SUPPLEMENTAL TEXT
Detailed Analysis of Articles

Scientific Quality of Health-Related Articles in Specialty Cannabis and General Newspapers in San Francisco

DETAILED ANALYSIS OF INDIVIDUAL ARTICLES

GREENSTATE

Cannabis superfoods tout their health effects
Ellen Holland, November 27, 2017
Article: http://www.greenstate.com/health/cannabis-superfoods-tout-health-effects/

***Summary**:*
This article discusses several new 'healthier' cannabis-infused edibles: Swerve Bars, Fruit Slabs, Native Seed Lift Bars, Utopia Farms Macaroons, and OM Edibles CBD Toasted Sesame Miso Broth, and Lifted Superfood Brownie Bites. For each of these products, the article discusses potential benefits from taking the edible (ease nausea, treat irritable bowel syndrome, balance of body, mind, and spirit).

Category	Score
Applicability	4.0
Opinions vs Facts	1.3
Validity	1.3
Magnitude	1.7
Precision	1.3
Consistency	1.3
Consequences-Benefits	2.3
Consequences-Risks and Costs	1.3
Overall	1.3

***Critique**:*
The article promotes five cannabis infused edibles as products that are unambiguously healthy. There is no discussion of the risks associated with ingesting edibles, such as increased risk of injury and death (NAS 9-3),[1] impairment of learning and memory (NAS 11-1a), progression to problem cannabis use (NAS 13-1), or the development of schizophrenia or other psychoses (NAS 12-1).

The article claims superfood edibles work alongside cannabis "in the most curative way possible." However, in domains where cannabis is known to have therapeutic effects, there is not evidence that these 'healthier' edibles have increased efficacy compared to other types of edibles.
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The article claims OM Edibles CBD Toasted Sesame Miso Broth is a "soothing way to ease nausea and treat conditions such as irritable bowel syndrome." While there is strong evidence that cannabis can act as an antiemetic in the treatment of chemotherapy-induced nausea (NAS 4-

[1] National Academy of Sciences Report Chapter 9, Conclusion 3, abbreviated: (NAS 9-3).

3), there is no evidence that cannabis improves the symptoms of irritable bowel syndrome (NAS 4-5).

Since similar articles feature a disclaimer that the included product reviews are independent of industry sponsorships; this particular article does not, raising the possibility of conflicts of interest.

Here's the science behind cannabis therapies for pain, inflammation
Emily Earlenbaugh, November 28, 2017
Article: http://www.greenstate.com/explained/heres-science-behind-cannabis-therapies-pain-inflammation/

***Summary**:*
This article presents a comprehensive summary of the current state of medical knowledge on the effects of cannabis on chronic pain and inflammation. The authors reference the growing body of medical literature (including the 395-page NAS report) on the safety and efficacy of medical cannabis. The authors discuss the fundamentals of the endocannabinoid system and its role in inflammation and pain. Medicinal marijuana is discussed as a safer alternative to opioids for pain management, citing a 2016 JAMA Internal Medicine study.[2] Finally, the authors discuss a need to include marijuana in medical education.

Category	Score
Applicability	4.7
Opinions vs Facts	4.3
Validity	5.0
Magnitude	4.3
Precision	3.3
Consistency	4.0
Consequences-Benefits	4.3
Consequences-Risks and Costs	1.3
Overall	4.3

***Critique**:*
This is a generally sound article, well supported by evidence. The findings discussed are in agreement with the current scientific understanding on the effects of cannabis use on types of chronic pain and inflammation (NAS 4-1). The article does not compare the efficacy of marijuana to that of ibuprofen or opioids in regards to pain management in the conditions described. The author brings up the psychoactive properties of cannabis, but not other adverse effects which may have strengthened the article.

[2] Opioid Overdose [Internet]. Centers for Disease Control and Prevention. Centers for Disease Control and Prevention; 2017 [cited 2018 Jan 17]. Available from: https://www.cdc.gov/drugoverdose/data/prescribing.html

Maternal cannabis use didn't hurt kids' grades, study finds
Emily Earlenbaugh, November 28, 2017
Article: http://www.greenstate.com/explained/mothers-cannabis-use-didnt-hurt-kids-grades-study-finds/

***Summary**:*
This article discusses a new study[3] based on data from 6018 families from the Avon Longitudinal Study of Parents and Children. According to the authors, the study suggests cannabis use during pregnancy does not cause lasting effects on offspring brain development. The article acknowledges the research is controversial, with many experts disagreeing. It discusses the many confounding factors in the study and other limitations in the paper's conclusion. The article mentions that the American College of Obstetricians and Gynecologists discourages marijuana use during pregnancy but claims the research suggesting cannabis is harmful is ambiguous. The author does refer to other studies which point to lower birth weights for babies of mothers who use marijuana. Finally, the article refers to recent reviews and meta-analyses which fail to show an association between maternal cannabis use and lasting negative associations.

***Critique**:*
The article claims the 2017 National Academy of Sciences, Engineering and Medicine report was unable to link smoking cannabis during pregnancy with any negative later outcomes (lower socioeconomic status, educational attainment, etc) for the baby. While this is true, the report also found that there was not sufficient evidence to refute any statistical associations between maternal cannabis smoking and these outcomes (NAS 10-4).

The author often relies on anecdotal evidence to relate to the findings of the article: "I personally know several healthy babies whose mothers used cannabis throughout their pregnancy." However, there is substantial evidence of a statistical association between smoking cannabis during pregnancy and lower birth weight of the offspring (NAS 10-2).

Category	Score
Applicability	4.7
Opinions vs Facts	2.3
Validity	3.3
Magnitude	3.0
Precision	3.0
Consistency	3.7
Consequences-Benefits	3.7
Consequences-Risks and Costs	2.7
Overall	3.3

Besides the statement on lowered birth weight, this article lacks discussion of other complications associated with cannabis use during pregnancy. There is limited evidence of statistical associations between smoking cannabis during pregnancy and (1) pregnancy complications for the mother (NAS 10-1), and (2) admission of the infant to the neonatal intensive care unit (NAS 10-3).

[3] Teyhan A, Evans D, Macleod J. The effect of in utero exposure to alcohol, tobacco and cannabis on educational attainment in adolescence: findings from ALSPAC, a UK cohort study. International Journal for Population Data Science. 2017;1(1) from: http://dx.doi.org/10.1136/jech-2016-208064.3

At points, the author implies that ambiguity or a lack of consensus is the same as "not harmful." For example, in the last paragraph, Earlenbaugh claims that "it is difficult to point to any solid studies that show why [concerns over cannabis' effect on fetal development are high]." While this is true, it is important to note that a lack of association does not imply safety.

Medical marijuana could help many more seniors, but some still see a threat
David Downs, November 28, 2017
Article: http://www.greenstate.com/news/medical-marijuana-could-help-many-more-seniors-but-some-still-see-a-threat/

***Summary**:*
After the passage of California Proposition 64 in November 2016, the sale and cultivation of recreational marijuana became legal in California as of January 1, 2018. This article discusses the ensuing practical challenges in actually bringing medicinal marijuana to San Francisco, especially to seniors. According to the article, American seniors are a population that could greatly benefit from some of these medicinal properties: the author cites CDC data indicating large proportions of seniors have chronic pain, arthritis, insomnia, headaches, and other conditions. Despite this, the article claims many seniors are not educated on the benefits of medicinal cannabis.

The author references the 2017 National Academy of Sciences report for justification, which concludes that cannabis works on chronic pain, nausea, muscle spasms, and some other conditions. The article mentions that some doctors are hesitant to prescribe medicinal cannabis given the potential risks, such as a 26% increase in risk of stroke and a 10% increase in risk of heart failure, according to the American College of Cardiology. The article discusses other challenges in safely locating and buying the drug, discusses cannabis as a safer alternative to opioids, and interviews Dr. Donald Abrams from the UCSF Osher Center for Integrative Medicine. Abrams is an expert in integrative oncology who has done research on medicinal marijuana and has authored several medical textbooks on the topic.

Category	**Score**
Applicability	5.0
Opinions vs Facts	4.0
Validity	3.7
Magnitude	4.0
Precision	2.7
Consistency	4.0
Consequences-Benefits	4.7
Consequences-Risks and Costs	3.0
Overall	4.0

***Critique**:*
The article cites Floyed Huen, a retired geriatrician who is now medical director of the Apothecarium dispensary in San Francisco's Castro district to support the claim that "cannabis cannot cause a fatal overdose." The National Academy of Sciences report found that there is insufficient evidence to support or refute a statistical association between cannabis use and death due to cannabis overdose (NAS 9-4a). The NAS report did find moderate evidence of a statistical

association between cannabis use and increased risk of overdose injuries, especially with children[4] (NAS 9-4b).

The author relies on anecdotal evidence at times that blurs the lines between fact and opinion. In one instance, the author tells a brief story about an elderly patient with diabetes who uses marijuana to manage his symptoms. The National Academy of Sciences report concludes that it is "unclear as to whether and how cannabis use is associated with diabetes." In another anecdote, the author talks about a retired physician, Dr. Paul Holland, who claims to have used cannabis to treat his tremors, loss of appetite, and insomnia after a massive stroke.

The author claims cannabis helps manage diabetes, without providing evidence. In fact, obesity is the greatest risk factor for type 2 diabetes, and stimulation of the endogenous cannabinoid system by THC promotes appetite and fat storage.[5] Bancks et al. in 2015 found a 1.39 adjusted hazard ratio of developing prediabetes in subjects who used marijuana at least 100 times over their lifetime. In other words, subjects who regularly used marijuana displayed a 39% higher lifetime risk of developing prediabetes. Overall, however, the NAS report finds the research is not sufficient to draw a definitive conclusion about the effects of marijuana on diabetes (NAS 6-3a).

Sublingual relief: From underground to under the tongue
Emily Earlenbaugh, November 27, 2017
Article: http://www.greenstate.com/explained/sublinguals-from-underground-to-under-the-tongue/

***Summary**:*
This article provides a general overview of sublingual cannabis, a form of marijuana that can be consumed by placing it under the tongue, where it is absorbed into blood, discussing what it is and how it is used. The author discusses differences in both absorption mechanism, rate, and bioavailability, when compared to smoking and traditional edibles. The author quotes Bonni Goldstein, a medical cannabis physician in Lawndale, California. According to her website,[6] she specializes in the use of cannabis to treat various conditions such as "epilepsy, cancer, autism, and mental health conditions." The article interviews Shannon Hattan, co-creator of sublingual tincture maker Fiddler's Greens. Article acknowledges more research on sublinguals is needed, but promotes them as a discreet alternative to smoking and vaping. The author points to sublinguals as an alternate route to consume cannabis as smoking becomes less socially acceptable.

***Critique**:*
There is an overall lack of medical evidence from the literature. The article's two main sources of information are interviews with Dr. Goldstein and Shannon Hattan, co-creator of sublingual tincture maker Fiddler's Greens.

[4] Onders B, Casavant MJ, Spiller HA, Chounthirath T, Smith GA. Marijuana Exposure Among Children Younger Than Six Years in the United States. Clinical Pediatrics. 2015Jul;55(5):428–36.
[5] Marzo VD, Piscitelli F, Mechoulam R. Cannabinoids and Endocannabinoids in Metabolic Disorders with Focus on Diabetes. Diabetes - Perspectives in Drug Therapy Handbook of Experimental Pharmacology. 2011;:75–104.
[6] http://www.bonnigoldsteinmd.com/ Accessed 17 Jan 2018

Category	Score
Applicability	4.7
Opinions vs Facts	3.0
Validity	1.0
Magnitude	1.0
Precision	1.0
Consistency	1.0
Consequences-Benefits	3.3
Consequences-Risks and Costs	1.0
Overall	2.0

The opening paragraph uses anecdotal evidence to claim that various pharmaceuticals are less effective and more toxic than marijuana in the treatment of rheumatoid arthritis. A rheumatoid arthritis patient, Sarah Wall, claims the pharmaceuticals prescribed by her doctor caused painful gastric problems, and ultimately found that cannabis more effectively delivered pain relief without any of the side effects.

The article does not discuss any of the short-term adverse effects of cannabis and cannabinoids, including dizziness, dry mouth, nausea, fatigue, somnolence, euphoria, vomiting, disorientation, drowsiness, confusion, loss of balance, and hallucination.[7] Additionally, Shannon Hatton, the co-creator of Fiddler's Greens sublingual tincture maker, compares taking cannabis several times per day to "taking Advil." This article could have been strengthened if it referenced clinical trials comparing the efficacy or toxicity of ibuprofen to cannabis.

New frontiers open for cannabis dermatology
David Downs, November 27, 2017
Article: http://www.greenstate.com/explained/cannabis-opens-new-frontiers-dermatology/

Summary:
This article follows the story of several patients who used cannabis topicals (lotions, ointments and other skin products) and saw improvements in various conditions. The article acknowledges that few placebo-controlled human trials have been conducted, but references lab, cell, and animal studies, as well as patient self-reports suggesting that cannabinoids are safe to use for skin care. While several pharmaceutical companies are working through FDA pathways to bring cannabis skin products to market, the article discusses various non-FDA-approved versions of these topicals, such as Xternal. The author interviews Dr. Robert Dellavalle, a professor of dermatology at University of Colorado who discusses the potential for topicals as a therapeutic for skin diseases. In April 2017, Dellavalle published a commentary in the Journal of the American Academy of Dermatology titled *The role of cannabinoids in dermatology.*[8] The author also includes an interview with a nurse practitioner from Berkeley who shares her thoughts on medicinal cannabis applied as a topical. Concludes with a statement of uncertainty and an acknowledgement that the data discussed is largely anecdotal, but the author remains optimistic that the effectiveness will prove to be true.

[7] Whiting PF. Cannabinoids for Medical Use: A Systematic Review and Meta-analysis. JAMA. 2015Jun23;313(24).
[8] Mounessa JS, Siegel JA, Dunnick CA, Dellavalle RP. The role of cannabinoids in dermatology. Journal of the American Academy of Dermatology. 2017;77(1):188–90.

***Critique**:*
The author largely relies on anecdotal evidence and personal stories. For example, the nurse from Berkeley who is interviewed speculates that the actual cause of fibromyalgia and psoriasis may turn out to be "endocannabinoid-deficiency disorders," despite no current medical evidence to suggest that is the case.

Category	**Score**
Applicability	4.3
Opinions vs Facts	4.0
Validity	3.0
Magnitude	2.3
Precision	2.0
Consistency	2.3
Consequences-Benefits	4.0
Consequences-Risks and Costs	1.3
Overall	2.7

The article incorrectly refers to Dellavalle's April 2017 commentary in the Journal of the American Academy of Dermatology[12] as a "study."

There is conflation between what is fact and what is opinion. Expert researcher opinions, such as those of Dr. Robert Dellavalle, are intermixed with those of patients, nurses, and other doctors, such as Jeanette Jacknin, a holistic dermatologist, author, and "professional speaker", according to her website, who does not do research.

The article claims Dr. Jacknin researches topical cannabinoids, but she has not actually published any peer-reviewed studies. She also has a vested interest in the "business side of the cosmeceutical industry" according to her website.

The article does not discuss any of the short-term adverse effects of cannabis and cannabinoids, including dizziness, dry mouth, nausea, fatigue, somnolence, euphoria, vomiting, disorientation, drowsiness, confusion, loss of balance, and hallucination.[11]

Challenging assumptions around marijuana addiction
Maia Szalavitz, November 26, 2017
Article: http://www.greenstate.com/health/challenging-assumptions-around-marijuana-addiction/

***Summary**:*
The article defines addiction as "compulsive behavior despite negative consequences" and contrasts this to physical dependence "which is when the body needs a drug to function regularly." The author explains that since the 1980s, addiction was viewed as either a physical or psychological need of a substance to avoid withdrawals, whereas marijuana addiction could be managed by self-discipline. The article states that the more updated definition is recognized by DSM 5, which is the reference manual used by clinicians that describes mental health disorders and is published by the American Psychiatric Association, as well as the National Institute of Drug Abuse (NIDA). The article states that 9% of marijuana users are addicted. The author further claims that marijuana addiction results in a lower magnitude of harm compared to opioids or alcohol, and recommends avoiding dealing with it through the criminal justice system, addressing underlying mental illnesses, and separating teens in rehab from those in rehab for opioid, cocaine, and methamphetamine problems.

***Critique**:*
The article provides a brief and accurate description of the evolution of the definition of addiction. The author then claims that the negative effects of marijuana addiction are lower compared to other addictions, without providing support.

The article's definition of addiction is consistent with NIDA's definition of addiction of "a chronic, relapsing disease characterized by compulsive drug-seeking and use despite negative consequences and by long-lasting changes in the brain."[9] DSM-5 does not have a specific definition for addiction, but rather for "substance use disorder." There are several criteria listed by DSM-5 that can qualify for substance use disorder,[10] including the description provided by the article. Also included in this criteria are physical withdrawals and a buildup of tolerance, which is the definition that the author attempted to refute throughout the article.

Category	**Score**
Applicability	4.3
Opinions vs Facts	3.3
Validity	4.3
Magnitude	3.0
Precision	3.7
Consistency	3.7
Consequences-Benefits	3.0
Consequences-Risks and Costs	5.0
Overall	4.0

The 2014 Surgeon General Report *The Health Consequences of Smoking: 50 Years of Progress* describes the history of addiction in the context of tobacco use.[11] Similar to the article's claims, the report explains that in 1957 the World Health Organization defined addiction through physical dependence and withdrawal. It references that the 1988 report of the Surgeon General included cigarettes as addicting, which was part of a change of opinion of what constituted addiction. Finally, the National Academy of Science report in 2017 refers to cannabis as an addictive substance (NAS p. 126).

Despite the minor inconsistencies, the article is a well researched piece on the nature and history of addiction in the context of cannabis.

[9] National Institute on Drug Abuse. Glossary. Available at: https://www.drugabuse.gov/publications/media-guide/glossary. Accessed Jan 20, 2018
[10] National Institute on Drug Abuse. The Science of Drug Abuse and Addiction: The Basics. Available at: https://www.drugabuse.gov/publications/media-guide/science-drug-abuse-addiction-basics. Accessed Jan 20, 2018
[11] U.S. Department of Health and Human Services. The Health Consequences of Smoking: 50 Years of Progress. A Report of the Surgeon General. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2014. Printed with corrections, January 2014.

Does 'spraying' cannabis beat smoking it?
Emily Earlenbaugh, November 26, 2017
Article: http://www.greenstate.com/reviews/cannabis-spray-reviews-marijuana-spray/

***Summary**:*
This article states that sublingual sprays and tinctures are an alternative to smoking cannabis. It states that they come in a range of formulas and aromas, and are being taken as medications or for lifestyle uses. It then proceeds to give brief descriptions of a variety of products: Care by Design, Thera-Cann High CBD Spray, Forest Nymph Botanicals Sweet Dreams Tincture, Fiddler's Greens Raw Tinctures, and Moxie Meds Relief and Recovery Tinctures. The article briefly explains that THC is the main ingredient that causes euphoria, and that CBD calms anxiety and limits the effect of THC. The author states that the Thera-Cann product has been reported to treat pain by patients, the Sweet Dreams Tincture will aid in sleep, Fiddler's Greens Raw Tinctures contains THC-A which offers pain relief with less euphoria than THC, and Moxie Meds products were made to treat menstrual cramps, hormone-related stress and other "reproductive concerns", and contain beta-caryophyllene which has been shown to aid with pain, inflammation, anxiety, and depression.

***Critique**:*
This article provides a mix of assertions that are supported by the literature and some that are not. It is often unclear throughout the article which statements were made by the author as assertions, and which were made by the companies selling the products being described.

Category	**Score**
Applicability	4.3
Opinions vs Facts	1.0
Validity	1.3
Magnitude	1.0
Precision	1.0
Consistency	1.0
Consequences-Benefits	4.3
Consequences-Risks and Costs	1.0
Overall	1.3

CBD, or cannabidiol, has been shown to lack the intoxicating of properties of THC. However, it has not been thoroughly demonstrated that CBD is a treatment for anxiety and limits the effect of THC as the author asserts. In contrast, the available literature shows evidence that daily cannabis use is associated with an increase in anxiety (NAS 12-8b, 12-8a, 12-9). Cannabis has been shown to be effective in the treatment of chronic pain (NAS 4-1), which is roughly in agreement with the article. There is moderate evidence that cannabinoids improve short term sleep outcomes in certain patient populations (NAS 4-19), and this qualification would be important for the author to provide.

There has not been significant evidence that cannabis can effective treat menstrual cramps, hormone-related stress, or other "reproductive concerns," and the evidence that beta-caryophyllene improves pain, inflammation, anxiety, and depression has not been definitively demonstrated in humans.[12] Clarifying whether these

[12] Varga ZV, Matyas C, Erdelyi K, Cinar R, Nieri D, Chicca A, Nemeth BT, Paloczi J, Lajtos T, Corey L, Hasko G, Gao B, Kunos G, Gertsch J, Pacher P. β-Caryophyllene protects against alcoholic steatohepatitis by attenuating inflammation and metabolic dysregulation in mice. Br J Pharmacol. 2018 Jan;175(2):320-334.

assertions were opinions of the sellers of the product, the author, or significantly supported by evidence would strengthen this article.

Is marijuana bad for the heart? What you need to know
Emily Earlenbaugh, November 26, 2017
Article: http://www.greenstate.com/explained/marijuana-bad-heart-need-know/

***Summary**:*
The article begins by stating that THC can increase heart rate, affect blood pressure, prompt angina with less exercise, and trigger cardiac events in those at risk. It cites a website of the American College of Cardiology in support of these claims. The author then states that there is limited evidence of an association between cannabis and strokes and triggering of heart attacks, citing the 2017 National Academy of Science review of cannabis. It further references a study[13] that linked cannabis use to stress cardiomyopathy, and states that there have been reports of young people having fatal cardiac events, but there is no overall association between cannabis use and cardiovascular mortality.

The author then transitions into beneficial associations with cannabis. The first association is that cannabis use lowers the risk of obesity, has been suggested to lower the risk of heart disease, to reduce the damage from heart attacks, that CBD has antiarrhythmic properties, and cannabis use decreases the risk of diabetes. Finally, the article claims that cannabis is an anti-inflammatory agent, and cites American Heart Association research that cannabis is protective against peripheral vascular disease. The author concludes with a measured statement that cannabis can be helpful or harmful, and more research is needed.

Category	**Score**
Applicability	5.0
Opinions vs Facts	5.0
Validity	5.0
Magnitude	4.7
Precision	3.7
Consistency	4.7
Consequences-Benefits	4.7
Consequences-Risks and Costs	4.7
Overall	4.7

***Critique**:*
The article presents a significant body of evidence in support of the potentially negative and positive consequences of cannabis use. The claims that cannabis can increase heart rate, alter blood pressure, reduce exertion to angina, and increase cardiac events in those at risk are supported by the 2017 National Academy of Science review, which summarized a large body of cannabis research in humans to date (NAS 6-1). However, the article noted that it was THC, rather than cannabis that was associated with these effects. The article correctly states that there is limited association between cannabis with acute myocardial infarction and stroke (NAS 6-1a, 6-2).

[13] Singh, A. et al. Marijuana (cannabis) use is an independent predictor of stress cardiomyopathy in young men [abstract]. Circulation 134, A14100 (2016).

In regard to the reported protective effects, there are studies that have found an inverse relationship between cannabis use and obesity.[14] However, the author states that there is a lowered risk of obesity with cannabis use, which is not what the research states. The research cited that demonstrated the lower risk of heart disease, reduced damage from myocardial infarction,[15] and the antiarrhythmic properties[16] of cannabis were performed in mouse and rat models. The claims that there is a lower risk of diabetes, and that cannabis has anti-inflammatory properties is supported by limited evidence in humans (NAS 6-3a, 8-1a). Overall, the research presented for the protective effects associated with cannabis could have been more precise if the studies were qualified by stating that they were in animal models or that there was limited research in support of these effects. Despite these limitations, the article as a whole was informative and measured for readers.

Cancer: Can cannabis really cure it?
Emily Earlenbaugh, November 26, 2017
Article: http://www.greenstate.com/health/explainer-does-marijuana-cure-cancer/

***Summary**:*
The article begins with two anecdotes of cancer patients who apparently were cured after only using marijuana. Dennis Hill had prostate cancer, decided to use cannabis over chemotherapy, and fully recovered in six months. Kelly Hauf used cannabis oil for eight months which fully eliminated her brain tumor. The author then cites Dr. Donald Abrams of UCSF as cautioning against cannabis as a cure, but notes it can help with side effects of cancer. The article further cites the 2017 National Academy of Science review on cannabis in agreement with Dr. Abrams. The article continues to a section titled "Science Shows Cannabis Has Anti-Cancer Properties," which cites a study that found a proapoptotic effect of endocannabinoids in a prostate cell line. The author further cites research from David Meiri, an Israeli researcher who reported to have "successfully killed brain and breast cancer cells through exposure to cannabis." The article concludes by stating that various cancers may respond to cannabis in distinct ways, and that future research and clinical trials are needed. The final sentence states "patients must decide whether to wait indefinitely or follow in the footsteps of patients before them - experimenting with cannabis on their own."

Category	Score
Applicability	5.0
Opinions vs Facts	4.3
Validity	4.0
Magnitude	3.7
Precision	2.3
Consistency	2.7
Consequences-Benefits	4.7
Consequences-Risks and Costs	3.3
Overall	2.7

[14] Warren M, Frost-Pineda K, Gold M. Body mass index and marijuana use. J Addict Dis. 2005;24(3):95-100.
[15] Waldman M, Hochhauser E, Fishbein M, Aravot D, Shainberg A, Sarne Y. An ultra-low dose of tetrahydrocannabinol provides cardioprotection. Biochem Pharmacol. 2013 Jun 1;85(11):1626-33.
[16] Gonca E, Darıcı F. The effect of cannabidiol on ischemia/reperfusion-induced ventricular arrhythmias: the role of adenosine A1 receptors. J Cardiovasc Pharmacol Ther. 2015 Jan;20(1):76-83.

***Critique**:*
The article accurately portrays cannabis as a treatment for the side effects of cancer, as stated in National Academy of Science (NAS) 2017 review. It also clearly states Dr. Abrams' caution against using cannabis as a treatment for cancer itself. However, the article's inclusion of testimonials of patients being cured of cancer is in direct contradiction Dr. Abram's 2016 review on cannabis and cancer,[17] where he stated that "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." The testimonials are from patients with prostate cancer and brain cancer, and according to the NAS report, there is no or insufficient evidence to support or refute that cannabis can be an effective treatment for cancer, including glioma.

In support of the anti-cancer properties of cannabis, the author cited an article that found an apoptotic effect of endocannabinoids in prostate cancer cells. The article also referenced the work and opinion of David Meiri, who stated that he successfully killed brain and breast cancer cells. These findings have been demonstrated in vitro and in animal models, which the author accurately presented. However, a PubMed search of "Meiri D[author]" on January 15, 2018, revealed 10 items, the most recent of which was a 2015 review article on Rho proteins in cancer. This lack of published findings leads to significant doubts as to the credibility of the article's claims. As the article focused on cancer, it is important to note that it failed to comment on the fact that marijuana smoke is listed as a carcinogen by the State of California.[18]

Overall, the article fairly presents the findings on cannabis as a treatment for the side effects of cancer, however the inclusion of patient anecdotes and minimal demonstration of the limitations of cannabis as a treatment for cancer severely weaken the article as an unbiased reflection of the current state of research.

Case studies from the field of medical cannabis for gerontology
April Michelle Short, November 25, 2017
Article: http://www.greenstate.com/explained/case-studies-field-medical-cannabis-gerontology/

***Summary**:*
The article begins by introducing Eloise Theisen, a nurse practitioner who educates seniors about the use of medical marijuana. It continues to quote the CDC that Americans over age 65 account for 30 percent of all pharmaceutical use, and that Theisen views medical marijuana as a safe alternative for pharmaceuticals, with the implication of opioids in particular. The author elaborates on Theisen's work, stating that she is on the board of the American Cannabis Nurses Association, she receives many new patients through referrals, and speaks at regional meetings for gerontology groups. Theisen estimated that cannabis does not work at all for 20 percent of patients, and proceeds to describe five success stories of medical cannabis. The first is of an 89 year old woman with dementia who replaced her opioids with cannabis, and made a recovery in

[17] Abrams DI. Integrating cannabis into clinical cancer care. Curr Oncol. 2016 Mar;23(2):S8-S14.
[18] OEHHA. Marijuana Smoke [Internet]. OEHHA. 2016 [cited 2018 Jan 20]. Available from: https://oehha.ca.gov/proposition-65/chemicals/marijuana-smoke

both pain and mental status. A woman in her 70s found relief from chronic back pain, and a man with Parkinson's and dementia had significantly reduced aggression, which Theisen claimed that cannabis seems to work for Parkinson's symptoms. Another Parkinson's patient had reduced tremors, another patient had improved sleep, and finally a patient showed less anxiety within 15 minutes after smoking from a vaporizer in Theisen's office.

***Critique**:*

Category	**Score**
Applicability	4.3
Opinions vs Facts	2.0
Validity	1.3
Magnitude	2.0
Precision	2.3
Consistency	2.3
Consequences-Benefits	3.0
Consequences-Risks and Costs	1.7
Overall	2.0

The article writes through Theisen's point of view and experience. It does not make claims of its own, nor does it provide any evidence to support or refute Theisen's conclusions. The specific diseases mentioned are autoimmune and neurological diseases, and the anecdotes tell stories of relief from dementia, chronic pain, aggression, Parkinson's, insomnia, and anxiety. The 2017 National Academy of Science review of cannabis is in agreement with Theisen's claim that cannabis is successfully used for chronic pain (NAS 4-1), and insomnia for certain (obstructive sleep apnea syndrome, fibromyalgia, chronic pain, and multiple sclerosis) patient populations (NAS 4-19), although Theisen does not specify these criteria. It states that there is limited evidence of association between inflammation in healthy individuals, rather than for autoimmune disease as Theisen claims. Finally, the NAS review states that there is no evidence to support or refute cannabis as treatment for Parkinson's, there is limited evidence that cannabis is actually ineffective for treating dementia, and there is moderate evidence of association that cannabis use increases, rather than decreases, social anxiety. Overall, the article presents Theisen as an authority on the subject, and the author does not appear to have done their due diligence regarding the efficacy or research supporting these claims.

Does cannabis cause a hangover?
Emily Earlenbaugh, November 22, 2017
Article: http://www.greenstate.com/uncategorized/cannabis-hangovers/

***Summary**:*
The article begins by stating that a "weed" hangover is milder than an alcohol hangover, and states that two studies have investigated cannabis hangovers. The first study was in 1985 which found that there was a mild hangover effect the following day after smoking cannabis,[19] while a second study in 1998 from the National Institute of Drug Abuse (NIDA) performed a similar study and found no hangover effects.[20] The author then stated that reports by regular users of

[19] Chait LD, Fischman MW, Schuster CR. 'Hangover' effects the morning after marijuana smoking. Drug Alcohol Depend. 1985 Jun;15(3):229-38.
[20] Fant RV, Heishman SJ, Bunker EB, Pickworth WB. Acute and residual effects of marijuana in humans. Pharmacol Biochem Behav. 1998 Aug;60(4):777-84.

cannabis hangovers included symptoms such as headache, lethargy, dryness, nausea, brain fog, and congested sinuses. In order to lessen or avoid this weed hangover, the article recommends hydrating, avoiding edibles, limiting the amount of use, and eating healthily while using cannabis. In support of avoiding edibles, the article cites a 2007 NIDA study that eating cannabis increases THC concentration for up to 15 hours.[21]

Category	Score
Applicability	4.3
Opinions vs Facts	3.7
Validity	4.3
Magnitude	4.0
Precision	3.0
Consistency	3.7
Consequences-Benefits	4.0
Consequences-Risks and Costs	3.7
Overall	3.7

***Critique**:*
The article succinctly summarizes two relevant papers on the residual effect of cannabis. However, the statement that there are only two studies that have investigated this phenomenon is not accurate, as there have been several other studies, including a 2011 review of the literature on acute and residual effects of cannabis. Despite this missing literature, the conclusions of the review and other studies were similar, either showing some cognitive residual effects or showing no difference. The author provided strong evidence for the recommendation to avoid edibles by citing the study and presenting blood concentrations of THC after ingestion. Overall, the message of the article was clear and supported by research, despite missing more current studies.

Cannabis users' sex lives are thriving, Stanford study finds
David Downs, November 22, 2017
Article: http://www.greenstate.com/uncategorized/cannabis-users-stanford-sex/

***Summary**:*
This article discusses the results of a recent Stanford University study, which found an association between cannabis use and increased sexual frequency according. The study was published in the Journal of Sexual Medicine on October 27, 2017.[22] Specifically, the article reports men who smoked cannabis daily had sex about 1.3 more times per month (6.9 times) than never-users as well as infrequent users. Women who smoked cannabis every day had sex about one more time per month (7.1 times) than never users. The author refers to other studies[23] which suggest marijuana affects "the part of the brain that turns desire into action." The article also interviews several physicians, such as Dr. Frank Ludico, and a certified clinical sexologist, Diana Urman, who recommend to marijuana to patients with difficulty orgasming and performance anxiety. The article also discusses study limitations, and says that the findings do not apply to people older than 44 or homosexual couples. The article closes with a broader discussion of the rise of marijuana use in California.

[21] Huestis MA. Human cannabinoid pharmacokinetics. Chem Biodivers. 2007 Aug;4(8):1770-804.
[22] Sun A, Eisenberg M. Association Between Marijuana Use and Sexual Frequency in the United States: A Population-Based Study. 2018.
[23] Androvicova R, Horacek J, Tintera J, Rydlo J, Jezova D, Balikova M et al. Acute Cannabis Intoxication and the Brain's Response to Visual Erotica: An Fmri Study. 2018.

***Critique**:*
The article backed up its claims with sound scientific research, especially papers that used a large sample size (more than 50,000 men and women) and were from reputable journals such as the Journal of Sexual Medicine and JAMA. Animal models were also cited. While the data is inconclusive surrounding sexual dysfunction and cannabis, this article cites reputable sources such as Journal of Sexual Medicine and JAMA, and also discusses study limitations of these articles. Surveys in these research articles also use self-reported questions, and the article acknowledges the potential bias this creates. The end of the article discusses "pot on the rise" in the US, and took a positive spin on an inconclusive data point regarding cannabis use and lung function, which was the only negative critique of this otherwise well-supported article.

Category	**Score**
Applicability	5.0
Opinions vs Facts	3.7
Validity	4.3
Magnitude	5.0
Precision	4.3
Consistency	3.7
Consequences-Benefits	4.3
Consequences-Risks and Costs	4.3
Overall	4.0

Can I combine alcohol and marijuana?
Emily Earlenbaugh, November 22, 2017
Article: http://www.greenstate.com/explained/can-combine-alcohol-marijuana/

***Summary**:*
This article discusses the synergistic effect of mixing alcohol and marijuana, also known as "crossfading." Specifically, it references studies that found higher THC levels upon smoking cannabis and drinking alcohol than in smoking alone, suggesting alcohol increases the absorption of THC.[24] The article also references studies that found that while driving ability was only moderately impaired by alcohol, it was severely impaired by the combination of alcohol and cannabis (link to research article that the journalist is referencing is broken).The author also discusses anti-emetic effects of cannabis, which prohibits people from throwing up when they have had too much to drink.[25] While vomiting is a defense mechanism to prevent alcohol poisoning, the author claims that its inhibition by marijuana could result in more severe alcohol poisoning.

***Critique**:*
The article lists anecdotal evidence between combining alcohol and marijuana, thus not backing up their statements with many articles. The research regarding consumption of cannabis and alcohol simultaneously is inconclusive (NAS p. 361). There is moderate evidence of a statistical association between frequency of cannabis use during adolescence and age of first alcohol use

[24] Hartman R, Brown T, Milavetz G, Spurgin A, Gorelick D, Gaffney G et al. Controlled Cannabis Vaporizer Administration: Blood and Plasma Cannabinoids with and without Alcohol. Clinical Chemistry. 2015;61(6):850-869.
[25] Söderpalm A, Schuster A, de Wit H. Antiemetic efficacy of smoked marijuana. Pharmacology Biochemistry and Behavior. 2001;69(3-4):343-350.

and also moderate association of development of substance use disorder of alcohol and cannabis (NAS 14-3). There is also substantial evidence of an increased risk of motor vehicle crashes and cannabis (NAS 9-3), and the article appropriately advises against crossfading and driving. However, there is no substantial evidence if alcohol affects THC levels. While the author does state that cannabis' antiemetic effects combined with alcohol haven't been studied, the author states that "common sense" would suggest that it would increase chance of overdosing. The article would be strengthened with support for this claim.

Category	Score
Applicability	4.7
Opinions vs Facts	3.0
Validity	1.7
Magnitude	1.3
Precision	1.3
Consistency	1.7
Consequences-Benefits	3.3
Consequences-Risks and Costs	3.3
Overall	2.0

Study: Can cannabis increase high blood pressure deaths?
Paul Armentano, November 13, 2017
Article: http://www.greenstate.com/health/study-can-cannabis-increase-high-blood-pressure-deaths/

***Summary**:*
The article presents a study published in the European Journal of Preventive Cardiology that found that cannabis users may be close to three times more likely to die from high blood pressure than non-users.[26] A follow-up survey of 1,212 participants showed that marijuana users had a 3.42-times higher risk of dying from high-blood pressure-related causes. The article then proceeds to discuss the study design flaws of this article, and brings up the fact that the distinction between current and habitual user was not made. The article reports that in a separate study published in the American Journal of Public Health that tracked marijuana use of 5,113 young adults for 25 years, no connection was found between cannabis use and incident cardiovascular disease.[27]

Category	Score
Applicability	5.0
Opinions vs Facts	4.3
Validity	3.3
Magnitude	3.3
Precision	2.3
Consistency	3.7
Consequences-Benefits	3.3
Consequences-Risks and Costs	4.0
Overall	3.0

***Critique**:*
This article cites the current state of research by highlighting the research studies that present the limited evidence regarding cardiovascular health and cannabis. It mainly addresses the study

[26] Yankey B, Rothenberg R, Strasser S, Ramsey-White K, Okosun I. Effect of marijuana use on cardiovascular and cerebrovascular mortality: A study using the National Health and Nutrition Examination Survey linked mortality file. European Journal of Preventive Cardiology. 2017;24(17):1833-1840.
[27] Reis J, Auer R, Bancks M, Goff D, Lewis C, Pletcher M et al. Cumulative Lifetime Marijuana Use and Incident Cardiovascular Disease in Middle Age: The Coronary Artery Risk Development in Young Adults (CARDIA) Study. American Journal of Public Health. 2017;107(4):601-606.

published in the European Journal of Preventive Cardiology that found cannabis users to be three times more likely to die from high blood pressure than non-users. The NAS on the other hand has not identified anything specifically linking high blood pressure and cannabis use but they have concluded that there is limited evidence between cannabis and risk of myocardial infarction (NAS 6-1a).This article also brings up flaws in the study design, stating that the distinction between current use and habitual use was not made. The article cites the statistics from another newspaper article[28] that used a Yahoo News-Marist poll to find that only 12% of Americans say that they are current cannabis users, while over half have tried cannabis at some point, thus suggesting that there is a disconnect in the number of people who smoke habitually versus currently.

Cannabis topicals get to the bottom of aches, pains
April Michelle Short, November 13, 2017
Article: http://www.greenstate.com/health/gateway-cannabis-relief-topicals-get-bottom-aches-pains/

***Summary**:*
This article is interviewing Dr. Selman Holden, who is a family physician in Maine who has a fellowship in integrative medicine. Holden reports that there are CB1/2 receptors all over our body, and thus applying cannabis locally will result in a release of endogenous opioids, having an anti-inflammatory effect. In a second interview with Jeffrey Raber, an organic chemist who then began his own lab-testing facility of cannabis, the article also mentions that one cannot get a high from topical cannabis, but failing a drug test may be possible.

Category	Score
Applicability	3.7
Opinions vs Facts	2.0
Validity	2.0
Magnitude	1.7
Precision	2.0
Consistency	1.7
Consequences-Benefits	2.7
Consequences-Risks and Costs	2.0
Overall	1.7

***Critique**:*
The article interviews Holden and Raber and presents their views. Holden is quoted saying that cannabis topical products should "theoretically work" in reducing pain. Raber is quoted saying that cannabis is "believed to enter the bloodstream" and while the extent to which it does is unclear, individuals will act differently to cannabis' chemicals. While the article does not claim to be making statements backed up by science, by not presenting other data and representing the interviewees as authoritative figures, the article is potentially misleading. There is substantial or conclusive evidence that cannabis is effective for treatment of pain in adults (NAS 4-1) but there is not conclusive data on the topical use of cannabis regarding its effectiveness to treat pain. The main results of a meta-analysis comparing

[28] Mohney G. More than half of US adults have tried marijuana, poll finds [Internet]. ABC News. 2018 [cited 18 January 2018]. Available from: http://abcnews.go.com/Health/half-american-adults-marijuana-poll-finds/story?id=46786923

topical treatment and placebo showed that there was weak evidence that topical medicine was superior to placebo in reducing pain in patients with rheumatoid arthritis.[29]

Marijuana's link to heart attack not clear
Paul Armentano, November 8, 2017
Article: http://www.greenstate.com/pov/pot-and-heart-attack-lets-talk/

Summary:
This article states that current media reports surrounding cannabis are mixed because (1) the studies finding harmful effects of cannabis attract little attention and (2) reporters gravitate towards more sensational claims even when their methods are dubious. The article provides an example of a claim from a researcher's presentation at the annual meeting of the American College of Cardiology that smoking cannabis may adversely impact cardiovascular health which received media attention in March 2017.[30] The article reports that this press release was not peer-reviewed nor formally published, as the media published its findings prior to the presentation of the data at the annual American College of Cardiology meeting. The author also brings up studies that were better designed, but which did not receive mainstream media attention. For example, a longitudinal study was published in the American Journal of Public Health[31] consisted of a cohort of over 5000 subjects and assessed cardiovascular risk associated with cumulative use of cannabis over a period of at least twenty years, and it found that there was not a positive association between the two.

Category	**Score**
Applicability	3.7
Opinions vs Facts	4.0
Validity	2.7
Magnitude	2.7
Precision	2.0
Consistency	2.3
Consequences-Benefits	1.7
Consequences-Risks and Costs	3.7
Overall	2.3

Critique:
The article does raise good points about the media not representing the entire story of what is published in research in the section titled "Media Highlights Trash Studies." It points out that titles of news articles misrepresent data that is actually published by citing examples of news articles. The article also highlights study design flaws in a French study. However, the article does not cite the original study so as to allow the reader to reference the article themselves. he article also diverts the attention from the issue at hand of cardiovascular risk by bringing up other issues surrounding cannabis smoking. For example, in a study examining cardiovascular events in those between the

[29] 1. Richards B, Whittle S, Buchbinder R. Neuromodulators for pain management in rheumatoid arthritis. Cochrane Database of Systematic Reviews. 2012.
[30] Marijuana Use Associated with Increased Risk of Stroke, Heart Failure - American College of Cardiology [Internet]. American College of Cardiology. 2018 [cited 18 January 2018]. Available from: http://www.acc.org/about-acc/press-releases/2017/03/09/14/05/marijuana-use-associated-with-increased-risk-of-stroke-heart-failure
[31] Reis J, Auer R, Bancks M, Goff D, Lewis C, Pletcher M et al. Cumulative Lifetime Marijuana Use and Incident Cardiovascular Disease in Middle Age: The Coronary Artery Risk Development in Young Adults (CARDIA) Study. American Journal of Public Health. 2017;107(4):601-606.

ages of 18 to 55 with a history of cannabis exposure, only 1.5% reported marijuana use. This might represent underreporting as the article speculates, as national records are significantly different, however he article does not state national records to back up this point. At the end of the article, studies with larger sample size, literature reviews, and articles written in reputable journals are presented, however the NAS review was not mentioned, which would have strengthened the article.. The author also compares the risks of cannabis to Advil and cigarette smoke, stating that ibuprofen and tobacco increase risk of heart failure and stroke risk, respectively, and thus fare worse than cannabis because no independent association has been found between cannabis and coronary artery disease or sudden cardiac death. This comparison is unwarranted as other research is not arguing that ibuprofen and/or tobacco are worse/better than cannabis. This thus seems to minimize the impact of the finding that those with a "past history of cannabis exposure were ten percent more likely than controls to experience heart failure." Finally, the author of the study is a leader of National Organization for the Reform of Marijuana Laws (NORML), potentially raising conflict of interest questions.

Table S1 Summary evaluations of all *GreenState* articles

Article	**Applicability**	**Opinion vs. Facts**	**Validity**	**Magnitude**	**Precision**	**Consistency**	**Consequences - benefits**	**Consequences - risks and costs**	**Overall**
Cannabis superfoods tout their health effects	4.0	1.3	1.3	1.7	1.3	1.3	2.3	1.3	1.3
Here's the science behind cannabis therapies for pain, inflammation	4.7	4.3	5.0	4.3	3.3	4.0	4.3	1.3	4.3
Maternal cannabis use didn't hurt kids' grades, study finds	4.7	2.3	3.3	3.0	3.0	3.7	3.7	2.7	3.3
Medical marijuana could help many more seniors, but some still see a threat	5.0	4.0	3.7	4.0	2.7	4.0	4.7	3.0	4.0
Sublingual relief: From underground to under the tongue	4.7	3.0	1.0	1.0	1.0	1.0	3.3	1.0	2.0
New Frontiers open for cannabis dermatology	4.3	4.0	3.0	2.3	2.0	2.3	4.0	1.3	2.7
Challenging assumptions	4.3	3.3	4.3	3.0	3.7	3.7	3.0	5.0	4.0

Table S1 Summary evaluations of all *GreenState* articles									
Article	**Applicability**	**Opinion vs. Facts**	**Validity**	**Magnitude**	**Precision**	**Consistency**	**Consequences - benefits**	**Consequences - risks and costs**	**Overall**
around marijuana addiction									
Does 'spraying' cannabis beat smoking it?	4.3	1.0	1.3	1.0	1.0	1.0	4.3	1.0	1.3
Is marijuana bad for the heart? What you need to know	5.0	5.0	5.0	4.7	3.7	4.7	4.7	4.7	4.7
Cancer: Can cannabis really cure it?	5.0	4.3	4.0	3.7	2.3	2.7	4.7	3.3	2.7
Case studies from the field of medical cannabis for gerontology	4.3	2.0	1.3	2.0	2.3	2.3	3.0	1.7	2.0
Does cannabis cause a hangover?	4.3	3.7	4.3	4.0	3.0	3.7	4.0	3.7	3.7
Cannabis users' sex lives are thriving, Stanford study finds	5.0	3.7	4.3	5.0	4.3	3.7	4.3	4.3	4.0
Can I combine alcohol and marijuana?	4.7	3.0	1.7	1.3	1.3	1.7	3.3	3.3	2.0
Study: Can cannabis increase high blood pressure deaths?	5.0	4.3	3.3	3.3	2.3	3.7	3.3	4.0	3.0
Cannabis topicals get to the bottom of aches, pains	3.7	2.0	2.0	1.7	2.0	1.7	2.7	2.0	1.7
Marijuana's link to heart attack not clear	3.7	4.0	2.7	2.7	2.0	2.3	1.7	3.7	2.3
Average for all articles	**4.5**	**3.3**	**3.0**	**2.9**	**2.4**	**2.8**	**3.6**	**2.8**	**2.9**

SAN FRANCISCO CHRONICLE

SF report weighs health risks raised by legal pot
Erin Allday, November 26, 2017
Article: http://www.sfchronicle.com/bayarea/article/SF-report-weighs-health-risks-raised-by-legal-pot-12383530.php

***Summary**:*
This article reports on the San Francisco public health officials' report[32] of the problems that could arise from widespread marijuana use and its health risks towards young adults. They created this report based on recommendations from previous studies conducted where recreational marijuana is legal, focus group meetings with teenagers, interviews with doctors, drug-use experts, and cannabis representatives. The article reports that hospital and emergency room visits related to cannabis have increased in the 2011-15 period compared to the 2006-10 period as marijuana laws have become more lax. The article also mentions that it is easy to overdose on edibles, and while it is better than smoking cannabis, it also carries health risks.

Category	Score
Applicability	5.0
Opinions vs Facts	4.7
Validity	5.0
Magnitude	5.0
Precision	3.7
Consistency	4.7
Consequences-Benefits	3.0
Consequences-Risks and Costs	5.0
Overall	4.3

***Critique**:*
This article summarizes the San Francisco public health report well, including details on how this report was created, which is helpful for the reader to provide context for the report's conclusions. While much of the concern is surrounding young adult use, and making sure that the risks of marijuana consumption are properly understood by that demographic, the article does not back up these concerns and statements with research that might suggest that young adults are more prone to the risks of cannabis. The article does a good job of quantifying adult risks of cannabis, by citing the increase in emergency room visits due to cannabis in the recent years. The article also discusses the risks and benefits of edibles that the public health report touches on, through interviews with local scientists and physicians.

More pregnant women are using marijuana, study says
Sophie Haigney, December 27, 2017
Article: http://www.sfchronicle.com/health/article/More-pregnant-women-are-using-marijuana-study-12458236.php

[32] Cannabis Legalization in San Francisco [Internet]. San Francisco: San Francisco Department of Public Health; 2017. Available from: https://www.sfdph.org/dph/files/opp/SFDPH-CannabisReport-ExecutiveSummary-Fall2017.pdf

Summary:
This article cites the Kaiser Permanente study which showed that the number of California women who used marijuana while pregnant increased between 2009 and 2016.[33] The study tested more than 30,000 women through questionnaires and urine toxicology tests--which are the objective, universal standard. The article also cites guidelines from the American College of Obstetricians and Gynecology, which recommends that pregnant women stop using the drug as there is little to no information surrounding pregnancy and fetus health.

Category	Score
Applicability	5.0
Opinions vs Facts	5.0
Validity	5.0
Magnitude	5.0
Precision	4.7
Consistency	5.0
Consequences-Benefits	4.7
Consequences-Risks and Costs	4.3
Overall	4.7

Critique:
This article adequately reports the findings from the Kaiser Permanente study by commenting on how the study recruited participants, and how they were followed. It highlights that the Kaiser study used toxicology reports, which is an objective measure. It also addressed a limitation of the study in that it did not seek to find why pregnant women chose to use marijuana. Therefore, the article gave a non-biased report of the Kaiser Permanente study. The article also presents current research, and how there is little evidence regarding fetus health during marijuana usage during pregnancy.

Stoner syndrome? People 'scromiting' from illness linked to heavy cannabis use, Calif. doctors say
Michelle Robertson, December 6, 2017
Article:
http://www.sfchronicle.com/science/article/marijuana-cannabis-scromiting-syndrome-cannabinoid-12411099.php

Category	Score
Applicability	5.0
Opinions vs Facts	5.0
Validity	4.3
Magnitude	4.3
Precision	4.3
Consistency	5.0
Consequences-Benefits	4.3
Consequences-Risks and Costs	5.0
Overall	4.7

Summary:
This article discusses the prevalence of Cannabinoid Hyperemesis Syndrome (CHS), a condition characterized by “chronic cannabis use, cyclic episodes of nausea and vomiting, and the compulsion to take hot baths or showers”. This is a disease that primarily affects heavy, long term users of marijuana. The author interviews Dr. Roneet Lev, the director of operations at Scripps Mercy

[33] Young-Wolff K, Tucker L, Alexeeff S, Armstrong M, Conway A, Weisner C et al. Trends in Self-reported and Biochemically Tested Marijuana Use Among Pregnant Females in California From 2009-2016. JAMA. 2017;318(24):2490.

Hospital in San Diego, and Dr. Linda Nguyen, a gastroenterologist at Stanford. The doctors weigh in that little is known about the syndrome or its prevalence in marijuana users. The author refers to the paper that initially describes the syndrome, published in Australia in 2004.[34] The authors also refer to a paper from Temple[35] which shows that the prevalence of cannabis use disorders in the United States has risen, despite the overall marijuana use prevalence remaining constant at 4%. Finally, the authors mention potential mechanisms and common treatments for CHS, including IV fluids and anti-nausea drugs.

***Critique**:*
This is a well written article, heavily supported by the primary literature on the subject. The article is also careful about where current medical knowledge is insufficient, as CHS is a recently characterized, and poorly understood phenomenon.

The Australian paper from 2004 is nearly 14 years old at the time of this article's publication. The article's conclusions would have been stronger if a more recent paper was available. Additionally, the paper from Australia only presents 9 cases. A stronger article would feature a larger sample size and a more relevant population for California's demographics. However, the paper partially compensates for this by interviewing California physicians who see this condition frequently.

Teenage pot, alcohol use can reduce success later in life, study says
Gregory B. Hladky, November 7, 2017
Article:
http://www.sfchronicle.com/nation/article/Teenage-pot-alcohol-use-can-reduce-success-later-12338784.php

***Summary**:*
The article cites a study from the University of Connecticut that found that teens who used marijuana and alcohol were less likely to have a full time job, get a college education, or get married.[36]The article then states that this effect was stronger on males, as the study found that women who were dependent on marijuana and alcohol were less likely to go to college and had lower standard of living, but were equally as likely to be employed full time and get married compared to non-dependent women. The article finally gives the details of the study as a presentation at the American Public Health Association's 2017 Annual

Category	Score
Applicability	5.0
Opinions vs Facts	5.0
Validity	4.7
Magnitude	4.3
Precision	4.3
Consistency	4.5
Consequences-Benefits	3.0
Consequences-Risks and Costs	5.0
Overall	4.7

[34] Allen JH. Cannabinoid hyperemesis: cyclical hyperemesis in association with chronic cannabis abuse. Gut. 2004Jan;53(11):1566–70.
[35] Galli JA, Sawaya RA, Friedenberg FK. Cannabinoid Hyperemesis Syndrome. Current Drug Abuse Reviewse. 2011Jan;4(4):241–9.
[36] Harari E. Impact of marijuana use and dependence on life achievement in young adults. 2017; Available at: https://apha.confex.com/apha/2017/meetingapp.cgi/Paper/386095. Accessed Jan 20, 2018

Meeting, and that individuals were followed from age 12 to ages 25 to 34, with 1165 participants.

***Critique**:*
The article effectively summarizes the research, giving the study design, number of participants, stated that it was research that was presented at a meeting, and mentioned how the primary outcomes of this study differed slightly from previous research. The final claim that previous research has demonstrated that chronic marijuana use in adolescence can affect the user's development is supported by the National Academy of Science 2017 review on cannabis (NAS 13-2k). The article is of high overall quality.

Table S2 Summary evaluations of all *San Francisco Chronicle* articles

Article	**Applicability**	**Opinion vs. Facts**	**Validity**	**Magnitude**	**Precision**	**Consistency**	**Consequences - benefits**	**Consequences - risks and costs**	**Overall**
SF reports weighs health risks raised by pot	5.0	4.7	5.0	5.0	3.7	4.7	3.0	5.0	4.3
More pregnant women are using marijuana, study says	5.0	5.0	5.0	5.0	4.7	5.0	4.7	4.3	4.7
Stoner syndrome? People 'scromiting' from illness linked to heavy cannabis use, Calif. doctors say	5.0	5.0	4.3	4.3	4.3	5.0	4.3	5.0	4.7
Teenage pot, alcohol use can reduce success later in life, study says	5.0	5.0	4.7	4.3	4.3	4.5	3.0	5.0	4.7
Average for all articles	**5.0**	**4.9**	**4.8**	**4.7**	**4.3**	**4.8**	**3.8**	**4.8**	**4.6**

ANALYSIS OF PROMOTIONAL ARTICLES

Table S3. Comparison of mean scores (SD) between promotional and non-promotional *GreenState* articles.

Category	Non-promotional n=13	Promotional n=4	*P* value
Applicability	4.6 (0.5)	4.3 (0.3)	0.4
Opinions versus Facts	3.5 (1.0)	2.3 (1.4)	0.06
Validity	3.5 (1.2)	1.7 (0.9)	0.02
Magnitude	3.3 (1.1)	1.5 (0.6)	0.01
Precision	2.8 (0.8)	1.3 (0.5)	0.006
Consistency	3.2 (1.0)	1.4 (0.6)	0.003
Consequences: Benefits	3.6 (0.9)	3.5 (0.9)	0.75
Consequences: Risks and Costs	3.3 (1.1)	1.2 (0.2)	0.02
Global	3.2 (1.0)	1.8 (0.7)	0.02

Table S4. Comparison of *GreenState* and *San Francisco Chronicle* mean scores, with promotional article removed.

Category	GS (no promotional) n=13	SF Chronicle n=4	*P* value
Applicability	4.6 (0.5)	5.0 (0)	0.1
Opinions versus Facts	3.5 (1.0)	4.9 (0.2)	0.01
Validity	3.5 (1.2)	4.8 (0.3)	0.06
Magnitude	3.3 (1.1)	4.7 (0.4)	0.04
Precision	2.8 (0.8)	4.3 (0.4)	0.004
Consistency	3.2 (0.96)	4.8 (0.3)	0.006
Consequences: Benefits	3.6 (0.9)	3.8 (0.9)	0.84
Consequences: Risks and Costs	3.3 (1.1)	4.8 (0.4)	0.02
Global	3.2 (1.0)	4.6 (0.2)	0.02

SUMMARY OF AUTHORS

The 17 *GreenState* articles were written by six freelance journalists. The most frequent marijuana health writer in this cohort was Emily Earlenbaugh, who wrote eight out of the 17 articles we examined. She has a PhD in Philosophy of Science and is also the co-founder of Mindful Cannabis Consulting, where she consults with patients interested in utilizing cannabis as a natural medicine. The other authors also have backgrounds in similar areas such as wellness, cannabis journalism, or addiction.

The *San Francisco Chronicle* employs full time health reporters, who cover cannabis among other health issues. Erin Allday, the most frequent writer, has been reporting on health-based topics such as infectious diseases, stem cells, neuroscience, and fitness and nutrition since 2006. No writers were authors for both publications. Understanding the background of the authors is important, as differences in qualifications and expertise could account for some of the difference in quality between the two publications.

Table S5. Authors for Articles in *Green State* and *San Francisco Chronicle*

Reporter	Prior/Current Major Projects
GreenState	
Ellen Holland	Senior Editor at Cannabis Now Magazine
Emily Earlenbaugh	Co-founder of Mindful Cannabis Consulting
David Downs	Founder of *GreenState*/Cannabis Editor at SF Chronicle
Maia Szalavitz	Author/Journalist on Addiction for 25+ years
April Michelle Short	Part-time Managing Editor at AlterNet.org
Paul Armentano	Deputy Director of the National Organization for the Reform of Marijuana Laws; Writer on marijuana and marijuana policy of over 1000 publications
San Francisco Chronicle	
Erin Allday	Health Reporter on infectious diseases, stem cells, neuroscience, and fitness and nutrition since 2006
Sophie Haigney	Metro Reporter
Michelle Robertson	Producer for SF Chronicle and SFGate
Gregory B. Hladtky	Hartford Courant writer on environment, agriculture, food-related issues and policy