

Marijuana Use and Respiratory Health (1)—APPROVED STATEMENTS

	Evidence Reviews				APPROVED STATEMENTS
	Colorado Report Review Article, 2014 (pg.125-134)	RAND report Evidence review, 2015 (pg.57)	Institute of Medicine Review Article, 1999 (pg. 111-115)	Oregon: Washington county report, 2014 (pg. 8; 32-34)	Oregon Public Health Division Approved Statements
Carcinogens	SUBSTANTIAL evidence that marijuana smoke, both mainstream and sidestream contains many of the same cancer-causing chemicals as tobacco smoke. ^{1,2,3,4}	Marijuana smoke contains many of the same carcinogens as tobacco smoke. ¹	<p>The gas and tar phases of marijuana and tobacco smoke contain many of the same compounds.</p> <p>The tar phase of marijuana smoke contains higher concentrations of polycyclic aromatic hydrocarbons (PAHs), such as the carcinogen benzopyrene.</p>	<p>Marijuana smoke contains levels of ammonia, hydrogen cyanide, nitric oxide and aromatic amines at concentrations three to five times those found in tobacco smoke.</p> <p>In 2009, marijuana smoke was placed on California’s Proposition 65 list of chemicals known to the state to cause cancer.⁵</p> <p>Independent of THC content, cannabis smokers are typically exposed to more carbon monoxide and tar than cigarette smokers.⁶</p>	Marijuana smoke, both firsthand and secondhand, contains many of the same cancer-causing chemicals as tobacco smoke.

Marijuana Use and Respiratory Health (2)—APPROVED STATEMENTS

				In a study of the chemical composition of marijuana smoke, ammonia was found in mainstream marijuana smoke at levels up to twenty-fold greater than found in tobacco. ¹	
Airflow Obstruction	MODERATE evidence that heavy marijuana smoking is associated with mild airflow obstruction. ^{7,8,9,10}		There is conflicting evidence on whether regular marijuana use harms the small airways of the lungs.	Lung function is significantly poorer and there are significantly greater abnormalities in the large airways of marijuana smokers than in non-smokers. ¹¹	Regular marijuana smoking is associated with mild decreased airflow in the lungs.
Particulate matter	LIMITED evidence that smoking marijuana deposits more particulate matter per puff in the lungs compared to tobacco smoke. ¹²		Given a cigarette of comparable weight, as much as four times the amount of tar can be deposited in the lungs of marijuana smokers as in the lungs of tobacco smokers. ¹³ Marijuana cigarettes usually do not have filters, and marijuana smokers typically develop a larger puff	Methods of cannabis smoking may place more cannabis particulate matter into the lungs than noted with typical cigarette smoking. ¹⁵ Marijuana smoking is characterized by about two-thirds larger inhalation or “puff” volume, 40% deeper inhalation, and four times longer retention of hotter and unfiltered smoke	Marijuana smoke may deposit more particulate matter in the lungs per puff compared to tobacco smoke.

Meeting date:
October 22, 2015

Marijuana Use and Respiratory Health (3)—APPROVED STATEMENTS

			<p>volume, inhale more deeply, and hold their breath several times longer than tobacco smokers.¹⁴</p>	<p>in comparison to tobacco cigarettes.¹⁶</p>	
Emphysema	<p>INSUFFICIENT evidence to suggest that marijuana smoking alone is associated with emphysema.^{17,18}</p>			<p>There is no evidence to date that chronic cannabis smoking increases the risk of emphysema.¹⁹</p>	<p>There is currently not enough evidence to indicate that chronic marijuana smoking increases the risk of emphysema.</p>
Chronic Obstructive Pulmonary Disease (COPD)	<p>MIXED evidence for whether or not smoking marijuana is associated with chronic obstructive pulmonary disease (COPD).^{20,21,22,23,24,25,26}</p>		<p>In the absence of epidemiological data, indirect evidence, such as nonspecific airway hyperresponsiveness and measures of lung function, offers an indicator of the vulnerability of marijuana smokers to COPD.²⁷</p> <p>It has not been established whether chronic marijuana smoking causes COPD, but there is probably an association.</p>		<p>There is conflicting research for whether or not regular marijuana smoking is associated with chronic obstructive pulmonary disease (COPD).</p>

Meeting date:
October 22, 2015

Marijuana Use and Respiratory Health (4)—APPROVED STATEMENTS

<p>Chronic bronchitis with cough/wheeze/sputum</p>	<p>SUBSTANTIAL evidence that heavy marijuana smoking is associated with chronic bronchitis, including chronic cough, sputum production, and wheezing.^{28,29,30,31,32,33,34}</p>		<p>Chronic marijuana smoking might lead to acute and chronic bronchitis.</p> <p>When marijuana smokers were compared with nonsmokers and tobacco smokers in a group of 446 volunteers, the difference in the percentages of tobacco smokers and marijuana smokers experiencing symptoms of chronic bronchitis was statistically insignificant.³⁵</p>	<p>In a nationally representative US survey, after controlling for age, gender and current asthma, marijuana use was significantly associated with respiratory symptoms of chronic bronchitis, coughing on most days, phlegm production, wheezing, and chest sounds without a cold.³⁶</p>	<p>Heavy marijuana smoking is associated with chronic bronchitis, including chronic cough, sputum production and wheezing.</p>
<p>Bullous lung disease</p>	<p>LIMITED evidence that heavy marijuana smoking is associated with bullous lung disease.^{37,38,39}</p>				<p>Heavy marijuana smoking may be associated with a specific type of lung tissue destruction called bullous lung disease.</p>
<p>Respiratory Infections</p>	<p>INSUFFICIENT evidence to determine if smoking marijuana is associated with</p>		<p>In a large sample of volunteers, habitual marijuana smokers had twice as many alveolar macrophages as</p>	<p>Regular or heavy cannabis consumption can result in generalized airway inflammation with evidence of respiratory epithelial cell</p>	<p>There is conflicting research for whether or not marijuana smoking is associated with lung cancer.</p>

Meeting date:
October 22, 2015

Marijuana Use and Respiratory Health (5)—APPROVED STATEMENTS

	increased risk of respiratory infections. ^{40, 41}		nonsmokers, and smokers of both marijuana and tobacco had twice as many again. ⁴²	injury and damage to alveolar macrophages, which can lead to pulmonary infection. ⁴³ The immunological competence of regular cannabis smokers is impaired, increasing rates of respiratory infections and pneumonia and their use of health services for these infections. ^{44,45}	
Lung cancer	MIXED evidence for whether or not marijuana smoking is associated with lung cancer. ^{46,47,48,49,50, 51}		There is no conclusive evidence that marijuana causes cancer in humans, including cancers usually related to tobacco use. Although cellular, genetic, and human studies all suggest that marijuana smoke is an important risk factor for the development of respiratory cancer, proof that habitual marijuana smoking does or does not cause cancer awaits	Chronic cannabis smokers show many of the pathological changes in lung cells that precede the development of cancer in tobacco smokers. ⁵² Studies that examined lung cancer risk factors found an association of marijuana smoking with increased tar exposure, alveolar macrophage tumoricidal dysfunction, increased oxidative stress, and bronchial mucosal histopathologic abnormalities as compared to tobacco	

Meeting date:
October 22, 2015

Marijuana Use and Respiratory Health (6)—APPROVED STATEMENTS

			the results of well-designed studies.	<p>smokers or nonsmoking controls.⁵³</p> <p>In a case-control study, the risk of lung cancer increased by about 8% for each joint-year of cannabis smoking, after adjusting for confounding variables.⁵⁴</p> <p>A population based case-control study showed no significant risk of lung cancer with even long-term or heavy use of marijuana.⁵⁵</p> <p>Heavy cannabis smoking was significantly associated with more than a twofold risk of developing lung cancer over the 40-year follow-up period in a large cohort study.⁵⁶</p>	
Pre-malignant lesions in airways	SUBSTANTIAL evidence that heavy marijuana smoking is associated with pre-malignant			Chronic inflammatory and precancerous changes in the airways have been identified in cannabis smokers and the most recent case-control study shows an	Heavy marijuana smoking is strongly associated with pre-malignant lesions in your lungs.

Meeting date:
October 22, 2015

Marijuana Use and Respiratory Health (7)—APPROVED STATEMENTS

	lesions in the airway. ^{57,58,59}			increased risk of airways cancer that is proportional to the amount of cannabis use. ⁶⁰	
Smoke from water pipes or bongs contain more cancer-causing chemicals	LIMITED evidence from simulated smoking studies that smoke from water pipes or bongs contains more cancer-causing chemicals per milligram of THC compared to smoke from unfiltered joints ^{61,62}				Smoke from water pipes or bongs may contain more cancer-causing chemicals per milligram of THC compared to smoke from unfiltered joints.
Acute use improves airflow	SUBSTANTIAL evidence that marijuana use (inhaled or oral) results in an immediate short-term improvement of lung airflow. ^{63,64,65}				One-time marijuana use (edible or smoked) is strongly associated with immediate, short-term (1 to 6 hours) improved airflow in the lungs of healthy marijuana users and asthmatics.
Respiratory health effects from aerosolizing	INSUFFICIENT evidence to determine if vaporizing				There is currently not enough evidence to determine if aerosolizing or vaporizing marijuana is associated with effects on lung health.

Meeting date:
October 22, 2015

Marijuana Use and Respiratory Health (8)—APPROVED STATEMENTS

/vaporizing	marijuana is associated with respiratory health effects. ⁶⁶				
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Meeting date:
October 22, 2015

Marijuana Use and Respiratory Health (9)—APPROVED STATEMENTS

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Meeting date:

October 22, 2015

Marijuana Use and Respiratory Health (10)—APPROVED STATEMENTS

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Meeting date:
October 22, 2015