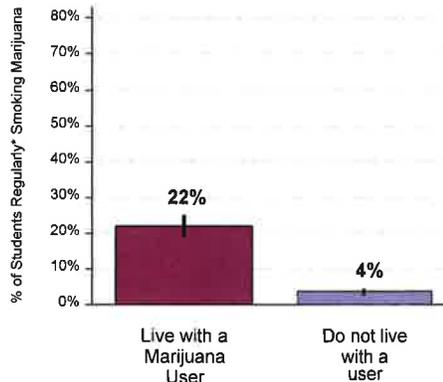
Type of Marijuana Used, among Current Marijuana Users



Marijuana Use and Riding/Driving



Statewide Relationship between Regular* Marijuana Use and Living with a Marijuana User, Grade 10, 2014



Statewide, 10th graders who live with a marijuana user are more likely to report regular* marijuana use compared to those who don't live with a user.

*Regular marijuana use is defined as use on 6 or more days in the past 30 days.

Marijuana: What Do We Really Know?

Marijuana is the most widely used illegal substance in America, with a reported 19.8 million adults using at least once in the last 30 days.¹ With legalization of marijuana for recreational purposes spreading to more and more states, the demand for scientifically sound information about marijuana has outpaced the capacity of the scientific community to accurately answer many questions.



The mismatch between demand for accurate information and the availability of scientific knowledge has created both gross exaggerations and complacent dismissals of the short and long term risks of using marijuana. In this document, we present a brief summary of the most frequently discussed issues about possible negative effects of marijuana use. Our intent is to educate the public on what is known and where the knowledge gaps are.²

NO EXAGGERATION, NO MINIMIZATION: WHAT WE KNOW

Marijuana and the Teenage Brain. The human brain is not fully developed until the mid-twenties. Some research has shown that regular use of marijuana during teen years may impact the development of the pre-frontal cortex and other areas of the brain, resulting in permanent difficulties with memory, learning, planning and problem-solving.

A contrary finding was reported in a recent longitudinal study that followed males from adolescence into their mid-thirties, which found no differences in any of the mental or physical health outcomes measured regardless of the amount or frequency of marijuana used during adolescence.

In Washington State, 27% of high school seniors reported using marijuana in the last month.³ Adolescents that are already using marijuana will not necessarily develop irreversible damage, but they are risking it. There is no clear threshold for safe use – teenagers should not use marijuana or other substances such as alcohol, tobacco and other drugs until their brain is fully developed.

School Performance. It is well documented in Washington State and nationwide that marijuana users present poorer school performance and higher rates of school dropout. This could be related to short memory impairment caused by marijuana use. It could be also be related to other factors: Marijuana use is highly correlated with other risky behaviors such as smoking, drinking, rebellious lifestyle, peers who do not value academics and disinterest in school in general. Singling out marijuana use as the cause of low school performance can result on missing the mark – a comprehensive approach to improving teenage school performance is more likely to be effective.

◊ The factsheet [Adolescents and Marijuana](#) discusses this age group in more detail.

Addiction. Marijuana addiction is well documented, affecting 9% of all marijuana users. Marijuana addiction is more common among people who started using marijuana in their teens (about 16%). The rate of life time dependence among near daily users is estimated to be 35-50%.

◊ The factsheet [Dependence on Marijuana](#) discusses marijuana addiction in more detail.

Marijuana and Driving. There is insufficient research on marijuana use and driving to definitively answer some of the most pressing questions on this topic. A robust body of research informs legal limits for driving after drinking, supporting guidelines on number and types of drinks consumed and time needed to wait before driving, according to gender. The same is not true for marijuana; we do know however that marijuana affects coordination, reaction time, alertness and concentration. It also impairs our ability to judge distances. Based on these facts, the general recommendation has been to wait at least 4 hours after smoking and much longer after ingesting marijuana.

◊ The factsheet [Marijuana and Driving - Research Brief](#) discusses this topic in more detail.

Pregnancy. Several large epidemiological studies report that marijuana use in pregnancy is associated with reduced birth weight, even after adjusting for other variables. However, smoking tobacco and marijuana overlap so often in this group that it is difficult to entirely tease apart the two behaviors. Some studies report cognitive problems in children of heavy marijuana users; other studies with more than 5 years of follow-up found no problems. More research is needed since marijuana using mothers are different than non-marijuana abusing mothers in many other aspects. In the meanwhile, total abstinence of marijuana during gestation and while breastfeeding is strongly recommended and the safest alternative, giving insufficient knowledge in this area.

◊ The factsheet [Marijuana and Reproduction/Pregnancy](#) discusses this topic in more detail.

Mental Health.

Anxiety and paranoia: Many users report feeling less anxious and depressed when under the effect of marijuana. By the same token, many users report episodes of anxiety and paranoia when high on marijuana. It is possible that the specific components of the marijuana used play a role on triggering or buffering these symptoms. Cannabis plants with high levels of THC are more likely to produce generalized anxiety or paranoia, while plants with relatively high levels of Cannabidiol (CBD) can have calming effects. The plant composition may also interact with users' specific genetic makeup and the environment. At this point in time, the relationship between anxiety, paranoia and marijuana use is poorly understood.

Schizophrenia: Research suggests that marijuana may trigger schizophrenia in those who are already at risk of developing the disorder, such as having a family history of the illness. Those with a vulnerability to develop schizophrenia should be strongly advised against using marijuana. People with existing psychotic disorders should be strongly advised and assisted to cut-down and/or cease their cannabis use. More studies are needed to determine if marijuana use can cause schizophrenia and psychosis – at this point in time, there is no clear evidence one way or another.

◊ The factsheet [Mental Health and Marijuana](#) discusses these topics in more detail.

Lung Cancer. Marijuana use affects the respiratory system and can cause cough, airways inflammation and wheezing. So far, studies have not shown that marijuana causes lung cancer. However, as many marijuana users also smoke tobacco (with or right after marijuana) it is possible that the relationship is hard to detect. It is also possible that it does not exist at all. The factsheet [Respiratory Effects of Marijuana](#) discusses this topic in more detail.

Medicinal Cannabis (medical marijuana). Half of the states in the US have legalized the use of marijuana for medical purposes, despite federal regulations deeming marijuana as a substance with no medical benefit. The lack of research is also concerning when it comes to determine marijuana use benefits, particularly because the use of marijuana as a medicine. While a lot of research is still needed regarding medicinal cannabis, the National Institutes of Health explains cannabis therapeutic potential: "Currently, the two main cannabinoids from the marijuana plant that are of medical interest are THC and CBD. THC increases appetite and reduces nausea. The FDA-approved THC-based medications are used for these purposes. THC may also decrease pain, inflammation (swelling and redness), and muscle control problems. CBD is a cannabinoid that does not affect the mind or behavior. It may be useful in reducing pain and inflammation, controlling epileptic seizures, and possibly even treating mental illness and addictions."⁴

◊ The factsheet [Medicinal Cannabis and Chronic Pain](#) discusses this topic in more detail.

FINAL COMMENTS

This factsheet presents key marijuana-related topics of great societal interest and for which there are not clear scientific answers to date. Fortunately, things seem to be slowly changing, as state and federal funding agencies have been expressing interest in supporting research projects that can shed light on the topics presented. Meanwhile, the best approach is to be aware of the uncertainties surrounding marijuana use risks – and cautious when making decisions surrounding a topic with not enough research evidence to back them up.

¹ SAMHSA. Cannabis. <http://www.samhsa.gov/atod/cannabis>

² Hall, W. (2015). What has research over the past two decades revealed about the adverse health effects of recreational cannabis use? *Addiction*, 110(1):19-35. <http://dx.doi.org/10.1111/add.12703>

³ Health Youth Survey. Marijuana Use by Washington State 12th Graders, 2014. <http://www.askhys.net/>

⁴ National Institute on Drug Abuse. DrugFacts: Is Marijuana Medicine? (rev. July 2015) <http://www.drugabuse.gov/publications/drugfacts/marijuana-medicine>

How can people get treatment for marijuana addiction?

Long-term marijuana users trying to quit report withdrawal symptoms that make quitting difficult. These include: grouching, sleeplessness, decreased appetite, anxiety, and cravings.

Behavioral support has been effective in treating marijuana addiction. Examples include therapy and motivational incentives (providing rewards to patients who remain substance free). No medications are currently available to treat marijuana addiction. However, continuing research may lead to new medications that help ease withdrawal symptoms, block the effects of marijuana, and prevent relapse.

Learn more

For more information about marijuana and marijuana use, visit:

www.drugabuse.gov/drugs-abuse/marijuana

www.drugabuse.gov/publications/drugfacts/drugged-driving

For more information about marijuana as medicine and about state laws related to marijuana, visit:

www.drugabuse.gov/publications/drugfacts/marijuana-medicine

www.whitehouse.gov/ondcp/state-laws-related-to-marijuana

Monitoring the Future

Learn more about the Monitoring the Future survey, which annually measures drug, alcohol, and tobacco use and related attitudes among teenage students nationwide:

www.drugabuse.gov/related-topics/trends-statistics/monitoring-future

References

1. Center for Behavioral Health Statistics and Quality (CBHSQ). Behavioral Health Trends in the United States: Results from the 2014 National Survey on Drug Use and Health. Rockville, MD: Substance Abuse and Mental Health Services Administration, 2015. (HHS Publication No. SMA 15-4927, NSDUH Series H-50)
2. Johnston L, O'Malley P, Miech R, Bachman J, Schulenberg J. Monitoring the Future National Survey Results on Drug Use: 1975-2015: Overview: Key Findings on Adolescent Drug Use. Ann Arbor, MI: Institute for Social Research, The University of Michigan, 2015
3. Meier MH, Caspi A, Ambler A, et al. Persistent cannabis users show neuropsychological decline from childhood to midlife. Proc Natl Acad Sci U S A. 2012;109(40):E2657-E2664. doi:10.1073/pnas.1206820109
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5. McCaffrey DF, Pacula RL, Han B, Ellickson P. Marijuana Use and High School Dropout: The Influence of Unobservables. Health Econ 2010;19(11):1281-1299. doi:10.1002/hec.1561
6. Zwerling C, Ryan J, Orav EJ. The efficacy of preemployment drug screening for marijuana and cocaine in predicting employment outcome. JAMA 1990;264(20):2639-2643.
7. Secades-Villa R, Garcia-Rodríguez O, Jin CJ, Wang S, Blanco C. Probability and predictors of the cannabis gateway effect: a national study. Int J Drug Policy 2015;26(2):135-142. doi:10.1016/j.drugpo.2014.07.011
8. Panlilio LV, Zanettini C, Barnes C, Solinas M, Goldberg SR. Prior exposure to THC increases the addictive effects of nicotine in rats. Neuropsychopharmacol Off Publ Am Coll Neuropsychopharmacol 2013;38(7):1198-1208. doi:10.1038/npp.2013.16
9. Hasin DS, Saha TD, Kerridge BT, et al. Prevalence of Marijuana Use Disorders in the United States Between 2001-2002 and 2012-2013. JAMA Psychiatry 2015;72(12):1235-1242. doi:10.1001/jamapsychiatry.2015.1858
10. Winters KC, Lee C-YS. Likelihood of developing an alcohol and cannabis use disorder during youth: association with recent use and age. Drug Alcohol Depend 2008;92(1-3):239-247. doi:10.1016/j.drugalcdep.2007.08.005

Updated March 2016

Adapted from:

<https://www.drugabuse.gov/publications/drugfacts/marijuana>

Submitted:

YPC Hearing- 6/16/16

Download or request copies from:

<http://adaiclearinghouse.org>



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www.drugabuse.gov

Marijuana

What is marijuana?

Marijuana refers to the dried leaves, flowers, stems, and seeds from the hemp plant, *Cannabis sativa*. The plant contains the mind-altering chemical Δ^9 -tetrahydrocannabinol (THC) and other related compounds. Extracts with high amounts of THC can also be made from the cannabis plant (see "Marijuana Extracts" on pg. 2).



Marijuana is the most commonly used illicit drug in the United States (CBHSQ, 2015). Its use is widespread among young people. According to a yearly survey of middle and high school students, rates of marijuana use have steadied in the past few years after several years of increase. However, the number of young people who believe marijuana use is risky is decreasing (Johnston, 2014).

Legalization of marijuana for medical use or adult recreational use in a growing number of states may affect these views. Read more about marijuana as medicine in *DrugFacts: Is Marijuana Medicine?* at www.drugabuse.gov/publications/drugfacts/marijuana-medicine.

How do people use marijuana?

People smoke marijuana in hand-rolled cigarettes (*joints*) or in pipes or water pipes (*bongs*). They also smoke it in *blunts*—emptied cigars that have been partly or completely refilled with marijuana. To avoid inhaling smoke, more people are using vaporizers. These devices pull the active ingredients (including THC) from the marijuana and collect their vapor in a storage unit. A person then inhales the vapor, not the smoke.

Users can mix marijuana in food (*edibles*), such as brownies, cookies, or candy, or brew it as a tea. A newly popular method of use is smoking or eating different forms of THC-rich resins (see "Marijuana Extracts").

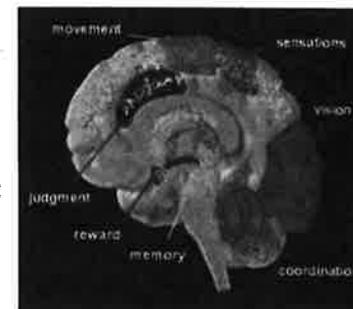
How does marijuana affect the brain?

Marijuana has both short- and long-term effects on the brain.

Short-term effects

When a person smokes marijuana, THC quickly passes from the lungs into the bloodstream. The blood carries the chemical to the brain and other organs throughout the body. The body absorbs THC more slowly when the person eats or drinks it. In that case, the user generally feels the effects after 30 minutes to 1 hour.

THC acts on specific brain cell receptors that ordinarily react to natural THC-like chemicals in the brain. These natural chemicals



play a role in normal brain development and function.

Marijuana overactivates parts of the brain that contain the highest number of these receptors. This causes the "high" that users feel.

Other effects include:

- altered senses (for example, seeing brighter colors)
- altered sense of time
- changes in mood
- impaired body movement
- difficulty with thinking and problem-solving
- impaired memory

Long-term effects

Marijuana also affects brain development. When marijuana users begin using as teenagers, the drug may reduce thinking, memory, and learning functions and affect how the brain builds connections between the areas necessary for these functions.

Marijuana's effects on these abilities may last a long time or even be permanent. For example, a study showed that people who started smoking marijuana heavily in their teens and had an ongoing cannabis use disorder lost an average of eight IQ points between ages 13 and 38. The lost mental abilities did not fully return in those who quit marijuana as adults. Those who started smoking marijuana as adults did not show notable IQ declines (Meier, 2012).

What are the other health effects of marijuana?

Marijuana use may have a wide range of effects, both physical and mental.

Physical effects

- Breathing problems. Marijuana smoke irritates the lungs, and frequent marijuana smokers can have the same breathing problems that tobacco smokers have. These problems include daily cough and phlegm, more frequent lung illness, and a higher risk of lung infections. Researchers still do not know whether marijuana smokers have a higher risk for lung cancer.
- Increased heart rate. Marijuana raises heart rate for up to 3 hours after smoking. This effect may increase the chance of heart attack. Older people and those with heart problems may be at higher risk
- Problems with child development during and after pregnancy. Marijuana use during pregnancy is linked to increased risk of both brain and behavioral problems in babies. If a pregnant woman uses marijuana, the drug may affect certain developing parts of the fetus's brain. Resulting challenges for the child may include problems with attention, memory, and problem-



Marijuana Extracts

Smoking THC-rich resins extracted from the marijuana plant is on the rise. Users call this practice *dabbing*. People are using various forms of these extracts, such as:

- *hash oil* or *honey oil*—a gooey liquid
- *wax* or *budder*—a soft solid with a texture like lip balm
- *shatter*—a hard, amber-colored solid

These extracts can deliver extremely large amounts of THC to users, and their use has sent some people to the emergency room. Another danger is in preparing these extracts, which usually involves butane (lighter fluid). A number of people who have used butane to make extracts at home have caused fires and explosions and have been seriously burned.

solving. Additionally, some research suggests that moderate amounts of THC are excreted into the breast milk of nursing mothers. The effects on a baby's developing brain are still unknown.

Mental effects

Long-term marijuana use has been linked to mental illness in some users, such as:

- temporary hallucinations—sensations and images that seem real though they are not
- temporary paranoia—extreme and unreasonable distrust of others
- worsening symptoms in patients with schizophrenia (a severe mental disorder with symptoms such as hallucinations, paranoia, and disorganized thinking)

Marijuana use has also been linked to other mental health problems, such as depression, anxiety, and suicidal thoughts among teens. However, study findings have been mixed.

How does marijuana affect a user's life?

Compared to nonusers, heavy marijuana users more often report the following:

- lower life satisfaction
- poorer mental health
- poorer physical health
- more relationship problems

Users also report less academic and career success. For example, marijuana use is linked to a higher likelihood of dropping out of school (McCaffrey, 2010). It is also linked to more job absences, accidents, and injuries (Zwerling, 1990).

Is marijuana a gateway drug?

Some research suggests that marijuana use is likely to come before use of other drugs (Secades-Villa, 2015). Marijuana use is also linked to addiction to other substances, including nicotine. In addition, animal studies show that the THC in marijuana makes other drugs more pleasurable to the brain (Panlilio, 2013).

Although these findings support the idea of marijuana as a "gateway drug," the majority of people who use marijuana don't go on to use other "harder" drugs. Read more about marijuana as a gateway drug in the *Marijuana Research Report* at www.drugabuse.gov/publications/research-reports/marijuana.

Is marijuana addictive?

Contrary to common belief, marijuana can be addictive. Research suggests that 30 percent of users may develop some degree of problem use, which can lead to dependence and in severe cases takes the form of addiction (Hasin, 2015). People who begin using marijuana before age 18 are 4 to 7 times more likely than adults to develop problem use (Winters, 2008). Dependence becomes addiction when the person can't stop using marijuana even though it interferes with his or her daily life.

A Rise in Marijuana's THC Levels

The amount of THC in marijuana has been increasing steadily over the past few decades (Mehmedic, 2010). For a new user, this may mean exposure to higher THC levels with a greater chance of a harmful reaction. Higher THC levels may explain the rise in emergency room visits involving marijuana use.

The popularity of edibles also increases the chance of users having harmful reactions. Edibles take longer to digest and produce a high. Therefore, people may consume more to feel the effects faster, leading to dangerous results.

Dabbing is yet another growing trend. More people are using marijuana extracts that provide stronger doses, and therefore stronger effects, of THC (see "Marijuana Extracts").

Higher THC levels may mean a greater risk for addiction if users are regularly exposing themselves to high doses.



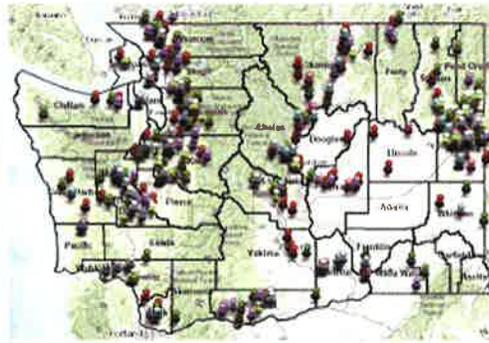
Licensing

Producer licenses issued	Producer/Processor licenses issued	Processor licenses issued	Retail licenses issued
146	748	109	378
Pending build out / applicant place on hold	Producer/Processor pending inspection	Retailer pending inspection	
102	12	17	

Locations



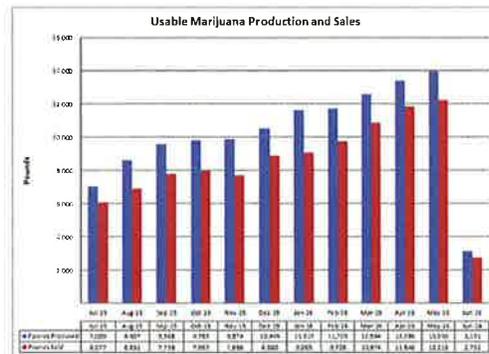
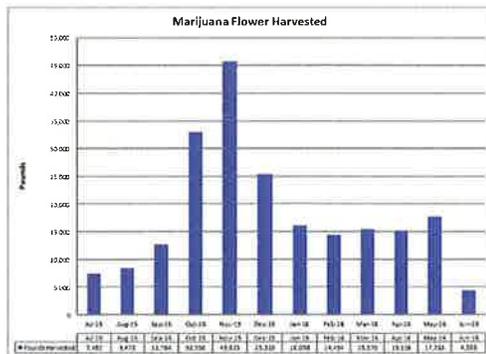
[View larger map](#)
Retail locations



[View larger map](#)
Producer/Processor locations

Production

Flower harvest MTD/FYTD lbs.	Useable MJ produced MTD/FYTD	Useable MJ sales volume MTD/FYTD	Extracts produced MTD/FYTD grams
7,850 lbs. 219,314 lbs.	6,371 lbs. 124,927 lbs.	5,525 lbs. 104,530 lbs.	394,415 g. 7,943,805 g.
Extract for inhalation sales volume MTD/FYTD units	Solid edibles sales volume MTD/FYTD units	Liquid edibles sales volume MTD/FYTD units	Topicals sales volume MTD/FYTD units
210,063 units 3,498,513 units	122,976 units 2,408,723 units	31,351 units 645,126 units	6,156 units 107,706 units

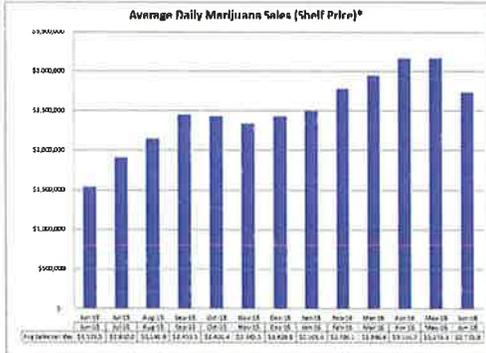


[View larger chart](#)

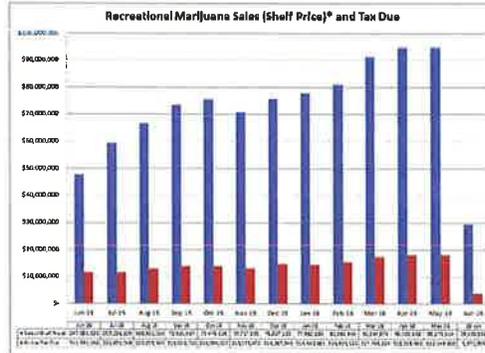
[View larger chart](#)

Sales

Average daily sales WTD (shelf price)	Total sales* (shelf price) FY 2015	Total tax obligation FY 2015
\$3,387,707	\$259,785,729	\$64,946,432
	Total sales* (shelf price) FY 2016	Total tax obligation FY 2016
	\$908,725,755	\$170,011,544



[View larger chart](#)



[View larger chart](#)

Compliance

Premise checks	Compliance checks MTD/FYTD	Failed compliance checks MTD/FYTD	Violations issued
May 2016 = 475	May 2016 = 162	May 2016 = 12	May 2016 = 23
FY 2016 = 3,619	FY 2016 = 531	FY 2016 = 51	FY 2016 = 261

MTD = Month to date
FY 2016 = Fiscal year 2016

FY 2015 = Fiscal year 2015
WTD = Week to date

*Shelf price = sales price + tax

Literature Review on Marijuana Use and Health Effects

Summary and Key Findings

Retail Marijuana Public Health Advisory Committee
Final Approval: January 12, 2015

Introduction

In C.R.S. 25-1.5-110, the Colorado Department of Public Health and Environment (CDPHE) was given statutory responsibility to:

- “...monitor changes in drug use patterns, broken down by county and race and ethnicity, and the emerging science and medical information relevant to the health effects associated with marijuana use.”
- “...appoint a panel of health care professionals with expertise in cannabinoid physiology to monitor the relevant information.”

Based on this charge, CDPHE appointed a 13-member committee, the Retail Marijuana Public Health Advisory Committee (RMPHAC), to review scientific literature on the health effects of marijuana. Members of this committee (see Appendix, Retail Marijuana Public Health Advisory Committee Membership Roster) consisted of individuals in the fields of public health, medicine, epidemiology, and medical toxicology who had demonstrated expertise related to marijuana through their work, training, or research. This committee was charged with the duties as outlined in C.R.S. 25-1.1-110 to “...establish criteria for studies to be reviewed, reviewing studies and other data, and making recommendations, as appropriate, for policies intended to protect consumers of marijuana or marijuana products and the general public.” The Committee conducted nine public meetings between May 2014 and January 2015 to complete these duties. The overall goal of the committee was to implement an unbiased and transparent process for evaluating scientific literature as well as marijuana use and health outcome data. The committee was particularly interested in ensuring quality information is shared about the known physical and mental health effects associated with marijuana use - and also about what is unknown at present. The official committee bylaws of this committee are included in the Appendix, Retail Marijuana Public Health Advisory Committee By-laws.

The committee used a standardized systematic literature review process to search and grade the existing scientific literature on health effects of marijuana. Findings were synthesized into evidence statements that summarize the quantity and quality of supporting scientific evidence. These evidence statements were classified as follows:

- **Substantial evidence** which indicates robust scientific findings that support the outcome and no credible opposing scientific evidence.
- **Moderate evidence** which indicates that scientific findings support the outcome, but these findings have some limitations.
- **Limited evidence** which indicates modest scientific findings that support the outcome, but these findings have significant limitations.
- **Mixed evidence** which indicates both supporting and opposing scientific findings for the outcome with neither direction dominating.
- **Insufficient evidence** which indicates that the outcome has not been sufficiently studied.

The committee also translated these evidence statements into lay language understandable by the general public for future use in public health messaging. In addition, the committee was asked to develop public health recommendations based on potential concerns identified

through the review process and to articulate research gaps based on common limitations of existing research. All of these were presented to the full committee during open public meetings with opportunities for stakeholder input. Final statements, recommendations, and research gaps were formally approved by a vote of the committee.

The topics for review were chosen based on recently published peer-reviewed publications outlining the potential health effects of marijuana use, and public health priorities identified from key informant interviews of local public health officials across Colorado, including in urban, rural, and resort communities. Key findings for each topic are presented below.

An important note for all key findings is that the available research evaluated the *association* between marijuana use and potential adverse health outcomes. This *association* does not prove that the marijuana use alone *caused* the effect. Despite the best efforts of researchers to account for confounding factors, there may be other important factors related to *causality* that were not identified. In addition, marijuana use was illegal everywhere in the United States prior to 1996. Research funding, when appropriated, was commonly sought to identify adverse effects from marijuana use. This legal fact introduces both funding bias and publication bias into the body of literature related to marijuana use.

The Retail Marijuana Public Health Advisory Committee recognizes the limitations and biases inherent in the published literature and made efforts to ensure the information reviewed and synthesized is reflective of the current state of medical knowledge. Where information was lacking - for whatever reason - the Committee identified this knowledge gap and recommended further research. This information will be updated as new research becomes available.

Marijuana Use During Pregnancy and Breastfeeding

The committee reviewed the literature for marijuana use during pregnancy and while breastfeeding. Outcomes reviewed included those apparent at birth as well as physical, neurocognitive, and mental health findings throughout childhood and adolescence. We found moderate evidence that maternal use of marijuana during pregnancy is associated with negative effects on exposed offspring, including decreased academic ability, cognitive function and attention. Importantly, these effects may not appear until adolescence. We also found moderate evidence that maternal use of marijuana during pregnancy is associated with decreased growth in exposed offspring.

Unintentional Marijuana Exposures in Children

The committee found moderate evidence that more unintentional marijuana exposures of children occur in states with increased legal access to marijuana; and the exposures can lead to significant clinical effects requiring medical attention. Additionally, we found moderate evidence that use of child resistant packaging reduces unintentional pediatric poisoning.

Marijuana Use Among Adolescents and Young Adults

The committee reviewed the literature on the potential effects of marijuana use among adolescents and young adults including effects on cognitive abilities, learning, memory,

achievement, future use of substances such as marijuana and illicit drugs, and mental health issues. We found substantial evidence for associations between adolescent and young adult marijuana use and future addiction to illicit drugs in adulthood. We found an increased risk for developing psychotic symptoms or psychotic disorders in adulthood among regular adolescent and young adult users. In addition, we found moderate evidence for associations between adolescent and young adult marijuana use and at least short-term impairment of cognitive and academic abilities. We also found moderate evidence indicating that adolescent marijuana users were less likely to graduate from high school and more likely to be addicted to marijuana, alcohol, and tobacco in adulthood. We found beneficial effects related to cessation of use including moderate evidence that adolescent and young adult marijuana users who quit have lower risks of adverse cognitive and mental health outcomes than those who continue to use.

Marijuana Dose and Drug Interactions

This literature review focused on the dose-response of different methods of marijuana use with regard to THC blood levels and impairment. Additional review was performed to evaluate marijuana's interactions with other drugs and the possibility of a positive drug screen from passive marijuana exposure. In general, we found that substantial evidence that for occasional (less than weekly) marijuana users, smoking, eating, or drinking marijuana containing 10 milligrams or more of THC is likely to cause impairment that affects the ability to drive, bike, or perform other safety sensitive activities. In addition, for these occasional users, waiting at least six hours after smoking marijuana (containing up to 35 milligrams of THC) will likely allow sufficient time for the impairment to resolve. The waiting time is longer for eating or drinking marijuana products. We found it is necessary for occasional users to wait at least eight hours for impairment to resolve after orally ingesting up to 18 milligrams of THC.

A substantial finding, regarding the use of edible marijuana products, is that it can take up to four hours after ingesting marijuana to reach the peak THC blood concentration and perhaps more time to feel the full effects. This has important implications for the time to wait between doses. Using alcohol and marijuana at the same time is likely to result in greater impairment than either one alone. Finally, typical passive exposure to marijuana smoke is unlikely to result in a failed workplace urine test or a failed driving impairment blood test.

Marijuana Use and Neurological, Cognitive and Mental Health

The committee reviewed the literature on the potential adverse effects of marijuana use among adults including effects on cognitive functioning, memory, and mental health issues such as anxiety, depression, and psychosis. We found substantial evidence for associations between marijuana use and memory impairments lasting at least seven days after last use, as well as the potential for acute psychotic symptoms immediately after use. We found moderate evidence that adults who use marijuana regularly are more likely than non-users to have symptoms or diagnosis of depression.

Marijuana Use and Respiratory Effects

The committee reviewed literature focused on marijuana use and effects to the respiratory tract. We found substantial evidence that marijuana smoke contains many of the same carcinogens found in tobacco smoke. We also found substantial evidence that acute use - (within the past hour) - results in immediate, short-term improvement in lung airflow. This finding includes use of both smoked and edible marijuana products. However, we found moderate evidence that heavy marijuana smoking is associated with mild airflow obstruction. In addition, we found substantial evidence heavy marijuana smoking is associated with chronic bronchitis, including chronic cough, sputum production, and wheezing. Finally, we found substantial evidence that heavy marijuana smoking is associated with pre-malignant lesions in the airway, but mixed evidence for whether or not marijuana smoking is associated with lung cancer.

Marijuana Use and Extrapulmonary Effects (non-respiratory body systems)

Unlike other literature reviews outlined in this document, there were relatively few literature reports of marijuana use related to myocardial infarction (heart attacks), ischemic stroke, male infertility, testicular cancer, prostate cancer and bladder cancer. We found limited evidence that marijuana use may increase risk for both heart attack and some forms of stroke. These findings were most closely associated with recent, and in some cases heavy, marijuana use. Limited evidence also suggests an increased risk in both testicular (non-seminoma) and prostate cancers with marijuana use. Evidence was mixed for whether or not marijuana use increased the risk of male infertility.

Marijuana Use and Injury

Our literature review focused on the increased risk of injury with marijuana use in a variety of settings (occupational, motor vehicle, recreational). The committee found substantial evidence that risk of motor vehicle crash doubles among drivers with recent marijuana use. Additionally, we found substantial evidence for a positive relationship between THC blood level and motor vehicle crash risk - that is, substantial evidence that the higher the level of THC in blood, the higher the crash risk. Finally, the committee found the combined use of marijuana and alcohol increases motor vehicle crash risk more than use of either substance alone. For non-traffic injuries, the evidence is limited, but data suggest the risk of non-traffic workplace injuries may be higher with marijuana use.

Public Health Recommendations

The committee made a number of public health recommendations interspersed throughout this report. These recommendations loosely fall into several categories but almost all of the recommendations include some effort to standardize data quality (marijuana use frequency), standardize procedures (roadside THC testing) and improve monitoring of use patterns and health outcomes. Standardized data collection on method of marijuana use, amount and frequency should be encouraged across medical specialties and on survey tools used in Colorado to better characterize use patterns and dose among users. The committee also

recommends data collection on the THC content of Colorado products to better characterize the THC dose of a typical user. In addition, improved information on blood THC levels of drivers is needed to effectively monitor the impact of driving under the influence of marijuana.

The committee recommended many educational interventions ranging from information on safe storage to protect the youngest Coloradans, to information for adult users, their families, and health care providers. Education for health care providers on the known health effects of marijuana use may encourage more open dialog between providers and patients.

Research Gaps

Important research gaps related to the population-based health effects of marijuana use were identified during the literature and data review process. These research gaps were based on common limitations of existing research (e.g., not enough focus on occasional marijuana use, distinct from regular or heavy use), exposures not sufficiently studied (e.g., dabbing or edibles), outcomes not sufficiently studied, or issues important to public education or policymaking (e.g., defining impairment in frequent users). These research gaps provide an important framework for prioritizing research related to marijuana use and public health. The committee strongly recommends Colorado support research to fill these important gaps in public health knowledge. While outside the scope of this committee's duties, the committee also recognizes more research is needed on the potential therapeutic benefits of marijuana.

Research gaps identified by the committee had five common themes: 1) Additional research using marijuana with THC levels consistent with currently available products; 2) Research on impairment in regular marijuana users who may have developed tolerance; 3) Research to identify improved testing methods for impairment either through alternate biological testing methods or physical tests of impairment; 4) Research to better characterize the pharmacokinetics/pharmacodynamics, potential drug interactions, health effects, and impairment related to newer methods of marijuana use such as edibles and vaporizing as well as other cannabinoids such as CBD; and 5) Research to better characterize possible differences in health effects between heavy (daily or near daily), regular(weekly or more), and occasional (less than weekly) users.

Table 1.
Substantial and Moderate Findings from Systematic Literature Review

	Substantial	Moderate
Marijuana Use During Pregnancy & Breastfeeding (p.75)		Decreased IQ scores Attention problems Decreased growth Decreased cognitive function Decreased academic ability
Unintentional Marijuana Exposures in Children (p.87)		Legal marijuana access increases unintentional marijuana exposures in children Child resistant packaging reduces unintentional pediatric poisonings
Marijuana Use Among Adolescents and Young Adults (p.94)	Other illicit drug use and addiction after adolescence Psychotic symptoms or disorders like schizophrenia	Impaired cognitive abilities and academic performance after 28 days abstinence Less high school graduation Increased MJ use and addiction after adolescence Alcohol or tobacco use and addiction after adolescence Quitting lowers risks
Marijuana Dose and Drug Interactions (p.103)	Increased risk of driving impairment at blood [THC] 2-5 ng/mL Smoking > 10 mg THC leads to blood [THC] near or > 5 ng/mL within 10 minutes Smoking > 10 mg THC leads to driving impairment	Ingesting ≥15mg THC may lead to blood [THC] > 5 ng/mL Inhaling vaporized THC leads to blood [THC] similar to smoking same dose Higher blood [THC] in impaired drivers now than in past

Table 1 (Continued).
Substantial and Moderate Findings from Systematic Literature Review

	Substantial	Moderate
Marijuana Dose and Drug Interactions (p.103)	Ingesting > 10 mg THC leads to driving impairment	Waiting at least 6 hrs after smoking < 35 mg resolves/nearly resolves driving impairment
	Waiting at least 6 hrs after smoking < 18 mg resolves/nearly resolves driving impairment	
	Waiting at least 8 hrs after ingesting < 18 mg resolves/nearly resolves driving impairment	
	Time to peak blood [THC] up to four hours post oral ingestion	
	Passive exposure does not lead to positive screen by urine or blood	
Marijuana Use and Neurological, Cognitive, and Mental Health Effects (p.116)	Impaired memory to at least 7 days abstinence (heavy users)	Depression [symptoms or diagnosis], (regular users)
	Acute psychotic symptoms during intoxication	
Marijuana Use and Respiratory Effects (p.125)	Same carcinogens in marijuana smoke as tobacco smoke	Heavy use increases airflow obstruction
	Chronic bronchitis with cough/wheeze/sputum	
	Precancerous lesions in airways	
	Acute use improves airflow	
Marijuana Use and Injury (p.142)	Increased MV crash risk	
	THC level and MV crash risk	
	Combined use with alcohol increases MV crash risk	