



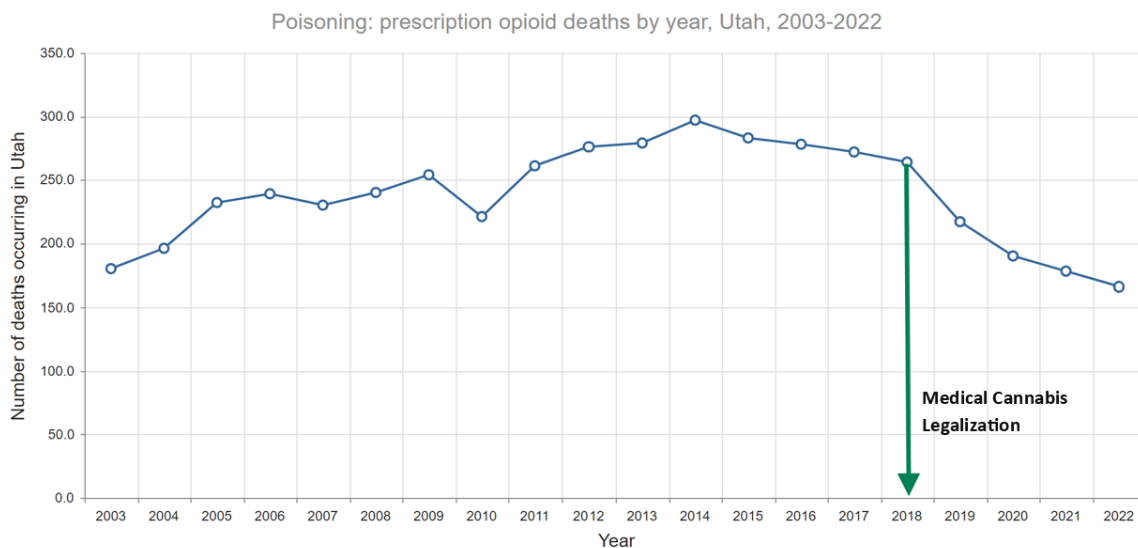
# Impact of Cannabis on Opioid Prescriptions in Chronic Pain: *Insights from Recent Research in Utah*



## INTRODUCTION

The opioid crisis remains a significant public health concern, affecting countless individuals and communities across the United States. In Utah, the impact of this crisis has been profound, leading to a surge in overdose deaths and widespread dependence on prescription opioids.

Since the legalization of medical cannabis in 2018, there has been a noticeable decrease in deaths related to prescription opioids in the state. This shift suggests that the introduction of cannabis as a therapeutic alternative may have contributed to a reduction in opioid use among patients seeking pain relief.



Previous studies have demonstrated that states with medical cannabis laws have observed reductions in opioid prescription rates and opioid-related mortality.<sup>1,2</sup> The increasing acceptance of medical cannabis provides an opportunity to explore its role in addressing the ongoing challenges of opioid misuse and addiction, potentially offering safer treatment options for those in need. In collaboration with Dragonfly Wellness, which provided comprehensive point-of-sale data, we have studied the behaviors and trends of medical cannabis among patients in Utah. By linking Dragonfly's transaction data with clinical data from electronic health records, we aim to explore cannabis' effects on certain chronic pain conditions and its potential to reduce opioid prescriptions.

Prior research suggests that cannabis may serve as an adjunctive therapy for chronic pain, leading to decreased opioid usage.<sup>3,4</sup> Our study will help to characterize the patients who would most

benefit from cannabis for managing pain, with a focus on demographics and types of cannabis products. This analysis will provide valuable insights into how specific cannabis formulations and delivery methods correlate with patient outcomes, potentially guiding personalized medical cannabis recommendations.<sup>5,6</sup>

This study aims to contribute to the growing body of evidence about the role of cannabis as a potential alternative for pain management and opioid reduction. This investigation aims to investigate the association between cannabis use and the prescription of anti-anxiety medications, providing insights that could support healthcare providers in making informed decisions about integrating cannabis into treatment plans for patients with anxiety, potentially leading to broader changes in prescribing practices.

## **METHODS**

### ***Study Design and Population***

This retrospective cohort study included 186 patients identified by the International Classification of Diseases, Tenth Revision (ICD-10) codes. Pain types were classified according to the latest guidelines from the International Association for the Study of Pain (IASP). We matched cannabis consumption data from registered transactions from Dragonfly Wellness Medical Cannabis dispensaries with medical records of these patients using MSA patented, HIPAA compliant de-identification system.

### ***Opioid Use (MME)***

Opioid use was standardized in MME per month to allow for comparison across different opioid types. Monthly MME was computed using prescription dosages adjusted for the specific opioid type.

### ***Cannabis use Periods***

Before: The period before the first recorded cannabis purchase.

After: The period following the first recorded cannabis purchase.

### ***Statistical Analysis***

We summarized patient demographics, pain categories, and cannabis product types for descriptive statistics. Calculated mean and standard deviation for numerical variables and counts and percentages for categorical variables. We used Linear Mixed Effects Model to analyze the association between cannabis use and changes in MME/month, accounting for repeated measures within patients and incomplete data. We analyzed demographic and clinical characteristics (age, gender, ethnicity, smoking status, pain category) of patients who reduced opioid prescriptions to identify patterns associated with effective cannabis use.

## RESULTS

There were 296 patients with data on transactions and opioid prescriptions, from which 186 patients had been diagnosed with conditions related to chronic pain based on ICD-10 codes, who were included in the analysis.

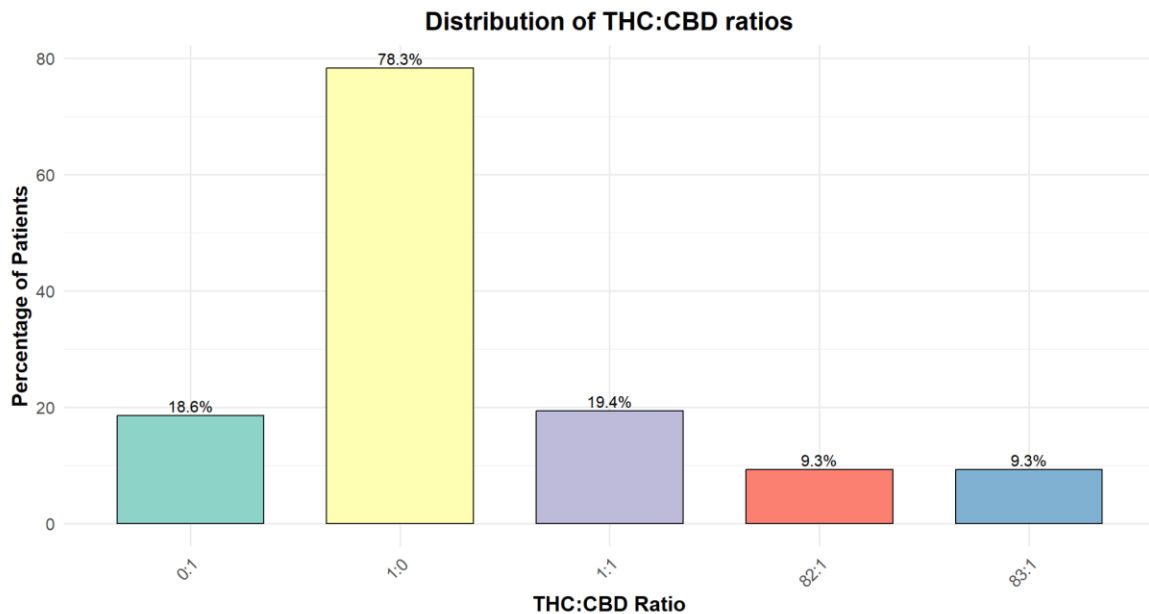
### *Descriptive Statistics*

Our sample comprised 186 patients with chronic pain using cannabis with an age ranging from 23 to 89 years old, with a mean age of 49 years and a standard deviation of 14.4. Approximately 98.9% of patients were from Utah, and a minority of patients from Oregon and New Mexico.

Fifty four percent of patients were females and 45% of patients were males, 162 patients were white (87%), 2 patients (1%) were Black, 1 patient (0.53%) was Asian.

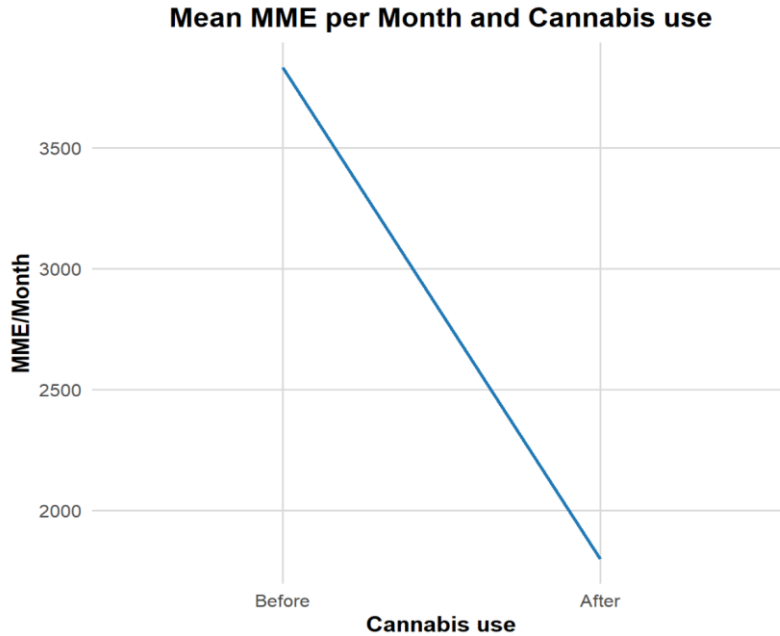
In this study, approximately 57% of patients were diagnosed with chronic musculoskeletal pain, 19% with chronic visceral pain, 13% with chronic headache and orofacial pain, 4% with chronic primary pain, 3% with chronic neuropathic pain, and 2% with chronic post-traumatic and postsurgical pain. Patients with musculoskeletal pain had higher opioid consumption. Additionally, many patients experienced overlapping types of pain. Notably, no cancer patients using opioids were present in this cohort.

Most patients were using cannabis in vapes (19.4%), gummies (18.8%), and flower (12.9%). Products with a THC:CBD ratio of 1:0 were the most used (78.3%) followed by 1:1 ratio (19.4%).



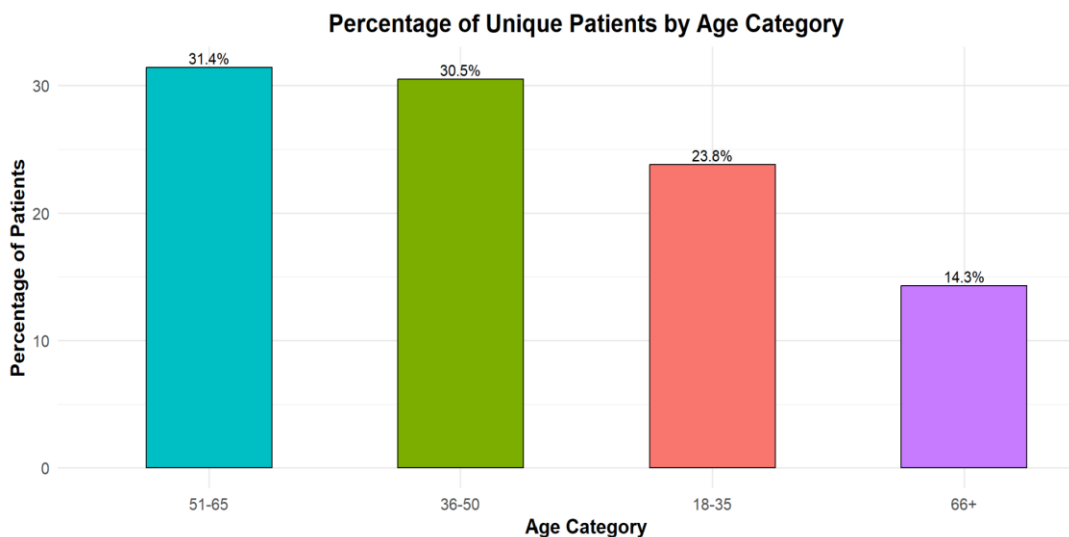
***Association between cannabis consumption and reduction of opioid use***

In this population, 157 patients (84.4%) showed a decrease in Morphine Milligram Equivalents (MME) per month after starting cannabis use. Specifically, there was a 53.1% reduction. The mean MME/month in the period before cannabis use was 3832 MMD/Month, and after starting cannabis we observed a mean of 1798 MME/Month.

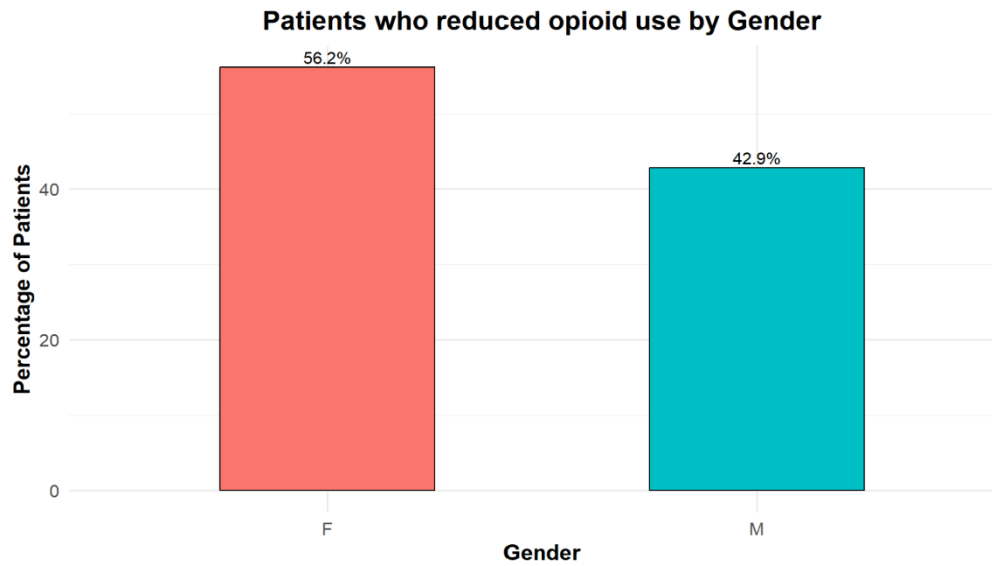


***Characterization of patients who reduced MME/month***

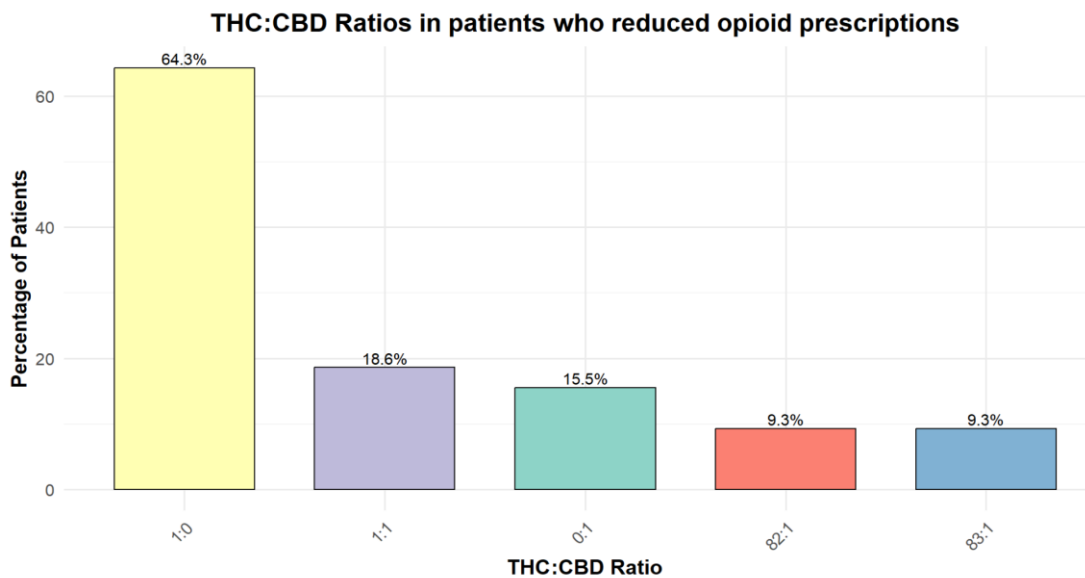
- **Age:** Most patients who reduced opioid use were 36 – 65 years old.



- **Gender:** In the group of patients who experienced a reduction in opioid use, 56% were females and 43% were males.



- **THC:CBD ratio:** Most patients who reduced opioid prescriptions were using cannabis products with a ratio of 1:0 (64%), a ratio of 1:1 (19%), and a ratio of 0:1 (16%).

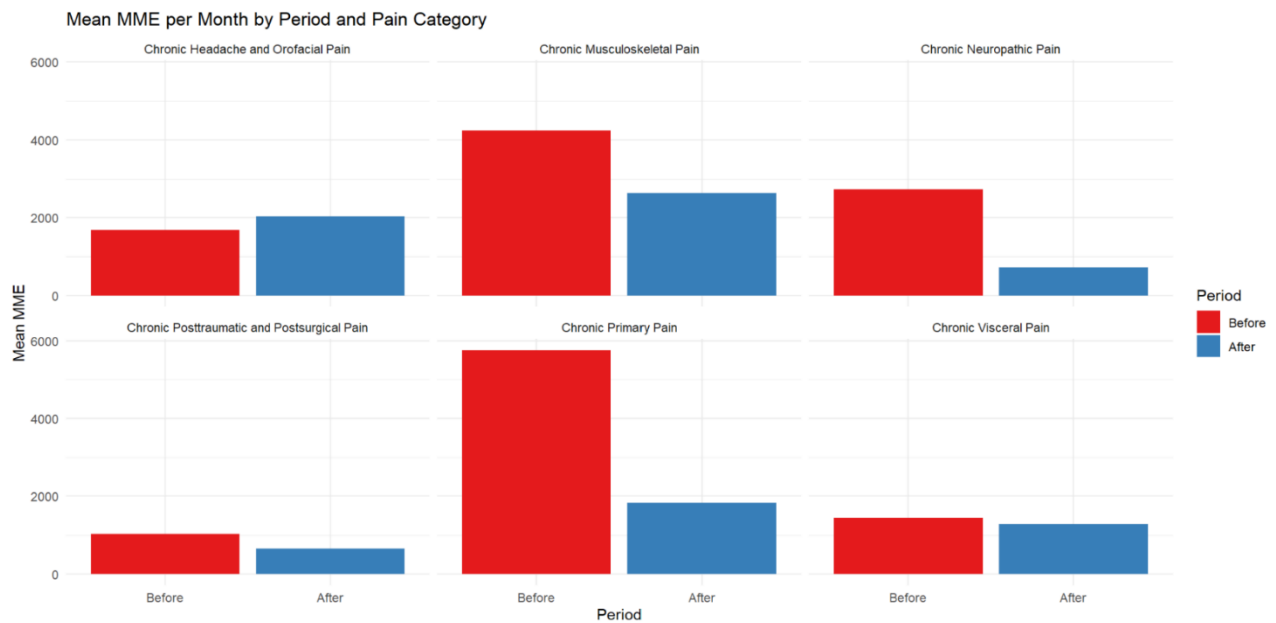


- **Pain category:** Most patients who reduced their opioid prescriptions during cannabis use were suffering from Chronic Musculoskeletal Pain. Many patients reported more than one type of pain. Patients with chronic headache and orofacial pain showed an increase in opioid use after starting cannabis, further research is needed on each type of pain to clarify the analgesic effect of cannabis. Patients with neuropathic pain had a 73.5% reduction in MME/month after starting cannabis, while those with chronic primary pain had a 68% reduction.

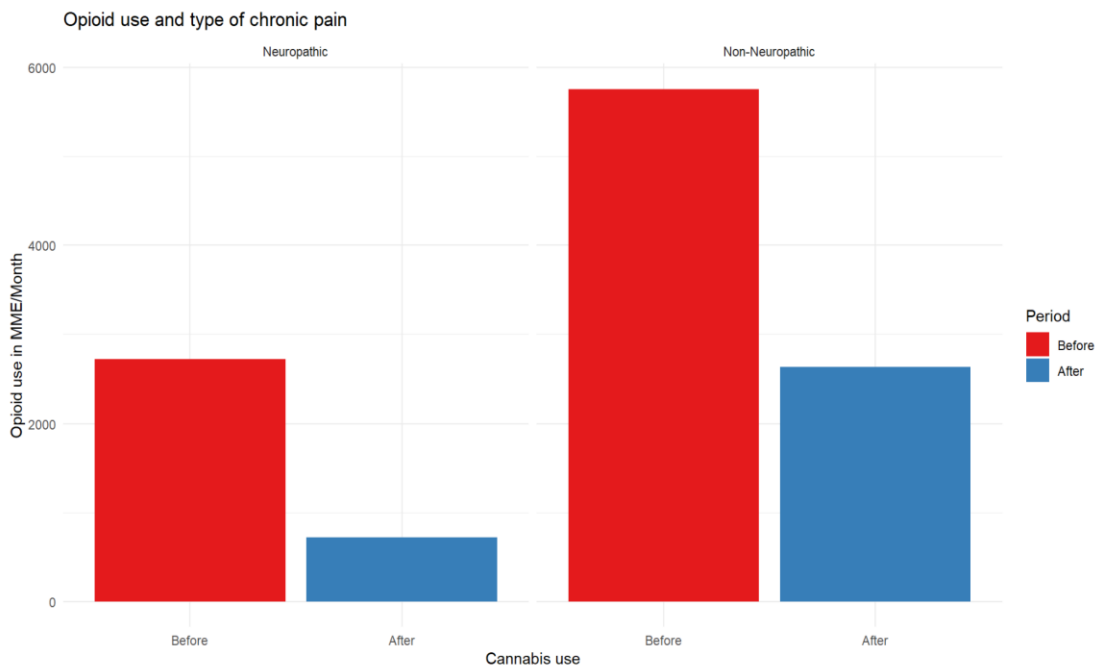
Pain Category	Before	After	Reduction %
Chronic Headache and Orofacial Pain	1685.7	2032.3	-20.6*
<b>Chronic Musculoskeletal Pain</b>	4237.5	2639.2	37.7
<b>Chronic Neuropathic Pain</b>	2726.4	722.8	73.5
<b>Chronic Posttraumatic and Postsurgical Pain</b>	1033.2	658.3	36.3
<b>Chronic Primary Pain</b>	5757.2	1836.8	68.1
<b>Chronic Visceral Pain</b>	1447.2	1289.6	10.9

\*Increase in MME/Month for Chronic Headache and Orofacial Pain

*Opioid prescriptions reduction in MME/Month by type of pain*

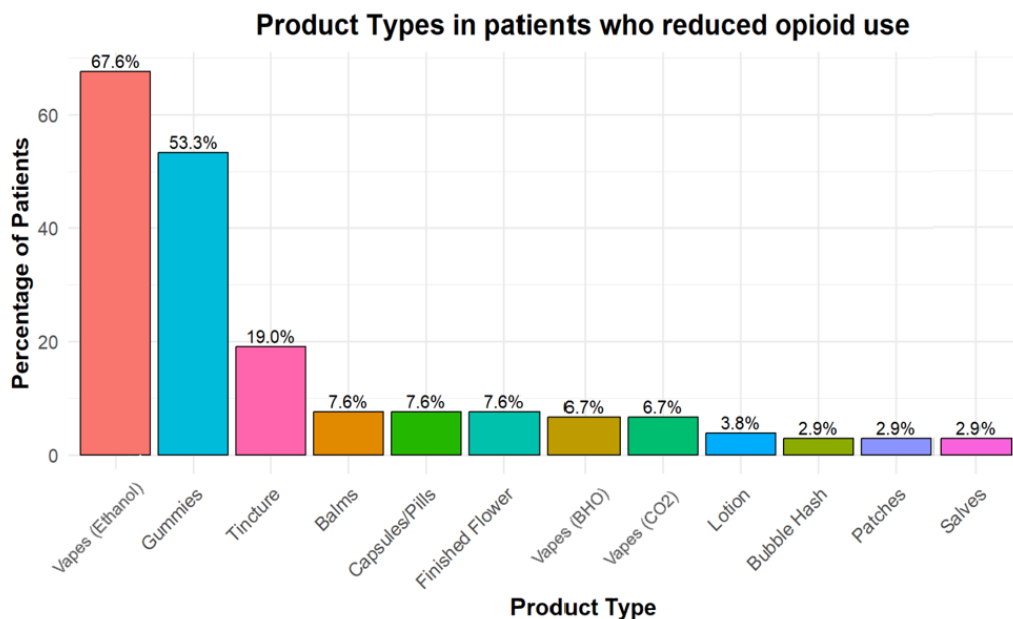


## Opioid prescriptions reduction in Neuropathic vs non-neuropathic pain



### - Preferred product types

Patients who experienced reductions in opioid prescriptions were using mostly cannabis products in vapes (67.6%), gummies (53.3%), and tincture (19%).



We used a linear mixed effects model to test the association between cannabis use and a reduction in opioid prescriptions in MME/Month while controlling for covariates (age, sex, race, smoking status, type of pain and cannabis product used). The model showed a decrease of 343 in MME/month after starting cannabis, compared to the period before ( $b = -342.9$ ,  $p = 0.077$ ) This trend of reduction in opioid prescriptions was marginally significant, and persisted even after controlling for age, sex, race, smoking status, type of pain and product used. This suggests that there is some evidence of the association between the observed decrease in MME/month and the initiation of cannabis use.

The model also revealed an increase in opioid prescriptions in tobacco smokers after starting cannabis, compared to non-smokers. ( $p = 0.046$ ). No other significant differences were identified in this model.

## **CONCLUSIONS**

The preliminary results from this analysis in patients from Utah support our previous findings on Minnesota, suggesting that cannabis has a substantial role to play in pain management and the reduction of opioid use. As the medical community continues to seek safer pain management options, cannabis may become a key component of treatment strategies, particularly for chronic pain patients. These findings support the hypothesis that cannabis can significantly reduce opioid use among chronic pain patients. This is crucial as it provides a potential pathway to tackle opioid dependency, offering a less addictive alternative for chronic pain management with fewer side effects.

Our results showed that smoking tobacco was associated with an increase in opioid prescriptions. Studies have shown that smoking can exacerbate chronic pain conditions and potentially affect the metabolism of both cannabis and opioids. Non-smokers may experience different therapeutic outcomes compared to current or former smokers when using cannabis for pain management. Additionally, smoking status has been associated with varying levels of compliance and responsiveness to medical treatments, including cannabis.

## **DISCUSSION**

The results from this study align with previous literature indicating that medical cannabis can serve as an effective adjunctive therapy for chronic pain, leading to a significant reduction in opioid use. Studies have shown that cannabis can alleviate various types of chronic pain, including neuropathic and musculoskeletal pain, which are prevalent among our study participants. Our findings suggest a higher reduction in MME/month among patients with neuropathic pain compared to those with non-neuropathic pain. This is consistent with prior research indicating that cannabinoids have a unique mechanism of action that can modulate pain pathways differently than opioids, making them particularly effective for neuropathic pain.



Our study also highlights the importance of product type and THC ratio in achieving optimal pain management outcomes. The prevalent use of products with a THC ratio of 1:0 suggests that high-THC products might be more effective for pain relief in this population. However, the significant use of 1:1 ratio products underscores the potential benefits of balanced THC and CBD formulations, which might offer pain relief with fewer psychoactive effects.

Our results suggest that while there is evidence supporting the efficacy of cannabis in reducing opioid use, larger studies are needed to confirm these findings and refine cannabis treatment protocols. The significant increase in opioid use among tobacco smokers after starting cannabis highlights the need for targeted interventions addressing smoking cessation in this population to enhance the therapeutic outcomes of medical cannabis.

Future research should focus on longitudinal studies with larger and diverse populations to better understand the long-term effects of cannabis use for pain management and its interactions with opioids. Additionally, studies examining specific dosages of cannabinoids and potential adverse effects will help to optimize cannabis treatment protocols, ensuring maximum benefits and minimal risks for patients.

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