

## The Relationship Between Cannabis and Cancer in Men

Cannabis is the most commonly used illicit drug in Canada, and is much more likely to be used by young people (15 to 24 years) than by adults (25+ years; Canadian Centre on Substance Abuse [CCSA], 2014). In 2013, Canadian men reported nearly double the cannabis use of Canadian women (13.9% vs. 7.4%; Statistics Canada, 2015a). Smoking is the most common way to ingest cannabis, either as a cigarette, or in a pipe or bong (CCSA, 2015).



Research suggests that cannabis smoke cannot be considered safer than tobacco smoke (Maertens et al., 2009). Cannabis smoke has been shown to contain high concentrations of carcinogens also found in tobacco smoke (Skeldon & Goldenberg, 2014), and cannabis users generally take larger puffs and hold their inhalations for longer than tobacco users. This difference in smoking style may increase the carcinogenic properties of cannabis smoke (Wu, Tashkin, Djahed, & Rose, 1988).

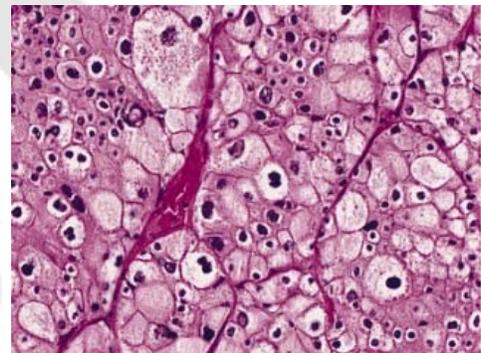
Prospective changes to current federal government legislation regarding cannabis to legalize, regulate, and restrict access to cannabis (Liberal Party of Canada, 2016) may lead to an increase in use (Cerdá, Wall, Keyes, Galea, & Hasin, 2012). Research has shown that young people perceive cannabis as less harmful than cigarettes and other tobacco products (Berg et al., 2015), and adolescents and young people are more likely than older individuals to view cannabis use as having few risks (Pacek, Mauro, & Martins, 2015).

## Research into Cannabis and Cancer

Many researchers agree that the epidemiological evidence on the link between cannabis use and various cancers is inconclusive due to conflicting results from a limited number of studies (Abramovici, 2013). Some argue that the great heterogeneity in these studies may be due to the challenges of quantifying cannabis use, unmeasured confounding factors, or variable expression of cannabinoid receptors in target tissues (Bowles, O'Bryan, Camidge, and Jimeno, 2012). Additionally, research in the area of cannabis use and cancer likely suffers from underreporting because cannabis is still an illegal substance in many jurisdictions (Pujazon-Zazik & Park, 2009).

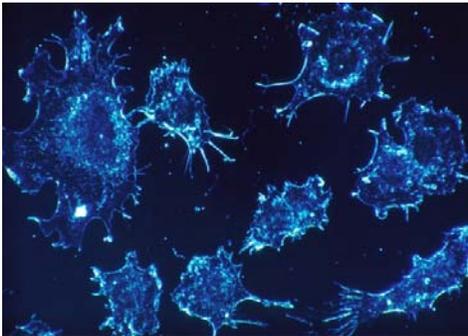
### Testicular Cancer

Testicular cancer is the most common cancer among young men, occurring mainly between 15 and 40 years of age (Winter & Albers, 2011). Most testicular tumours are malignant germ cell tumours (Neinstein, Gordon, Katzman, Rosen, & Woods, 2008). Testicular germ cell tumours (TGCTs) can be classified into the following histological types: non-seminoma, seminoma, or mixed.



Although few research studies have investigated the link between cannabis use and testicular cancer risk, those that have been conducted have all found an association between cannabis smoking and an increased risk of TGCT development. Meta-analyses suggest a strong association between current, long-term, and/or frequent cannabis use and the development of TGCTs, particularly non-seminoma tumours, when compared to individuals who have never used cannabis (Gurney, Shaw, Stanley, Signal, and Sarfati, 2015).

Meta-analysis by Huang et al. (2015) found that ever having used cannabis alone does not appear to be associated with an increased risk of TGCTs. The researchers argue that these studies provide enough information to conclude that there is an association between frequent and long-term cannabis use and increased incidence of TGCTs. Additionally, early exposure to cannabis (<18 years) may be associated with an increased risk of developing TGCTs. More research is necessary before drawing conclusions about seminoma or mixed histology TGCTs.



### Bladder Cancer

Bladder cancer is one of the most common genitourinary cancers and is three times more common in men than women (Thomas et al., 2015). Sidney, Quesenberry, Friedman, and Tekewa (1997) found that in men and women aged 15 to 49, current or former cannabis use was not associated with an increased risk of bladder cancers.

Thomas et al. found that in men aged 45 to 69, cannabis use alone, without tobacco use, was associated with a significant reduction in bladder cancer risk. Conversely, Chacko, Heiner, Siu, Macy, and Terris (2006) found that in men aged 45 to 60, transitional cell carcinoma of the bladder was significantly associated with ever having used cannabis, as well as with a higher quantity of cannabis use. The research regarding bladder cancer and cannabis use is complicated by the fact that tobacco smoking is an important risk factor for bladder cancer (Freedman, Silverman, Hollenbeck, Schatzkin, & Abnet, 2011), and research has shown that many tobacco smokers also use cannabis (Agrawal et al., 2011).

### Lung Cancer

Results have been mixed on the possible association between cannabis use and lung cancer. Fischer, Imtiaz, Rudzinski, and Rehm (2016) suggest that studies of cannabis and lung cancer suffer from confounding due to large overlaps with tobacco use, limited consistency in quantification of frequency and quantity of cannabis use, and a substantial time lag between risk exposure and disease outcome (that is, over 20 years). Lutchmansingh, Pawar, and Savici (2014) argue that although epidemiological studies are still inconclusive about cannabis risks, particularly due to this long time lag, individuals should still be advised that smoking cannabis might lead to serious short-term or long-term respiratory complications that are potentially as serious as those from tobacco smoke.

Bowles et al. (2012) cite evidence that cannabis smoke has been shown to be carcinogenic in the lungs of rodents; despite this, the authors argue that research studies have had difficulty strongly

correlating cannabis use with the development of various cancers. However, Mehra, Moore, Crothers, Tetrault, and Fiellin (2006) were able to demonstrate that cannabis smoking is associated with premalignant cancerous changes in the lung.



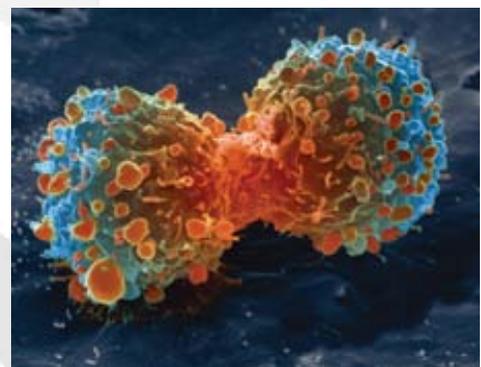
Research has shown lung cancer risk to increase in proportion to frequency of tobacco smoking, that is, heavy smokers have a greatly increased risk of lung cancer (Pope et al., 2011), and some research suggests this relationship for cannabis as well (Taylor, 1988; Sridhar et al., 1994; Callaghan et al., 2013). This is particularly relevant as Canadian males are more likely to be heavy smokers than Canadian females (23.5% vs. 14.2% in 2011; Statistics Canada, 2015b).

Several research studies have posited possible interaction effects between cannabis and tobacco (Zhang et al., 1999; Sasco et al., 2002; Berthiller et al., 2008; Imtiaz et al., 2016; and others). Sridhar et al. (1994) identified that more cannabis users than non-users also smoke tobacco which could contribute to additive or synergistic harmful effects on the lung. Some research studies have also noted an “uncharacteristic” presentation of lung cancers in young cannabis users, which suggests that cannabis smoke speeds the development of carcinoma (Sridhar et al., 1994; Aldington et al., 2008b).

Huang et al. (2015) argue that studies of cannabis and lung cancer have not been able to demonstrate consistent associations because the quantities of cannabis that individuals smoke is much smaller than the quantities of tobacco that individuals smoke. However, upon consideration of past research on cannabis and lung cancer, both Fischer et al. (2016) and Imtiaz et al. (2016) report finding the evidence to be sufficient for causality.

### Head and Neck Cancers<sup>a</sup>

Several research studies have found no association between cannabis use and the development of head and neck cancers in general. In a study of various head and neck cancers in individuals younger than 55 years, Aldington et al. (2008a) found no increased risk attributable to cannabis smoking. Berthiller et al. (2009) investigated risk factors for head and neck cancer cases, comparing them to controls, and found no increased risk associated with cannabis use in general, nor based on increasing frequency, duration, or lifetime consumption. De Carvalho et al. (2015) conducted a meta-analysis of matched case-control studies on cannabis use and head and neck



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<sup>a</sup> Cancers of the head and neck generally include those that start in the oral cavity, nasal cavity, paranasal sinuses, pharynx, larynx, or salivary glands.

cancers and found no association between ever use of cannabis and development of head and neck cancers, even after controlling for other factors, including tobacco use.

Zhang et al. (1999) noted that cannabis use conferred a greater risk of head and neck squamous cell carcinoma (HNSCC) in younger people; however Llewellyn et al. (2004) who specifically investigated HNSCC in individuals under age 40, found no association. Further research is necessary to determine whether cannabis use is of particular risk for young people in the development of HNSCC.

## What Do the Findings Indicate?

Insufficient research has been conducted to adequately assess the effect of cannabis use on the development of human cancers in men, with the exception of non-seminoma testicular germ cell tumours (Tashkin, Baldwin, Sarafian, Dubinett, & Roth, 2002; Hashibe et al., 2005; Tashkin, 2005; Hashibe et al., 2006; Pujazon-Zazik & Park, 2009; Bowles et al., 2012; Abramovici, 2013; Huang et al., 2015; de Carvalho et al., 2015; and others). Considering that legalization of cannabis in the near future may lead to increased consumption, more research should be devoted to understanding the risks and preventative factors associated with cannabis use and various cancers. Future cannabis research may be facilitated by legalization as it could reduce underreporting by cannabis users, and therefore afford more opportunity to investigate possible associations between cannabis and cancer. This could potentially improve the quality and quantity of cannabis research.



Learn more about cannabis and cancer from the following organizations:

- [The Canadian Cancer Society](#)
- [Health Canada](#)

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