

CBD is not a cure-all: Here's what science says about its real health benefits

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Over the last five years, an often forgotten piece of U.S. federal legislation—the Agriculture Improvement Act of 2018, also known as the [2018 Farm Bill](#)—has ushered in an [explosion of interest](#) in the

medical potential of cannabis-derived cannabidiol, or CBD.

After decades of debate, the bill made it legal for farmers to grow [industrial hemp](#), [a plant rich in CBD](#). Hemp itself has tremendous value as a cash crop; it's used to produce biofuel, textiles and animal feed. But the CBD extracted from the hemp plant also has numerous medicinal properties, with [the potential to benefit millions](#) through the treatment of seizure disorders, pain or anxiety.

Prior to the bill's passage, the resistance to legalizing hemp was due to its association with marijuana, its biological cousin. Though hemp and marijuana belong to the same species of plant, *Cannabis sativa*, they each have a unique chemistry, [with very different characteristics and effects](#). Marijuana possesses tetrahydrocannabinol, or THC, [the chemical that produces the characteristic "high"](#) that is associated with cannabis. Hemp, on the other hand, is defined as the part of the cannabis plant that contains virtually no THC, and [neither it nor the CBD derived from it](#) can produce a high sensation.

[As a professor and chair](#) of the [department of pharmacology](#) at Penn State, I have been following research developments with CBD closely and have seen some promising evidence for its role in treating a broad range of medical conditions.

While there is growing evidence that CBD can help with certain conditions, caution is needed. Rigorous scientific studies are limited, so it is important that the marketing of CBD products does not get out ahead of the research and of robust evidence.

Unpacking the hype behind CBD

The primary concern about CBD marketing is that the [scientific community](#) is not sure of the best form of CBD to use. CBD can be

produced as either a pure compound or a complex mixture of molecules from hemp that constitute [CBD oil](#). CBD can also be formulated as a [topical cream or lotion](#), or as a [gummy](#), [capsule](#) or [tincture](#).

Guidance, backed by [clinical research](#), is needed on the best dose and delivery form of CBD for each medical condition. That research is still in progress.

But in the meantime, the siren's call of the marketplace has sounded and created an environment in which CBD is often [hyped as a cure-all](#)—an elixir [for insomnia](#), [anxiety](#), [neuropathic pain](#), [cancer](#) and [heart disease](#).

Sadly, there is precious little rigorous scientific evidence to support many of these claims, and much of the existing research has been performed in animal models.

CBD is simply [not a panacea for all that ails you](#).

Childhood seizure disorders

Here's one thing that is known: Based on rigorous trials with hundreds of patients, CBD has been shown to be a [proven safe and effective drug for seizure disorders, particularly in children](#).

In 2018, the U.S. Food and Drug Administration granted regulatory approval for the use of a purified [CBD product sold under the brand name Epidiolex](#) for the treatment of [Lennox-Gastaut](#) and [Dravet syndromes](#) in children.

These two rare syndromes, appearing early in life, produce large numbers of frequent seizures that are [resistant to traditional epilepsy treatments](#). CBD delivered as an oral solution as Epidiolex, however, [can produce a significant reduction](#)—greater than 25%—in the frequency of

seizures in these children, with 5% of the patients becoming seizure-free.

More than 200 scientific trials

CBD is what pharmacologists call a promiscuous drug. That means it could be effective for treating a number of medical conditions. In broad strokes, CBD affects more than one process in the body—a term called polypharmacology—and so could benefit more than one medical condition.

As of early 2023, there are [202 ongoing or completed scientific trials](#) examining the effectiveness of CBD in humans on such diverse disorders as chronic pain, [substance use disorders](#), anxiety and arthritis.

In particular, CBD appears to be [an anti-inflammatory agent and analgesic](#), similar to the functions of aspirin. This means it might be helpful for treating people suffering with inflammatory pain, like arthritis, or headaches and body aches.

CBD also holds potential for use in [cancer therapy](#), although it has not been approved by the FDA for this purpose.

The potential for CBD in the context of cancer is twofold:

First, there is evidence that it [can directly kill cancer cells](#), enhancing the ability of traditional therapies to treat the disease. This is not to say that CBD will replace those traditional therapies; the data is not that compelling.

Second, because of its ability to reduce pain and perhaps anxiety, the addition of CBD to a treatment plan may [reduce side effects](#) and increase the quality of life for people with cancer.

The risks of unregulated CBD

While prescription CBD is safe when used as directed, other forms of the molecule come with risks. This is especially true for CBD oils. The over-the-counter CBD oil industry [is unregulated and not necessarily safe](#), in that there are no regulatory requirements for monitoring what is in a product.

What's more, rigorous science does not support the unsubstantiated marketing claims made by many CBD products.

In a [2018 commentary](#), the author describes the results of his own study, which was published in Dutch (in 2017). His team obtained samples of CBD products from patients [and analyzed their content](#). Virtually none of the 21 samples contained the advertised quantity of CBD; indeed, 13 had little to no CBD at all and many contained significant levels of THC, the compound in marijuana that leads to a high—and that was not supposed to have been present.

In fact, studies have shown that there is little control of the contaminants that may be present in over-the-counter products. The FDA has [issued scores of warning letters](#) to companies that market unapproved drugs containing CBD. In spite of the marketing of CBD oils as all-natural, plant-derived products, consumers should be aware of the risks of unknown compounds in their products or unintended interactions with their prescription drugs.

Regulatory guidelines for CBD [are sorely lacking](#). Most recently, in January 2023, the FDA concluded that the existing framework is "not appropriate for CBD" and said it would work with Congress to chart a way forward. In a statement, the agency said that "[a new regulatory pathway for CBD is needed](#) that balances individuals' desire for access to CBD products with the regulatory oversight needed to manage risks."

As a natural product, CBD is still acting as a drug—much like aspirin, acetaminophen or even a cancer chemotherapy. Health care providers simply need to better understand the risks or benefits.

CBD may [interact with the body in ways that are unintended](#). CBD is eliminated from the body by the same liver enzymes that remove a variety of drugs such as blood thinners, antidepressants and organ transplant drugs. Adding CBD oil to your medication list without consulting a physician could be risky and could interfere with prescription medications.

In an effort to help prevent these unwanted interactions, my colleague Dr. Paul Kocis, a clinical pharmacist, and I have created a free online application called the [CANNabinoid Drug Interaction Resource](#). It identifies how CBD could potentially interact with other prescription medications. And we urge all people to disclose both over-the-counter CBD or recreational or medical marijuana use to their [health care providers](#) to prevent undesirable drug interactions.

In the end, I believe that CBD will prove to have a place in people's medicine cabinets—but not until the medical community has established the right form to take and the right dosage for a given medical condition.

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