Marijuana is the most commonly used illicit drug in the United States. The prevalence of marijuana use has remained stable over the past several years, with 14.6 million persons older than 12 years reporting past-month use in 2005. Given the prevalence of illicit use and interest in the medicinal use of marijuana, an understanding of the potential negative health consequences of marijuana smoking is needed. While tobacco smoking is clearly associated with numerous adverse respiratory complications, including increased cough and wheeze, the development of chronic obstructive pulmonary disease (COPD), lung cancer, and an increased incidence of infections, the relationship between marijuana and pulmonary disease is controversial, despite similarities in many compounds found in marijuana and tobacco smoke.

Evidence supports that smoking marijuana is significantly associated with increased respiratory symptoms. In a recent systematic review of the literature, we found that in 14 of 14 articles that focused on this issue, the incidence of respiratory complications was substantially higher for marijuana users than for nonsmokers of marijuana. Symptoms and signs included cough, phlegm, dyspnea, hoarse voice, pharyngitis, and bronchitis. Notably, cough, phlegm, and wheezing remained significantly increased in marijuana smokers after controlling for concomitant tobacco use and other potential confounders in 2 of the higher-quality studies included in our review. The impact of marijuana on pulmonary function and the development of COPD is less clear from the literature. One reason for apparently conflicting data may be that marijuana smoking appears to have potentially different effects on pulmonary function depending on whether testing is done after short-term exposure or long-term use. Past literature suggested that short-term marijuana smoking has a bronchodilating effect. In our systematic review, we confirmed the bronchodilating effect of short-term exposure to marijuana in 11 of 12 experimental studies. However, the data regarding the long-term effects of marijuana use have been conflicting. Despite the association with cough, phlegm, and wheezing, we found that long-term marijuana smoking has not been associated with measures of airflow obstruction or other abnormalities in pulmonary function. In 3 observational cohort studies, no clear association was found between marijuana smoking and longitudinal decline in the forced expiratory volume in 1 second. The association of marijuana smoking with lung cancer also has been controversial. In another systematic review, we assessed 19 articles and found that marijuana smoking was associated with premalignant changes in the lung that included many cytomorphological changes, such as metaplasia, alveolar macrophage tumoricidal dysfunction, and oxidative stress. In addition, all of the 4 studies that measured tar exposure showed increased tar retention in the lungs of marijuana smokers compared with tobacco-only smokers; the association between tar deposition in the lung and the development of lung cancer has been established. Despite the association between marijuana smoking and changes at a cellular level, studies have failed to demonstrate an increased risk of lung cancer in marijuana smokers when controlling for tobacco smoking. Several reports suggested an association between marijuana smoking and pulmonary infections in both immunocompromised and immunocompetent persons. Some of the risk for infection may be...
related to behaviors associated with sharing of marijuana smoke, such as "shotgunning" or "hotboxing," as opposed to exposure to infectious agents within the marijuana itself. Pulmonary infections in marijuana smokers have included pneumonias and tuberculosis. In addition, marijuana smokers may have increased exposure and sensitivity to *Aspergillus* and other fungal pathogens. Finally, marijuana smoking also may be associated with barotrauma. Smoking marijuana differs from tobacco smoking in that marijuana smokers have a larger puff volume, greater depth of inhalation, and longer breath-holding time. Several reports describe pneumomediastinum and pneumothorax in marijuana smokers. Overall, these reviews have led us to conclude that marijuana and tobacco smoking share some negative pulmonary consequences; however, there are some distinct differences. Barotrauma that is seen with marijuana smoking is not generally seen with tobacco smoking and likely results from the differences in smoking dynamics. In addition, with short-term exposure to marijuana smoke, there seems to be an association with bronchodilation that is not seen with tobacco smoking. Both marijuana and tobacco smoking cause cytomorphological changes in the lungs and symptoms of cough, phlegm, and wheezing. Yet despite clear biological plausibility, a direct association between marijuana smoking and the development of lung cancer or COPD has not been determined. A final answer to the question "how does smoking marijuana compare with tobacco smoking in terms of its effects on the lungs?" will not be available until we have carefully designed longitudinal studies that compare the effects of tobacco and marijuana smoking on lung health. As noted in our systematic reviews, prior studies have been of varying quality in the degree to which they have adjusted for tobacco smoking and other confounders and in how they have measured exposures and outcomes. For example, studies have not adjusted for occupational or environmental exposures. Thus, future studies will not only need to account for potential confounding factors but will also need to define standard exposure and outcome criteria to accurately assess potential associations.

**References:**


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