This Q & A article is from BDSRA’s “Ask An Expert” Facebook Chat in the BDSRA Closed Facebook group for parents and caregivers.

*\*Please note: the information contained in this material is intended to provide basic information to Batten families and caregivers. It is not intended to be, nor is it, medical advice for individual children. Parents and caregivers should consult the patient’s physician prior to changing medication, medical treatment or daily activities.*

**“Children, Epilepsies and Cannabinoids”**

Featured Expert:

**Joshua Dearborn, Ph. D.**

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Hello everyone, welcome to our September Ask an Expert chat with Dr. Joshua Dearborn. Some of you may remember Dr. Dearborn from the BDSRA Family Conference session "Children, Epilepsies and Cannabinoids" where he provided an overview of current research related to CBD and his proposed research for the study of CBD in CLN1 mouse models.

He will be continuing that discussion here on the chat, filling us in on the basics of CBD and answering questions about his work.

Hi everybody! Like Noreen said, I'm Dr. Joshua Dearborn, but please call me Josh. I'm a researcher at Washington University in St. Louis, MO, and I've been studying infantile Batten disease for just over 4 years. Right now I'm working on a project to test if cannabidiol (CBD), one of the chemicals found in the cannabis plant, can stop seizures in the mouse model of infantile Batten disease.

1. Could you start us off by explaining what exactly is CBD?
	1. Sure! Cannabidiol is a chemical that naturally occurs in the cannabis plant. You may know the cannabis plant as marijuana; they are the same thing. Cannabidiol, abbreviated CBD, is just 1 of about 80 related chemicals called “cannabinoids”. It is sometimes referred to as a phytocannabinoid, which simply means that it is a cannabinoid that comes from a plant. While CBD can be made in a lab, the CBD used in my own research, as well as that being used in clinical trials for human seizure disorders, comes from plants. CBD has the ability to affect many cells in the human brain and body.
2. How does CBD affect the brain differently than traditional seizure medications?
	1. This is a great question! I really wish I had a better answer for you, but the truth is that we don't yet know. I can give you a list of more than 10 different things CBD does in the brain, but unfortunately we don't know which of those are responsible for any antiseizure effects.
3. What are the common side effects of using CBD long-term?
	1. There are certainly side effects of CBD that should be kept in mind. GW Pharmaceuticals’ trials list 2 categories of side effects as occurring the most: sleepiness and gastrointestinal effects. Specifically, the side effects that occurred most involved fatigue, drowsiness, diarrhea, and upset stomach.
4. Would you suggest I try CBD. My daughter is CLN6 and 15 years old. She doesn't qualify for any kind of treatment but she is on several seizure medications and still has seizures
	1. This is a really tough question. Instead of suggesting a "yes" or a "no, what I can tell you is that some recent clinical trials using CBD have revealed some promising results. This may help better prepare you to make that kind of a decision. What stands out recently are a couple of clinical trials conducted by a company called GW Pharmaceuticals. Originally a European company, GW is now headquartered in California. They make a drug called Epidiolex, which is 98-99% CBD oil. It doesn’t have any other cannabis components; the only active ingredient is CBD. The trials performed by GW Pharmaceuticals, using Epidiolex to try to reduce seizures, have been in 3 different diseases: Dravet syndrome, Lennox-Gastaut syndrome, and Tuberous Sclerosis Complex. These 3 diseases are different from each other, but like Batten disease they all involve seizures that are difficult to treat. Across these clinical trials, and in VERY general terms, the results show that Epidiolex (CBD) cuts the number of seizures in half in about 45% of patients. So, for about half of the patients, the number of seizures will be cut in half. For about 5% of the patients, seizures will be eliminated. For somewhere between 0 and 30% of patients, CBD will have no effect.
5. Are there requirements that have to be met to try a clinical trial for my daughter? Does she have to be walking or talking?
	1. I am unaware of any clinical trials for kids with Batten, unfortunately. At some point down the line, I think we hope that the trials will open up to kids with many seizure disorders.
6. I have seen videos of Parkinson's patients using CBD and their tremors almost stopped completely, I would think this would be great for Batten's children. Please give us your honest opinion would you try it? More for movements than seizures as my daughter has been seizure free for 2 1/2 years.
	1. My answer is solely hypothetical. My feelings are that I would try almost anything to help my child. I have also seen the Parkinson's videos, and they look stunning. What I can tell you is that the GW trials took measures of a couple of different seizures, some of the tonic-clonic nature and some more myoclonic. The CBD seemed to help equally regardless of seizure type. This may be meaningful when it comes to CBD addressing motor coordination.
7. I know that some seizure parents are using more than just CBD... maybe a little more THC in the product. I.e. Charlotte’s web, Hayley's hope etc
	1. I have also heard that some parents are having good luck with products that contain more than just CBD. This is purely anecdotal, of course, but it's worth taking into account.
8. Is CBD only used for seizures? Our child is 14 and diagnosed with CLN3. The progression in the disease has been significant since March. Their seizures have been managed well since June. In fact, no seizures since June. But they have really bad crying spells that can last up to an hour or more. My husband thinks the CBD is something we should try to help get them some relief during these episodes. Any thoughts?
	1. I don't know of any research that CBD would help regulate this kind of a behavior. This is not to say it wouldn't help; anecdotally CBD can have a calming effect, though this can sometimes manifest as drowsiness or fatigue. I don't know how it would affect someone's mood.
9. I have a 7-year-old NCL1 child. I would like to transition them to a CBD oil if it meant he wouldn’t be as tired or “drugged” as his meds make him. He is currently on keppra, onfi, neurontin and zonisimide for seizures. Has it been showing more alertness for our children and how would I go about the transition?
	1. One of the complicated things about CBD research is that there haven't been any studies testing out CBD alone in kids with seizures. In the clinical trials, all of the kids were kept on their drug regimen...often 2-5 antiseizure medications. I would be surprised if CBD were to make your child more alert; there is no research to support that. However, it is possible that if CBD had a positive effect on your 7-year-old's seizures, some of the other meds could be adjusted. This is assuming, of course, that CBD helped with his seizures.
10. Could you post the citation for the GW study? Parents might feel more comfortable approaching their doctors for discussion about options. Some docs will say no outright, but we're finding more who are interested in at least dialogue.
	1. This is a link to the GW study in Dravet. It is a scientific paper, so the language can be technical, but it has the results they published in May from Phase III clinical trials. <http://www.nejm.org/doi/full/10.1056/NEJMoa1611618#t=article>
11. Do you have any advice for parents on what they should discuss with their doctor?
	1. I know this can be a complicated thing to talk about with your doctors. I would recommend asking for your doctor’s opinion on the use of CBD, or cannabis products in general, to help control seizures. The fact is that it’s relatively new and understudied, and some physicians simply aren’t up-to-date on the research. Views on using CBD and cannabis products as medicine vary wildly; you may want to be prepared to seek a second opinion. If a doctor is candid enough to tell you they aren’t educated on the subject, I’d recommend asking them to find someone in the area you can have an informed discussion with. They likely know a neurologist who is more educated on the issue. I would also recommend, to those of you in states/territories where medical cannabis is widely available, to keep a healthy skepticism when speaking with doctors whose specialty it is to prescribe these products. There’s no evidence that CBD or any cannabis product is a miracle cure for any condition. So at the end of the day, I think you have to consider your doctors’ recommendations, the experience of other Batten families, and the snapshot of the CBD research that we have, and make a decision you’re comfortable with. As with any new drug, safety is key. Remain vigilant to changes, open-minded to positive effects, and aware of possible side effects. You may want to be prepared for your doctors to be resistant to the idea of using this type of treatment. It is reasonable for us all to be skeptical of new or unproven therapies. Given the complicated legal status of CBD and the cannabis plant, we should expect that some doctors are going to be unwilling to consider recommending its use.
	2. I want to recommend also keeping realistic expectations about this kind of treatment. My big takeaway from the available research is this: CBD reduces seizures in SOME kids (40-50%). In those kids, it cuts the number of seizures just about in half. However, it is important to keep in mind that in all of the research performed in humans, the children remained on their existing antiseizure drug regimen. The CBD was added to the drugs the kids were already taking, often between 2-5 different antiseizure drugs. This means that we don’t have any clue what CBD would do to human seizures if administered on its own. Only 5% of kids using CBD in addition to their other seizure drugs are completely seizure-free. To put it simply: there seems to be a 50/50 chance whether or not this drug will work for any given child. This is not unlike many other seizure medications.
12. We're in Washington State where it's legal, but how much legal risk do parents take giving this to their children?
	1. This varies by state. There are regulations you have to comply with, but these should be easily available and relatively easy to adhere to. I bet your neurologist has a pretty good idea. If they don't, they should be able to point you in the right direction. If that doesn't work, email me and I'll dig it up for you. joshua.dearborn@wustl.edu.
13. Does CBD cause any interaction with multiple seizure meds? Knowing my goal would be to not be on all of the meds, but curious if there is any interactions?
	1. Here are a few resources to share with your doctor about possible drug reactions with CBD. This link http://www.neurologyadvisor.com/.../signi.../article/577194/ has an article that mentions a few anti-epileptic drugs that react with CBD. Here is another study abstract that might be good to take a look at <https://www.aesnet.org/.../annual_meeting.../view/1868391>.
14. Could you give us a lay summary of your CLN1 project?
	1. Absolutely. This is a picture of one of my infantile Batten disease mice that I've hooked up to an EEG machine; I'm taking readings of its electrical brain activity following treatment with CBD. The electrical activity in the brain is how we detect if a seizure is occurring.



The gist is this: Our infantile Batten disease mice develop seizures at about 7 months of age. They become more severe and more frequent as time passes. I'm asking 2 questions: 1) Can CBD prevent these seizures from developing? 2) Can CBD decrease or eliminate these seizures once they've developed? Our very early results are promising; I presented in Pittsburgh that 3 different doses of CBD reduced seizures in my Batten mice. That was the early indicator that there may be something here worth digging into. Now I'm testing a lot of mice, at various time points, to really answer the question in a rigorous scientific fashion.

1. Is CBD available at a regular pharmacy and covered by insurance, or is there a separate process for obtaining it?
	1. This is another issue that varies widely by state/territory. My understanding is that in some states, pharmacies have to be licensed separately to dispense cannabis products. In other states, only certain special dispensaries can sell it. As for insurance, I am sorry to report that I have no idea.
2. I recently got a medical marijuana card for my son with cln3. He’s 28 years old and pretty far progresses with this disease. What CBD treatment would you recommend?
	1. I would want your neurologist can steer you. As with any new treatment, body weight and specific disease concerns have to be taken into consideration. If you start low and slow, you'll leave room if you have to increase it. Most administration is via an oil, either on the tongue, under the tongue, or in food.
3. Here in our town we have a shop and things are legal here in Washington - but how do I know where to start- amounts? Frequency? Only during a seizure spell or all the time?
	1. I can tell you that in the recent clinical trials the doses were determined by body weight. The highest does given was 20mg/kg daily. It is likely that your physician would recommend starting lower than that and increasing if necessary. I'd ask your neurologist where to start. Typically, I think the doses are spread out over the day, and at least in clinical trials they were given regularly, i.e. not just during a seizure spell.