

# **Health Impact Assessment**

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## **Marijuana Regulation in Vermont**

### **Executive Summary**

Released January 2016



## Executive Summary

The Vermont Department of Health and key stakeholders conducted this Health Impact Assessment of the possible effects that could result from regulating and taxing adult marijuana use on the health of Vermonters.

### Literature Review

The assessment began with an extensive review of the existing literature to identify the strength of evidence associated with the potential health impacts. Indicators (impacts) were rated as not well researched, a fair amount of evidence, strong evidence, or very strong evidence. A full description of the methodology used to determine these ratings is provided on page 17.

### Health Indicators associated with Marijuana Use

*NOTE: This section of the literature review is related to use, but not specifically legalized use – it does not include research related to medical marijuana use.*

Impact of non-medical marijuana use on health indicator	Does indicator get better, worse, or stay the same with non-medical marijuana use?	Strength of evidence on the indicator
<b>Mental health</b>		
Psychosis/Psychotic symptoms	Worse	Very strong evidence
Depression	Worse	Fair evidence
Schizophrenia	Worse	Fair evidence
Anxiety	Worse	Fair evidence
Brain function	Worse	Fair evidence
Psychosocial functioning	Worse	Strong evidence
<b>Injury</b>		
Motor vehicle accidents	Worse	Very strong evidence
Child poisoning	Worse	Not well researched
Skiing safety (snowboarding)	No studies	No research
<b>Respiratory</b>		
Short-term air flow	Better	Strong evidence
Long-term air flow	Worse	Fair evidence
Cancer	Unclear	Fair evidence
Chronic bronchitis	Worse	Strong evidence
<b>Physical health</b>		
Cancer (non-lung)	Unclear	Not well researched
Stroke/heart attack	Worse	Fair evidence
<b>Reproductive health</b>		
Pregnancy	Worse	Strong evidence
<b>Youth</b>		
Future dependence	Worse	Very strong evidence
Academic performance	Worse	Strong evidence

Substance abuse		
Dual use	Worse	Fair evidence
Treatment	Unclear	Not well researched
Future use	Unclear	Not well researched
Dependence on marijuana	Worse	Strong evidence

### Health Indicators associated with Non-Medical Marijuana Regulation on Youth

Impact of regulation of non-medical marijuana use on youth	Does indicator get better, worse, or stay the same under marijuana regulation?	Strength of evidence on the indicator
Access	Increases	Fair evidence
Use	Unclear	Not well researched

### Medical Marijuana Uses *Note: This summary is based on three clinical review articles.*

Symptom the patient is seeking to relieve	Legal in Vermont?	Alleviates symptoms?	Strength of evidence on the indicator
<b>Physical health</b>			
Symptoms of cancer	Yes	Yes	Strong evidence
Symptoms of cancer treatment	Yes	Yes	Strong evidence
Symptoms of HIV/AIDS or treatment	Yes	Yes	Strong evidence
Multiple-sclerosis or treatment	Yes	Yes	Strong evidence
Wasting syndrome (excluding related to cancer, HIV & MS)	Yes	Yes	Fair evidence
Severe pain (excluding related to cancer, HIV & MS)	Yes	Yes	Fair evidence
Chronic pain (non-severe)	No	Yes	Fair evidence
Nausea (excluding related to cancer, HIV & MS)	Yes	Yes	Fair evidence
Seizures	Yes	Research in progress	Not well researched
Glaucoma	No	Unclear	Not well researched
<b>Other</b>			
Sleep	No	Not helpful	Not well researched
Social anxiety	No	Unclear	Not well researched
PTSD	No	Unclear	Not well researched

*The reviews note that with the use of cannabinoids for treatment of these disorders, individuals can also experience increased risk of short-term adverse events including dizziness, dry mouth, nausea, fatigue, somnolence, vomiting, disorientation, confusion, loss of balance, and hallucinations.*

*References: Hill, 2015; Koppel et al., 2014; Whiting et al., 2015*

## Questions and Findings

Following are the questions the stakeholder group sought to answer with this health impact assessment, and the findings.

### **What would happen to the prevalence of marijuana use if Vermont taxed and regulated marijuana?**

- Perception of harm and perception of use are both predictors of marijuana use among youth and adults. The percentage of Vermonters who perceive marijuana use as harmful is decreasing; at the same time, they overestimate the prevalence of marijuana use.
- Some populations are more likely to use marijuana, and health impacts differ depending on who uses marijuana. Children, pregnant women, people with pre-existing physical health or mental health conditions, users of alcohol or other drugs, etc. are at greater risk of negative health outcomes from using marijuana.
- Among high school students who use marijuana, about one-third use it almost daily.
- The concentration of THC in marijuana being sold now in Vermont is not known, but it has likely increased greatly since 1990. The average THC concentration now being sold in Colorado is 17 percent, which is much higher than any concentrations used in peer-reviewed health effect studies. It is not known how this higher concentration of THC affects prevalence of use.

### **Would traffic safety change if Vermont taxed and regulated marijuana?**

- Research shows increased odds of crashing, crash culpability, and fatality with increasing blood THC levels. A blood THC concentration of 5 ng/mL increased the odds of crash responsibility from 2.7 to 6.6 – odds similar to that of a blood alcohol content of 0.15 percent. The exact blood level of THC associated with impairment is not known, and it is not entirely clear if blood level alone is a sufficient indicator of impairment for all users.
- Data from Washington and Colorado show more fatalities with THC in the blood toxicology, but the data are too new to establish causality.
- Using marijuana and alcohol together increases crash risk, but it is not clear whether regulation will increase or decrease driving under the influence of alcohol alone. It is possible that fewer people will drive drunk if they substitute marijuana for alcohol.
- Education campaigns alone will not deter drivers from using and driving.

**What would be the impact on mental health be if Vermont regulated and taxed marijuana?  
What would change in psychosocial outcomes (e.g. life satisfaction, interpersonal relationships) if Vermont regulated and taxed marijuana?**

- Early and persistent use of marijuana can lead to the development of anxiety disorders later in life. It may lead to development of depressive disorders. Among individuals at risk for the development of some psychotic disorders, marijuana use may increase the risk or mean that onset of those disorders begins earlier in life.
- Marijuana use may impact the physical structure of the brain. The exact effect, whether it is reversible, and what the potential health implications are, remains unknown.
- Early and continuous use of marijuana significantly increases risk of not completing high school, not enrolling or completing college, low educational achievement, lower income, unemployment and welfare dependence as an adult, premature work force retirement due to disability, and reduction in IQ in middle adulthood.

**What might change in other substance use disorders and treatment if Vermont regulated and taxed marijuana?**

- The number of Vermonters in treatment for marijuana as the primary substance of abuse is going down overall. Still, about 40 percent of those treated for a substance use disorder in the state substance abuse treatment system also misuse marijuana.
- If marijuana use increases, the number of people with a marijuana use disorder will also increase.
- If use increases among youth, individuals with a substance use disorder for more than one substance will also increase.

**What might change in academic outcomes if Vermont regulated and taxed marijuana?**

- Marijuana use among high school and college students negatively impacts academic outcomes. The association has a dose-response relationship, which means the more a student uses, the worse the outcomes.
- The research on the relationship between marijuana use and academic outcomes is almost sufficient to show a cause-and-effect link between the two.
- Youth in more vulnerable situations (e.g. already experiencing behavior or mental health problems) are more likely to experience a negative academic outcome due to marijuana use.
- In Colorado, there has been a sharp increase in suspensions from 2013 to 2014. The state cannot confirm whether this is due to marijuana use, or due to the state's legalization in 2014. In Vermont, marijuana is the number one substance for which students are suspended from school.

- In a convenience sample of 130 Vermont educators, half reported they had not noticed an increase in marijuana use from the 2013 school year to the 2015 school year, but two-thirds expected to see an increase in use under a regulated system.

### **Would emergency department admissions change if Vermont regulated and taxed marijuana?**

- In Vermont, there was a drop in the number of emergency department visits with any mention of cannabis abuse or dependence in the diagnosis codes from 2008 to 2011. Since 2011, the numbers have gone back up.
- Based on Colorado's estimates within the first year of legalization, should Vermont see a similar trend after regulation, the increase would be from 581 visits in 2013 to approximately 750 visits in 2014. This assumes Vermont includes infused products in the legislation.

### **Lessons from Tobacco and Alcohol that Could Apply to Marijuana Regulation**

The stakeholder group also explored what is known from tobacco and alcohol policy and lessons that may be applied to protect and improve health under a regulated marijuana market. Here are some of the key lessons:

- **Smoke-free policies** reduce secondhand smoke, increase the number of people who quit smoking, reduce tobacco initiation rates, and reduce tobacco-related morbidity and mortality. Vermont law currently allows for tobacco substitutes (i.e. vaporizers) in many places where smoking is banned. Vermont smoke-free laws do not cover the use of marijuana.
- **Limiting access** to alcohol and tobacco has been proven to reduce use. This includes:
  - Limiting outlet density – controlling the number of stores that can sell the substance within a certain area. This is true for alcohol or tobacco.
  - Limiting the type of outlet that can sell tobacco can decrease initiation and youth use. If youth have access to tobacco or exposure to tobacco advertising in the retail outlets they frequent, they are more likely to begin smoking cigarettes.
  - Limiting the times of day that alcohol can be sold.
  - Limiting the age at which a person can purchase alcohol or tobacco.
- **Increasing taxes** and establishing minimum price laws reduce the amount of alcohol or tobacco people use. In addition, prohibiting price discounting is an effective strategy to reduce use.
- **Allowing local control** over outlet density and advertising contributes to a culture of health in the community, despite the fact that people can easily travel from one town to another.

- **Limiting the age** of legal alcohol purchase to 21 years old or older decreases the number of motor vehicle accidents, reduces initiation of use, and use of alcohol.
- **Child-resistant packaging** saves lives.
- **Limiting tobacco and alcohol advertising** can reduce youth initiation and use. Prohibiting self-service displays, Internet sales, free samples, mass media advertising and flavored products are all established means of limiting youth tobacco use.
- **Enforcing laws** that restrict sale to those of legal age is an effective way to keep alcohol and tobacco out of the hands of youth. This requires a strong enforcement effort.

## Recommendations

Stakeholders identified the following recommendations should Vermont decide to regulate and tax marijuana for non-medical use.

### *Infrastructure*

- **Put infrastructure in place before sales begin.** Ensure that all critical staff are hired, all regulations and rules are in place, and all testing infrastructure is built and functioning before allowing for the licensing of production, distribution or retail of marijuana products. Authorize a governing body or administrative unit responsible for overseeing the implementation of the regulation and taxation of marijuana.
- **Expand Existing Tobacco Laws.** Expand and enhance *all* current tobacco smoking laws and regulations to include the use of tobacco *or* marijuana and include any potential type of delivery system or tobacco substitute (electronic cigarettes, vape pens, etc.).
- **Do not allow use of marijuana in public places.** Ensure children and youth are not exposed to marijuana use or second hand smoke.
- **Fully fund enforcement and oversight.** Follow best practice in protecting youth and young-adults, as well as adult users, by ensuring licensing fees are set at a level, and will continue to grow with inflation and industry growth, that fully funds the necessary enforcement and oversight efforts now and in the future. Note: Current tobacco and alcohol licensing fees are not sufficient to support best practice enforcement efforts.
- **Standardize and test packaging and potency.** Ensure that all THC concentration regulations, particularly those relating to packaging, labeling and testing, are in place before implementation. Marijuana and marijuana products should be batch-tested and labeled for potency. Procedures must be in place to regulate and test final products for contaminants.

### ***Protect Youth and Young Adults***

- **Restrict Age of Access.** Implement prevention, regulation and enforcement strategies that greatly reduce access to marijuana for those age 25 and younger. This is to protect children, youth and young adults during the time in life of rapid brain development and academic involvement.
- **Fund Prevention.** Set up a fund, similar in mechanics to the Clean Water Fund, from taxes on marijuana production, distribution and sales directed to a designated fund in the Treasurer's Office, and used only for substance use prevention and education efforts. Use this funding to:
  - Expand substance misuse prevention, education and screening in schools (including post-secondary institutions) and pediatric offices.
  - Launch a statewide education campaign directed at specific populations such as youth, young adults and pregnant women, about the potential health risks of non-medical marijuana use.
- **Restrict Advertising.** Put in place advertising restrictions to ensure that youth and young adults are not targeted by, or exposed to, marijuana advertising. Restrict advertising from any area where youth could potentially be exposed.

### ***Infused Products (Edibles)***

- **Do not allow infused products on the regulated market.** Do not include retail sales of products infused with marijuana for non-medical purposes.
- **Never allow infused products that could appeal to children.** Mandate that should future legislation ever allow for infused/edible products, they are never allowed in a format that could be attractive to youth (e.g. gummy bears, cookies, brownies, etc.). Before any future regulation regarding edibles is implemented, ensure that full testing and regulatory bodies are in place. This includes development, implementation and full funding for comprehensive food inspection.

### ***Prevent Motor Vehicle Crashes***

- **Set a blood level operating limit for THC.** Set a per se active-THC blood level limit for operating a motor vehicle based on the best available evidence. Designate a non-Legislative body with rulemaking authority made up of law enforcement and health officials to review data and determine the exact per se limit. Allow this body to amend that limit in the future based on scientific evidence, surveillance data, and emerging information from other states.



- **Build driver testing infrastructure.** Build the infrastructure and procedures necessary to conduct appropriate and consistent testing for THC before marijuana is regulated.
- **Implement a public education strategy about the dangers of driving under the influence of THC.** Do this before marijuana is regulated and ensure that the education includes information on what the legal limits mean in terms of use.

### ***Protect Adults***

- **Expand screening in primary care practices.** Expand screening for substance use disorders and mental health problems and trauma in primary care.
- **Get providers the information they need.** Ensure medical providers receive the most recent information and training related to screening for risk factors for substance misuse disorders (e.g. non-adaptive stress response) as well as Screening, Brief Intervention and Referral to Treatment (SBIRT). Work with local teaching institutions to ensure that medical students, nursing students (and other allied health professionals) receive the most recent information and training on the health impacts of marijuana.

### ***Reduce Access and Protect Local Control***

- **Limit sales to adult-only outlets statewide.** Do not allow sales in locations that minors can enter. Ensure a statewide standard, but:  
  
Allow local governments to further restrict sale, outlet density/location and advertising through municipal zoning and ordinance mechanisms – including banning the sale of marijuana, similar to Vermont’s laws concerning medical marijuana dispensaries.
- **Consider statewide “buffer zones”.** Consider implementing statewide buffer zones for the sale of marijuana around areas such as playgrounds, schools and colleges.

### ***Monitor the Future***

- **Fund surveillance and research.** Fund surveillance efforts to monitor more closely the type of use, frequency of use, and potency of marijuana used among Vermonters of all ages. Encourage and fund the scientific study of health effects among Vermonters who use marijuana.

For the full report:

[http://healthvermont.gov/pubs/healthassessments/documents/HIA\\_marijuana\\_regulation\\_in\\_vermont\\_201601.pdf](http://healthvermont.gov/pubs/healthassessments/documents/HIA_marijuana_regulation_in_vermont_201601.pdf)