

## Retail Marijuana Scientific Advisory Committee (RMSAC) Revised OHA-Approved Public Health Statements, March, 2017

This document summarizes recently published scientific evidence on the health effects associated with marijuana use for the purpose of reviewing Oregon Public Health Division approved statements on the topic.

A previous series of reviews and original development of public health statements was conducted by the RMSAC in 2015, using the best evidence available at the time. The 2015 RMSAC Evidence Reviews with OHA-approved Public Health Statements can be found at:  
<http://public.health.oregon.gov/PreventionWellness/marijuana/Pages/Retail-Marijuana-Scientific-Advisory-Committee.aspx>.

The new major national reports on health effects from marijuana use or exposure referenced in tables are:

- **NAS, 2017: National Academies of Sciences, Engineering, and Medicine.** 2017. *The health effects of cannabis and cannabinoids: The current state of evidence and recommendations for research.* Washington, DC: The National Academies Press. doi: 10.17226/24625.. Available at <http://nationalacademies.org/hmd/reports/2017/health-effects-of-cannabis-and-cannabinoids.aspx>
- **CDC, 2017: Centers for Disease Control and Prevention (CDC).** *Marijuana and Public Health.* Website revision released January 26, 2017. <https://www.cdc.gov/marijuana/index.htm>

Tables are presented for several health categories:

1. Cognitive, neurological and mental health effects of adult marijuana use
2. Cardiovascular effects of marijuana use
3. Respiratory health and marijuana use
4. Effect of adolescent marijuana use on health and other outcomes
5. Fetal marijuana exposure and health effects; breast-fed infant marijuana exposure
6. Motor vehicle crashes and marijuana exposure
7. Problem marijuana use

Statements highlighted in yellow within tables are the current public health statements. These may be the original statements created in 2015 or revised statements that incorporate the new scientific evidence when applicable.

## 1. Cognitive, Neurological, and Mental Health Effects of Adult Marijuana Use

	NAS (National Academies of Sciences, Engineering, Medicine), 2017	CDC, 2017	Oregon Public Health Division Approved Statements, 2015	Oregon Public Health Division Approved Statements, 2017
<b>Memory, Attention, Learning</b>	MODERATE evidence of statistical association between acute cannabis use and impairment in the cognitive domains of learning, memory, and attention. (Conclusion 11-1a, page 11-6)	Acute marijuana use directly affects the brain -- specifically the parts of the brain responsible for memory, learning, attention, decision making, coordination, emotions, and reaction time. Heavy users of marijuana can have short-term problems with attention, memory, and learning, which can affect relationships and mood.	Heavy use of marijuana is associated with impaired memory, persisting a week or more after quitting.	<p>Marijuana use can be associated with acute impairments in memory, attention and learning.</p> <p>Frequent use of marijuana is associated with impaired memory, persisting a week or more after quitting.</p>
<b>Symptoms of depression and anxiety</b>	<p>LIMITED evidence of a statistical association between near daily cannabis use and increased symptoms of anxiety. (Conclusion 12-9, page 12-24) and development of any type of anxiety disorder (except social anxiety disorder). (Conclusion 12-8a, page 12-23)</p> <p>MODERATE evidence of association between cannabis use and increased incidence of social anxiety disorder (regular cannabis use). (Conclusion 12-8b, page 12-23)</p>	Marijuana use has been linked with depression and anxiety. However, it is not known whether this is a causal relationship or simply an association.	Regular use of marijuana is associated with future symptoms or diagnosis of anxiety.	Regular use of marijuana may be associated with symptoms of depression and anxiety.

	<p>MODERATE evidence for association of cannabis use with a small increased risk for development of depressive disorders (Conclusion 12-5, page 12-17) and increased incidence of suicidal ideation and attempts; with higher incidence among heavier users (Conclusion 12-7a, page 12-19); and increased incidence of suicide completion. (Conclusion 12-7b, page 12-19)</p>			<p>Marijuana use may increase the risk of suicide.</p>
<p><b>Acute psychotic symptoms</b></p>	<p>MODERATE evidence of a small increase in risk (page 12-5)</p>		<p>Tetrahydrocannabinol (THC), a component of marijuana, can cause acute psychotic symptoms during intoxication</p>	<p>No change</p>
<p><b>Symptoms or diagnosis of psychosis, onset of schizophrenia</b></p>	<p>SUBSTANTIAL evidence of a statistical association between cannabis use and the development of schizophrenia or other psychoses, with the highest risk among the most frequent users. (Conclusion 12-1, page 12-6)</p> <p>LIMITED evidence of a statistical association between cannabis use and an increase in positive symptoms of schizophrenia (e.g., hallucinations) among individuals with psychotic disorders. (Conclusion 12-2(b) on page 12-11)</p>	<p>Marijuana users are significantly more likely than nonusers to develop chronic mental disorders, including schizophrenia.</p> <p>Some marijuana users have an increased risk for psychosis.</p> <p>Marijuana use can trigger psychosis in people with schizophrenia.</p>	<p>Regular use of marijuana may be associated with future symptoms or diagnosis of psychosis.</p>	<p>Marijuana users are significantly more likely than nonusers to develop chronic mental disorders, including schizophrenia.</p> <p>Some marijuana users have an increased risk for psychosis.</p> <p>Marijuana use can trigger psychosis in people with schizophrenia.</p>



## 2. Cardiovascular Effects of Marijuana Use

	<b>NAS (National Academies of Sciences, Engineering, Medicine), 2017</b>	<b>CDC, 2017</b>	<b>Oregon Public Health Division Approved Statements, 2015</b>	<b>Oregon Public Health Division Approved Statements, 2017</b>
<b>Myocardial infarction (heart attack)</b>	<p>LIMITED evidence of a statistical association between cannabis smoking and the triggering of acute myocardial infarction. (Conclusion 6-1(a), page 6-4)</p> <p>NO EVIDENCE to support or refute an association between chronic effects of cannabis use and heart attack. (Conclusion 6-1(b), page 6-4.)</p>	<p>The compounds in marijuana can affect the circulatory system and may increase the risk of heart attacks and strokes. Research has found a significant increase in the risk of heart attack in the hours after marijuana use. Smoking marijuana could also lead to increased risk for stroke, mini-stroke, and heart disease.</p> <p>Some evidence that marijuana use may lead to heart attack and stroke</p>	<p>Acute marijuana use may be associated with increased risk of heart attack among adults.</p>	<p>Marijuana use may be associated with increased risk of triggering a heart attack among adults.</p>
<b>Stroke (ischemic)</b>	<p>LIMITED evidence of a statistical association between cannabis use and ischemic stroke or subarachnoid hemorrhage. (Conclusion 6-2, page 6-7)</p>	<p>Some evidence that marijuana use may lead to heart attack and stroke.</p>	<p>Marijuana use may be associated with increased risk of stroke.</p>	<p>No change</p>

### 3. Respiratory Health and Marijuana Use

	NAS (National Academies of Sciences, Engineering, Medicine), 2017	CDC, 2017	Oregon Public Health Division Approved Statements, 2015	Oregon Public Health Division Approved Statements, 2017
<b>Airflow obstruction</b>	No comment		Regular marijuana smoking is associated with mild decreased airflow in the lungs.	No change
<b>Acute use improves airflow</b>	MODERATE evidence of a statistical association between cannabis smoking and improved airway dynamics with acute use but not with chronic use. (Conclusion 7-1(a), page 7-4)		One-time marijuana use (edible or smoked) is strongly associated with immediate, short-term (1-6 hours) improved airflow in the lungs of healthy marijuana users & asthmatics.	There is some evidence that acute (but not chronic) marijuana smoking can improve airflow in the lungs.
<b>Particulate matter</b>	No comment		Marijuana smoke may deposit more particulate matter in the lungs per puff compared to tobacco smoke.	No change
<b>Chronic Obstructive Respiratory Disease (COPD)</b>	LIMITED evidence of a statistical association between occasional cannabis smoking and an increased risk of developing COPD when controlled for tobacco use. (Conclusion 7-2(a), page 7-7)  NO or INSUFFICIENT evidence to support or refute an association between cannabis smoking and increased risk of hospital admission for COPD. (7-2(b), page 7-12)		There is conflicting research for whether or not regular marijuana smoking is associated with COPD.	Smoking marijuana may increase the risk of developing COPD

<p><b>Chronic bronchitis with cough/wheeze/sputum</b></p>	<p>SUBSTANTIAL evidence of a statistical association between long-term cannabis smoking and more frequent chronic bronchitis episodes. (Conclusion 7-3(a), page 7-10)</p> <p>MODERATE evidence of a statistical association between cessation of cannabis smoking and improvements in respiratory symptoms. (Conclusion 7-3(b), page 7-10.)</p>	<p>Smoking marijuana can lead to a greater risk of bronchitis, cough, and phlegm production. These symptoms generally improve when marijuana smokers quit.</p> <p>Strong evidence that marijuana use may lead to breathing problems, including inflammation of the airways and symptoms of chronic bronchitis, such as daily cough and phlegm.</p>	<p>Heavy marijuana smoking is associated with chronic bronchitis, including chronic cough, sputum production and wheezing.</p>	<p>Heavy marijuana smoking is associated with chronic bronchitis, including chronic cough, sputum production and wheezing. These symptoms generally improve when marijuana smokers quit.</p>
<p><b>Carcinogens in smoke, including smoke from water pipes or bongs</b></p>	<p>No comment</p>		<p>Marijuana smoke, both firsthand and secondhand, contains many of the same cancer-causing chemicals as tobacco smoke. Smoke from water pipes or bongs may contain more cancer-causing chemicals per milligram of Tetrahydrocannabinol (THC) compared to smoke from unfiltered joints.</p>	
<p><b>Lung cancer, pre-malignant lesions in airways</b></p>	<p>MODERATE evidence of no statistical association between cannabis smoking and the incidence of lung cancer. (Conclusion 5-1, page 5-3)</p>		<p>There is conflicting research for whether or not marijuana smoking is associated with lung cancer. Heavy marijuana smoking is strongly associated with pre-malignant lesions in your lungs.</p>	<p>Although there is not enough evidence to know whether smoking marijuana directly causes lung cancer, heavy marijuana smoking is strongly associated with pre-malignant lesions in the lungs.</p>
<p><b>Respiratory health effects from aerosolizing/Vaporizing</b></p>	<p>No comment</p>		<p>There is currently not enough evidence to determine if aerosolizing or vaporizing marijuana is associated with effects on lung health.</p>	<p>No change</p>

#### 4. Effect of Adolescent Marijuana Use on Health and Other Outcomes

	<b>NAS (National Academies of Sciences, Engineering, Medicine), 2017</b>	<b>CDC, 2017</b>	<b>Oregon Public Health Division Approved Statements, 2015</b>	<b>Oregon Public Health Division Approved Statements, 2017</b>
<b>Cognition</b>	<p>LIMITED evidence for an association between cannabis use and effects on cognitive development during adolescence. (page 11-7)</p> <p>MODERATE evidence for association between cannabis use and impairment in cognitive domains of learning, memory and attention (acute cannabis use). (Conclusion 11-1a, page 11-6)</p>	<p>When marijuana users begin using as teenagers, the drug may reduce attention, 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. This means that someone who uses marijuana may not do as well in school and may have trouble remembering things.</p>	<p>Regular marijuana use by adolescents and young adults is associated with impaired learning, memory, math and reading achievement, even 28 days after last use. These impairments increase with more frequent marijuana use.</p>	<p>Marijuana use during adolescence may be associated with impairments in cognitive development.</p>
<b>Education and Income</b>	<p>LIMITED evidence for statistical association between cannabis use and impaired academic achievement and education outcomes (Conclusion 11-2, page 11-10).</p> <p>Cannabis use during adolescence is related to impairments in subsequent academic achievement and education, employment and income, and social relationships and social roles. (page 11-1)</p>	<p>Some evidence that marijuana use may lead to poor school performance, less academic and career success.</p> <p>Some evidence that marijuana use may lead to lower income.</p>	<p>Regular marijuana use by adolescents is associated with low academic achievement, such as not graduating from high school.</p>	<p>No change</p>
<b>Marijuana dependence</b>	<p>SUBSTANTIAL evidence that initiating cannabis use at an earlier age is a risk factor for the development of problem cannabis use. (Conclusion 13-2(j), page 13-12),</p>	<p>Strong evidence that marijuana use may lead to addiction.</p>	<p>Starting marijuana use during adolescence or young adulthood is associated with marijuana use disorder as an adult.</p>	<p>No change</p>

<p><b>Other drug use</b></p>	<p>MODERATE evidence of a statistical association between cannabis use and development of substance dependence and/or a substance abuse disorder for substances including alcohol, tobacco and other illicit drugs. (Conclusion 14-3, page 14-11)</p> <p>LIMITED evidence of an association between cannabis use and initiation of tobacco use (Conclusion 14-1, page 14-4) and changes in the rates and use patterns of other licit and illicit substances (Conclusion 14-2, page 14-7).</p>		<p>Marijuana use by adolescents and young adults - even occasional use - is associated with adult high-risk use of alcohol, tobacco, and other drugs (e.g. opioids and methamphetamine).</p>	<p>Marijuana use by adolescents and young adults -- even occasional use -- is associated with adult high-risk use of alcohol, tobacco, and other drugs.</p>
<p><b>Psychosis (see Section 1 above)</b></p>	<p>No comment</p>		<p>Regular marijuana use by adolescents and young adults is associated with an increased rate of psychotic symptoms and disorders such as schizophrenia in adulthood.</p> <p>This risk is increased among those who start using marijuana at a younger age and those with more frequent marijuana use.</p>	<p>No change</p>
<p><b>Mental health (depression, anxiety, suicidal thoughts) (see Section 1 above)</b></p>	<p>No comment</p>		<p>There is conflicting research for whether or not marijuana use by adolescents and young adults is associated with depression, anxiety or suicidal thoughts.</p>	<p>No change</p>

## 5a. Fetal Marijuana Exposure and Health Effects

	<b>NAS (National Academies of Sciences, Engineering, Medicine), 2017</b>	<b>CDC, 2017</b>	<b>Oregon Public Health Division Approved Statements, 2015</b>	<b>Oregon Public Health Division Approved Statements, 2017</b>
<b>General</b>	No comment	Using marijuana during pregnancy may increase your baby's risk of developmental problems.	There is no known safe level of marijuana use during pregnancy.  Marijuana use during pregnancy may have negative effects on the fetus, regardless of when it is used during pregnancy.	No change
<b>Tetrahydrocannabinol (THC) transfer to fetus</b>	No comment		Tetrahydrocannabinol (THC) can pass from the mother to the fetus through the placenta. The fetus can be exposed to THC used by the mother.	Tetrahydrocannabinol (THC) passes from the mother to the fetus through the placenta and exposes the fetus to THC.
<b>IQ and Cognitive and Behavioral Effects</b>	INSUFFICIENT evidence to support or refute association between cannabis smoking during pregnancy and cognition/academic achievement. (Conclusion 10-4, page 10-12)	Marijuana use by mothers during pregnancy may be linked to problems with attention, memory, problem-solving skills, and behavior problems in their children.	Maternal use of marijuana during pregnancy may be associated with negative effects on exposed offspring, including decreased academic ability, cognitive function and attention. These effects may not appear until adolescence. Scientific literature on this topic is limited.	No change

<b>Pregnancy complications including stillbirth</b>	LIMITED evidence for statistical association between maternal cannabis smoking and pregnancy complications for the mother (which included stillbirth) (conclusion 10-1, page 10-4); evidence is especially weak for the association with stillbirth.		Marijuana use during pregnancy may be associated with an increased risk of stillbirth. Scientific literature on this topic is limited.	No change
<b>Birth Weight</b>	SUBSTANTIAL evidence but not conclusive (mostly because no RCTs) that smoking MJ during pregnancy is associated with decreased birth weight of offspring. (Conclusion 10-2, page 10-6)	Some research shows that using marijuana while you are pregnant can cause low birth weight.		Maternal use of marijuana during pregnancy can decrease the birth weight of the offspring.
<b>Birth Defects</b>	INSUFFICIENT evidence on congenital malformations (Page 10-6)		Marijuana use during pregnancy may be associated with an increased risk of heart defects (isolated simple ventricular septal defects) in exposed offspring. Scientific literature on this topic is limited.	No change

### 5b. Breast Fed Infants: Marijuana Exposure

	NAS (National Academies of Sciences, Engineering, Medicine), 2017	CDC, 2017	Oregon Public Health Division Approved Statements, 2015	Oregon Public Health Division Approved Statements, 2017
<b>General</b>	No comment	Chemicals from marijuana can be passed to baby in breast milk. Data on the effects of marijuana exposure to the infant through breastfeeding are limited and conflicting.	Tetrahydrocannabinol (THC) can be passed from the mother's breast milk to the infant. THC exposure may affect the baby.	Tetrahydrocannabinol (THC) can pass from the mother's breast milk to the infant.

### 6. Motor Vehicle Crashes and Marijuana Exposure

	NAS (National Academies of Sciences, Engineering, Medicine), 2017	CDC, 2017	Oregon Public Health Division Approved Statements, 2015	Oregon Public Health Division Approved Statements, 2017
<b>Motor Vehicle Crashes</b>	SUBSTANTIAL evidence of a statistical association between cannabis use and increased risk of motor vehicle crashes. (Conclusion 9-3, page 9-11)	Some evidence that marijuana use may lead to increased risk for motor vehicle crashes.		Driving after using marijuana can increase the risk of motor vehicle crashes.

## 7. Problem Marijuana Use

	<b>NAS (National Academies of Sciences, Engineering, Medicine), 2017</b>	<b>CDC, 2017</b>	<b>Oregon Public Health Division Approved Statements, 2015</b>	<b>Oregon Public Health Division Approved Statements, 2017</b>
<b>Problem Cannabis Use (including Cannabis Use Disorder, dependence, and abuse)</b>	SUBSTANTIAL evidence of a statistical association between increases in cannabis use frequency and progression to developing problem cannabis use (Conclusion 13-1, page 13-4)	Research shows that 1 in 10 marijuana users will become addicted. Signs of addiction include: unsuccessful efforts to quit using marijuana, giving up important social activities in favor of using marijuana, using marijuana even when it causes problems with everyday tasks at home, school, or work.	None	Frequent marijuana use increases the risk of developing problem use, including dependency.