

Cultivating Wellness

A SURVEY ON THE WHO, WHAT, WHEN, WHERE & WHY OF CBD

Tiffany Devitt

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ABOUT PROJECT CBD

Project CBD is a California-based nonprofit dedicated to promoting and publicizing research into the medical uses of cannabidiol (CBD) and other components of the cannabis plant. We provide educational services for physicians, patients, industry professionals, and the general public.

For questions and suggestions regarding this report, please email us at: research@projectcbd.org.

DISCLOSURES & DISCLAIMERS

THE INFORMATION HEREIN IS NOT INTENDED TO DIAGNOSE, TREAT, OR CURE ANY DISEASE. THIS INFORMATION SHOULD NOT BE INTERPRETED AS MEDICAL ADVICE OR TREATMENT.

Tiffany Devitt, the author of this report, holds stock in, is separately employed by, and serves on the Board of Directors of, CannaCraft, a commercial cannabis company. The views and opinions expressed in this report are those of the author and do not necessarily reflect the policies or positions of CannaCraft.

RECRUITMENT & PARTICIPATION

In early 2019, Project CBD posted one of the most comprehensive research surveys to date on the use of CBD. With over 200 questions, the survey was designed to shed light on who is using CBD, what kind of products they are using, for what purpose, and to what ends.

As of June 26, 2019, 3,506 people had completed the survey. Survey participants spanned the globe, representing 58 different countries, from Afghanistan to Australia, from the US to Uruguay.

Participants reported using CBD for over 200 different medical conditions. The majority said they were using this much-talked-about cannabinoid for common ailments, such as pain, depression, anxiety, sleep problems, and hormonal conditions – all of which, despite their prevalence, remain stubbornly difficult to treat. A significant minority of survey respondents reported using CBD to manage the symptoms of catastrophic illnesses like cancer, Parkinson’s disease, and Alzheimer’s disease. The [complete list](#) of ailments is a sobering reminder of the limitations of pharmacology, and the magnitude of human suffering in the face of intractable diseases.

What follows is a preliminary summary of the data collected thus far. This survey is still open. We will be updating results regularly and publishing in-depth reports on specific conditions.

Visit projectcbd.org for more information and updates.

LIMITATIONS

There are limitations to this observational study that warrant mention. Most significant is the way participants were selected; we recruited from people who visit the Project CBD [website](#) or social media sites, or subscribe to the Project CBD [newsletter](#). This means that participants were interested in CBD as a treatment modality, and many had already found it to be helpful. This likely had the effect of increasing the proportion of patients who reported improvements and decreasing the proportion of patients reporting that their condition worsened.

The selection of patients may have also introduced systematic biases in other categories, though this is less clear. For example, since CBD is rarely a first-line treatment, patients who turn to CBD products may be more likely to respond poorly to other modalities. This sample bias cannot be distinguished from the data, and the data must be viewed with these qualifications in mind.

Finally, this study relies entirely on self-reported outcomes.

SUMMARY OF KEY FINDINGS



This observational study validated some well-established facts about CBD – namely that it has a strong safety profile,ⁱ and is extraordinarily effective at ameliorating painⁱⁱ and anxiety.ⁱⁱⁱ Participants reported significant improvements in pain and mood regardless of the underlying medical condition.

That said, the study also showed that CBD is not a panacea – as some would claim – for all that ails us. Some symptoms were decidedly less responsive to CBD products. For example, CBD was not particularly useful in helping people with gastrointestinal diseases maintain a healthy weight. Nor did it have much of an impact on PMS-related bloating, cancer-related diarrhea and constipation, or low sex drive during menopause.

Nonetheless, it was astonishingly effective at simply making people feel better – most likely because of its impact on pain, mood, and sleep.

The survey also found that there were few adverse effects, which is consistent with studies showing that CBD is safe and well-tolerated even at high doses.^{iv}

WHO IS USING CBD?



The first question we set out to answer was who is using CBD? Based on this survey, it appears that the typical CBD user is white, well-educated, over 45, female, and living in the US.

To some extent, this skewing towards females may reflect their greater utilization of healthcare services in general^v, and alternative medicines in particular^{vi}. It may also reflect the fact that the two most prevalent conditions for which participants reported using CBD – pain and anxiety – affect women disproportionately.^{vii, viii}

Regarding ethnicity, as mentioned, the vast majority of survey participants were white. In the US, which is where the majority of participants were located, this may be due to the high costs of CBD therapeutics, the greater utilization of alternative therapies by Caucasians,^{ix} and/or a wariness of cannabis on the part of communities of color that have borne the brunt of the US drug war.

CBD users in this survey also skewed older. Almost two-thirds were over the age of 44, and almost 20% were seniors over the age of 64. This finding may be explained by CBD's popularity for treating pain and sleep problems, ailments that are common among the elderly, particularly in the US where half of older adults report suffering from chronic "bothersome" pain,^x and half report regular sleep disturbances.^{xi}

WHAT KIND OF PRODUCTS ARE PEOPLE USING?



Participants were more likely to be using CBD from hemp rather than cannabis. (This is unsurprising given that the latter is still illegal in most of the world.)

They tended to favor CBD tinctures and topicals over traditional modes of taking cannabis, i.e. smoking and edibles. They typically used CBD products multiple times per day and used more than one type of product (most often a tincture with a topical).

Few participants were able to say how much CBD (or THC) they were taking, suggesting an urgent need for both better product labeling and consumer education. Almost half of participants had been using CBD for under six months.

WHAT ARE PEOPLE USING CBD FOR?



The vast majority of participants reported using CBD to alleviate pain (particularly inflammatory pain), to improve mood and sleep, and/or for general wellness.

Around 10% reported using CBD products to treat severe, debilitating, treatment-resistant conditions, including brain injuries, epilepsy, multiple sclerosis, autism spectrum disorder, Parkinson's disease, and Alzheimer's disease.

Most participants were using CBD for more than one condition, and there was a notable clustering of certain conditions.^{xii} Pain, mood issues, and sleep problems correlated closely. A significant number of participants using CBD for pain reported suffering from fibromyalgia and/or arthritis though we had not asked specifically about these conditions. There was also a notable correlation between addiction and ADD/ADHD, and addiction and PTSD; participants who were using CBD for ADD/ADHD or PTSD were three times more likely than the average participant to be using CBD for alcoholism or addiction.

CBD'S IMPACT & EFFICACY



The survey asked about CBD's impact on six quality of life measurements: Pain, mood, sleep, physical function, energy or motivation, and the ability to socialize. A majority of participants reported some improvement across all measures, but the most significant were in the areas of pain and mood.

Forty percent of participants reported having one or more side effects. These were typically mild. The most common side effects were dry mouth, tiredness, dry or bloodshot eyes, and increased appetite.

Of great interest were the efficacy reports for specific conditions. The survey asked about 17 different conditions for which CBD is sometimes used, including alcoholism/addiction, ADD or ADHD, Alzheimer's disease, autism spectrum disorder, brain injury (e.g. stroke, TBI, tumor), cancer, diabetes, epilepsy and

other seizure disorders, gastrointestinal disease (e.g. Colitis, Crohn's, IBS), depression, anxiety and other mood disorders, motion sickness, pain, Parkinson's disease, hormonal conditions (e.g. PMS, menopause), multiple sclerosis, PTSD, and sleep problems. The survey asked what type or stage of disease the person had (e.g. type 1 or type 2 diabetes), and how they felt CBD impacted the common symptoms of that disease.

Here are some of the findings regarding the efficacy of CBD for specific conditions:

- ✓ **CBD for Pain:** Most participants taking CBD for pain indicated that they got meaningful relief. Just under 90% of participants of this group reported some improvement in the frequency and duration of their pain, with 60% reporting that CBD made these aspects “much better.” Most significant though was CBD’s impact on the perception of pain intensity: Before taking CBD, the average pain score was 6.85; when taking CBD, the average pain score was 2.76, representing a 60% decrease in intensity.
- ✓ **CBD for Sleep:** Participants taking CBD for sleep were more likely to report having problems staying asleep than getting to sleep though most people reported having difficulty with both. Participants reported that CBD helped them get to sleep more quickly, reducing the average time from about an hour to 20 minutes. They also reported waking up much less often – 1.4 times per night versus 4.3 or about a third as many times. Without CBD, almost three-quarters of participants reported waking up tired; with CBD, 9% reported waking up tired. The reported improvements in how people reported feeling upon waking is likely explained by improvements in the ability to stay asleep. People taking CBD for sleep were somewhat more likely to also use some THC than the average participant.
- ✓ **CBD for Anxiety, Depression & Other Mood Disorders:** Almost 90% of participants using CBD for a mood disorder reported that they had anxiety. For most, anxiety went hand-in-hand with depression. Participants reported that CBD had significant effect as both an anti-anxiety agent and anti-depressant. It performed especially well at mitigating feelings of nervousness; 92% of participants experienced some relief from this symptom, and 68% reported that feelings of nervousness were “much better” with CBD. CBD also performed well at relieving panic attacks, mitigating mood swings, and quelling feelings of agitation, irritability, and sadness. CBD was less effective at mitigating difficulties concentrating, a lack of interest in activities, and digestive upset; almost a fifth of people report no change in these symptoms. Moreover, 3% of people using CBD for a mood disorder reported that the ability to concentrate worsened with CBD.
- ✓ **CBD for Hormonal Issues:** Among people taking CBD for PMS, menopause, or other female hormonal conditions, CBD appears to be highly effective in addressing mood disturbances and pain. It also appears to help mitigate night sweats and, to a lesser degree, hot flashes associated with menopause. CBD was less effective at ameliorating bloating common to menstruation; and it was less effective at mitigating sexual discomfort, low sex drive, and dry skin associated with menopause. About 5% of people reported that their CBD product made PMS-related food cravings worse, an effect that may be attributable to THC’s well-known tendency to cause the “munchies.”

- ✓ **CBD for PTSD:** Among people taking CBD for PTSD, CBD appears to be highly effective in addressing a range of symptoms, particularly anxiety, anger, irritability, depression, mood swings, and panic attacks. CBD also appears helpful, though less so, in mitigating unwanted thoughts, nightmares, and heart palpitations in people with PTSD.
- ✓ **CBD for Gastrointestinal (GI) Diseases:** Among people taking CBD for GI diseases, particularly IBS (Irritable Bowel Syndrome), CBD appears to be extremely helpful for relieving abdominal cramps or pain, nausea or vomiting, and indigestion. Many participants also found it helpful for fatigue though some found it made them more tired. CBD appears to be less effective at helping people with GI diseases maintain a healthy weight; half of participants in this group reported either no change or a worsening of this symptom.
- ✓ **CBD for ADD / ADHD (Attention Deficit Disorder / Attention Deficit Hyperactivity Disorder):** Among people with ADD/ADHD, CBD appears most helpful with staying on task, minimizing distractibility, and mitigating agitation or irritability. It appears less effective at minimizing the tendency to lose things and procrastinate (common to ADD/ADHD) and sometimes made those symptoms worse.
- ✓ **CBD for Cancer:** Among people taking CBD for cancer, CBD was most helpful with ameliorating nausea and vomiting. Many participants also found it helpful for appetite, neuropathy (numbness or tingling), and weakness. As mentioned earlier, CBD was markedly less likely to help with cancer-related constipation and diarrhea. The most significant side effects were with memory and concentration issues. People taking CBD for cancer were more likely than the average participant to be taking some THC. This may be due to THC's efficacy as a pain reliever^{xiii} or to well-publicized preclinical data suggesting that both THC and CBD may have tumor-fighting properties.^{xiv}
- ✓ **CBD for Diabetes:** Participants taking CBD for diabetes were asked their average blood sugar levels before and after they started taking CBD. Though average blood sugar levels with CBD were still high, they showed significant improvements over the pre-CBD levels, decreasing from 178 to 130 on average. Participants also reported significant improvements in neuropathy-type symptoms (i.e. nerve pain, tingling or numbness), and some improvements in their ability to maintain a healthy weight.
- ✓ **CBD for Alcoholism / Addiction:** Among people using CBD for addiction, most (70%) were seeking to abstain from their substance of abuse (as opposed to using less or getting through withdrawal). CBD appeared to be extremely helpful for getting and staying off opiates. This is consistent with observational studies that have noted that many patients voluntarily decrease the number of opiates they are using—or go off opiates completely—when they use them in conjunction with cannabis, as well with animal and preclinical studies suggesting that cannabis and CBD may reduce the risk of relapse.^{xv} CBD was also reportedly helpful for reducing or eliminating alcohol consumption. It was comparatively less helpful as a smoking cessation aid. Twenty-four percent of tobacco users experienced no change, and 4% report using more tobacco after introducing CBD.
- ✓ **CBD for Brain Injury:** Among people using CBD for a brain injury (typically a TBI), CBD proved most helpful for relieving headaches, irritability, and agitation. CBD was less helpful for balance issues. In a small percentage of participants, CBD seemed to make issues with memory, concentration, and self-expression worse.

DEMOGRAPHICS

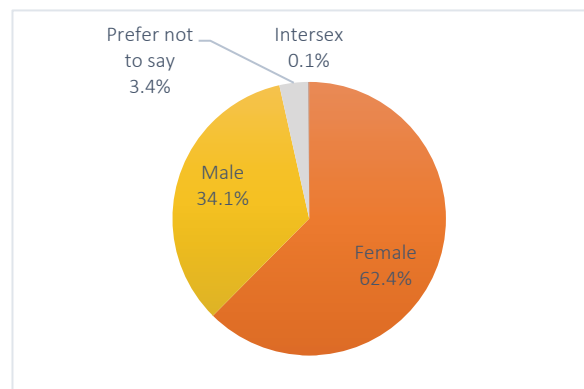


This section looks at the demographics of survey participants, including gender, ethnicity, age, education, and location.

SEX

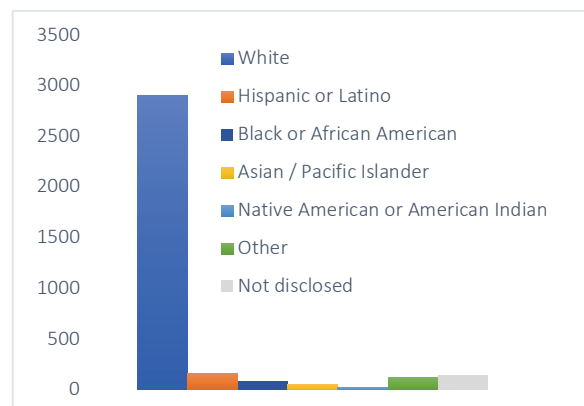
Participants skewed strongly female. This skewing may reflect females' higher utilization of healthcare services in general and alternative medicines in particular.

It may also reflect the fact that the two most prevalent conditions – pain and anxiety – affect women disproportionately.



ETHNICITY

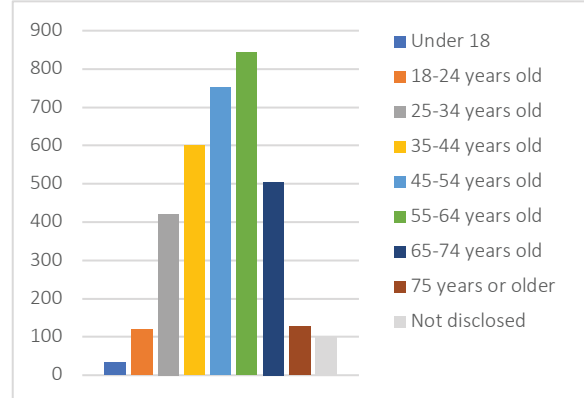
The vast majority of survey participants classified themselves as white. In the US, this may be due to the high cost of CBD therapeutics, greater utilization of alternative therapies by Caucasians, and/or a wariness of cannabis therapeutics on the part of communities of color that have borne the brunt of the US drug war.



AGE

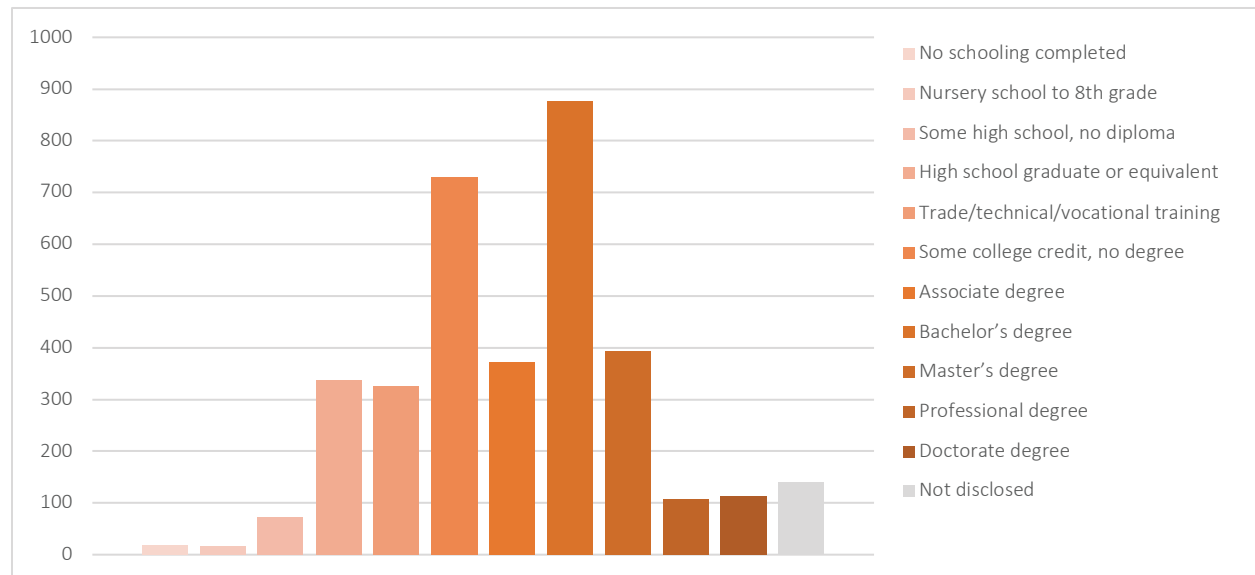
Participants skewed older. Almost two-thirds were over the age of 44, and almost 20% were over the age of 64.

This may be explained by the CBD's reported effectiveness in treating pain and sleep problems, ailments that are common among the elderly, particularly in the US where half of older adults (i.e. over the age of 65) report suffering from "bothersome" pain regularly, and half report regular sleep disturbances.



EDUCATION

Survey participants were well-educated. Just under three-quarters reported having at least some college education. About one-fifth (18%) reported having a graduate degree. This may reflect the fact that participants were recruited through Project CBD, a website that focuses on CBD science and education.



LOCATION OF PARTICIPANTS

Fifty-eight separate countries were represented in the survey; however, most participants (80%) were from the United States.

TOP COUNTRIES

1. United States
2. Canada
3. United Kingdom
4. South Africa
5. Australia
6. Germany
7. Norway
8. Mexico
9. Argentina
10. Italy

TOP US STATES

1. California
2. Texas
3. Florida
4. Washington
5. Pennsylvania
6. Kentucky
7. North Carolina
8. Utah
9. Colorado
10. New York

CBD PRODUCTS & DOSING



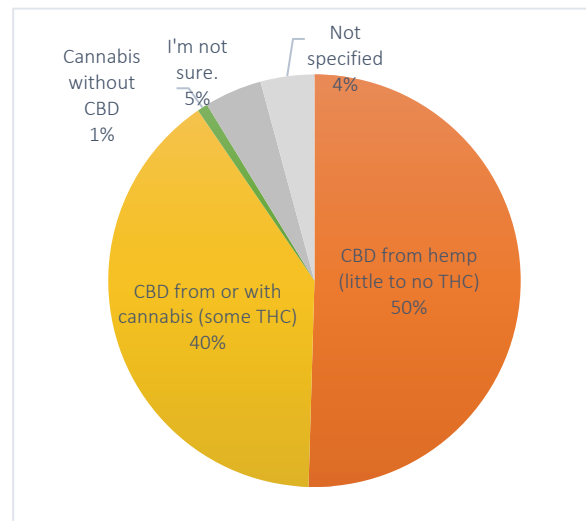
This section looks at what people are taking: what type of products, what dosages, how often, and for how long.

CBD SOURCES: HEMP VS. CANNABIS

Half of participants reported using CBD from hemp, that is CBD with less than 0.3% THC. Forty percent reported using CBD from cannabis or in combination with cannabis, meaning they take some THC as part of their CBD routine though amounts varied wildly.

The survey did not ask about CBD isolates. Some of the participants who did not specify the source of their CBD (4%) may be using an isolate.

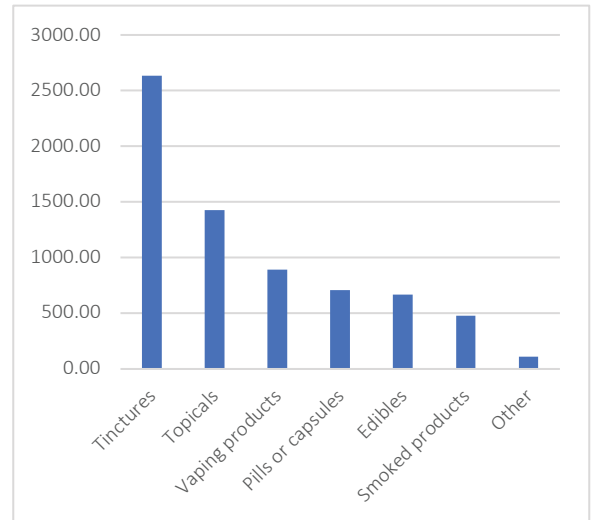
Five percent of participants stated that they were not sure where their CBD came from. This may reflect poor labeling, and/or confusion around the changing legal definition of hemp.



PRODUCT TYPES

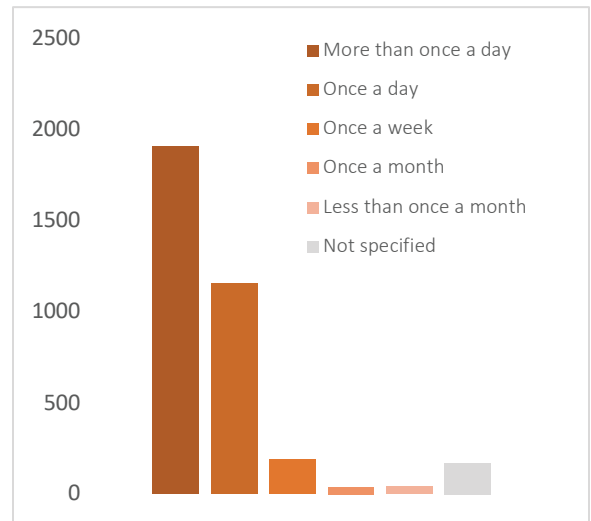
CBD users tended to favor smoke-free methods, like tinctures and topicals, over traditional modes of ingesting cannabis (i.e. smoking, vaping, and edibles).

Almost half of participants (46%) reported using more than one type of product. The most popular combination was a tincture with a topical (13%) followed by a tincture with a vaped product (4%). Only 2% of participants reported using a topical alone.



FREQUENCY OF USE

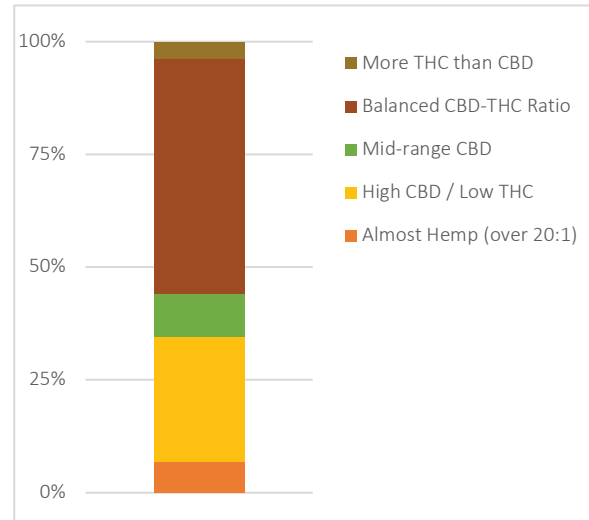
The majority of survey respondents report taking CBD at least once a day, and over half reported taking it multiple times per day.



DOSING & RATIO

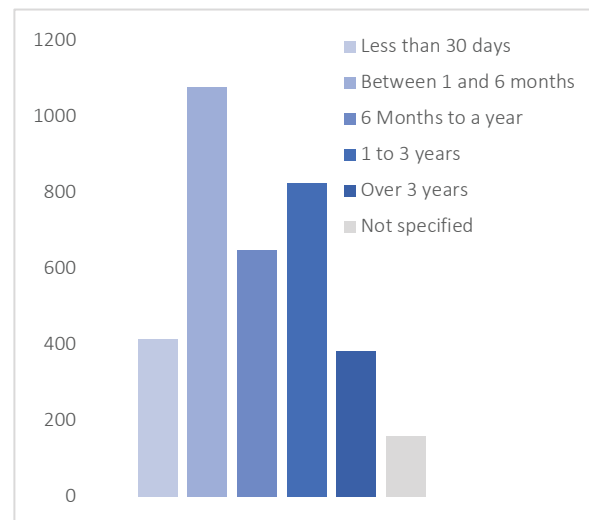
Few participants were able to say how much CBD (or THC) they were taking, suggesting an urgent need for both better product labeling and consumer education. Those that did answer this question indicated that they take anywhere from 2mg to 1000mg.

About half of participants taking CBD with or from cannabis specified the ratio of CBD to THC. Most favored a balanced ratio of CBD and THC (between 4:1 and 1:1), or a high CBD/low THC ratio between (20:1 and 10:1).



LENGTH OF USE

Forty-four percent of participants said that they had been using CBD for less than six months. This is not surprising given how recently it's become available and its therapeutic potential understood. Over one-third reported that they had been using CBD for over one year, and 11% reported they had been using it for over three years.



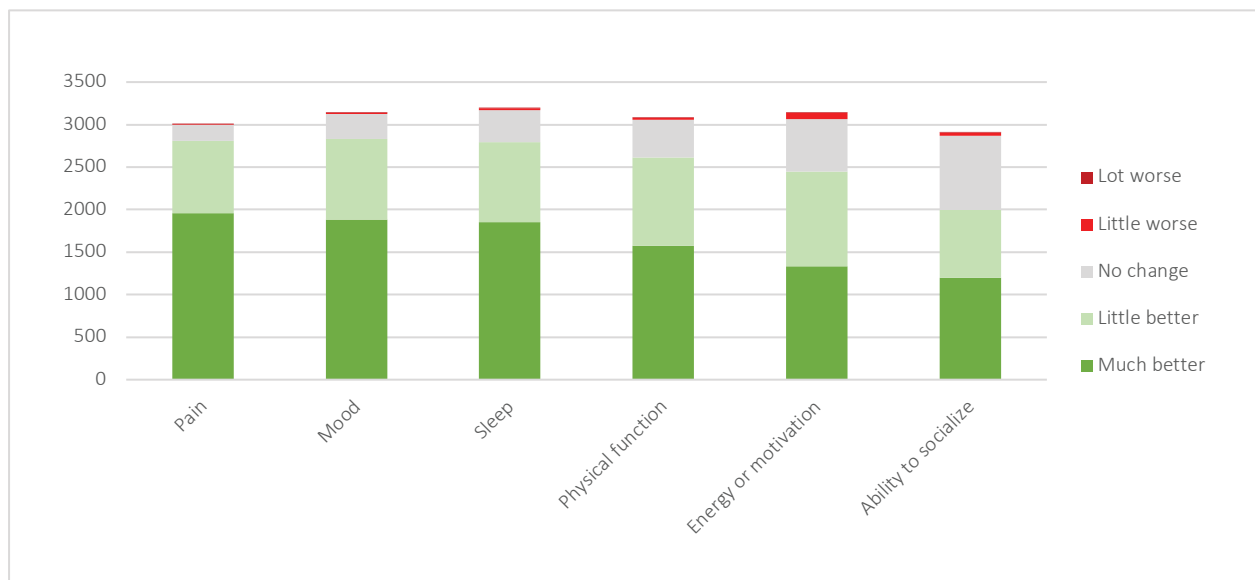
GENERAL IMPACT & SIDE EFFECTS



This section looks at the overall impact of CBD. Specifically: how did CBD impact key quality of life measurements, what sort of side effects did people experience, and how serious were those side effects?

QUALITY OF LIFE MEASURES

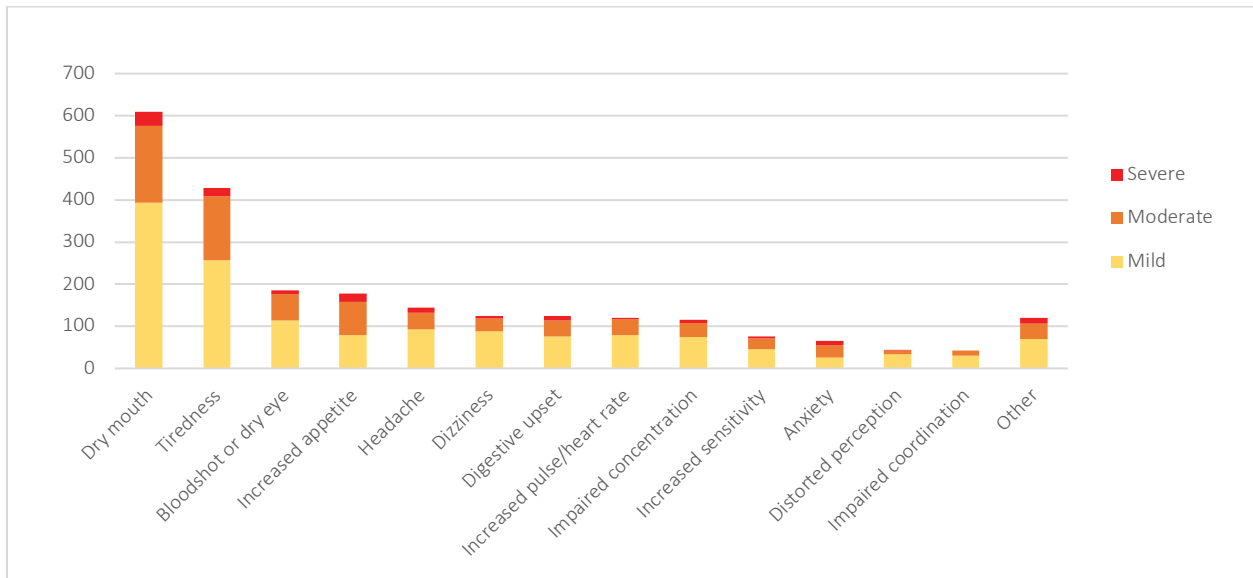
Participants were asked to assess CBD's impact on six quality of life measurements – pain, mood, sleep, physical function, energy or motivation, and the ability to socialize – and indicate if CBD made them feel “much better,” “a little better,” “a little worse,” “a lot worse,” or “no change.” A majority of survey respondents reported some improvement in all areas. The most significant improvements were in the areas of pain and mood. The only noticeable negative effects were on energy and motivation; just over 2% of participants reported that their energy or motivation got worse. This may be explained by the fact that both CBD and THC can be sedating depending upon the dose.



SIDE EFFECTS

Forty percent of participants reported having one or more side effects. These were typically mild. The most common side effects were dry mouth (18% of participants), tiredness (12%), dry or bloodshot eyes (5%), and increase appetite (5%).

See [Appendix B](#) for the complete list of reported side effects.

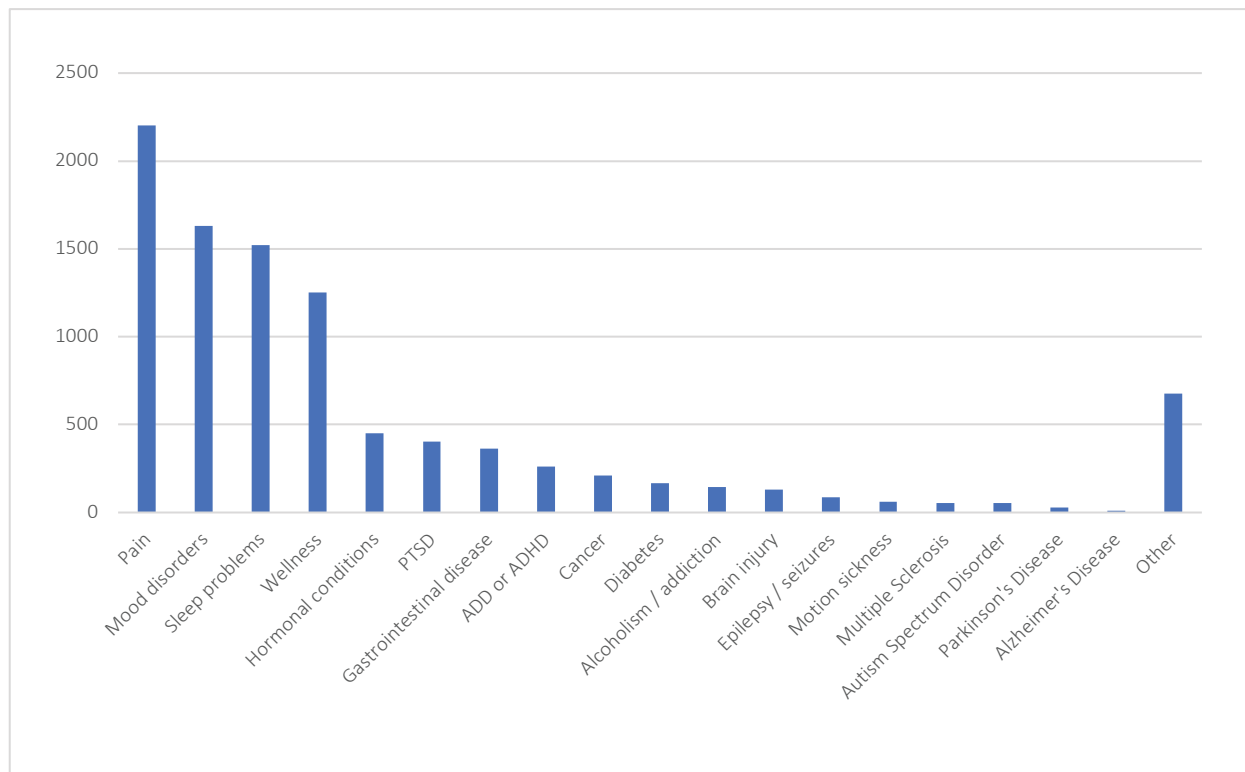


CONDITIONS



This section looked at the conditions for which people are taking CBD.

Participants reported using CBD for over 200 different conditions. (See [Appendix A](#) for the complete list.) The vast majority, however, reported using CBD to alleviate pain, improve mood and sleep, and/or for general wellness. Most participants (71%) were using CBD for more than one condition. Around 10% reported using CBD to treat serious, intractable illnesses such as brain injuries, epilepsy, multiple sclerosis, autism spectrum disorder, Parkinson's, and Alzheimer's.



CBD FOR PAIN



PROFILE

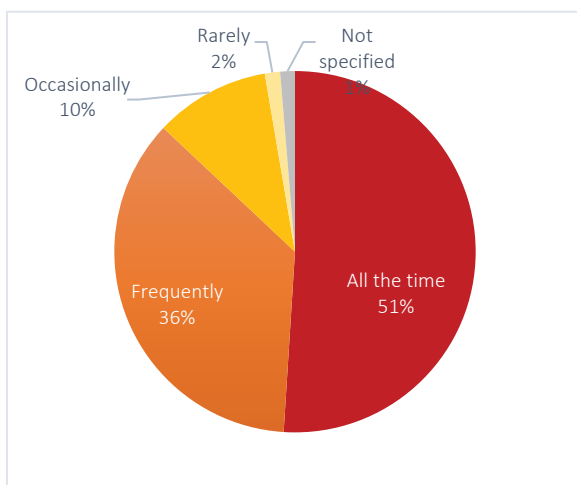
2,202 People reported taking CBD for pain

65% Female | **33%** Male | **2%** Prefer not to say

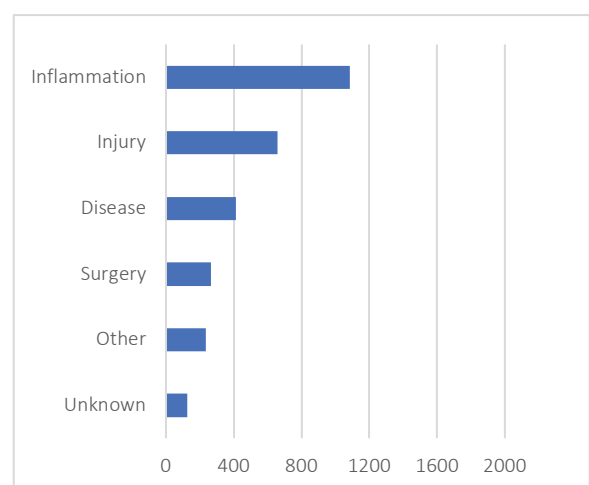
The vast majority of participants taking CBD for pain stated that they turned to CBD because they had pain most, if not all, the time (87%). Many had identified multiple sources of pain, the most significant being inflammation. Almost 10% of participants with pain indicated in the comments field that they had arthritis and/or fibromyalgia.

Other health issues were common among those with pain, in particular, sleep problems (51%), mood issues (typically anxiety and/or depression) (51%), hormonal conditions (15%), PTSD (14%), and gastrointestinal disease (12%).

FREQUENCY OF PAIN



SOURCES OF PAIN



EFFICACY

Participants were asked to rate their pain with and without CBD on a scale of 1 to 10 where 1 represented “a little pain” and 10 represented “the worst pain imaginable.” They were also asked about changes in the frequency, duration, and intensity of their pain.

Participants reported meaningful improvement against all pain measures. Just under 90% of participants reported some improvements in the frequency and duration of their pain, with 60% reporting that CBD made these aspects “much better.” Most significant though was CBD’s impact on the intensity of pain. Almost 70% of participants reported that their pain intensity was “much better” with CBD; an additional 23% reported it was “a little better.” Without CBD, the average pain score was 6.85. With CBD, the average pain score was 2.76, representing an average decrease in intensity of 60%.

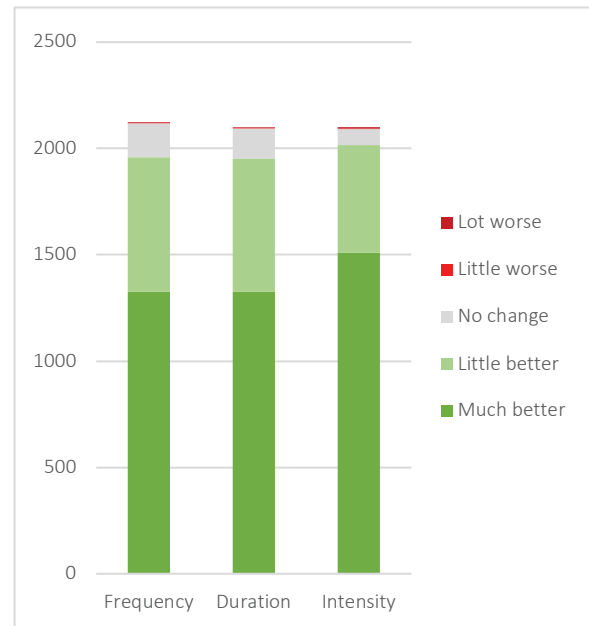
In light of the well-known dangers of opiates, this suggests that CBD has significant potential as a non-toxic, non-addictive, alternative pain remedy.

CHANGES IN PAIN SCORE

6.85

2.76

FREQUENCY, DURATION & INTENSITY



CBD FOR SLEEP



PROFILE

1,521 People reported taking CBD for sleep problems

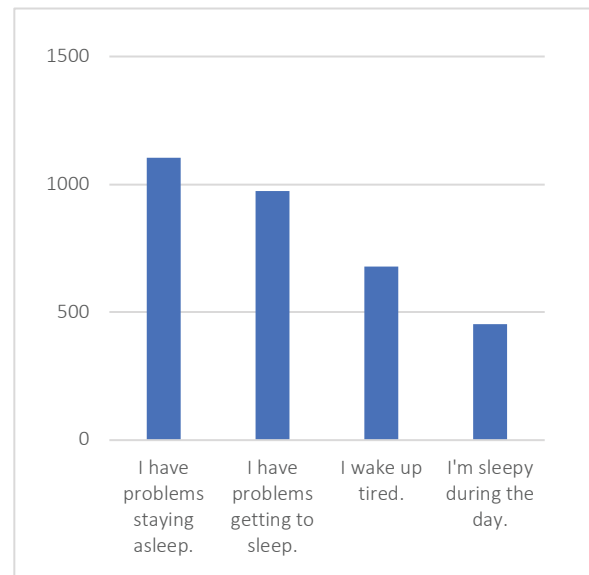
69% Female | **29%** Male | **2%** Prefer not to say

Survey participants were slightly more likely to report having problems staying asleep rather than falling sleep, though most people reported having difficulty with both.

Other health issues were common among those using CBD for sleep, in particular, pain (73%), mood issues (63%), hormonal conditions (20%), PTSD (18%), and gastrointestinal disease (15%).

People taking CBD for sleep were slightly more likely than average to use CBD with or from cannabis (rather than CBD from hemp alone), meaning they were more likely to be using some THC with their CBD.

SLEEP ISSUES

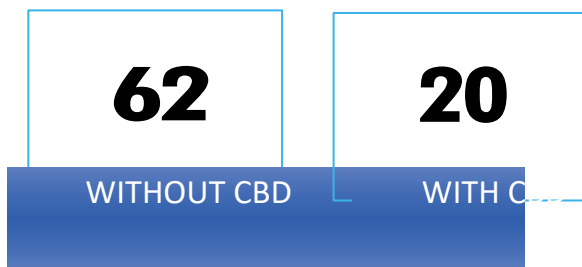


EFFICACY

Survey participants were asked to estimate how many minutes it took them to get to sleep with and without CBD, and how often they woke in the night with and without CBD.

Participants reported that CBD helped get to sleep more quickly, reducing the average time from about an hour to 20 minutes. Perhaps more importantly, participants reported waking up less often when using CBD for sleep (about a third as many times).

NO. OF MINUTES TO GET TO SLEEP



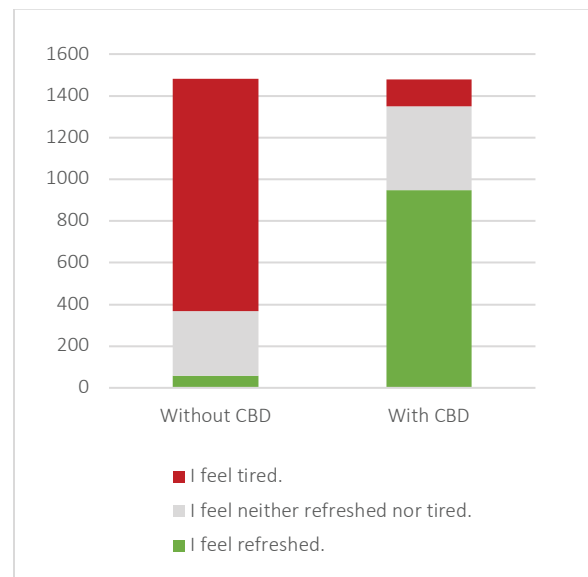
A majority of participants reported improvements in how they felt upon waking. Almost three-quarters of participants reported waking up tired without CBD; 9% reported waking up tired with CBD.

The significant improvements in how participants reported feeling upon waking when using CBD was likely connected to the decrease in the number of times they woke during the night.

NO. OF TIMES ONE WAKES IN THE NIGHT



FEELINGS UPON WAKING



CBD FOR MOOD DISORDERS



PROFILE

1,631 People reported taking CBD for mood disorders

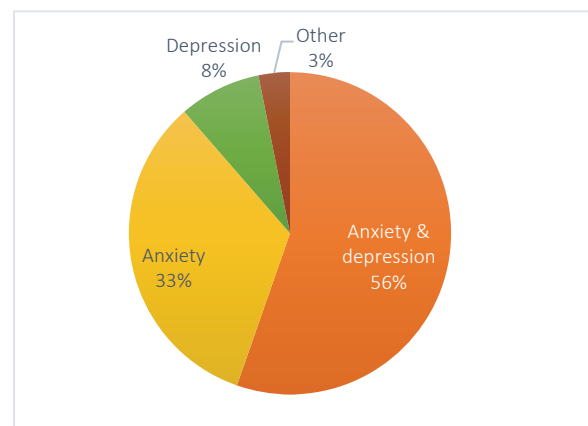
70% Female | **28%** Male | **2%** Prefer not to say

Of the participants taking CBD for a mood disorder, most stated that they had anxiety, depression, or both. The most common types of anxiety were generalized anxiety disorder (50% of all participants taking CBD for anxiety), social anxiety (10%), and panic disorder (10%).

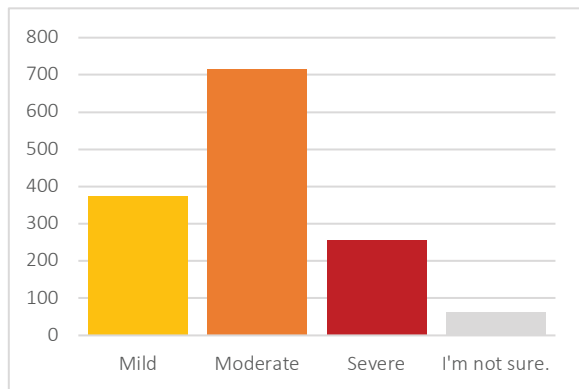
Most people with depression (58% of all participants taking CBD for depression) were not sure what type they had. Twelve percent of people taking CBD for depression said they had major depressive disorder, and seven percent said they had bipolar depression.

Most participants reported that their anxiety and/or depression were of moderate severity.

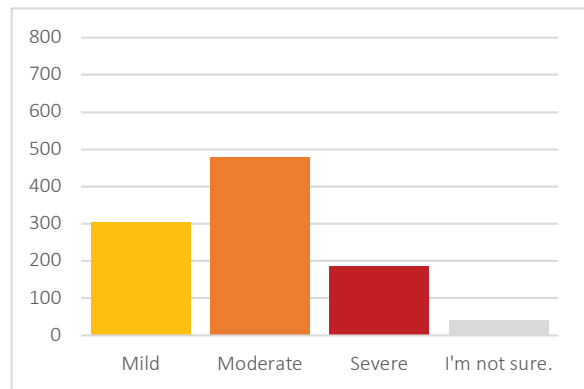
TYPES OF MOOD DISORDERS



SEVERITY OF ANXIETY



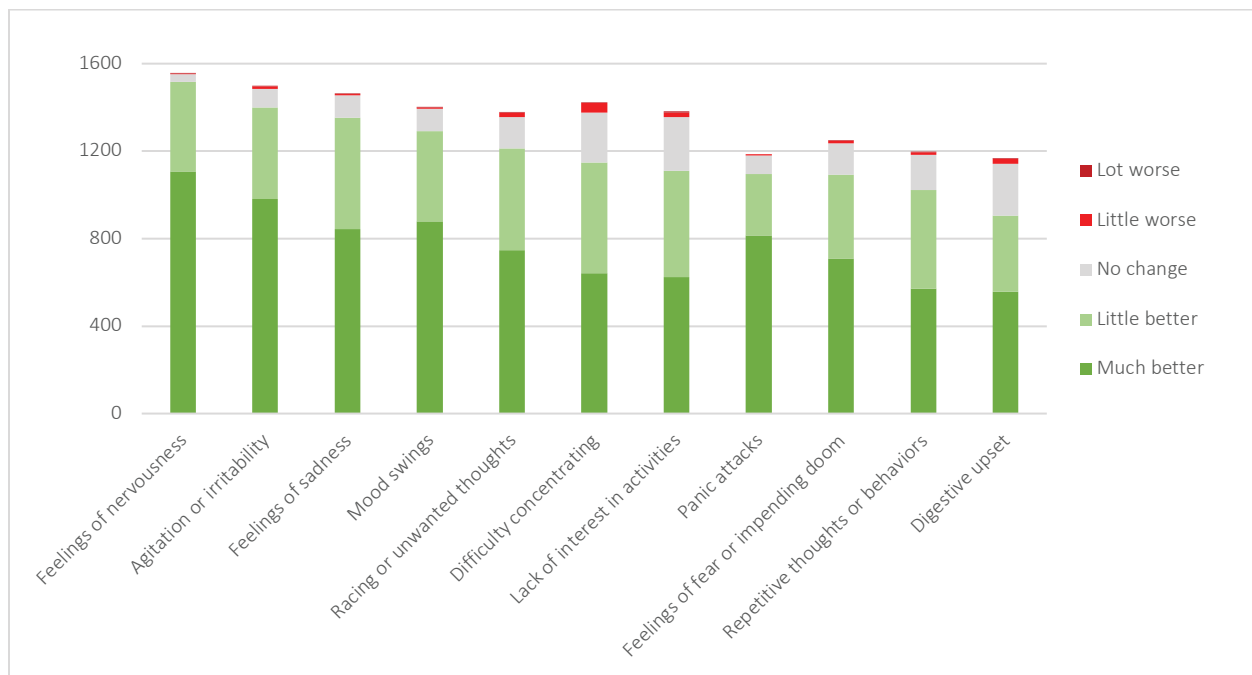
SEVERITY OF DEPRESSION



EFFICACY

Survey participants were asked to rate how CBD impacted 11 common symptoms of mood disorders (see chart below), indicating whether the symptom was a “much better,” “little better,” “no change,” a “little worse,” or “lot worse.” CBD appeared to be quite effective as an anti-anxiety agent and anti-depressant. Participants reported that it performed especially well at mitigating feelings of nervousness. Ninety-two percent of people experienced some relief, and 68% reported that feelings of nervousness were “much better” with CBD. CBD also performed well at relieving panic attacks, mitigating mood swings, and quelling feelings of agitation, irritability, and sadness.

CBD was less effective at mitigating difficulties concentrating, lack of interest in activities, and digestive upset. While still somewhat helpful for most, seventeen percent of people reported no improvement in these symptoms. And, 3% of people reported that the ability to concentrate worsened with CBD.



CBD FOR HORMONAL CONDITIONS



PROFILE

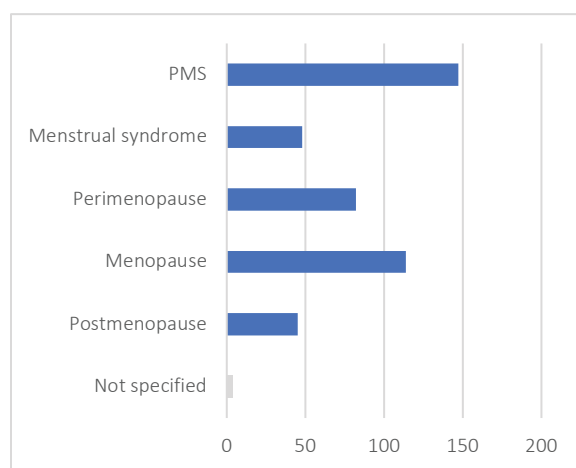
452 Females reported taking CBD for hormonal issues

Participants reported taking CBD for female hormonal issues across the lifecycle, from PMS to post-menopause.

Typically, people taking CBD for hormonal conditions also reported using CBD for pain (76%), and sleep problems (69%).

This group was more likely than average to be taking hemp (with little to no THC) rather than cannabis-derived CBD. Fifty-seven percent utilized hemp-derived CBD, while 38% used CBD with or from cannabis.

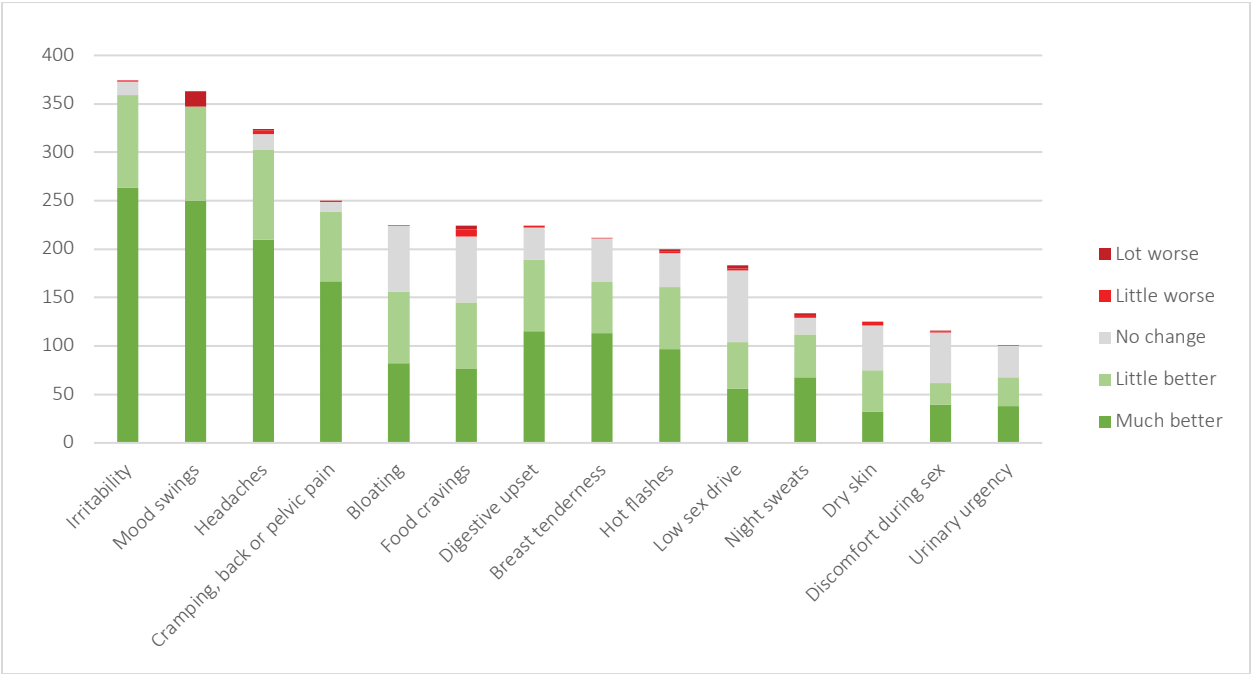
TYPES OF HORMONAL ISSUES



EFFICACY

Participants were asked to rate how CBD impacted 14 common symptoms of hormonal conditions (see chart below), indicating whether symptoms were “much better,” “little better,” “no change,” a “little worse,” or “lot worse.” CBD appeared to be highly effective in addressing mood and pain issues associated with female hormonal cycles. It also appeared to be especially helpful in mitigating night sweats and, to a lesser degree, hot flashes associated with menopause.

CBD was less effective at ameliorating bloating and food cravings related to menstruation, and sexual discomfort, low sex drive associated and dry skin related to menopause. About 5% of people reported that their CBD product made PMS-related food cravings worse, an effect that may be attributable to THC’s well-known tendency to cause the “munchies.”



CBD FOR PTSD



PROFILE

406 People reported taking CBD for PTSD (Post-Traumatic Stress Disorder)

69% Female | **30%** Male | **1%** Prefer not to say

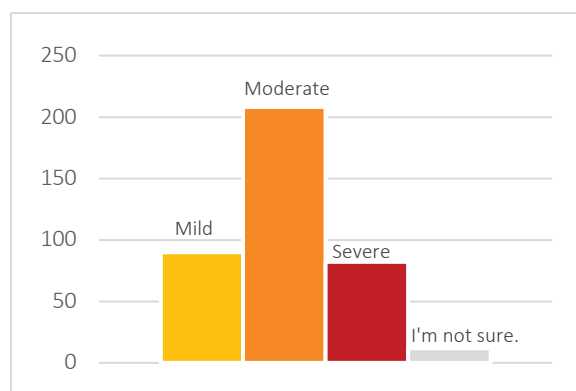
Most participants using CBD for PTSD characterized their PTSD as “moderate.” Over half (57%) reported that they had had PTSD for over ten years. Fourteen percent of participants with PTSD were military veterans.

The majority of participants using CBD for PTSD also reported that they were using CBD for depression (80%), pain (77%), and sleep problems (67%).

Notably, this group was almost three times more likely than the average participant to report using CBD for alcoholism/addiction. And, they were almost three times more likely to be using CBD for a brain injury.

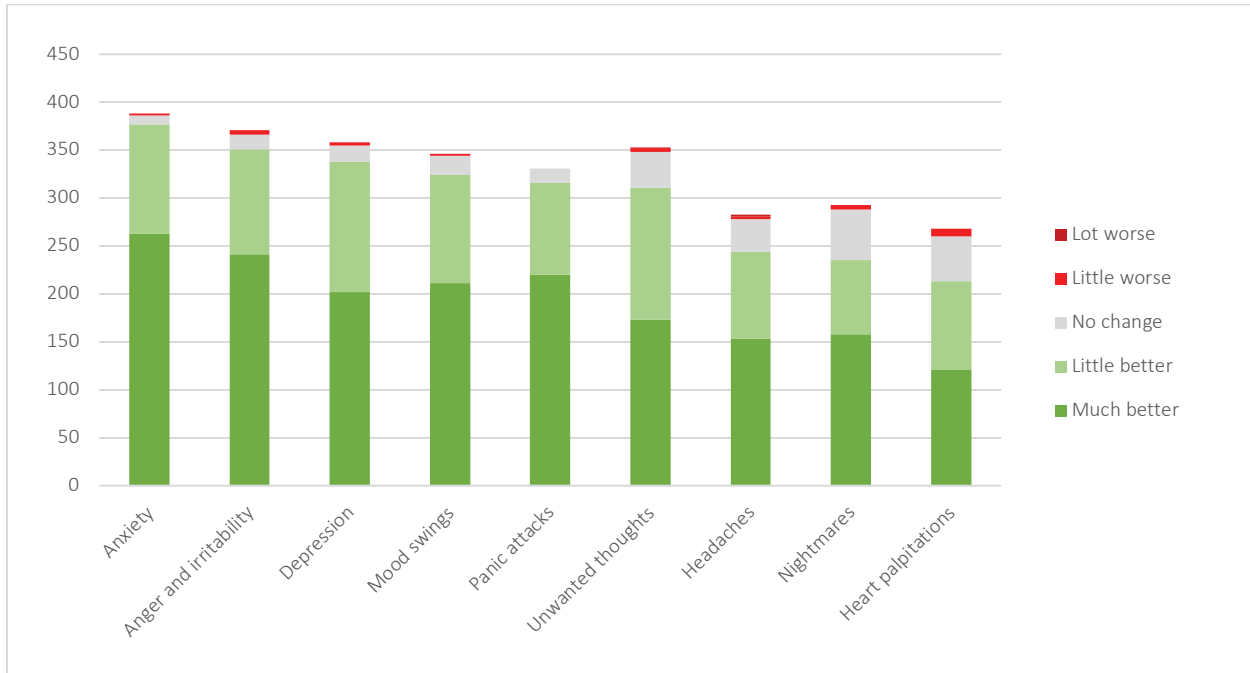
This group favored CBD derived from or used in combination with cannabis over hemp-derived CBD (53% utilized CBD from or with cannabis), meaning they were more likely to be using THC.

SEVERITY OF PTSD



EFFICACY

Participants were asked to rate how CBD impacted nine common symptoms of PTSD (see chart below), indicating whether the symptom was a “much better,” “little better,” “no change,” a “little worse,” or “lot worse.” CBD appeared to be highly effective in addressing a range of PTSD symptoms, particularly anxiety, anger, irritability, depression, mood swings, and panic attacks. CBD was also helpful, though less so, in mitigating unwanted thoughts, nightmares, and heart palpitations.



CBD FOR GASTROINTESTINAL DISEASE



PROFILE

366 People reported taking CBD for gastrointestinal (GI) diseases

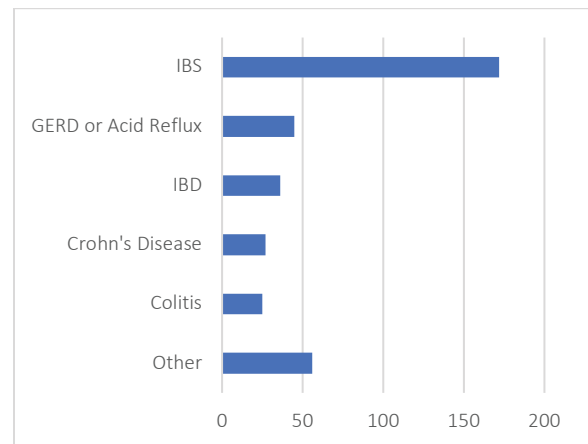
71% Female | **26%** Male | **3%** Prefer not to say

Irritable Bowel Syndrome (IBS) was the most common GI condition among participants reporting that they were using CBD for GI diseases.

The majority of participants using CBD for GI disease also reported that they were using CBD for pain (73%), mood issues (66%), and sleep problems (62%).

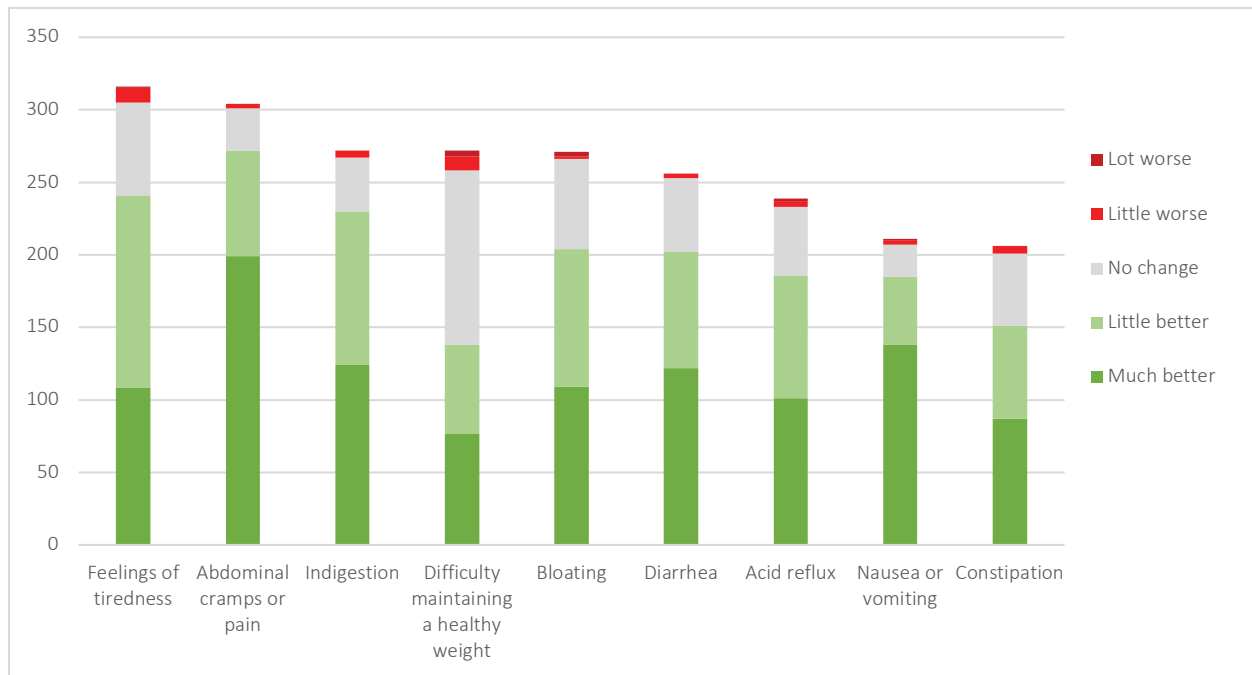
This group was more likely than average to be taking CBD with or from cannabis (as opposed to hemp-derived CBD), meaning they were more likely to be using some THC with their CBD.

TYPE OF GI DISEASES



EFFICACY

Participants were asked to rate how CBD impacted nine common symptoms of GI diseases (see chart below), indicating whether the symptom was a “much better,” “little better,” “no change,” a “little worse,” or “lot worse.” CBD appeared to be most helpful with relieving abdominal cramps or pain, nausea or vomiting, and indigestion. Many participants also found it helpful for fatigue though a small percentage found CBD made them more tired. CBD appeared to be far less effective at helping people with GI diseases maintain a healthy weight.



CBD FOR ADD / ADHD



PROFILE

263 People reported taking CBD for ADD / ADHD

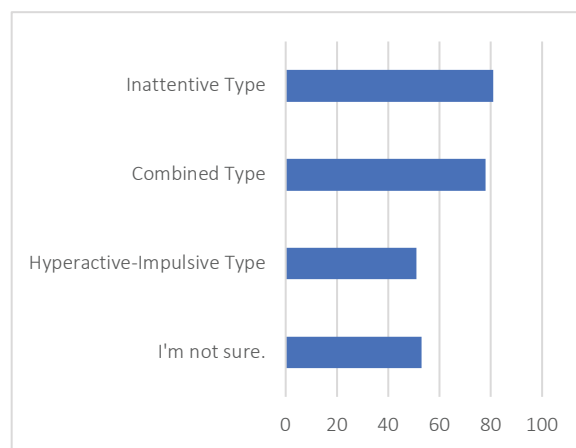
57% Female | **38%** Male | **4%** Prefer not to say

People reporting that they were using CBD for ADD / ADHD (attention deficit disorder /attention deficit hyperactivity disorder) typically had Inattentive Type or Combined type. This group frequently reported that they were using CBD for other issues such as mood issues (78%), pain (68%), and sleep problems (60%).

Similar to participants using CBD for PTSD, this group was almost three times more likely to be using CBD for alcoholism/addiction, as well.

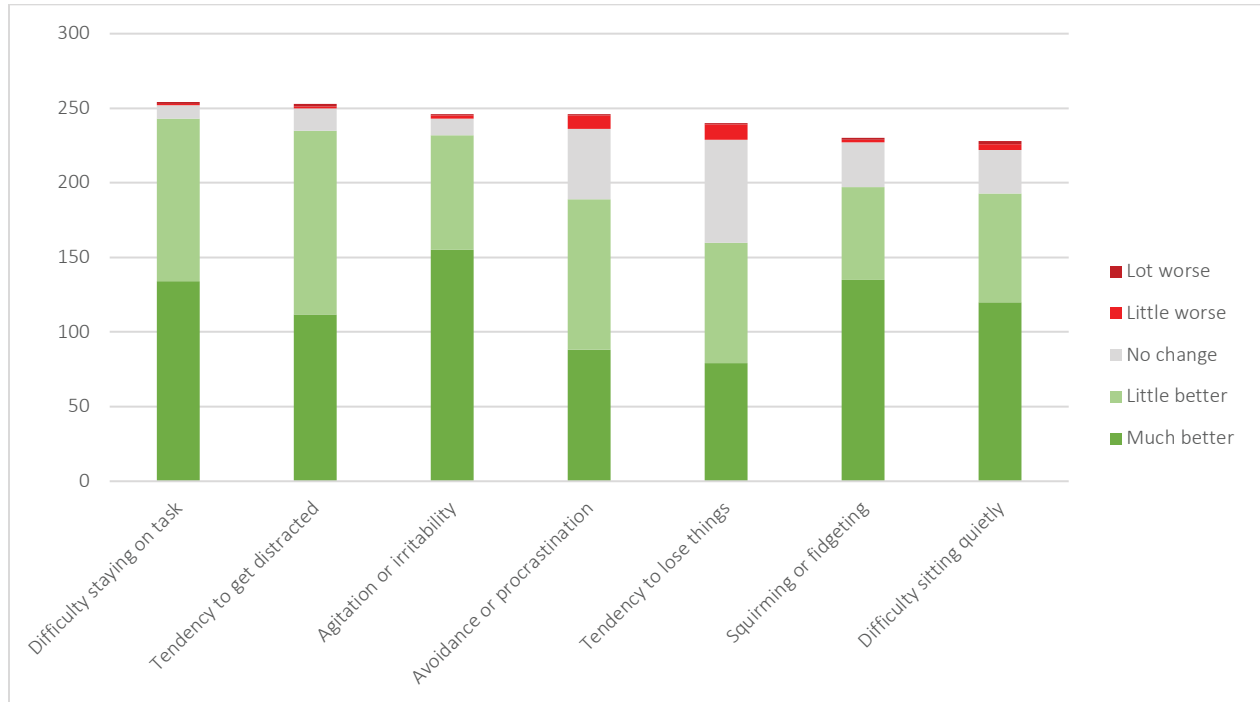
In addition, they were more likely to be using CBD with or from cannabis rather than hemp-derived CBD alone, meaning they were more likely to be using some THC with their CBD.

TYPES OF ADD / ADHD



EFFICACY

Participants were asked to rate how CBD impacted seven common symptoms of ADD/ADHD (see chart below), indicating whether the symptom was a “much better,” “little better,” “no change,” a “little worse,” or “lot worse.” CBD appeared to be most helpful with staying on task, minimizing distractibility, and mitigating agitation or irritability. It appeared less effective at minimizing the tendency to lose things and procrastinate and sometimes makes those symptoms worse.



CBD FOR CANCER



PROFILE

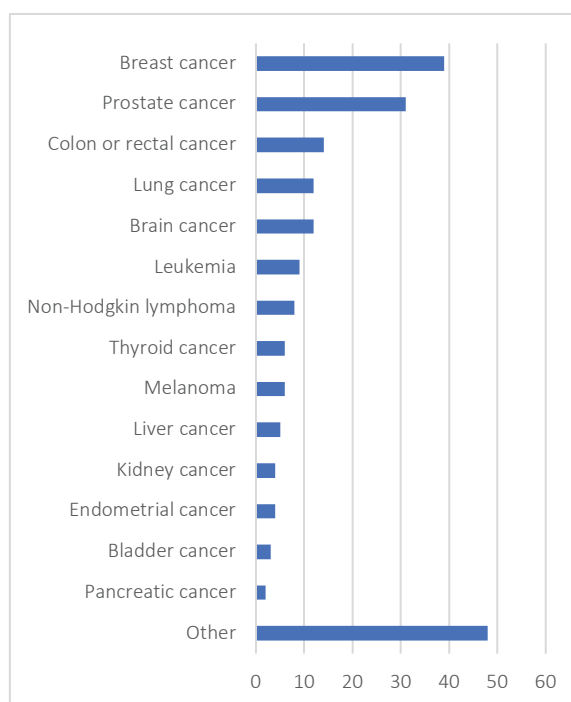
214 People reported taking CBD for cancer

51% Female | **49%** Male

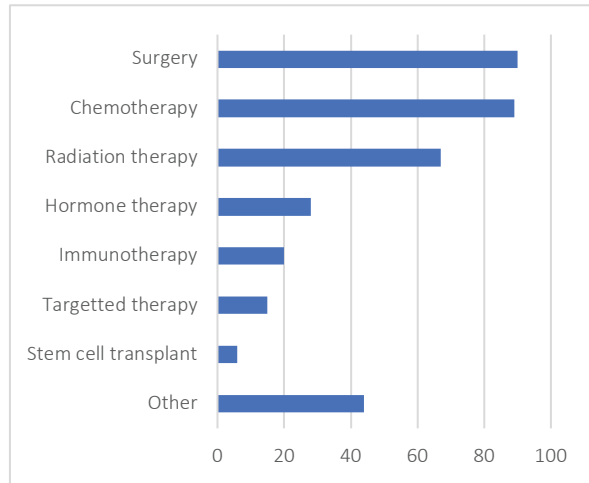
Participants reported having 32 different types of cancer. Breast, prostate, and colon/rectal cancer were the most common. The majority of participants in this group had had either surgery, chemotherapy, or radiation therapy. Many were in remission / cancer-free. Many were also using CBD for pain (44%), sleep problems (30%), and/or mood issues (25%).

Participants using CBD products for cancer were more likely to be using CBD with or from cannabis rather than hemp-derived CBD alone (57% versus 40%), meaning they were more likely to be taking some THC with their CBD regimen. This may be due to THC's effectiveness as a pain reliever or to well-publicized preclinical data suggesting that both THC and CBD may have tumor-fighting properties.

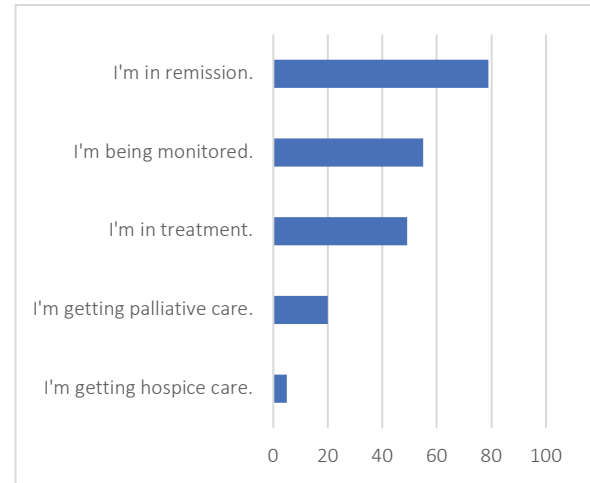
CANCER TYPES



TREATMENTS

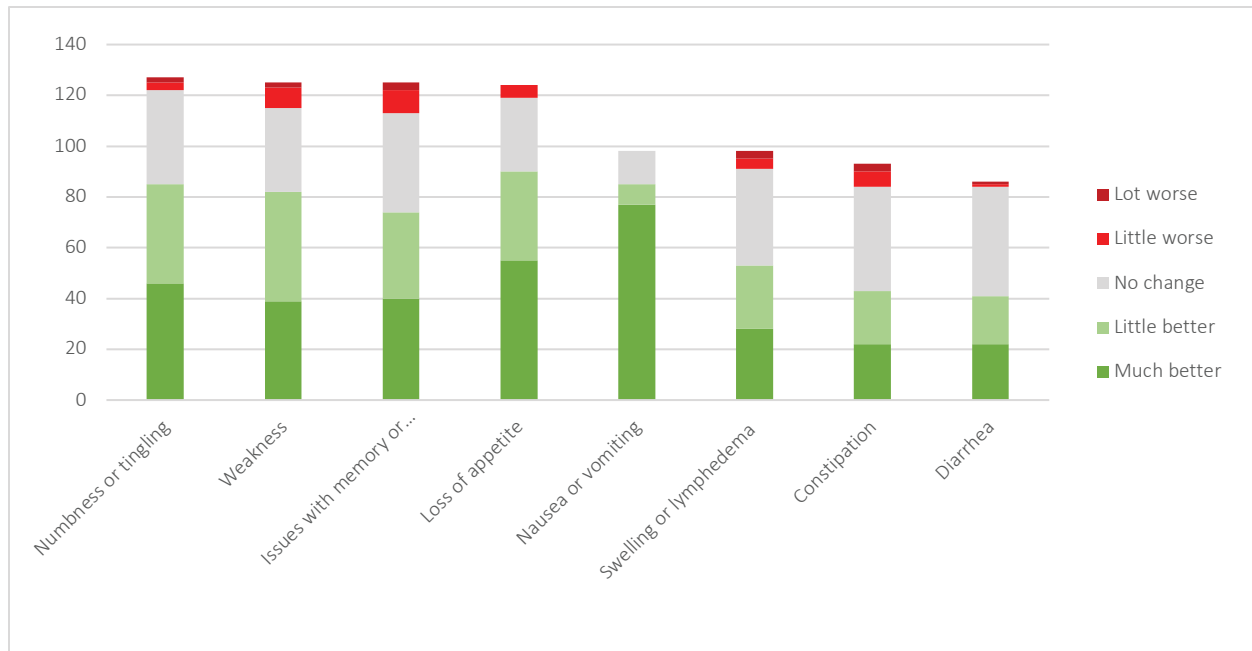


CANCER STATUS



EFFICACY

Participants were asked to rate how CBD impacted eight common symptoms of cancer and cancer treatment (see chart below), indicating whether the symptom was a “much better,” “little better,” “no change,” a “little worse,” or “lot worse.” CBD was most helpful with ameliorating nausea and vomiting. Some participants also found it helpful for loss of appetite, neuropathy (numbness or tingling), and weakness. CBD was markedly less likely to help with cancer-related constipation and diarrhea. The most significant side effects related to memory and concentration.



CBD FOR DIABETES



PROFILE

169 People reported taking CBD for diabetes

53% Female | **44%** Male | **3%** Prefer not to say

Most participants taking CBD for diabetes had Type 2 diabetes (72%). Many reported that they were taking CBD for other conditions, in particular, pain (77%), mood issues (49%), and sleep problems (46%). A significant minority of this group (14%) also reported taking CBD for GI diseases.

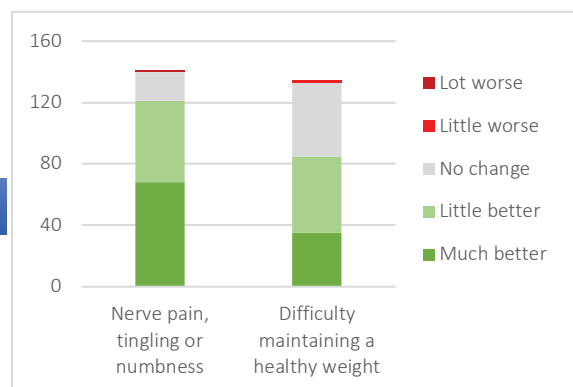
EFFICACY

Participants were asked about their typical blood sugar levels before and after they started taking CBD. Though the average levels with CBD were still high, they showed significant improvements over the pre-CBD levels, decreasing by about 27% on average. Participants also reported significant improvements in neuropathy-type symptoms (i.e. nerve pain, tingling or numbness), and some improvements in their ability to maintain a healthy weight.

BLOOD SUGAR LEVELS



SYMPTOM RELIEF



CBD FOR ALCOHOLISM / ADDICTION



PROFILE

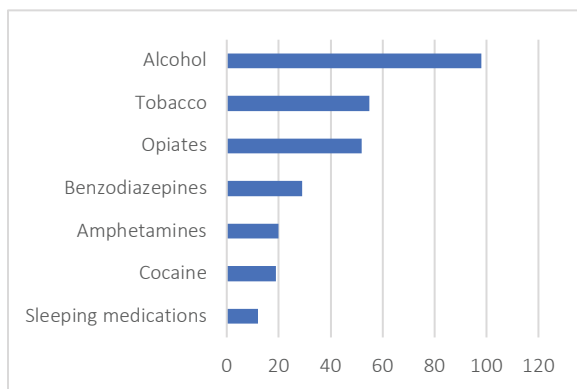
145 People reported taking CBD for addiction

49% Female | **48%** Male | **3%** Prefer not to say

Most participants using CBD for addiction reported being addicted to alcohol (68%), tobacco (38%), and/or opiates (36%). A smaller percent reported being addicted to benzodiazepines, amphetamines, cocaine, sleeping medications, ketamine, food, sugar, caffeine, and high THC cannabis. A majority of participants using CBD for addiction (55%) reported having more than one addiction. The most common combinations were alcohol and tobacco, alcohol and opiates, and opiates and tobacco, in that order. Participants taking CBD for addiction were very likely to report that they were also taking CBD for mood issues (78%), pain (69%), sleep problems (58%), and PTSD (30%).

Participants were asked what their primary recovery goal was: to avoid a relapse (stop using the substance), use less of the addictive substance, or manage the symptoms of withdrawal/detox. Most stated that they were trying to abstain from their addictive substance(s).

ADDICTION



PRIMARY RECOVERY GOAL

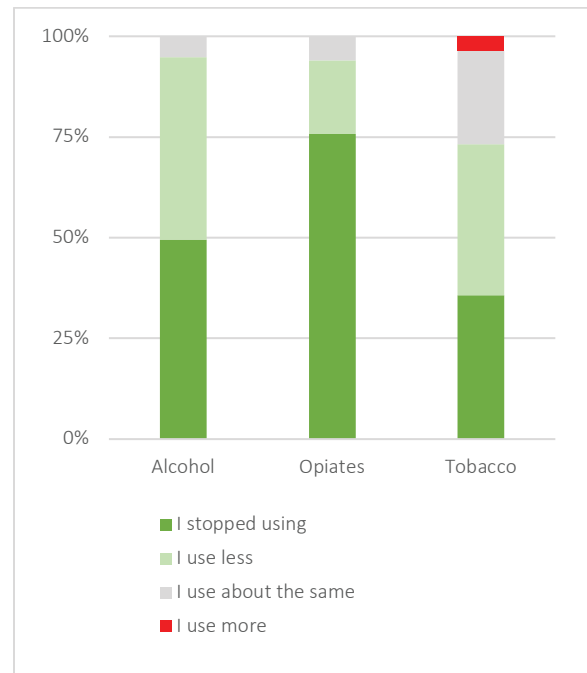
- 70%** "I'm trying to abstain/avoid a relapse."
- 23%** "I'm trying to use less of the substance I'm addicted to."
- 7%** "I'm trying to get through detox or withdrawal."

EFFICACY

CBD appeared to be extremely helpful for getting off and staying off opiates. This is consistent with observational studies that have noted that many patients voluntarily decrease the number of opiates they are using—or go off opiates completely—when they use them in conjunction with cannabis, as well with animal and preclinical studies suggesting that cannabis and CBD may reduce the risk of relapse.

CBD was also reportedly helpful for reducing or eliminating alcohol consumption. It was comparatively less helpful as a smoking cessation aid. Twenty-four percent of tobacco users experienced no change, and 4% report using more tobacco after introducing CBD.

CHANGES IN SUBSTANCE USE



CBD FOR BRAIN INJURIES



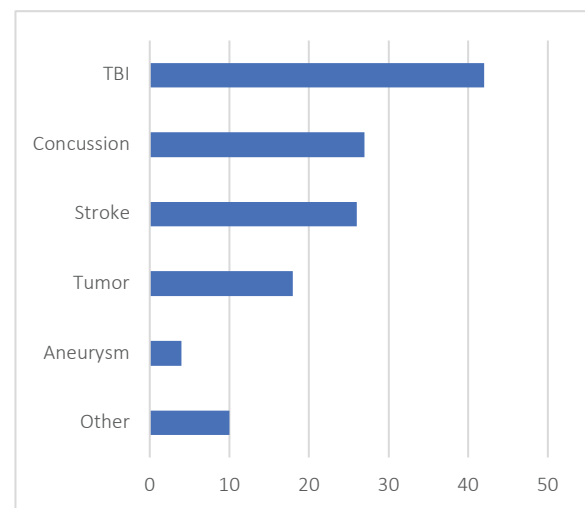
PROFILE

128 People reported taking CBD for brain injuries
58% Female | **41%** Male | **1%** Prefer not to say

The most common type of brain injury among participants was a TBI or Traumatic Brain Injury. Participants taking CBD for brain injuries often reported that they were also taking CBD for pain (68%), mood issues (55%), sleep problems (46%), and PTSD (33%).

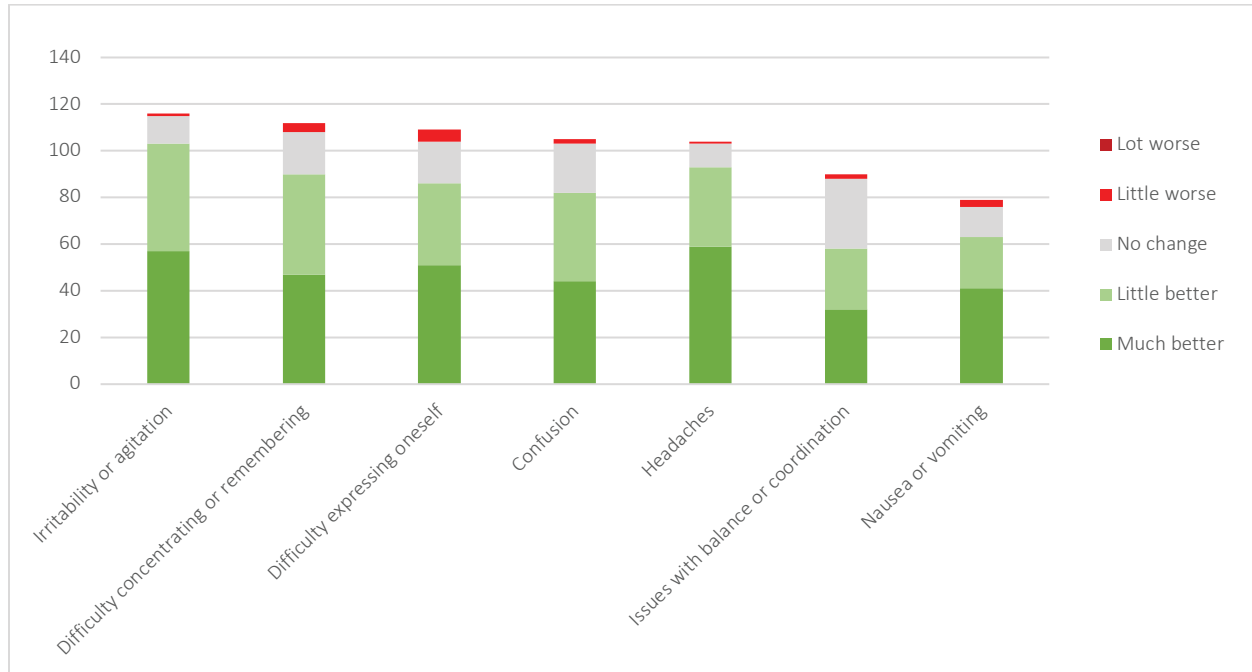
People with a brain injury were twice as likely to report using CBD for addiction as the average participant. Participants with brain injuries were also more likely to be taking CBD from or with cannabis rather than hemp-derived CBD alone (53% versus 40%), meaning they were more likely to be taking some THC with their CBD.

TYPES OF BRAIN INJURY



EFFICACY

Participants were asked to rate how CBD impacted seven common symptoms of brain injuries (see chart below), indicating whether the symptom was a “much better,” “little better,” “no change,” a “little worse,” or “lot worse.” For participants with brain injuries, CBD appeared most helpful for relieving headaches, irritability, and agitation. CBD was less helpful at relieving issues with balance or coordination. In a small percentage of participants, participants reported that issues with memory, concentration, and self-expression worsened though it is unknown if this was the result of CBD or THC.



ANECDOTAL FEEDBACK

In spite of the fact that this was a lengthy survey, over half of participants (1,897) answered the question “what else would you like to share about your CBD experience?” adding free-form comments at the end of their submission.

Most comments elaborated on how CBD enhanced the quality of participants’ lives, often poignantly describing the change in the day-to-day experience of their symptoms. Others elaborated on its efficacy for specific conditions, and many described CBD’s unexpected helpfulness in ameliorating symptoms for which they weren’t even taking CBD (such as psoriasis).

Many participants also noted that CBD helped them reduce or eliminate other medications, most notably opiates, but also anti-depressants, anti-anxiety agents, thyroid medications, insulin, and other prescription drugs.

A number of participants bemoaned the lack of access to CBD and other cannabis-derived therapeutics and the high price of such products. Others expressed consternation over the challenges of find right product.

Quite a few participants requested more information on how to figure out the right dose and/or balance of CBD and THC. Others wanted to share tips on using CBD based on their own experience, such as how much to use, daytime versus nighttime use, their favorite modes of administration, etc.

A few participants reported side effects, including in one case the need to change – under their doctor’s supervision – their dose of Warfarin (a common blood thinner).

CONCLUSIONS

Figuring out how to maximize the therapeutic benefits of CBD and other cannabis compounds is still a work in progress. This survey was intended to harness the great “laboratory experiment in democracy” known as medical and recreational cannabis that’s been unfolding state-by-state and around the world. We did this by crowd-sourcing therapeutic knowledge and sharing our collective learnings.

While largely anecdotal and limited in scope, the message is one of hope for people suffering a wide range of difficult-to-treat conditions and symptoms.

For questions and suggestions, please email us at: research@projectcbd.org.

APPENDIX A: MEDICAL CONDITIONS FOR WHICH PARTICIPANTS USE CBD

Participants reported that they were using CBD to treat a wide range of medical conditions and symptoms. The full list, which is below, includes many difficult to treat diseases.

1. Acid reflux
2. Acne
3. Acoustic neuroma
4. ADD / ADHD
5. Adrenal insufficiency
6. AIDS
7. Alcoholism / addiction
8. Allergies
9. Alopecia
10. ALS
11. Alzheimer's disease
12. Alzheimer's prevention
13. Anger management
14. Ankylosing spondylitis
15. Antiphospholipid syndrome
16. Anxiety
17. Appetite stimulation
18. Appetite suppression
19. Arrhythmia
20. Arthritis
21. Asthma
22. Atherosclerosis
23. Atrial fibrillation
24. Autism Spectrum Disorder
25. Autoimmune disease
26. Babesia disease
27. Back injury
28. Back pain
29. Bipolar disorder
30. Body dysmorphia
31. Brain injury
32. Bronchiectasis
33. Bulimia
34. Bulging cervical disks
35. Bursitis
36. Cancer
37. Cancer prevention
38. Carpel tunnel syndrome
39. Cataracts
40. Celiac disease
41. Cerebral palsy
42. Cervical spondylotic myelopathy
43. Charcot Marie Tooth disease
44. High cholesterol
45. Chronic fatigue syndrome
46. Cluster headaches
47. Colitis
48. Complex regional pain syndrome
49. Concussion
50. Connective tissue disorder
51. COPD
52. Cranial facial pain
53. Crohn's disease
54. Cymbalta withdrawal
55. Degenerative joint disorder
56. Depression
57. Dermatitis
58. Diabetes
59. DiGeorge syndrome
60. Diverticulitis
61. Dysautonomia
62. Dystonia
63. Eczema
64. Ehlers-Danlos Syndrome
65. Endometriosis
66. Enlarged spleen
67. Epilepsy/seizures
68. Essential tremors
69. Exercise recovery
70. Fatigue
71. Fibromyalgia
72. Focus
73. Functional neurological disorder
74. Generalized anxiety disorder
75. General movement disorder
76. General wellness
77. GERD
78. Glaucoma
79. Gluten sensitivity
80. Gout
81. Graft vs host disease
82. Grave's disease
83. Grief
84. Hashimoto's disease
85. Headaches
86. Heart disease
87. Hemifacial spasms
88. Hemorrhoids
89. Hepatitis C
90. Hereditary spastic paraplegia
91. High blood pressure
92. High cholesterol
93. Hirschsprung's disease
94. HIV
95. Hot flashes
96. Hypertension
97. Hypothyroidism
98. IBS
99. Idiopathic intracranial hypertension
100. Idiopathic membranous nephropathy
101. Inclusion body myositis
102. Inflammation
103. Inflammatory bowel disease
104. Insomnia
105. Intractable brainstem migraines
106. Interocular eye pressure
107. Irritable bowel syndrome
108. Joint health
109. Joint pain
110. Juvenile rheumatoid arthritis
111. Keratosis
112. Kidney disease
113. Kidney failure
114. Kidney transplant
115. Leaky gut
116. Leg cramps
117. Lichen sclerosis
118. Lumbar back injury
119. Lumbar spinal stenosis
120. Lung Injury
121. Lupus
122. Lyme's disease
123. Medullary sponge kidneys
124. Menopause
125. Menstruation pain
126. Mental clarity
127. Metabolic disease
128. Migraines
129. Mood disorders
130. Mood swings
131. Morning sickness
132. Motion sickness
133. Motor neuron disease
134. Multiple myeloma
135. Multiple sclerosis
136. Muscle pain
137. Muscle rigidity
138. Muscle spasms
139. Myasthenia gravis
140. Nail fungus

141. Nausea
142. Nerve disease/demyelination
143. Nerve pain
144. Neuropathy
145. Neuroprotection
146. Numbness in hands
147. Obsessive compulsive disorder
148. Ocular headaches
149. Osteoarthritis
150. Osteomalacia
151. Osteopenia
152. Osteoporosis
153. Pain
154. Panic attacks
155. Panic disorder
156. Parkinson's Disease
157. Parkinson's prevention
158. Polycystic ovary syndrome
159. Pemphigus
160. Pericarditis
161. Perimenopause
162. Peripheral neuropathy
163. Phantom limb pain
164. Plantar fasciitis
165. Polymyalgia rheumatica
166. Porphyria
167. Post ablation syndrome
168. Post menopause
169. Postural orthostatic
tachycardia syndrome
170. Prader-Willi syndrome
171. Prednisolone withdrawal
172. Primary biliary cholangitis
173. Psoriasis
174. Psoriatic arthritis
175. Psychosis
176. PTSD
177. Recovery from injury
178. Recovery from surgery
179. Relaxation
180. Restless leg syndrome
181. Rosacea
182. Sarcoidosis
183. Schizoaffective disorder
184. Schizophrenia
185. Sciatica
186. Scleroderma
187. Scoliosis
188. Seborrheic keratosis
189. Shingles
190. Sjögren's syndrome
191. Skin conditions
192. Skin, hair, nail health
193. Sleep problems
194. Smoking cessation
195. Social anxiety
196. Speech impediment
197. Spina bifida
198. Spinal cord injury
199. Spinal stenosis
200. Stroke
201. TBI
202. Temporal arteritis
203. THC withdrawal
204. Thyroid disease
205. Tinnitus
206. TMJ
207. Toothache
208. Tourette's syndrome
209. Transverse myelitis
210. Tremors
211. Trigeminal neuralgia
212. Tuberous sclerosis
213. Undiagnosed intestinal issues
214. Undiagnosed stomach pain
215. Vertigo
216. Weight loss
217. Wellness
218. Wound healing

APPENDIX B: COMPLETE LIST OF REPORTED SIDE EFFECTS

<i>Side Effect</i>	<i># Reports</i>	<i>% of Participants</i>
<i>Dry mouth</i>	619	17.66%
<i>Tiredness</i>	429	12.24%
<i>Bloodshot or dry eyes</i>	188	5.36%
<i>Overeating</i>	181	5.16%
<i>Headache</i>	150	4.28%
<i>Dizziness</i>	130	3.71%
<i>Digestive upset</i>	127	3.62%
<i>Increased pulse and heart rate</i>	122	3.48%
<i>Impaired concentration</i>	116	3.31%
<i>Increased sensitivity</i>	78	2.22%
<i>Anxiety</i>	67	1.91%
<i>Impaired coordination</i>	45	1.28%
<i>Vivid dreams or nightmares</i>	7	0.20%
<i>Itchiness or hives</i>	6	0.17%
<i>Insomnia/wakefulness</i>	5	0.14%
<i> ringing in ears</i>	5	0.14%
<i>Constipation</i>	3	0.09%
<i>Overheating</i>	3	0.09%
<i>Agitation / restlessness</i>	2	0.06%
<i>Diarrhea</i>	2	0.06%
<i>Forgetfulness</i>	2	0.06%
<i>Grogginess</i>	2	0.06%
<i>Impact on warfarin dose</i>	2	0.06%
<i>Nausea</i>	2	0.06%
<i>Tingling in extremities</i>	2	0.06%
<i>Blood sugar higher in the morning</i>	1	0.03%
<i>Blurred vision</i>	1	0.03%
<i>Brain fog</i>	1	0.03%
<i>Bruising</i>	1	0.03%
<i>Burning of tongue</i>	1	0.03%
<i>Cough/ lung irritation from vaping</i>	1	0.03%
<i>Delayed menstruation</i>	1	0.03%
<i>Distractibility</i>	1	0.03%
<i>Dried sinuses and nasal passage</i>	1	0.03%
<i>Food cravings</i>	1	0.03%
<i>Fuzzy and heavy feeling in the body</i>	1	0.03%

<i>Hypotension</i>	1	0.03%
<i>Incarceration</i>	1	0.03%
<i>Increase sensitivity to alcohol</i>	1	0.03%
<i>Increased appetite</i>	1	0.03%
<i>Increased pain</i>	1	0.03%
<i>Increased urination</i>	1	0.03%
<i>Irritability</i>	1	0.03%
<i>Lightheadedness</i>	1	0.03%
<i>Loss of appetite</i>	1	0.03%
<i>Nosebleed</i>	1	0.03%
<i>Numbness in mouth</i>	1	0.03%
<i>Poor impulse control</i>	1	0.03%
<i>Sadness</i>	1	0.03%
<i>Sciatica</i>	1	0.03%
<i>Scratchy throat</i>	1	0.03%
<i>Severe throbbing in my left leg</i>	1	0.03%
<i>Shingles outbreak</i>	1	0.03%
<i>Softer and faster-growing nails</i>	1	0.03%
<i>Swollen legs</i>	1	0.03%
<i>Urinary urgency</i>	1	0.03%
<i>Vomiting</i>	1	0.03%
<i>Weight gain</i>	1	0.03%

ENDNOTES

ⁱ For information on the safety of cannabidiol:

- Bergamaschi, M. M., Queiroz, R. H., Zuardi, A. W., & Crippa, J. A. (2011). Safety and Side Effects of Cannabidiol, a Cannabis sativa Constituent. *Current Drug Safety*, 6(4), 237-249. doi:10.2174/157488611798280924.
- Iffland, K., & Grotenhermen, F. (2017). An Update on Safety and Side Effects of Cannabidiol: A Review of Clinical Data and Relevant Animal Studies. *Cannabis and Cannabinoid Research*, 2(1), 139-154. doi:10.1089/can.2016.0034
- Martin-Santos, R., Crippa, J. A., Batalla, A., Bhattacharyya, S., et al. (2012). Acute Effects of a Single, Oral dose of d9-tetrahydrocannabinol (THC) and Cannabidiol (CBD) Administration in Healthy Volunteers. *Current Pharmaceutical Design*, 18(32), 4966-4979. doi:10.2174/138161212802884780

ⁱⁱ For information on cannabidiol and the treatment of pain:

- Committee on the Health Effects of Marijuana. *The Health Effects of Cannabis and Cannabinoids: The Current State of Evidence and Recommendations for Research*. (A Report of the National Academies of Science, Engineering, and Medicine.) The National Academies Press, 2017.
- Britch, S., Wiley, J., Yu, Z., Clowers, B., & Craft, R. (2017). Multicenter, double-blind, randomized, placebo-controlled, parallel-group study of the efficacy, safety, and tolerability of THC:CBD extract and THC extract in patients with intractable cancer-related pain. *Drug Alcohol Depend*, 175:187-197. doi:10.1016/j.drugalcdep.2017.01.046
- Fine, PG, and M J Rosenfeld. "Cannabinoids for Neuropathic Pain." *Current Pain and Headache Reports*, vol. 18, no. 10, ser. 451, Oct. 2014. 451, doi:10.1007/s11916-014-0451-2.
- Iskudjian, Michael, et al. "Meta-Analysis of Cannabis Based Treatments for Neuropathic and Multiple Sclerosis-Related Pain." *Current Medical Research and Opinion*, vol. 23, no. 1, 2006, pp. 17–24., doi:10.1185/030079906x158066.
- Johnson, J R, et al. "Multicenter, Double-Blind, Randomized, Placebo-Controlled, Parallel-Group Study of the Efficacy, Safety, and Tolerability of THC:CBD Extract and THC Extract in Patients with Intractable Cancer-Related Pain." *Journal of Pain Symptom Management*, vol. 39, no. 2, Feb. 2010, pp. 167–179., doi:10.1016/j.jpainsymman.2009.06.008.
- McDonough, Patrick, et al. "Neuropathic Orofacial Pain: Cannabinoids as a Therapeutic Avenue." *The International Journal of Biochemistry & Cell Biology*, vol. 55, 2014, pp. 72–78., doi:10.1016/j.biocel.2014.08.007.
- Nielsen, Suzanne, et al. "The Use of Cannabis and Cannabinoids in Treating Symptoms of Multiple Sclerosis: A Systematic Review of Reviews." *Current Neurology and Neuroscience Reports*, vol. 18, no. 2, 2018, doi:10.1007/s11910-018-0814-x.
- Nurmikko, Turo J., et al. "Sativex Successfully Treats Neuropathic Pain Characterised by Allodynia: A Randomised, Double-Blind, Placebo-Controlled Clinical Trial." *Pain*, vol. 133, no. 1, 2007, pp. 210–220., doi:10.1016/j.pain.2007.08.028.
- Rog, D, et al. "Oromucosal Δ9-Tetrahydrocannabinol/Cannabidiol for Neuropathic Pain Associated with Multiple Sclerosis: An Uncontrolled, Open-Label, 2-Year Extension Trial." *Clinical Therapeutics*, vol. 29, no. 9, 2007, pp. 2068–2079., doi:10.1016/j.clinthera.2007.09.013.
- Russo, Ethan B., et al. "Cannabis, Pain, and Sleep: Lessons from Therapeutic Clinical Trials of Sativex®, a Cannabis-Based Medicine." *ChemInform*, vol. 38, no. 47, 2007, doi:10.1002/chin.200747254.
- Russo, Ethan. "Cannabinoids in the Management of Difficult to Treat Pain." *Therapeutics and Clinical Risk Management*, Volume 4, 2008, pp. 245–259., doi:10.2147/tcrm.s1928.
- "Illuminating Results of CBD Patient Survey." *Project CBD: Medical Marijuana & Cannabinoid Science*, www.projectcbd.org/medicine/illuminating-results-cbd-patient-survey.

ⁱⁱⁱ For information on cannabidiol and the treatment of anxiety:

- Bergamaschi, M, et al. "Cannabidiol Reduces the Anxiety Induced by Simulated Public Speaking in Treatment-Naive Social Phobia Patients." *Neuropsychopharmacology*, vol. 36, 2011, doi:10.1038/npp.2011.6.
- Blessing, E, et al. "Cannabidiol as a Potential Treatment for Anxiety Disorders." *Neurotherapeutics: The Journal of the American Society for Experimental Neurotherapeutics*. 2015, doi:10.1007/s13311-015-0387-1.
- Campos, Alline C., et al. "Cannabidiol, Neuroprotection and Neuropsychiatric Disorders." *Pharmacological Research*, vol. 112, 2016, pp. 119–127., doi:10.1016/j.phrs.2016.01.033.
- Crippa, Jos. Alexandre S, et al. "Neural Basis of Anxiolytic Effects of Cannabidiol (CBD) in Generalized Social Anxiety Disorder: A Preliminary Report." *Journal of Psychopharmacology*, vol. 25, no. 1, 2010, pp. 121–130., doi:10.1177/0269881110379283.

-
- Soares, Vanessa P., and Alline C. Campos. “Evidences for the Anti-Panic Actions of Cannabidiol.” *Current Neuropsychopharmacology*, vol. 15, no. 2, 2017, pp. 291–299., doi:10.2174/1570159x14666160509123955.

^{iv} Armentano, P. (2012, September). CBD: Safe at High Doses. Retrieved June 26, 2019, from <https://www.projectcbd.org/medicine/cbd-safe-high-doses> Martin-Santos, R., Crippa, J. A., Batalla, A., Bhattacharyya, S., et al. (2012). Acute Effects of a Single, Oral dose of d9-tetrahydrocannabinol (THC) and Cannabidiol (CBD) Administration in Healthy Volunteers. *Current Pharmaceutical Design*, 18(32), 4966-4979. doi:10.2174/138161212802884780

^v Vaidya, V., Partha, G., & Karmakar, M. (2012). Gender Differences in Utilization of Preventive Care Services in the United States. *Journal of Women's Health*, 21(2), 140-145. doi:10.1089/jwh.2011.2876

^{vi} Alwhaibi, M., & Sambamoorthi, U. (2016). Sex Differences in the Use of Complementary and Alternative Medicine among Adults with Multiple Chronic Conditions. *Evidence-Based Complementary and Alternative Medicine*, 2016, 1-8. doi:10.1155/2016/2067095

^{vii} Carpenter, G., & Patil, M. (2017). Gender Differences in Pain. *Oxford Medicine Online*. doi:10.1093/med/9780190217518.003.0005

^{viii} Mclean, C. P., Asnaani, A., Litz, B. T., & Hofmann, S. G. (2011). Gender differences in anxiety disorders: Prevalence, course of illness, comorbidity and burden of illness. *Journal of Psychiatric Research*, 45(8), 1027-1035. doi:10.1016/j.jpsychires.2011.03.006

^{ix} Trends in alternative medicine use in the United States, 1990–1997: Results of a follow-up national survey. (1999). *Complementary Therapies in Medicine*, 7(3), 191-192. doi:10.1016/s0965-2299(99)80132-0

^x Patel, K. V., Guralnik, J. M., Dansie, E. J., & Turk, D. C. (2013). Prevalence and impact of pain among older adults in the United States: Findings from the 2011 National Health and Aging Trends Study. *Pain*, 154(12), 2649-2657. doi:10.1016/j.pain.2013.07.029

^{xi} Neikrug, A. B., & Ancoli-Israel, S. (2010). Sleep Disorders in the Older Adult – A Mini-Review. *Gerontology*, 56(2), 181-189. doi:10.1159/000236900

^{xii} Russo, E. B. (2016). Clinical Endocannabinoid Deficiency Reconsidered: Current Research Supports the Theory in Migraine, Fibromyalgia, Irritable Bowel, and Other Treatment-Resistant Syndromes. *Cannabis and Cannabinoid Research*, 1(1), 154-165. doi:10.1089/can.2016.0009

^{xiii} For information on THC, CBD, and pain:

- Committee on the Health Effects of Marijuana. *The Health Effects of Cannabis and Cannabinoids: The Current State of Evidence and Recommendations for Research*. (A Report of the National Academies of Science, Engineering, and Medicine.) The National Academies Press, 2017.
- Lötsch, J., et al. “Current Evidence of Cannabinoid-Based Analgesia Obtained in Preclinical and Human Experimental Settings.” *European Journal of Pain*, vol. 22, no. 3, 2017, pp. 471–484., doi:10.1002/ejp.1148.
- Johnson, Jeremy R., et al. “An Open-Label Extension Study to Investigate the Long-Term Safety and Tolerability of THC/CBD Oromucosal Spray and Oromucosal THC Spray in Patients With Terminal Cancer-Related Pain Refractory to Strong Opioid Analgesics.” *Journal of Pain and Symptom Management*, vol. 46, no. 2, 2013, pp. 207–218., doi:10.1016/j.jpainsymman.2012.07.014.
- Johnson, J R, et al. “Multicenter, Double-Blind, Randomized, Placebo-Controlled, Parallel-Group Study of the Efficacy, Safety, and Tolerability of THC:CBD Extract and THC Extract in Patients with Intractable Cancer-Related Pain.” *Journal of Pain Symptom Management*, vol. 39, no. 2, Feb. 2010, pp. 167–179., doi:10.1016/j.jpainsymman.2009.06.008.
- Johnson, J R, et al. “Multicenter, Double-Blind, Randomized, Placebo-Controlled, Parallel-Group Study of the Efficacy, Safety, and Tolerability of THC:CBD Extract and THC Extract in Patients with Intractable Cancer-Related Pain.” *Journal of Pain Symptom Management*, vol. 39, no. 2, Feb. 2010, pp. 167–179., doi:10.1016/j.jpainsymman.2009.06.008.

^{xiv} For information on CBD, THC, and cancer:

- Adinolfi, Barbara, et al. “Anticancer Activity of Anandamide in Human Cutaneous Melanoma Cells.” *European Journal of Pharmacology*, vol. 718, no. 1-3, 2013, pp. 154–159., doi:10.1016/j.ejphar.2013.08.039.

-
- Anderson, Susan P., et al. "Impact of Medical Cannabis on Patient-Reported Symptoms for Patients with Cancer Enrolled in Minnesota's Medical Cannabis Program." *Journal of Oncology Practice*, 2019, doi:10.1200/jop.18.00562.
 - Aviello, Gabriella, et al. "Chemopreventive Effect of the Non-Psychotropic Phytocannabinoid Cannabidiol on Experimental Colon Cancer." *Journal of Molecular Medicine*, vol. 90, no. 8, 2012, pp. 925–934., doi:10.1007/s00109-011-0856-x.
 - Bifulco, M., et al. "Endocannabinoids in Endocrine and Related Tumours." *Endocrine Related Cancer*, vol. 15, no. 2, 2008, pp. 391–408., doi:10.1677/erc-07-0258.
 - Blasco-Benito, Sandra, et al. "Appraising the 'Entourage Effect': Antitumor Action of a Pure Cannabinoid versus a Botanical Drug Preparation in Preclinical Models of Breast Cancer." *Biochemical Pharmacology*, vol. 157, 2018, pp. 285–293., doi:10.1016/j.bcp.2018.06.025
 - Brown, K J, et al. "Cannabidiol, a Novel Inverse Agonist for GPR12." *Biochemical and Biophysical Research Communications.*, vol. 4, no. 493, ser. 1, 4 Nov. 2017, pp. 451–454. 1, doi:10.1016/j.bbrc.2017.09.001.
 - Committee on the Health Effects of Marijuana. *The Health Effects of Cannabis and Cannabinoids: The Current State of Evidence and Recommendations for Research*. (A Report of the National Academies of Science, Engineering, and Medicine.) The National Academies Press, 2017.
 - Dall' Stella, Paula B., et al. "Case Report: Clinical Outcome and Image Response of Two Patients with Secondary High-Grade Glioma Treated With Chemoradiation, PCV, and Cannabidiol." *Frontiers in Oncology*, vol. 8, 2019, doi:10.3389/fonc.2018.00643.
 - Deng, L., et al. "Quantitative Analyses of Synergistic Responses between Cannabidiol and DNA-Damaging Agents on the Proliferation and Viability of Glioblastoma and Neural Progenitor Cells in Culture." *Journal of Pharmacology and Experimental Therapeutics*, vol. 360, no. 1, 2016, pp. 215–224., doi:10.1124/jpet.116.236968.
 - Fisher, T, et al. "In Vitro and in Vivo Efficacy of Non-Psychoactive Cannabidiol in Neuroblastoma." *Current Oncology* (Toronto, Ont.), Multimed Inc., Mar. 2016, www.ncbi.nlm.nih.gov/pmc/articles/PMC4791143/.
 - Guzman, M, et al. "A Pilot Clinical Study of Δ^9 -Tetrahydrocannabinol in Patients with Recurrent Glioblastoma Multiforme." *British Journal of Cancer*, vol. 95, 17 July 2006, pp. 197–203.
 - Johnson, J R, et al. "Multicenter, Double-Blind, Randomized, Placebo-Controlled, Parallel-Group Study of the Efficacy, Safety, and Tolerability of THC:CBD Extract and THC Extract in Patients with Intractable Cancer-Related Pain." *Journal of Pain Symptom Management*, vol. 39, no. 2, Feb. 2010, pp. 167–179., doi:10.1016/j.jpainsymman.2009.06.008.
 - Ligresti, A. "Antitumor Activity of Plant Cannabinoids with Emphasis on the Effect of Cannabidiol on Human Breast Carcinoma." *Journal of Pharmacology and Experimental Therapeutics*, vol. 318, no. 3, 2006, pp. 1375–1387., doi:10.1124/jpet.106.105247.
 - Marcu, J. P., et al. "Cannabidiol Enhances the Inhibitory Effects of 9-Tetrahydrocannabinol on Human Glioblastoma Cell Proliferation and Survival." *Molecular Cancer Therapeutics*, vol. 9, no. 1, 2010, pp. 180–189., doi:10.1158/1535-7163.mct-09-0407.
 - Massi, Paola, et al. "Antitumor Effects of Cannabidiol, a Nonpsychoactive Cannabinoid, on Human Glioma Cell Lines." *Journal of Pharmacology and Experimental Therapeutics*, vol. 308, no. 3, 2003, pp. 838–845., doi:10.1124/jpet.103.061002.
 - Massi, Paola, et al. "Cannabidiol as Potential Anticancer Drug." *British Journal of Clinical Pharmacology*, Blackwell Science Inc, Feb. 2013, www.ncbi.nlm.nih.gov/pmc/articles/PMC3579246/.
 - McAllister, Sean D., et al. "Cannabidiol as a Novel Inhibitor of Id-1 Gene Expression in Aggressive Breast Cancer Cells." *Molecular Cancer Therapeutics*, vol. 6, no. 11, 2007, pp. 2921–2927., doi:10.1158/1535-7163.mct-07-0371.
 - McAllister, Sean D., et al. "Pathways Mediating the Effects of Cannabidiol on the Reduction of Breast Cancer Cell Proliferation, Invasion, and Metastasis." *Breast Cancer Research and Treatment*, vol. 129, no. 1, 2010, pp. 37–47., doi:10.1007/s10549-010-1177-4.
 - McKallip, R. J. "Cannabidiol-Induced Apoptosis in Human Leukemia Cells: A Novel Role of Cannabidiol in the Regulation of p22phox and Nox4 Expression." *Molecular Pharmacology*, vol. 70, no. 3, 2006, pp. 897–908., doi:10.1124/mol.106.023937.
 - Nabissi, Massimo, et al. "Triggering of the TRPV2 Channel by Cannabidiol Sensitizes Glioblastoma Cells to Cytotoxic Chemotherapeutic Agents." *Carcinogenesis*, vol. 34, no. 1, 2012, pp. 48–57., doi:10.1093/carcin/bgs328.
 - Pacher, Pál. "Towards the Use of Non-Psychoactive Cannabinoids for Prostate Cancer." *British Journal of Pharmacology*, vol. 168, no. 1, 2012, pp. 76–78., doi:10.1111/j.1476-5381.2012.02121.x.
 - Pokrywka, M, et al. "Cannabinoids - a New Weapon against Cancer?" *Postepy Hig Med Dosw (Online)*, vol. 70, 29 Dec. 2016, pp. 1309–1320., doi:10.5604/17322693.1227443.

-
- Ramer, Robert, et al. “COX-2 and PPAR-g Confer Cannabidiol-Induced Apoptosis of Human Lung Cancer Cells.” *Molecular Cancer Therapeutics*, vol. 12, no. 1, 2012, pp. 69–82., doi:10.1158/1535-7163.mct-12-0335.
 - Ramer, Robert, and Burkhard, Hinz. “Antitumorigenic Targets of Cannabinoids – Current Status and Implications.” *Expert Opinion on Therapeutic Targets*, vol. 20, no. 10, 2016, pp. 1219–1235., doi:10.1080/14728222.2016.1177512.
 - Ramer, Robert, et al. “Cannabidiol Inhibits Cancer Cell Invasion via Upregulation of Tissue Inhibitor of Matrix Metalloproteinases-1.” *Biochemical Pharmacology*, U.S. National Library of Medicine, 1 Apr. 2010, www.ncbi.nlm.nih.gov/pubmed/19914218/.
 - Ramer, Robert, et al. “Cannabidiol Inhibits Lung Cancer Cell Invasion and Metastasis via Intercellular Adhesion Molecule-1.” *The FASEB Journal*, vol. 26, no. 4, 2012, pp. 1535–1548., doi:10.1096/fj.11-198184.
 - Rocha, Francisco Carlos Machado, et al. “Systematic Review of the Literature on Clinical and Experimental Trials on the Antitumor Effects of Cannabinoids in Gliomas.” *Journal of Neuro-Oncology*, vol. 116, no. 1, 2013, pp. 11–24., doi:10.1007/s11060-013-1277-1.
 - Russo, Ethan. “Cannabinoids in the Management of Difficult to Treat Pain.” *Therapeutics and Clinical Risk Management*, Volume 4, 2008, pp. 245–259., doi:10.2147/tcrm.s1928.
 - Russo, Ethan B., et al. “Cannabis, Pain, and Sleep: Lessons from Therapeutic Clinical Trials of Sativex®, a Cannabis-Based Medicine.” *ChemInform*, vol. 38, no. 47, 2007, doi:10.1002/chin.200747254.
 - Sharma, Manju, et al. “In Vitro Anticancer Activity of Plant-Derived Cannabidiol on Prostate Cancer Cell Lines.” *Pharmacology & Pharmacy*, vol. 05, no. 08, 2014, pp. 806–820., doi:10.4236/pp.2014.58091.
 - Shrivastava, A., et al. “Cannabidiol Induces Programmed Cell Death in Breast Cancer Cells by Coordinating the Cross-Talk between Apoptosis and Autophagy.” *Molecular Cancer Therapeutics*, vol. 10, no. 7, 2011, pp. 1161–1172., doi:10.1158/1535-7163.mct-10-1100.
 - Solinas, M, et al. “Cannabidiol Inhibits Angiogenesis by Multiple Mechanisms.” *British Journal of Pharmacology*, Blackwell Publishing Ltd, Nov. 2012, www.ncbi.nlm.nih.gov/pmc/articles/PMC3504989/.
 - Solinas, Marta, et al. “Cannabidiol, a Non-Psychoactive Cannabinoid Compound, Inhibits Proliferation and Invasion in U87-MG and T98G Glioma Cells through a Multitarget Effect.” *PLoS ONE*, vol. 8, no. 10, 2013, doi:10.1371/journal.pone.0076918.
 - Takeda, Shuso, et al. “Cannabidiolic Acid, a Major Cannabinoid in Fiber-Type Cannabis, Is an Inhibitor of MDA-MB-231 Breast Cancer Cell Migration.” *Toxicology Letters*, vol. 214, no. 3, 2012, pp. 314–319., doi:10.1016/j.toxlet.2012.08.029.
 - Vaccani, Angelo, et al. “Cannabidiol Inhibits Human Glioma Cell Migration through a Cannabinoid Receptor-Independent Mechanism.” *British Journal of Pharmacology*, vol. 144, no. 8, 2005, pp. 1032–1036., doi:10.1038/sj.bjp.0706134.

^{xv} In recent [animal studies](#), researchers found that the heroin-seeking behavior of self-administering rats decreased when the animals were given CBD. [Preclinical](#) data further suggests that CBD inhibits the reward-facilitating effect of opiates by disrupting the reconsolidation of cue-induced memories that reinforce addiction.