

Cannabinoids and Health

Module 8

Lecture 2: Can Cannabis Cause Cancer?

Can Cannabis Cause Cancer?

- Tobacco and alcohol clearly cause cancer
- Cannabis use is associated with cigarette smoking, and both cannabis and tobacco smoke contain carcinogens
- These potential risk factors prompted epidemiological research examining the association between cannabis use and the risk of developing several types of cancer
- The National Academy of Sciences reviewed evidence on the link between cannabis use and cancer.
 - The committee concluded the following based on evidence from systematic reviews and meta-analyses

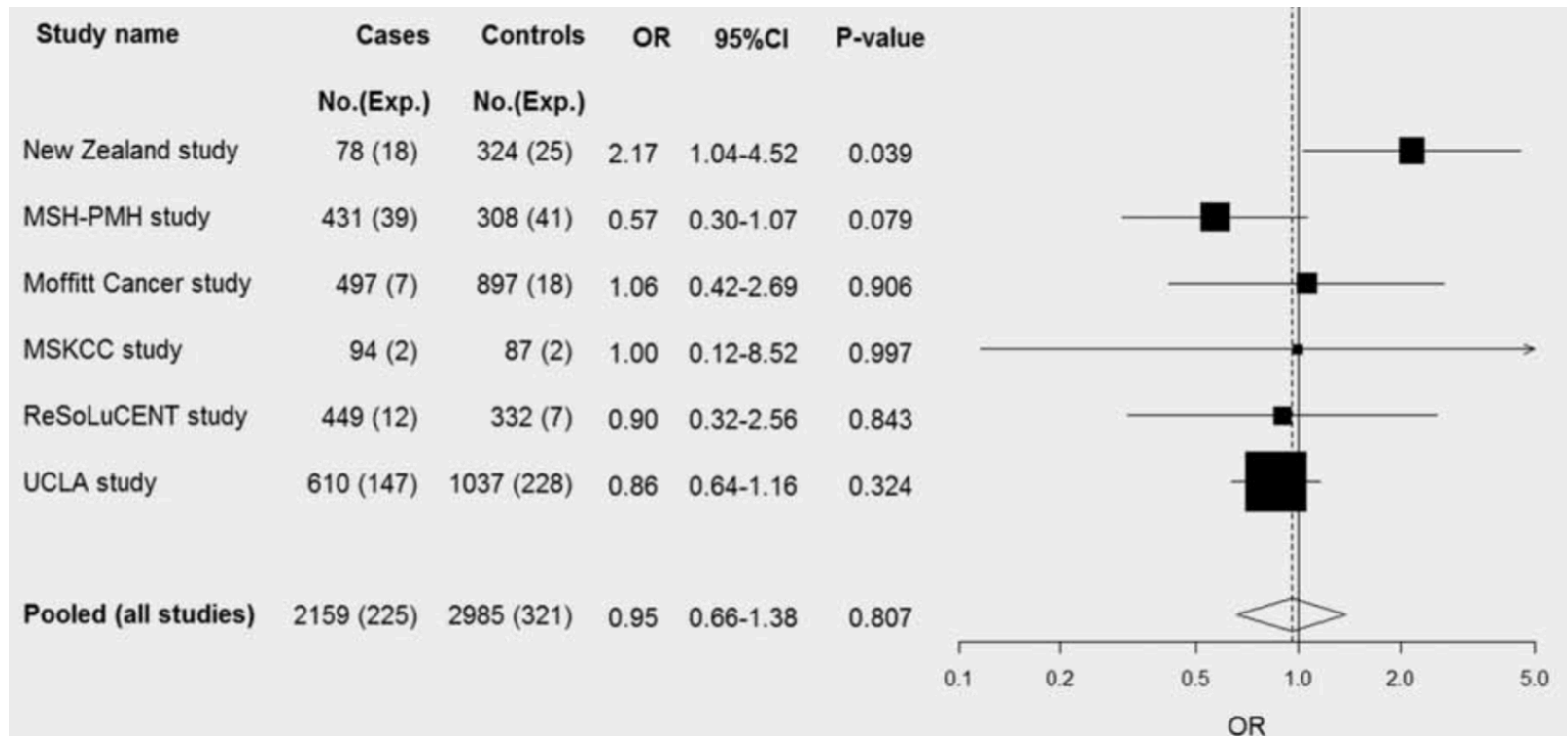
Can Cannabis Cause Cancer?



Cannabis smoking and lung cancer risk: Pooled analysis in the International Lung Cancer Consortium

Li Rita Zhang¹, Hal Morgenstern^{2,3,4}, Sander Greenland⁵, Shen-Chih Chang⁵, Philip Lazarus⁶, M. Dawn Teare⁷, Penella J. Woll⁷, Irene Orlow⁸, Brian Cox⁹ on behalf of the Cannabis and Respiratory Disease Research Group of New Zealand, Yonathan Brhane¹, Geoffrey Liu¹⁰ and Rayjean J. Hung^{1,11}

- Lung Cancer
 - “*moderate evidence of no statistical association between cannabis use*”



Can Cannabis Cause Cancer?



Contents lists available at [ScienceDirect](http://www.sciencedirect.com)

Archives of Oral Biology

journal homepage: www.elsevier.com/locate/aob

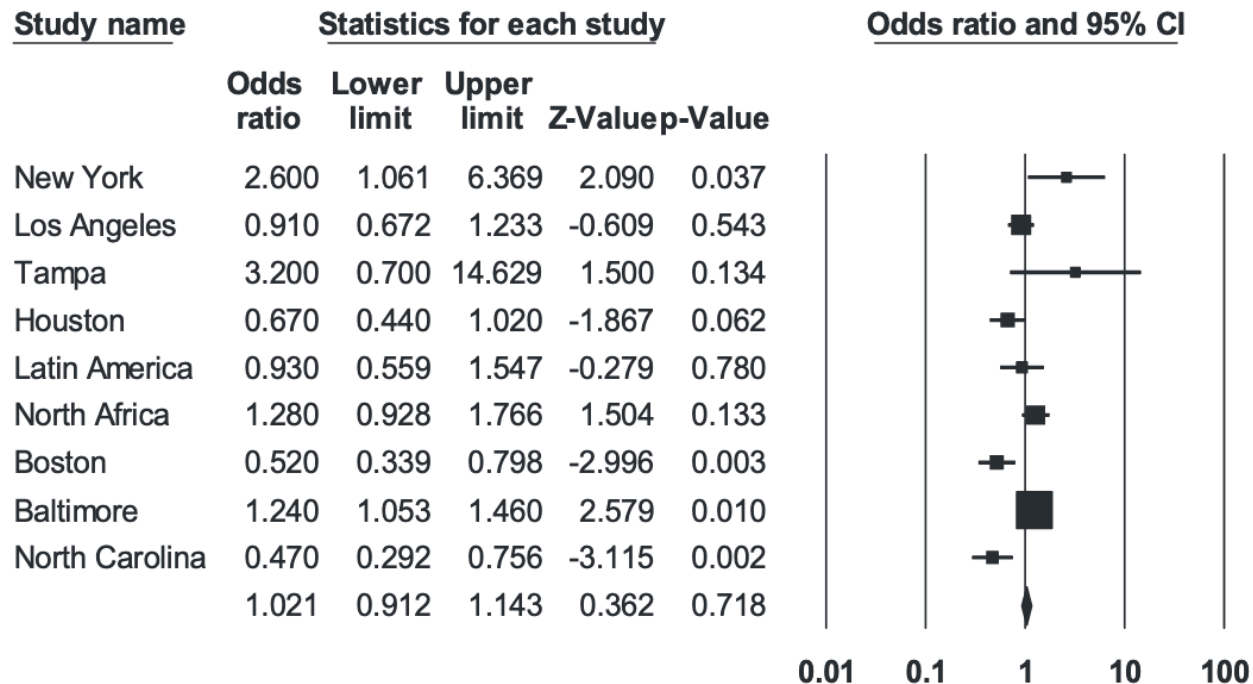


Review

Head and neck cancer among marijuana users: A meta-analysis of matched case-control studies



- Head and Neck Cancer
 - “*moderate evidence of no statistical association between cannabis use*”



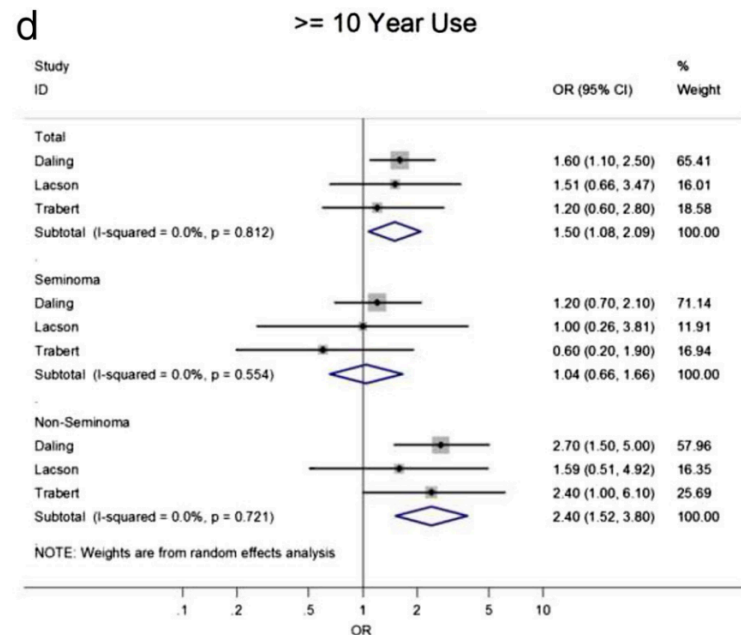
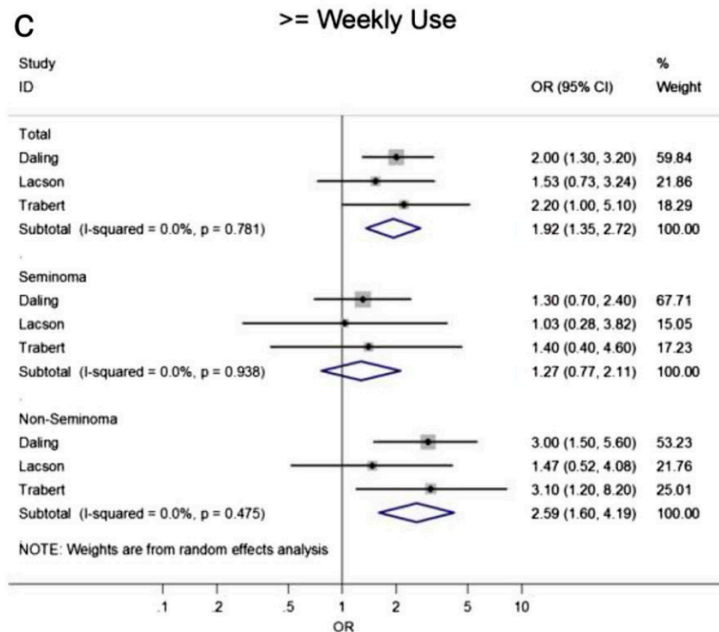
Can Cannabis Cause Cancer?

RESEARCH ARTICLE

Cannabis exposure and risk of testicular cancer: a systematic review and meta-analysis

J. Gurney*, C. Shaw, J. Stanley, V. Signal and D. Sarfati

- Testicular germ cell tumors
- “limited evidence” of a statistical association between cannabis smoking and:



Can Cannabis Cause Cancer?

- *“no or insufficient evidence to support or refute” associations with:*
 - Incidence of esophageal cancer
 - Incidence of prostate, cervical, penile, anal, or bladder cancers
 - Malignant gliomas, non-Hodgkin lymphoma, or Kaposi’s sarcoma
 - Leukemia, rhabdomyosarcoma, astrocytoma, or neuroblastoma (of parents who use)
- That is, there was insufficient evidence, or a lack of quality studies, to draw any conclusions on these condition

Can Cannabis *Cure* Cancer?

- A minority of participants (~16%) in prior studies have suggested they believe that cannabis, on its own, can treat cancer.
- In another study (Pergman et al), 26% believed that cannabis was helping to treat their cancer
 - 5% indicated that this was their only reason for use

Rates of cannabis use in patients with cancer


K. Martell MD,* A. Fairchild MD,[†] B. LeGerrier MRT(T),[†] R. Sinha MD,* S. Baker MD,[†] H. Liu MD,[‡] A. Ghose MD,[§] I.A. Olivetto MD,* and M. Kerba MD*

TABLE III Opinions about cannabis use from 1987 respondents

Statement	Opinion [n (%)]
Cannabis helps cure cancer	
Strongly agree or agree	326 (16)
Unsure or no response	945 (48)
Disagree or strongly disagree	716 (36)

Original Article

Cannabis Use Among Patients at a Comprehensive Cancer Center in a State With Legalized Medicinal and Recreational Use

Steven A. Pergam, MD, MPH ^{1,2,3,4}; Maresa C. Woodfield, BS¹; Christine M. Lee, PhD^{5,6}; Guang-Shing Cheng, MD^{2,3}; Kelsey K. Baker, MS²; Sara R. Marquis, MPH¹; and Jesse R. Fann, MD, MPH^{2,5}

Can Cannabis *Cure* Cancer?

- Several documentaries have promoted this view
- Lots of information on the internet and youtube videos on this topic
- However, the NAS committee reviewed this literature and noted:

CONCLUSION 4-2 There is insufficient evidence to support or refute the conclusion that cannabinoids are an effective treatment for cancers, including glioma.

Why is there information suggesting otherwise?

- There are a number of in vitro (cells in a dish) and animal studies indicating that cannabinoids suppress tumor growth and proliferation
- Rocha et al. (2014), *Journal of Neuro-Oncology*, provides a review of studies on one type of cancer (glioma) and concludes that there is evidence of anti-tumor effects
- This DOES NOT mean it works that way in humans
- But it does mean that research in humans should be done

Unintended Consequences?



ORIGINAL ARTICLE

Integrating cannabis into clinical cancer care

D.I. Abrams MD*

“One of the more distressing situations that oncologists increasingly face is trying to counsel the patient who has a curable diagnosis, but who seeks to forego conventional cancer treatment in favor of depending on cannabis oil to eradicate their malignancy because of the large number of online testimonials from people claiming such results. Given my long practice... I can assume that a large proportion of my patients have used cannabis during their journey. If cannabis cured cancer, I would have a lot more survivors in my practice today....”

It might be possible, but there is, as yet, no solid evidence to support (the belief that cannabis oils can cure cancer).”

Can Cannabis *Cure* Cancer?



ORIGINAL ARTICLE

Integrating cannabis into clinical cancer care

D.I. Abrams MD*

- Abrams suggests that optimism of cannabinoids to cure cancer originates from a 1975 rodent study.
 - Investigators reported that Δ^9 -THC, Δ^8 -THC, and CBD inhibited the growth of cancerous cells *in vitro* and in mice (Lewis lung adenocarcinoma cells).
- Cannabinoids are thought to have anticancer effects via CB1 receptors.
 - *In vitro* and rodent studies suggest that cannabinoids can inhibit gliomas.
 - Further, cannabinoids appear to induce apoptosis (cell death) likely via CB1r.
- These findings come with one important, and probably obvious, caveat....

Can Cannabis *Cure* Cancer?



ORIGINAL ARTICLE

Integrating cannabis into clinical cancer care

D.I. Abrams MD*

- People aren't rodents, and *in vitro* studies don't necessarily translate to medicine.
 - Thus, like many promising findings from rodent and laboratory models, most benefits of cannabis do not seem to apply to humans.
- “Currently, we can be confident that cannabis could have utility in *symptom management* for patients living with and beyond cancer.... To be able to suggest a single agent that could hold benefit in the treatment of nausea, anorexia, pain, insomnia, and anxiety instead of writing prescriptions for 5 or 6 medications that might interact with each other or with cancer-directed therapies seems advantageous.”

Conclusions

- Unlike tobacco, no compelling evidence that cannabis causes cancer, including lung cancer
 - Limited evidence of association with testicular cancer
- Some internet sites promote notion that cannabis cures cancer
 - There is evidence in cells in a dish and in rodents that cannabinoids have anti-tumor activity
 - There is NO conclusive evidence in humans
- Dangerous and unintentional consequence of this misinformation is that patients may wait to seek out oncologists and effective treatments
 - Waiting can lead to cancer progression and spread