

Patient information from the BMJ Group

Epilepsy

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Epilepsy

Epilepsy is a serious condition, but most people get fewer seizures with drug treatments. For some people, drugs stop their seizures altogether.

We've brought together the best research about epilepsy and weighed up the evidence about how to treat it. You can use our information to talk to your doctor and decide which treatments are best for you or your child.

What is epilepsy?

If you or your child has epilepsy, the normal electrical activity in the brain gets disturbed from time to time. This leads to seizures (also called fits).

During a seizure, you may feel strange and act oddly. Your muscles may go limp or stiff, and you may shake, twitch or black out. Seizures tend to be over quickly. Most people are back to normal within a few minutes.

Although epilepsy is a serious condition, it should not stop you or your child leading a healthy, active life. Drug treatments work well. Most people stop having seizures, or at least have them less often, once they get the right drug treatment.

Key points for people with epilepsy

- If you have epilepsy, you get seizures. These seizures may come out of the blue or you may get a warning sign, such as a strange feeling or smell.
- What happens to you during a seizure depends on what part of your brain it affects. Not everyone blacks out or falls down.
- If you or your child has had just one seizure, epilepsy may not be the cause. Doctors usually wait to see if another seizure happens before starting treatment.
- Drug treatment can reduce the number of seizures, make them less severe or stop them altogether. But it can have unpleasant side effects.
- If drug treatment doesn't help, surgery to remove part of your brain where the seizures start may be another option.

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- Most people with epilepsy lead a full, healthy, and active life.

How the brain works

To understand what happens in epilepsy, it's useful to know how your brain normally works.

Your brain controls everything you do.

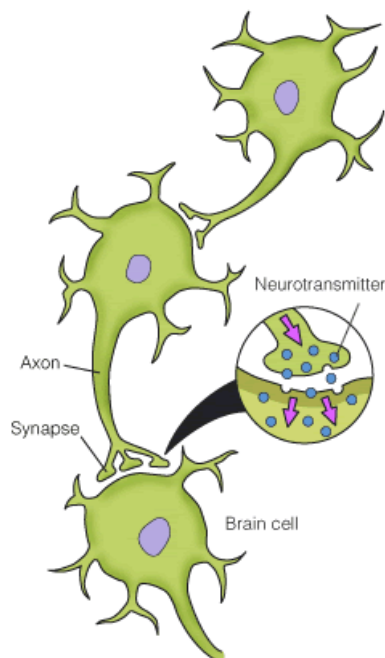
- Your brain allows you to think, to speak, to move your body and to remember things.
- It's also responsible for the things your body does automatically, such as breathing and digesting food.

Your brain is made up of billions of nerve cells that share information with each other. These cells are organised in chains. They are not actually joined together, but they sit close to each other with a space between them called a **synapse**.

Groups of nerve cells have specific jobs to do. For example:

- Some are involved in thinking, learning, remembering, and planning
- Others deal with seeing or hearing
- Others manage the millions of jobs that keep your body working.

To learn more, see [The parts of your brain and what they do](#) .



Neurotransmitters help signals travel from one brain cell to another.

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Nerve cells allow your brain to receive, process, and send information.

- Tiny electrical signals travel from one nerve cell to the next with the help of chemicals called **neurotransmitters**.
- To reach nerve cells throughout your body, these electrical signals travel from your brain to your **spinal cord**. This is a tube of nerves that runs down your back from your brain. It sits inside the bones that make up your spine.
- Once an electrical signal reaches your spinal cord, it can then travel along nerves to your arms, legs and elsewhere in your body.

What happens to your brain in epilepsy

In epilepsy, nerve cells in your brain tend to become over-excited.

- The nerve cells produce electrical signals faster than usual and in bursts.
- The electrical signals are stronger and more disorganised than usual.
- The result is a seizure.

A seizure affects how your brain does its many jobs. This is why a person having a seizure feels strange and acts in odd ways. Seizures can affect nerve cells in one particular part of your brain (these are called **focal seizures**). Or they can affect nerve cells all over your brain (these are called **generalised seizures**). See [What are the symptoms of epilepsy?](#) to learn more about seizures.

Sometimes, only a small group of nerve cells becomes over-excited. When this happens, the seizure may start off affecting only one part of your body. Your hand may shake or feel stiff, for example. But then other cells nearby may join in and start firing off signals. This makes your symptoms worse. For example, a whole arm or one side of your body may shake or feel numb.

Because different parts of the brain do different jobs, the symptoms you or your child gets depend on where in the brain the burst of electrical activity happens. To read more, see [The parts of your brain and what they do](#) .

Why do seizures happen?

Unfortunately, we know very little about why seizures happen or how they start and stop. But doctors think that epilepsy may be due to a problem with the links between nerve cells, the balance of chemicals in your brain, or a combination of both those things. ^[1]

We know that two brain chemicals (neurotransmitters) are important for slowing down and speeding up electrical signals in the brain:

- A chemical called **glutamate** helps to keep electrical signals moving

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- And a chemical called **gamma-aminobutyric acid** (GABA) helps to stop electrical signals passing from one brain cell to the next.

Doctors think that if you have too much glutamate in your brain, it could lead to too many electrical signals firing at once. And if you have too little GABA, then electrical signals can fire out of control. Some drugs help to control seizures by affecting the levels of these chemicals in the brain. To learn more, see [What treatments work for epilepsy?](#)

Epilepsy: why me?

Your doctor may not be able to tell you why you or your child has epilepsy. Around 7 in 10 people with epilepsy never find out the cause. If the cause isn't clear, the condition could be because of a problem with the **genes** that control how the brain works.^[2]

But for some people, an illness, infection, injury or problem in the way their brain developed has caused their epilepsy.^[3] All these things can change the structure of the brain, upsetting the way electrical signals work and leading to seizures.

If you get epilepsy as an adult, you're more likely to find out what caused the condition than if you get it as a child.

Although doctors often don't know why someone has epilepsy, they do know that some things can increase the chances of getting it. These things are called **risk factors**. Here, we've looked at each of the main risk factors for epilepsy.

Being older

Epilepsy is more common in older people because they're more likely to get other health problems that damage the brain, such as **strokes**, **Alzheimer's disease**, and **brain tumours**. About a third of older people diagnosed with epilepsy have had a condition that reduces the supply of oxygen to brain cells (such as a stroke or heart attack). This can upset the brain's electrical activity and cause seizures.^[3] ^[4]

Being male

More men have epilepsy than women, especially if they're older. Among people over 60, nearly twice as many men have epilepsy as women. This is probably because older men are more likely than older women to get health problems that can lead to epilepsy, such as strokes.

Having brain damage

Epilepsy is more common in people who have brain damage from a head injury, a brain tumour or an infection, such as **meningitis**, **AIDS**, or **encephalitis**. Other conditions, such as Alzheimer's disease and strokes, can also damage brain cells.^[4]

Damage caused by these conditions can upset the electrical activity in one part of the brain and lead to a type of seizure called a **focal seizure**. Damage can also be more

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widespread and lead to a type of seizure called a **generalised seizure**. (To learn more about these seizures, see [What are the symptoms of epilepsy?](#))

The fact that head injuries are twice as common in men as in women may partly explain why more men get epilepsy. People who injure their head are three times more likely to get epilepsy than people who don't. ^[5]

Having learning problems

People who have a **learning disability** because of a problem in their brain have a greater chance of getting epilepsy. (This problem may have been caused by a difficult birth or having an infection at birth.) About a third of people with **cerebral palsy** (a brain condition that affects movement) have epilepsy.

Having epilepsy in your family

Some types of epilepsy tend to run in families. Sometimes, the condition is caused by a problem with a **gene** that helps control how nerve cells in the brain send signals to each other. ^[3] If you have a brother or sister who has epilepsy, you are twice as likely to get the condition as someone who doesn't have a brother or sister with epilepsy. ^[2]

What are the symptoms of epilepsy?

The symptoms of epilepsy are seizures. A seizure happens when the normal electrical activity in your brain goes wrong.

There are lots of different types of seizures. They can look and feel very different, depending on where in the brain they start and how far and how quickly they spread. ^[6] ^[7] For example:

- You may get a strange feeling, as though you're out of touch with your surroundings
- Your muscles may feel stiff or limp
- Your arms may jerk suddenly
- You may twitch or tremble
- You may black out and fall to the ground.

Some people get a warning sign, such as a strange smell or feeling, before their seizure starts. These are called **auras**. Other people get no warning and their seizure comes on suddenly.

Sometimes, seizures are set off by things such as lack of sleep or flashing lights. Doctors call these things **triggers**. ^[8] (To learn more, see [Things that trigger seizures](#) .)

Once a seizure ends, some people know what happened to them, but others don't.

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The length of seizures can vary. They can last for a few seconds or several minutes.

Most people don't get symptoms between seizures. But if their epilepsy is caused by a problem in the brain (such as a **tumour**, infection or an injury), then this may lead to other problems besides the seizures. Drug treatments for epilepsy may also cause headaches, rashes and other side effects.

Types of seizures

It's important to work out what type of seizure you or your child is having. This is because:

- Some treatments work best for certain types of seizures
- Your seizure pattern (the type of seizure you get and how often they happen) may suggest what's causing the epilepsy.

Seizures are usually divided into two main groups according to where they start in the brain and what happens to you during them: ^[6]

- **Focal seizures** (doctors used to call these partial seizures)
- **Generalised seizures.**

But not all seizures can be grouped under these headings, especially those in babies. Doctors call these **unclassified seizures**.

It is possible to have a seizure that's caused by something else, not by epilepsy. (To learn more, see [Non-epileptic seizures](#) .)

Focal seizures: how they affect you

In a focal seizure only part of the brain is affected. The symptoms depend on what that part of the brain does. (To learn more, see [The parts of your brain and what they do](#) .)

During a focal seizure a person may black out or become less aware of his or her surroundings. ^[9]

Epilepsy that causes focal seizures is called **focal epilepsy**. This is because focal seizures start from a particular focus (which means area) of the brain.

Here's a summary of the main symptoms.

- During some focal seizures, you remain aware of what's going on. The muscles in your arms, legs, and face may become stiff, and your limbs may twitch on one side of your body. You may have unusual sensations, such as strange smells, distorted vision, a rising feeling in your stomach, changes in emotion, or a feeling of fear or déjà vu. ^[9]

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- In other focal seizures, you often have a warning sign (an aura) before the seizure starts, and you may become less aware of your surroundings. You may not answer when called or you may pass out. Some people start fidgeting, walking around or doing something over and over again, like chewing or smacking their lips (doctors call these automatisms).^[9]

Sometimes focal seizures spread throughout the brain. If this happens, you may have a generalised seizure (often a [tonic-clonic seizure](#)).

Generalised seizures: how they affect you

These affect your whole brain. During most of these seizures, the person passes out (loses consciousness). These are the main types of generalised seizures.^{[9] [7] [10]}

- [Tonic-clonic seizures](#) : A tonic-clonic seizure causes a mixture of symptoms, including stiffening of the body and jerking of the arms and legs. The person blacks out, and may bite their tongue or wet themselves.
- [Absence seizures](#) : The person appears to be staring blankly into space, unaware of his or her surroundings. Muscles may jerk or twitch, and the eyes may flutter. These seizures pass very quickly. They usually last only three seconds to 10 seconds.
- [Myoclonic seizures](#) : The upper body, arms or legs jerk or twitch as if they are being shocked. This may happen once or more than once during the seizure. People tend not to black out during these seizure.
- [Atonic seizures](#) : The muscles suddenly relax, which makes the person fall down without warning or drop his or her head forward. The person blacks out.

Sometimes doctors say a person has an **epilepsy syndrome**. An epilepsy syndrome is when you have a number of particular symptoms at the same time. An epilepsy syndrome may include more than one type of seizure. There are many epilepsy syndromes, but some are very rare. Children are more likely than adults to have an epilepsy syndrome.

^[11] To learn more, see [Epilepsy syndromes](#) .

Knowing which type of epilepsy syndrome you or your child has can help your doctor decide on the best treatment. It can also indicate whether the epilepsy will change in the future and whether it can be passed on from parent to child.

How do doctors diagnose epilepsy?

If you (or your child) have a seizure, it doesn't mean you have epilepsy. Many people have a seizure at some point in their life and never have another.

Diagnosing epilepsy can be difficult. So, if you have a seizure that could be due to epilepsy, your GP should send you to a specialist.

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The National Institute for Health and Care Excellence (NICE), the government body that advises doctors about tests and treatments, says you should see a specialist within two weeks if you have a seizure that could be due to epilepsy. ^[15]

Most of the time, doctors say a person has epilepsy only after they've had at least two seizures. ^[33] But before making this diagnosis, your doctor will ask lots of questions and run some tests.

Questions your doctor may ask

Your doctor may ask the following types of questions.

- **Questions about the seizures.** Your doctor may ask how the seizures felt, how long they lasted and if anything might have triggered them. Your doctor may also ask anyone who saw you having a seizure to describe what happened.
- **Questions about other conditions.** Your doctor may ask questions and run tests to rule out other conditions that can cause seizures. ^[8] You may be asked about your mental health to make sure you don't have problems such as [panic attacks](#) . You may also be asked questions about how well you can learn new things. Epilepsy is more common in people who have [learning disabilities](#) . ^[15]
- **Questions about your family history.** Your doctor may ask if anyone in your family has had epilepsy. If someone has, this increases your chance of getting the condition. ^[8]

Tests your doctor may suggest

If the specialist thinks you have epilepsy, he or she will probably recommend scans and other tests to learn more about the seizures and what might be causing them. ^[15] To learn about the tests you or your child might have, see [Tests for epilepsy](#) .

Finding answers

The specialist will use all this information to answer the following questions. ^[8] ^[1]

- **Are you or your child definitely having seizures?** Sometimes other conditions, such as severe [migraines](#) and [mini-strokes](#) , can cause symptoms that look like seizures.
- **Is epilepsy causing the seizures?** You or your child may have seizures that are not caused by epilepsy. To learn more, see [Non-epileptic seizures](#) . Also, some illnesses, diseases and injuries can cause seizures that stop when the condition gets better.
- **Do you or your child have a specific type of epilepsy?** The seizure pattern (the type of seizure and how often they happen) and your family history will help your

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doctor decide what type of epilepsy you or your child has. To learn more, see [Epilepsy syndromes](#) .

- **What type (or types) of seizures are you or your child having?** There are many different types of seizures related to epilepsy, each with a different set of symptoms. (To learn more, see [What are the symptoms of epilepsy?](#)) Knowing the type of seizure will help you and your doctor decide on the best treatment.

Once you've been diagnosed with epilepsy, you should have regular check-ups. To read more, see the section on regular check-ups for people with epilepsy in [Taking epilepsy drugs](#) .

How common is epilepsy?

Epilepsy is one of the most common brain disorders in the UK. Anyone can get epilepsy at any age.

In the UK, up to 1 in 100 people have epilepsy. ^[15]

Up to 5 in 100 people will have a seizure at some point in their lives. ^[15] But many seizures are not caused by epilepsy.

Although epilepsy can begin at any age, it usually starts in young children or older people. ^[4]

What treatments work for epilepsy?

If you or your child has epilepsy, treatments can help control the seizures, and help you get on with your life.

Key points about treating epilepsy

- Doctors usually wait for someone to have at least two seizures before they start treatment.
- Epilepsy drugs cut down or stop seizures for most people.
- Surgery can help some people whose epilepsy cannot be controlled with drugs.
- Nerve stimulation is another option. This treatment is mostly for people who cannot have surgery.
- Your doctor might also suggest other treatments, including classes to help you understand epilepsy and learn how to live with it, biofeedback, cognitive behaviour therapy, family counselling, relaxation therapy, yoga and a special diet.
- You or your child should have a thorough check-up at least once a year.

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Drug treatments recommended by NICE

The National Institute for Health and Care Excellence (NICE) is the government body that decides which treatments should be used by the NHS. NICE has recommended which drugs people who have recently been diagnosed with epilepsy should take. They have recommended certain drugs for different types of seizures.

In the table below, you can see the drugs that NICE recommends you try first. For most people (including children) these will be **carbamazepine** or **valproate**. Your doctor should only prescribe the newer drugs first if: ^[15]

- You or your child cannot take the older drug for any reason
- You are taking other drugs, such as contraceptive pills (the pill), that may not work properly if you take the older recommended drug
- You are a woman who may want to have a baby, or an older girl who may want a baby in the future.

Type	Older drugs	Newer drugs
Tonic-clonic seizures	carbamazepine, valproate	Lamotrigine, topiramate
Absence seizures	Valproate	Ethosuximide, lamotrigine
Myoclonic seizures	Valproate (for adults)	Topiramate (for children)
Atonic seizures	Valproate	Lamotrigine
Focal seizures	Carbamazepine, valproate	Lamotrigine, oxcarbazepine, topiramate

NICE also recommends which treatments should be used first for the different types of epilepsy syndromes. An epilepsy syndrome is a set of symptoms that fit a particular pattern. For more information, see [Epilepsy syndromes](#) . Children are more likely than adults to have a syndrome. Here are the drugs most often used to treat epilepsy syndromes: ^[16]

Syndrome	Older drugs	Newer drugs
Childhood absence epilepsy	Valproate	Ethosuximide, lamotrigine
Juvenile absence epilepsy	Valproate	Lamotrigine,
Benign childhood epilepsy	Carbamazepine, valproate	Lamotrigine, oxcarbazepine
Juvenile myoclonic epilepsy	Valproate	Lamotrigine

Treatments for epilepsy

Which treatments work best? We've looked at the research and given a rating for each treatment according to how well it works. For help in deciding which treatment is best for you or your child, see [How to use research to support your treatment decisions](#).

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- [Drug treatments for epilepsy](#) : These include (with brand names) carbamazepine (Tegretol and Tegretol Retard), phenobarbital, phenytoin (Epanutin), valproate (Epilim and Episenta), lamotrigine (Lamictal), oxcarbazepine (Trileptal), topiramate (Topamax), gabapentin (Neurontin), levetiracetam (Keppra), tiagabine (Gabitril), and vigabatrin (Sabril). [More...](#)
- [Non-drug treatments for epilepsy](#) : These include surgery, nerve stimulation, educational programmes, biofeedback, cognitive behaviour therapy, family counselling, relaxation therapy, relaxation plus behaviour modification therapy, yoga and the ketogenic diet. [More...](#)

Treatment Group 1

Drug treatments for epilepsy

If you or your child has epilepsy, drug treatments can help control the seizures, but they can cause side effects.

Key points about drug treatments for epilepsy

- Epilepsy drugs cut down or stop seizures for most people.
- Some people need to take two drugs. This is especially common for people who get seizures that affect only part of their brain (focal seizures).
- Most epilepsy drugs have side effects. They may make you feel drowsy, worn out and dizzy. Some may make you put on weight or lose weight. Others can cause a rash.
- Some epilepsy drugs can stop contraceptive pills or contraceptive injections working properly.
- If you haven't had a seizure for two years, your doctor may see how you get on without drugs. About 3 in 5 people who stop taking their drugs don't have seizures for at least two more years.
- If you're pregnant, you'll need to continue taking your epilepsy drugs.

Which drug treatments work for epilepsy?

Which treatments work best? We've looked at the best research and given a rating for each treatment according to how well it works. We've also looked at whether you need drug treatment [after just one seizure](#) , and when it's safe to [stop taking drug treatment](#)

For help in deciding which treatment is best for you or your child, see [How to use research to support your treatment decisions](#).

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Drug treatments for epilepsy

Treatments that are likely to work

- [Carbamazepine](#) : This is one of the main drugs that doctors use to try to stop seizures. The brand names include Tegretol and Tegretol Retard. [More...](#)
- [Lamotrigine](#) : The brand name of this drug is Lamictal. [More...](#)
- [Phenobarbital](#) : This is one of the main drugs that doctors use to try to stop seizures. (Phenobarbital is not sold under a brand name in the UK.) [More...](#)
- [Phenytoin](#) : This is one of the main drugs that doctors use to try to stop seizures. Its brand name is Epanutin. [More...](#)
- [Topiramate](#) : The brand name is Topamax. [More...](#)
- [Valproate](#) : This is one of the main drugs that doctors use to try to stop seizures. Its brand names are Epilim and Episenta. [More...](#)
- [Gabapentin](#) : The brand name is Neurontin. [More...](#) .
- [Levetiracetam](#) : The brand name is Keppra. [More...](#)
- [Taking more than one drug for epilepsy](#) : If you are taking one drug and still get seizures, then taking two or more drugs may work. Drugs (and their brand names) that are taken with other epilepsy drugs include gabapentin (Neurontin), lamotrigine (Lamictal), levetiracetam (Keppra), oxcarbazepine (Trileptal), tiagabine (Gabitril), topiramate (Topamax), and vigabatrin (Sabril). [More...](#)
- [Newer epilepsy drugs](#) : These drugs can be used alone or along with other epilepsy drugs. They include oxcarbazepine (Trileptal), tiagabine (Gabitril), perampanel (Fycompa) and vigabatrin (Sabril). [More...](#)

Decision points

- [Should someone start drug treatment for epilepsy after only one seizure?](#)
- [Should someone who no longer has seizures stop taking epilepsy drugs?](#)

Treatment Group 2

Non-drug treatments for epilepsy

Most people with epilepsy control their seizures by [taking drugs](#) . But drugs don't work for everyone, and some people may be interested in other ways of trying to control their seizures and cope with epilepsy.

Key points about non-drug treatments for epilepsy

- Surgery can help some people whose epilepsy cannot be controlled with drugs.
- Nerve stimulation is another option. This treatment is mostly for people who cannot have surgery.
- Educational programmes help some people learn how to live with epilepsy and possibly have fewer seizures.
- Your doctor may also recommend other treatments, such as biofeedback, cognitive behaviour therapy, family counselling, and yoga. But there's not enough research yet to say whether they work.

Which non-drug treatments work best?

Which treatments work best? We've looked at the research and given a rating for each treatment according to how well it works.

For help in deciding which treatment is best for you or your child, see [How to use research to support your treatment decisions](#).

Non-drug treatments for epilepsy

Treatments that are likely to work

- [Temporal lobectomy](#) : Your doctor may suggest surgery if drug treatments don't help control the seizures. [More...](#)
- [Nerve stimulation](#) : If you or your child has focal seizures and drug treatments aren't helping, your doctor may suggest nerve stimulation. This treatment uses an electrical device to stimulate a nerve in the neck. This may calm down the over-excited nerve cells in the brain that cause seizures. [More...](#)
- [Educational programmes](#) : Special classes can help you understand epilepsy and learn how to live with it. They may also cut down your seizures. Classes are available for both adults and children. [More...](#)

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Treatments that need further study

- [Biofeedback](#) : This treatment teaches you how to control the electrical activity in your brain. [More...](#)
- [Cognitive behaviour therapy](#) : You learn how to recognise and control unhelpful or negative thoughts about yourself and your epilepsy, and replace them with helpful, positive ones. [More...](#)
- [Family counselling](#) : This involves sessions with a therapist to help you and your family cope with and adjust to epilepsy. [More...](#)
- [Relaxation therapy](#) : A therapist teaches you ways to calm your mind by releasing the tension in your body. [More...](#)
- [Relaxation plus behaviour modification therapy](#) : This combined treatment may help you learn to relax and adjust to life with epilepsy. [More...](#)
- [Yoga](#) : Yoga classes focus on stretching, controlling breathing and deep relaxation or meditation. This may help you manage stress. [More...](#)
- [Ketogenic diet](#) : If your child has epilepsy and drug treatments aren't helping, your doctor may suggest you try a special diet. [More...](#)

What will happen?

If you (or your child) have been diagnosed with epilepsy, you may feel wary about what's going to happen. Many people worry that they'll have less control over their lives.

Some things will change if you have epilepsy. If you have seizures, you probably won't be allowed to drive, in case you have a seizure while driving. But most people with epilepsy lead a full, healthy, and active life. There is very little that epilepsy stops them doing. ^[21]

There are treatments that can reduce the number of seizures you or your child has, or stop them altogether. Drug treatments work for about three-quarters of people who take them. Surgery may also be an option. (To learn more, see [What treatments work for epilepsy?](#))

It's hard to say exactly what will happen to you or your child. A lot depends on how often the seizures happen, how severe they are and how well drug treatment works. But here are some things we know from research.

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Will I (or my child) have another seizure?

If you've had only one seizure, you may not have another. Some seizures are not caused by epilepsy and happen only once. (To learn more, see [Non-epileptic seizures](#) .) Nearly two-thirds of people don't have another seizure in the two years after their first. ^[22]

But if you've had two or three seizures, you are very likely to have more. In fact, three-quarters of people who've had two or three seizures will have another within four years. ^[23]

Some kinds of epilepsy, such as benign childhood epilepsy or childhood absence epilepsy, usually go away as children get older. (To learn more about these conditions, see [Epilepsy syndromes](#) .)

Will the seizures stop?

If you or your child has had two or more seizures, it's unlikely that the seizures will go away without treatment. About three-quarters of the people who've had two seizures will have more.

But with drug treatment, there's a good chance that you or your child will have fewer seizures, or the seizures may stop completely.

Many people stop having seizures for several years. In one study, 7 in 10 people with epilepsy stopped having seizures for five years. Sometimes they were taking treatment during this period, and other times they were not. ^[24] ^[25]

Will I (or my child) always need to take drugs?

You or your child may be able to stop taking drugs if the seizures stop. But if the seizures don't stop, you may need to take them for the rest of your life.

Most doctors won't stop someone's drug treatment until that person has been seizure-free for at least two years. To learn more, see [Should someone who no longer has seizures stop taking epilepsy drugs?](#)

About two-thirds of people who stop their drugs don't have another seizure in the next two years. ^[26] ^[27]

Can epilepsy hurt me (or my child)?

Most seizures are not harmful. But they can increase your chances of having an injury, drowning or falling. ^[3]

Very rarely, people with epilepsy can have a bad seizure that lasts a long time, or one bad seizure after another. Doctors call this **status epilepticus**. It can be dangerous. These seizures put your heart and lungs under a lot of stress, and your brain may not get enough oxygen.

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People having these kinds of seizures need emergency treatment with drugs and oxygen. **Call 999 if you see anyone having a seizure that lasts more than five minutes.** ^[3]

The National Institute for Health and Care Excellence (NICE), the government organisation that advises doctors about treatments, says if you care for someone with epilepsy, you can learn to treat some serious seizures yourself. But you need special training, and you must always stick to a treatment plan agreed between you, the person with epilepsy, and their specialist. ^[15] For more information, see [What can I do if I see someone having a bad seizure?](#)

People with epilepsy are more likely to die suddenly than people who don't have it. ^[28] Doctors call these deaths **sudden unexplained deaths in epilepsy**. Almost 800 people a year in the UK die suddenly from their epilepsy. ^[29] Unfortunately, we know very little about why these deaths happen, although they may have something to do with the effects of epilepsy on breathing and the heartbeat.

NICE says that up to 4 in 10 of these deaths in adults and up to 6 in 10 of these deaths in children could be avoided. ^[15] It helps to have as few seizures as possible. ^[30] So, it's important to take your drug treatment at the right time and at the right dose. One summary of research found that if you need to take more than one drug for epilepsy, taking the right doses lowers the risk of sudden unexplained deaths by seven times compared to taking a placebo (dummy drug). ^[31]

Can I have children?

Most women with epilepsy can get pregnant, and they have more than a 90 percent chance of having a normal, healthy baby. But epilepsy drugs can cause problems in pregnancy. If you're planning to get pregnant, you should discuss your epilepsy and your drug treatment with your doctor first. ^[3] See [Epilepsy and pregnancy](#) to read more about taking drugs while you are pregnant.

Can I drive?

If you've had a seizure, you must stop driving even if you haven't been diagnosed with epilepsy. You need to write to the DVLA to let them know you've had a seizure. The DVLA will send you a form to fill in and ask if they can contact your GP. The DVLA will then write to you to let you know whether you can keep driving or not. If you can't, you will have to send in your driving licence.

You can reapply for your licence when you have been free of seizures for 12 months.

Most people with epilepsy are unable to drive. But if your seizures only happen at night, and have been stable for at least a year, you may be able to drive.

Questions to ask your doctor

If you (or your child) have been diagnosed with epilepsy, you may want to talk to your doctor to find out more about the condition.

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Here are some questions that you might want to ask.

General questions about epilepsy

- Why am I (or my child) having seizures?
- What causes epilepsy?
- What sort of seizures do I (or my child) have?
- Will I (or my child) always have this sort of seizure or might they change?
- Which part of the brain are the seizures affecting?
- How likely is it that I (or my child) will have another seizure?
- Will I (or my child) know if a seizure is going to happen? What are the warning signs?

Questions about treatment

- How many seizures do I (or my child) need to have before treatment is necessary?
- How will drug treatment help?
- What are the chances that I (or my child) will stop having seizures after taking drugs?
- What are the drugs called? Which is the best one for me (or my child)?
- What are the side effects of treatment?
- Are there things I (or my child) can do to reduce the risk of side effects?
- What should I do if I forget a dose?
- If the seizures stop, can I (or my child) stop taking drugs?
- What will happen if epilepsy isn't treated?
- Is surgery an option? What are the pros and cons?
- Will epilepsy affect other aspects of my health (or my child's health)?

If you're a woman and thinking of having a baby

- Is it safe to get pregnant?

Epilepsy

- Can I carry on taking drug treatment when I'm pregnant?
- Will the treatment harm my baby?
- Are there things I shouldn't do during my pregnancy?
- Do I need to take any extra precautions when my baby is born?
- What vitamins should I take?

If your child has epilepsy

- Does my child need to take any extra safety measures?
- Does my child need to go to a special school?
- Should my child wear a helmet?
- What should I tell his or her teachers?
- Can my child join in all the normal activities in school?
- Can my child go swimming?
- Besides taking drugs, is there anything else we can do to prevent seizures?

If you're an adult with epilepsy

- Are there things I cannot do because of my epilepsy, such as swimming?
- Can I still drive?
- Are there any changes I should make to my life to help prevent seizures?
- Are there any jobs I shouldn't do?

Treatments:

Carbamazepine

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Epilepsy

This information is for people who have epilepsy. It tells you about carbamazepine, a drug used for epilepsy. It is based on the best and most up-to-date research.

Does it work?

Probably. If you or your child has epilepsy, taking carbamazepine may reduce your seizures or stop them altogether. But it does have side effects.

We don't know if carbamazepine works any better or any worse than other drugs for epilepsy.

What is it?

Carbamazepine (brand name Tegretol or Tegretol Retard) is an epilepsy drug that is used to prevent seizures. You may also hear it called an anti-epileptic drug (AED) or an anti-convulsant.

There are many epilepsy drugs and they work in different ways so it may take some time for your doctor to find the right treatment for you.^[54] But, carbamazepine is one of the drugs that doctors often try first to control seizures in people with epilepsy.

All epilepsy drugs come as tablets, and most people have to take them more than once per day. For practical advice on managing your treatment, see [Taking epilepsy drugs](#) .

You should see your doctor for a check-up at least once a year to talk about how you are getting on with treatment, including any side effects.^[55]

How can it help?

About two-thirds of people with epilepsy can control their seizures with one epilepsy drug. The seizures may stop, be less severe, or happen less often than they did before.^[56]

One study found that 8 in 10 people who took carbamazepine or a drug called [valproate](#) for three years didn't have any seizures for at least one of these years. And 6 in 10 had no seizures for two years.^[57]

We don't know for certain which drugs work best, or if they all work about the same.^[58]^[59] ^[60] Carbamazepine may work better than valproate for people who have seizures that affect only part of their brain (focal seizures).^[61] (For more about focal seizures, see [What are the symptoms of epilepsy?](#))

Carbamazepine may also control seizures better than a newer drug called [lamotrigine](#) , although the research on this is mixed.^[62] ^[63]

How does it work?

When you have a seizure, the nerve cells in your brain become over-excited and produce electrical signals faster than usual and in bursts. Epilepsy drugs calm down this activity.

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But doctors know very little about how the drugs actually do this. Also, different epilepsy drugs seem to work in different ways.

Carbamazepine seems to work by blocking the channels that electrical signals use to get into brain cells.^[64] Nerve cells in the brain work by sending electrical signals to each other. On the surface of each cell, there are channels, like doors, to let electrical signals in. Some epilepsy drugs stick to the channels that are closed and keep them closed.

This stops the over-excited cells making the rapid electrical signals that cause seizures.^[65]

Can it be harmful?

All epilepsy drugs cause side effects, and these side effects can be different in different people.

Studies have found that people may be less likely to stop taking carbamazepine because of side effects than [phenobarbital](#).^[60] ^[66] But people may be more likely to stop taking carbamazepine than [lamotrigine](#).^[62]

Common side effects

The most common side effects linked to carbamazepine are:^[67]

- Dizziness
- Drowsiness
- Constipation or diarrhoea
- Feeling sick
- Headaches
- Weight Loss
- Rashes.

If you get these side effects, your doctor may cut down the dose of your drug and wait a couple of weeks before increasing it again. Some people find the side effects pass.

But if your side effects continue, your doctor may switch you to another drug.^[54]

Skin reactions

About 1 in 10 people who take carbamazepine get a rash.^[57] You should **see your doctor immediately** if you or your child gets a rash while taking an epilepsy drug. Although the rash will probably go away, it can develop into a serious (and sometimes fatal) skin condition called Stevens-Johnson syndrome. Very rarely, another skin condition

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called toxic epidermal necrolysis (TEN) can develop. Warning signs that a rash is serious are: ^[54]

- Raised lumps
- Flaky skin
- A swollen face
- Painful skin
- Purple blotches
- Sores on the lips or inside the mouth
- Asthma symptoms (for example, wheezing and difficulty breathing easily).

The risk of getting a dangerous rash is small. Between 1 in 10,000 and 6 in 10,000 people who take carbamazepine get this rash. ^[68] But there's a bigger risk if you have a particular genetic type. Nearly all people with this genetic type are from Asian backgrounds. Doctors are advised to offer Asian people a blood test to check for their genetic type, before prescribing carbamazepine. ^[68] It's especially important to have the test if you come from a Han Chinese, Hong Kong Chinese, or Thai background.

If you get a bad skin reaction, your doctor will usually change your epilepsy drug.

Thinner bones

Some studies have shown that people taking carbamazepine get thinner bones. ^[69] ^[70] ^[71] ^[72] This could mean they're more likely to break a bone. However, the research hasn't looked at fractures, just at a measurement of bone strength, called bone mineral density (BMD). The research is not very clear. Some studies seem to show a reduction in BMD for people taking carbamazepine, while other studies do not. ^[73]

Stopping contraceptives working

Carbamazepine can stop the contraceptive pill and contraceptive injections working properly. ^[74] For more information, see [Contraception and epilepsy drugs](#) .

Epilepsy drugs and pregnancy

Epilepsy drugs can cause birth defects. ^[67] However, it's important to continue preventing seizures while you're pregnant. If you're planning a pregnancy, talk to your doctor. He or she may suggest adjusting your drugs before you get pregnant. To learn more, see [Epilepsy and pregnancy](#) .

Self-harm and suicide

There is a very small risk that taking carbamazepine might make you more likely to think about suicide or harming yourself.^[75] If you are worried about any thoughts or feelings you have, see your doctor straight away.

How good is the research on carbamazepine?

There is reasonably good evidence that taking carbamazepine helps to stop or reduce seizures for many people.^{[61] [76] [66] [58] [62] [63]}

The studies we found compared carbamazepine with other epilepsy drugs to find out which one might work better for certain types of seizures. The studies included people who got seizures that affect part of the brain (focal seizures) and people who got seizures that affect the whole brain (generalised seizures). To learn more about seizures, see [What are the symptoms of epilepsy?](#)

Comparing carbamazepine with valproate

We found a summary of the research (a **systematic review**) that looked at five studies involving 1,225 people.^[61] The review found no differences between the two drugs for people with generalised seizures. This could mean these drugs work equally well, or it could mean the studies were not good enough to find a difference between the two drugs.

However, after starting treatment, the people affected by focal seizures taking [valproate](#) had a seizure sooner than the people taking carbamazepine. This suggests (but doesn't prove) that carbamazepine may work better than [valproate](#) for people with focal seizures.

We don't know what happens to people who take these drugs for a long time because all the studies lasted less than five years.

Another study (a **randomised controlled trial**) found no difference in how well carbamazepine and valproate worked for people with either generalised or focal seizures.^[76] However, many people left the study before it was finished, which makes its results less reliable.

Comparing carbamazepine with phenobarbital

In another systematic review involving 680 people with focal or generalised seizures, researchers looked at results from four studies comparing [phenobarbital](#) with carbamazepine.^[66] The review found no difference between the treatments for people with generalised seizures.

Among people with focal seizures, those taking phenobarbital stayed free of seizures for longer. But they were more likely to stop their treatment than people taking carbamazepine, probably because phenobarbital caused more side effects.

Comparing carbamazepine with phenytoin

One systematic review looked at results from three studies involving 552 people with generalised seizures or focal seizures. ^[58] The review found no differences between carbamazepine and [phenytoin](#) .

Comparing carbamazepine with lamotrigine

We found a systematic review that looked at five studies involving 1,384 people, most with focal seizures. It found that people were more likely to stop taking carbamazepine than [lamotrigine](#) , mainly because of side effects. But people who took carbamazepine were less likely to have had a seizure after six months. ^[62]

A more recent study also found that people were more likely to stop taking carbamazepine than lamotrigine because of side effects but that both drugs seemed to control seizures equally well. ^[63] This study was well done overall, but it was unblinded, which means patients and their doctors knew what treatments were being used. This could have affected the study's results.

Comparing carbamazepine with topiramate

One study (a randomised controlled trial) found no difference in how well carbamazepine and [topiramate](#) worked for people with either generalised or focal seizures. ^[76] However, many people left the study before it was finished, which makes its results less reliable.

Another study found that people taking topiramate for focal seizures were as likely to be seizure-free after a year as people taking carbamazepine. ^[63] This study was well done overall, but it was unblinded, which means patients and their doctors knew what treatments were being used. This could have affected the study's results.

Lamotrigine

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[How can it help?](#)

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[Can it be harmful?](#)

[How good is the research on lamotrigine?](#)

This information is for people who have epilepsy. It tells you about lamotrigine, a drug used for epilepsy. It is based on the best and most up-to-date research.

Does it work?

Probably. If you or your child has epilepsy, taking lamotrigine may reduce your seizures or stop them altogether. But it does have side effects.

We don't know if lamotrigine works any better or any worse than other drugs for epilepsy. ^[77]

What is it?

Lamotrigine (brand name Lamictal) is a newer epilepsy drug that is used to prevent seizures. You may also hear it called an anti-epileptic drug (AED) or an anti-convulsant. There are many epilepsy drugs and they work in different ways so it may take some time for your doctor to find the right treatment for you. ^[54]

Some adults and children may be prescribed lamotrigine on its own if they find that older drugs for epilepsy ([phenobarbital](#) , [phenytoin](#) , [valproate](#) , or [carbamazepine](#)) cause bad side effects or don't help. ^[78] ^[56] Or it may be combined with other epilepsy drugs if your doctor can't find just one drug to stop your seizures. To learn more, see [Taking more than one drug for epilepsy if you have focal seizures](#) .

All epilepsy drugs come as tablets. For practical advice on managing your treatment, see [Taking epilepsy drugs](#) .

You should see your doctor for a check-up at least once a year to talk about how you are getting on with treatment, including any side effects. ^[55]

How can it help?

About two-thirds of people with epilepsy can control their seizures with one epilepsy drug. The seizures may stop, be less severe, or happen less often than they did before. ^[56]

We don't know for certain which epilepsy drugs work best, or if they all work about the same.

One study found that lamotrigine may work as well as carbamazepine and [topiramate](#) for focal seizures but with fewer side effects, so people may be less likely to stop taking it. ^[63] (Focal seizures affect only part of the brain. To learn more, see [What are the symptoms of epilepsy?](#)) But this study was unblinded, which means patients and their doctors knew what treatments were being used. This could have affected the study's results.

Other studies have also found that people may be less likely to stop taking lamotrigine, but that carbamazepine controls seizures better. ^[62]

How does it work?

When you have a seizure, the nerve cells in your brain become over-excited and produce electrical signals faster than usual and in bursts. Epilepsy drugs calm down this activity. But doctors know very little about how the drugs actually do this. Also, different epilepsy drugs seem to work in different ways.

Lamotrigine seems to work by blocking the channels that electrical signals use to get into brain cells. ^[64] ^[65] Nerve cells in the brain work by sending electrical signals to each other. On the surface of each cell, there are channels, like doors, to let electrical signals in. Some epilepsy drugs stick to the channels that are closed and keep them closed.

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This stops the over-excited cells making the rapid electrical signals that cause seizures.
[65]

Can it be harmful?

All epilepsy drugs cause side effects, and these side effects can be different in different people. Very few people stop taking lamotrigine because of side effects. [79]

Common side effects

In one large study, the most common side effects linked to lamotrigine were: [63]

- Tiredness and feeling worn out
- A rash (see below)
- Worsening of seizures.

These side effects affected 4 in 100 to 6 in 100 people. Lamotrigine has also been linked to dizziness, sickness, headaches, sleep problems and double vision.

If you get side effects, your doctor may cut down the dose of your drug and wait a couple of weeks before increasing it again. Some people find the side effects pass. But if your side effects continue, your doctor may switch you to another drug. [8]

Studies have found that people may be less likely to stop taking lamotrigine because of side effects than carbamazepine or topiramate. [63] [62]

Rashes

You should **see your doctor immediately** if you or your child gets a rash while taking an epilepsy drug. Although the rash will probably go away, it can develop into a serious (and sometimes fatal) skin condition called Stevens-Johnson syndrome. Very rarely, another skin condition called toxic epidermal necrolysis (TEN) can develop. Warning signs that a rash is serious are: [54]

- Raised lumps
- Flaky skin
- A swollen face
- Painful skin
- Purple blotches
- Sores on the lips or inside the mouth

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- Asthma symptoms (for example, wheezing and difficulty breathing easily).

If you get a bad skin reaction, your doctor will usually change your epilepsy drug.

Thinner bones

Some studies have shown that people taking lamotrigine get thinner bones.^[70] ^[71] ^[72] This could mean they're more likely to break a bone. However, the research hasn't looked at fractures, just at a measurement of bone strength, called bone mineral density (BMD). The research is not very clear. Some studies seem to show a reduction in BMD for people taking lamotrigine, while other studies do not.^[69]

Stopping contraceptives working

Lamotrigine can stop the contraceptive pill and contraceptive injections working properly.^[74] For more information, see [Contraception and epilepsy drugs](#) .

Epilepsy drugs and pregnancy

Epilepsy drugs can cause birth defects.^[67] However, it's important to continue preventing seizures while you're pregnant. If you're planning a pregnancy, talk to your doctor. He or she may suggest adjusting your drugs before you get pregnant. To learn more, see [Epilepsy and pregnancy](#) .

Self-harm and suicide

There is a very small risk that taking lamotrigine might make you more likely to think about suicide or harming yourself.^[75] If you are worried about any thoughts or feelings you have, see your doctor straight away.

How good is the research on lamotrigine?

We don't know for certain which epilepsy drugs work best, or if they all work about the same. But there is reasonably good evidence that taking lamotrigine helps to stop or reduce seizures for many people.^[63] ^[62]

One study with more than 700 people found that lamotrigine may work as well as [carbamazepine](#) and [topiramate](#) for focal seizures but with fewer side effects, so people may be less likely to stop taking it.^[63] (Focal seizures affect only part of the brain. To learn more, see [What are the symptoms of epilepsy?](#)) But this study was unblinded, which means patients and their doctors knew what treatments were being used. This could have affected the study's results.

Other studies have also found that people may be less likely to stop taking lamotrigine, but that carbamazepine controls seizures better.^[62]

Phenobarbital

Epilepsy

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[How good is the research on phenobarbital?](#)

This information is for people who have epilepsy. It tells you about phenobarbital, a drug used for epilepsy. It is based on the best and most up-to-date research.

Does it work?

Probably. If you or your child has epilepsy, then taking phenobarbital may reduce the number of seizures, or even stop them altogether. But it does have side effects.

We don't know if phenobarbital works any better or any worse than other drugs for epilepsy.

What is it?

Phenobarbital (also called phenobarbitine) is an epilepsy drug that is used to prevent seizures. You may also hear it called an anti-epileptic drug (AED) or an anti-convulsant. There are many epilepsy drugs and they work in different ways so it may take some time for your doctor to find the right treatment for you.^[54] But phenobarbital is one of the drugs that doctors often try first to stop seizures in people with epilepsy.

All epilepsy drugs come as tablets. For practical advice on managing your treatment, see [Taking epilepsy drugs](#) .

You should see your doctor for a check-up at least once a year to talk about how you are getting on with treatment, including any side effects.^[55]

How can it help?

About two-thirds of people with epilepsy can control their seizures with one epilepsy drug. The seizures may stop, be less severe, or happen less often than they did before.^[56]

Good-quality studies show that phenobarbital controls epilepsy as well as [carbamazepine](#) and [phenytoin](#) . Even so, we don't know for certain which drugs work best, or if they're all about the same.^[59] ^[80]

How does it work?

When you have a seizure, the nerve cells in your brain become over-excited and produce electrical signals faster than usual and in bursts. Epilepsy drugs calm down this activity. But doctors know very little about how the drugs actually do this. Also, different epilepsy drugs seem to work in different ways.^[81]

Phenobarbital probably works in lots of different ways. But the main way it helps is by increasing the action of a chemical called GABA in the brain.^[64] ^[65] GABA stands for

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gamma-aminobutyric acid. It acts as a braking fluid in the brain, stopping electrical signals passing from one brain cell to the next. This slows down electrical activity in the brain and reduces seizures. Doctors think that some people with epilepsy have too little GABA, so their brain cells fire off too many signals. ^[64] ^[65]

Can it be harmful?

All epilepsy drugs cause side effects and these side effects can be different for different people.

Studies have found that people may be more likely to stop taking phenobarbital because of side effects than phenytoin or carbamazepine. ^[60] ^[66]

Common side effects

The most common side effects linked to phenobarbital are: ^[82]

- Feeling worn out
- Drowsiness
- Depression
- Lack of co-ordination
- Confusion.

If you get these side effects, your doctor may cut down the dose of your drug and wait a couple of weeks before increasing it again. Some people find the side effects pass. But, if your side effects continue, your doctor may switch you to another drug. ^[54]

Phenobarbital causes more side effects than carbamazepine. So, doctors don't use this drug as much as they used to. ^[66]

Rarer side effects

Phenobarbital has these rarer and sometimes more serious side effects: ^[83]

- Liver damage
- Damage to your blood cells.

Rashes

You should **see your doctor immediately** if you or your child gets a rash while taking an epilepsy drug. Although the rash will probably go away, it can develop into a serious (and sometimes fatal) skin condition called Stevens-Johnson syndrome.

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Very rarely, another skin condition called toxic epidermal necrolysis (TEN) can develop. Warning signs that a rash is serious are: ^[54]

- Raised lumps
- Flaky skin
- A swollen face
- Painful skin
- Purple blotches
- Sores on the lips or inside the mouth
- Asthma symptoms (for example, wheezing and difficulty breathing easily).

If you get a bad skin reaction, your doctor will usually change your epilepsy drug.

Thinner bones

Some studies have shown that children taking phenobarbital get thinner bones, if they take it for more than two years. ^[73] This could mean they're more likely to break a bone. However, the research hasn't looked at fractures, just at a measurement of bone strength, called bone mineral density (BMD).

Stopping contraceptives working

Phenobarbital can stop the contraceptive pill and contraceptive injections working properly. ^[74] For more information, see [Contraception and epilepsy drugs](#) .

Epilepsy drugs and pregnancy

Epilepsy drugs can cause birth defects. ^[67] However, it's important to continue preventing seizures while you're pregnant. If you're planning a pregnancy, talk to your doctor. He or she may suggest adjusting your drugs before you get pregnant. To learn more, see [Epilepsy and pregnancy](#) .

How good is the research on phenobarbital?

There is reasonably good evidence that taking phenobarbital helps to stop or reduce seizures for many people. ^[60] ^[66]

The studies we found compared phenobarbital with one other epilepsy drug to find out which one might work better for certain types of seizures. The studies included people who got seizures that affect part of the brain (focal seizures) and people who got seizures

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that affect the whole brain (generalised seizures). (To learn more about seizures, see [What are the symptoms of epilepsy?](#))

Comparing phenobarbital with phenytoin

We found one **systematic review** that looked at results from three studies comparing phenobarbital with [phenytoin](#) .^[60] The review found that people taking either drug were equally likely to have no seizures for a year. However, people using phenobarbital were more likely to stop taking their drug, probably because of the side effects.

Comparing phenobarbital with carbamazepine

In another systematic review involving 680 people with focal or generalised seizures, researchers looked at results from four studies comparing phenobarbital with [carbamazepine](#) .^[66] The review found no difference between the treatments for people with generalised seizures. Among people with focal seizures, those taking phenobarbital stayed free of seizures for longer. But they were more likely to stop their treatment than people taking carbamazepine, probably because phenobarbital caused more side effects.

Phenytoin

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[How good is the research on phenytoin?](#)

This information is for people who have epilepsy. It tells you about phenytoin, a drug used for epilepsy. It is based on the best and most up-to-date research.

Does it work?

Probably. If you or your child has epilepsy, then taking phenytoin may reduce how many seizures you get or stop them altogether. But it does have side effects.

We don't know if phenytoin works any better or any worse than other drugs for epilepsy.

What is it?

Phenytoin (brand name Epanutin) is an epilepsy drug that is used to prevent seizures. You may also hear it called an anti-epileptic drug (AED) or an anti-convulsant.

There are many epilepsy drugs and they work in different ways so it may take some time for your doctor to find the right treatment for you.^[54] But phenytoin is one of the drugs that doctors often try first to stop seizures in people with epilepsy.

All epilepsy drugs come as tablets, and most people have to take them more than once per day. For practical advice on managing your treatment, see [Taking epilepsy drugs](#) .

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You should see your doctor for a check-up at least once a year to talk about how you are getting on with treatment, including any side effects. ^[55]

How can it help?

About two-thirds of people with epilepsy can control their seizures with one epilepsy drug. The seizures may stop, be less severe, or happen less often than they did before. ^[56]

Good-quality studies have shown that phenytoin controls epilepsy just as well as [valproate](#) , [carbamazepine](#) , [phenobarbital](#) and a newer drug called [oxcarbazepine](#) . Even so, we don't know for sure which drugs work best, or if they're all about the same. ^[84] ^[66]
^[85] ^[60] ^[86] ^[87]

How does it work?

When you have a seizure, the nerve cells in your brain become over-excited and produce electrical signals faster than usual and in bursts. Epilepsy drugs calm down this activity. But doctors know very little about how the drugs actually do this. Also, different epilepsy drugs seem to work in different ways. ^[81]

Phenytoin seems to work by blocking the channels that electrical signals use to get into brain cells. ^[64] ^[65] Nerve cells in the brain work by sending electrical signals to each other. On the surface of each cell, there are channels, like doors, to let electrical signals in. Some epilepsy drugs stick to the channels that are closed and keep them closed. This stops the over-excited cells making the rapid electrical signals that cause seizures. ^[65]

Can it be harmful?

All epilepsy drugs cause side effects, and these side effects can be different for different people.

Studies have found that people may be more likely to stop taking phenobarbital than phenytoin, probably because of side effects. ^[60] However, people with focal seizures may be more likely to stop taking phenytoin than oxcarbazepine. ^[86]

Common side effects

The most common side effects linked to phenytoin are: ^[88]

- Dizziness
- Confusion
- Headaches
- Problems getting to sleep (insomnia)

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- Shaking
- Feeling sick
- Rashes.

If you get these side effects, your doctor may cut down the dose of your drug and wait a couple of weeks before increasing it again. Some people find the side effects pass. But if your side effects continue, your doctor may switch you to another drug. ^[54]

Rarer side effects

Phenytoin has these rarer and sometimes serious side effects: ^[89]

- Liver damage
- Damage to your blood cells
- Some patients who take phenytoin for a long time get swollen gums, thick lips, or excessive hair growth on their face and body.

Rashes

You should **see your doctor immediately** if you or your child gets a rash while taking an epilepsy drug. Although the rash will probably go away, it can develop into a serious (and sometimes fatal) skin condition called Stevens-Johnson syndrome. Very rarely, another skin condition called toxic epidermal necrolysis (TEN) can develop. Warning signs that a rash is serious are: ^[54]

- Raised lumps
- Flaky skin
- A swollen face
- Painful skin
- Purple blotches
- Sores on the lips or inside the mouth
- Asthma symptoms (for example, wheezing and difficulty breathing easily).

If you get a bad skin reaction, your doctor will usually change your epilepsy drug.

Thinner bones

Some studies have shown that children taking phenytoin get thinner bones. This could mean they're more likely to break a bone. However, the research hasn't looked at fractures, just at a measurement of bone strength, called bone mineral density (BMD). The research is not very clear. Some studies seem to show a reduction in BMD for children taking phenytoin, while other studies do not. ^[73]

Stopping contraceptives working

Phenytoin can stop the contraceptive pill and contraceptive injections working properly. ^[89] For more information, see [Contraception and epilepsy drugs](#) .

Epilepsy drugs and pregnancy

Epilepsy drugs can cause birth defects. ^[67] However, it's important to continue preventing seizures while you're pregnant. If you're planning a pregnancy, talk to your doctor. He or she may suggest adjusting your drugs before you get pregnant. To learn more, see [Epilepsy and pregnancy](#) .

How good is the research on phenytoin?

There is reasonably good evidence that taking phenytoin helps to stop or reduce seizures for many people. ^{[84] [60] [86] [90]}

The studies we found compared phenytoin with one other epilepsy drug to find out which one might work better for certain types of seizures. The studies included people who got seizures that affect part of the brain (focal seizures) and people who got seizures that affect the whole brain (generalised seizures). (To learn more about seizures, see [What are the symptoms of epilepsy?](#))

Comparing phenytoin with valproate

In one summary of research (called a [systematic review](#)) involving 669 people, researchers looked at the results from five studies comparing [valproate](#) with phenytoin. ^[90]

The review found no differences in how the two drugs worked for people with generalised seizures or focal seizures. This could mean the drugs work equally well, or it could mean the studies were not good enough to find a difference between the two drugs.

Comparing phenytoin with phenobarbital

In another systematic review, researchers looked at results from three studies involving 599 comparing [phenobarbital](#) with phenytoin. ^[60] The review found that people taking either drug were equally likely to have no seizures for a year. However, people using phenobarbital were more likely to stop taking their drug, probably because of the side effects.

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Comparing phenytoin with carbamazepine

One systematic review looked at results from three studies involving 552 people with generalised seizures or focal seizures.^[84] The review found no differences between phenytoin and [carbamazepine](#) .

Comparing phenytoin with oxacarbazepine

One systematic review looked at results from two studies involving 480 people with generalised or focal seizures.^[86] The review found no difference in how well the treatments worked. But people with focal seizures were more likely to stop taking phenytoin than [oxacarbazepine](#) , possibly because of side effects.

Topiramate

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[How good is the research on topiramate?](#)

This information is for people who have epilepsy. It tells you about topiramate, a drug used for epilepsy. It is based on the best and most up-to-date research.

Does it work?

Probably. If you or your child has epilepsy, taking topiramate may reduce your seizures or stop them altogether. But it does have side effects.

We don't know if topiramate works any better or any worse than other drugs for epilepsy.

What is it?

Topiramate (brand name Topamax) is a newer epilepsy drug that is used to prevent seizures. You may also hear it called an anti-epileptic drug (AED) or an anti-convulsant. There are many epilepsy drugs and they work in different ways, so it may take some time for your doctor to find the right treatment for you.^[54]

Some adults and children may be prescribed topiramate on its own if they find that older drugs for epilepsy ([phenobarbital](#) , [phenytoin](#) , [valproate](#) or [carbamazepine](#)) cause bad side effects or don't help.^[78] ^[56] It may also be combined with other epilepsy drugs if your doctor can't find just one drug to stop your seizures. To learn more, see [Taking more than one drug for epilepsy if you have focal seizures](#) .

All epilepsy drugs come as tablets. For practical advice on managing your treatment, see [Taking epilepsy drugs](#) .

You should see your doctor for a check-up at least once a year to talk about how you are getting on with treatment, including any side effects.^[55]

How can it help?

About two-thirds of people with epilepsy can control their seizures with one epilepsy drug. The seizures may stop, be less severe, or happen less often than they did before. ^[56]

We don't know for certain which drugs work best, or if they all work about the same. One study found that topiramate may control seizures as well as [valproate](#) and [carbamazepine](#). ^[76] Another study found that people taking topiramate for [focal seizures](#) were as likely to be seizure-free after a year as people taking [carbamazepine](#) or [lamotrigine](#). ^[63]

Researchers have also found that topiramate may work as well as [valproate](#) for seizures that affect the whole brain ([generalised seizures](#)). ^[91]

How does it work?

When you have a seizure, the nerve cells in your brain become over-excited and produce electrical signals faster than usual and in bursts. Epilepsy drugs calm down this activity. But doctors know very little about how the drugs actually do this. Also, different epilepsy drugs seem to work in different ways.

Topiramate probably works in a couple ways. ^[64] It is thought to increase the action of a chemical called GABA in the brain. GABA stands for gamma-aminobutyric acid. It acts as a braking fluid in the brain, stopping electrical signals passing from one brain cell to the next. This slows down electrical activity in the brain and reduces seizures. Doctors think that some people with epilepsy have too little GABA, so their brain cells fire off too many signals. Topiramate also seems to block the channels that electrical signals use to get into brain cells.

Can it be harmful?

All epilepsy drugs cause side effects and these side effects can be different in different people.

Common side effects

- Topiramate may stop you thinking clearly. People in studies who took topiramate were nearly four times more likely to have this problem than people who took a placebo (a dummy treatment). ^[92] ^[93]
- People who take topiramate are twice as likely to feel dizzy as those taking a placebo.
- Tiredness and sleepiness are up to three times more common in people who take topiramate compared with those who take a placebo.
- Topiramate can give you a headache.

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- It can also put you off your food, so you lose weight.
- Much more rarely, topiramate can increase the pressure inside one or both eyes. This makes the affected eye red and sore.^[94]
- During one study, 1 in 5 people stopped taking topiramate. This is more than twice as many people as stopped taking a placebo.

If you get side effects, your doctor may cut down the dose of your drug and wait a couple of weeks before increasing it again. Some people find the side effects pass. But if your side effects continue, your doctor may switch you to another drug.^[8]

Research has found that people may be more likely to stop taking topiramate because of side effects than lamotrigine.^[63]

Rashes

You should **see your doctor immediately** if you or your child gets a rash while taking an epilepsy drug. Although the rash will probably go away, it can develop into a serious (and sometimes fatal) skin condition called Stevens-Johnson syndrome. Very rarely, another skin condition called toxic epidermal necrolysis (TEN) can develop. Warning signs that a rash is serious are:^[54]

- Raised lumps
- Flaky skin
- A swollen face
- Painful skin
- Purple blotches
- Sores on the lips or inside the mouth
- Asthma symptoms (for example, wheezing and difficulty breathing easily).

If you get a bad skin reaction, your doctor will usually change your epilepsy drug. Rashes very rarely happen with topiramate.

Stopping contraceptives working

Topiramate can stop the contraceptive pill and contraceptive injections working properly.^[74] For more information, see [Contraception and epilepsy drugs](#) .

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Epilepsy drugs and pregnancy

Epilepsy drugs can cause birth defects.^[67] However, it's important to continue preventing seizures while you're pregnant. If you're planning a pregnancy, talk to your doctor. He or she may suggest adjusting your drugs before you get pregnant. To learn more, see [Epilepsy and pregnancy](#) .

Self-harm and suicide

There is a very small risk that taking topiramate might make you more likely to think about suicide or harming yourself.^[75] If you are worried about any thoughts or feelings you have, see your doctor straight away.

How good is the research on topiramate?

We don't know for certain which epilepsy drugs work best, or if they all work about the same. But there is reasonably good evidence that taking topiramate helps to stop or reduce seizures for many people.^[76] ^[63]

One study (a [randomised controlled trial](#)) found that topiramate may control seizures as well as [valproate](#) and [carbamazepine](#) .^[76] But many people left the study before it was finished, which makes its results less reliable.

Another study found that people taking topiramate for [focal seizures](#) were as likely to be seizure-free after a year as people taking carbamazepine or [lamotrigine](#) .^[63] But people were more likely to stop taking topiramate because of side effects than lamotrigine. A study also found that topiramate may work as well as valproate for seizures that affect the whole brain ([generalised seizures](#)).^[91]

However, these studies were unblinded, which means patients and their doctors knew what treatments were being used. This could have affected the results.

Valproate

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[Can it be harmful?](#)

[How good is the research on valproate?](#)

This information is for people who have epilepsy. It tells you about valproate, a drug used for epilepsy. It is based on the best and most up-to-date research.

Does it work?

Probably. If you or your child has epilepsy, then taking valproate may reduce the seizures or stop them altogether. But it does have side effects.

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We don't know if valproate works any better or any worse than other drugs for epilepsy.

What is it?

Valproate (brand names Epilim and Episenta) is an epilepsy drug that is used to control seizures. You may also hear it called an anti-epileptic drug (AED) or an anti-convulsant.

There are many epilepsy drugs and they work in different ways so it may take some time for your doctor to find the right treatment for you.^[54] But valproate is one of the drugs that doctors often try first to control seizures in people with epilepsy.

All epilepsy drugs come as tablets, and most people have to take them more than once per day. For practical advice on managing your treatment, see [Taking epilepsy drugs](#) .

You should see your doctor for a check-up at least once a year to talk about how you are getting on with treatment, including any side effects.^[55]

How can it help?

About two-thirds of people with epilepsy can control their seizures with one epilepsy drug. The seizures may stop, be less severe, or happen less often than they did before.^[56]

One study found that 8 in 10 people who took valproate or [carbamazepine](#) for three years didn't have any seizures for at least one of these years. And 6 in 10 had no seizures for two years.^[57]

We don't know for certain which drugs work best, or if they're all about the same.^[84] ^[66]
^[85] ^[60] Carbamazepine may work better than valproate for seizures that affect only part of the brain ([focal seizures](#)).^[61] For seizures that affect the whole brain ([generalised seizures](#)), valproate may work better than [lamotrigine](#) and as well as carbamazepine, [topiramate](#), and [phenytoin](#).^[63] ^[90]

How does it work?

When you have a seizure, the nerve cells in your brain become over-excited and produce electrical signals faster than usual and in bursts. Epilepsy drugs calm down this activity. But doctors know very little about how the drugs actually do this. Also, different epilepsy drugs seem to work in different ways.^[81]

Doctors aren't entirely sure how valproate works, but it may work in three ways.^[64] ^[65]
By:

- Blocking the channels that electrical signals use to reach brain cells
- Increasing the action of a chemical called gamma-aminobutyric acid (GABA) in the brain which slows down the electrical activity in the brain

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- Blocking calcium from reaching cells. Cells need calcium to make electrical signals. ^[81]

Can it be harmful?

All epilepsy drugs cause side effects and these side effects can be different in different people.

People may be less likely to stop taking valproate because of side effects than [topiramate](#). ^[63]

Common side effects

The most common side effects linked to valproate are: ^[95]

- Dizziness
- Feeling worn out
- Upset stomach
- Drowsiness
- Temporary hair loss
- Lack of co-ordination
- Feeling sick
- Weight gain
- Rashes.

Some people also find that their hair falls out more than usual. It regrows again after about six months. ^[55]

If you get side effects, your doctor may cut down the dose of your drug and wait a couple of weeks before increasing it again. Some people find the side effects pass. But if your side effects continue, your doctor may switch you to another drug. ^[8]

Rashes

You should **see your doctor immediately** if you or your child gets a rash while taking an epilepsy drug. Although the rash will probably go away, it can develop into a serious (and sometimes fatal) skin condition called Stevens-Johnson syndrome. Very rarely, another skin condition called toxic epidermal necrolysis (TEN) can develop.

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Warning signs that a rash is serious are: ^[8]

- Raised lumps
- Flaky skin
- A swollen face
- Painful skin
- Purple blotches
- Sores on the lips or inside the mouth
- Asthma symptoms (for example, wheezing and difficulty breathing easily).

If you get a bad skin reaction, your doctor will usually change your epilepsy drug.

Thinner bones

Some studies have shown that people taking valproate may get thinner bones. This could mean they're more likely to break a bone. However, the research hasn't looked at fractures, just at a measurement of bone strength, called bone mineral density (BMD). The research is not very clear. Some studies seem to show a reduction in BMD for people taking valproate, while other studies do not. ^[69] ^[73]

Epilepsy drugs and pregnancy

Valproate is more likely than other epilepsy drugs to cause birth defects if you take it when you are pregnant. ^[55] ^[42] However, it's important to continue preventing seizures while you're pregnant. If you're planning a pregnancy, talk to your doctor. He or she may suggest adjusting your drugs before you get pregnant. To learn more, see [Epilepsy and pregnancy](#) .

Self-harm and suicide

There is a very small risk that taking valproate might make you more likely to think about suicide or harming yourself. ^[75] If you are worried about any thoughts or feelings you have, see your doctor straight away.

How good is the research on valproate?

There is reasonably good evidence that taking valproate helps to stop or reduce seizures for many people. ^[61] ^[76] ^[90] ^[63]

The studies we found compared valproate with other epilepsy drugs to find out which might work better for certain types of seizures. The studies included people who got seizures that affect part of the brain (focal seizures) and people who got seizures that

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affect the whole brain (generalised seizures). (To learn more about seizures, see [What are the symptoms of epilepsy?](#))

Comparing valproate with carbamazepine

We found one summary of the research (a [systematic review](#)) that looked at five studies involving 1,225 people. The review found no differences between the two drugs for people with generalised seizures. This could mean these drugs work equally well, or it could mean the studies were not good enough to find a difference between the two drugs.

However, after starting treatment, the people affected by focal seizures taking valproate had a seizure sooner than the people taking [carbamazepine](#) . This suggests (but doesn't prove) that carbamazepine may work better than valproate for people with focal seizures. We don't know what happens to people who take these drugs for a long time because all the studies lasted less than five years. ^[61]

Another study (a [randomised controlled trial](#)) with more than 600 people found no difference in how well valproate and carbamazepine worked for people with generalised or focal seizures. ^[76] However, many people left the study before it was finished, which makes its results less reliable.

Comparing valproate with phenytoin

In another summary of research involving 669 people, researchers looked at the results from five studies comparing valproate with [phenytoin](#) . ^[90]

The review found no differences in how the two drugs worked for people with generalised seizures or focal seizures. This could mean the drugs work equally well, or it could mean the studies were not good enough to find a difference between the two drugs.

Comparing valproate with lamotrigine and topiramate

A large study with more than 700 people found that valproate may work better than [lamotrigine](#) for people with generalised seizures. ^[63] It also found that valproate and [topiramate](#) worked equally well at stopping generalised seizures after one year, but people were less likely to stop taking valproate.

This study was well done overall, but it was unblinded, which means patients and their doctors knew what treatments were being used. This could have affected the study's results.

Another study (a [randomised controlled trial](#)) with more than 600 people found no difference in how well valproate and topiramate worked for people with either generalised or focal seizures. ^[76] However, many people left the study before it was finished, which makes its results less reliable.

Taking more than one drug for epilepsy

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[Can it be harmful?](#)

[How good is the research on taking more than one drug for epilepsy?](#)

This information is for people who have epilepsy. It tells you about taking more than one drug for epilepsy. It is based on the best and most up-to-date research.

Does it work?

Probably. If you're taking one epilepsy drug and still get focal seizures, then taking two or more drugs is likely to work. (Focal seizures affect only part of the brain. To learn more, see [What are the symptoms of epilepsy?](#))

There is less research looking at taking two or more drugs for generalised seizures. But there is evidence to show that two drugs (lamotrigine and levetiracetam) may work as add-on treatments for generalised seizures.

But you may get more side effects from taking two or more drugs than from taking one. And we can't say whether the seizures will stop completely, or which combinations of drugs work best.

What is it?

There are many epilepsy drugs. Most people can reduce or stop their seizures by taking one drug. ^[57]

But focal seizures can be difficult to control. About 1 in 3 people with focal seizures may need to take more than one drug each day. ^[32] ^[15] Doctors call this add-on or adjunctive treatment. Your doctor is likely to choose an add-on drug that works in a different way from the drug you are already taking. ^[96]

These are the drugs (followed by their brand names) that doctors prescribe as add-on treatments to reduce focal seizures.

- eslicarbazepine (Zebinix)
- gabapentin (Neurontin)
- lacosamide (Vimpat)
- lamotrigine (Lamictal)
- levetiracetam (Keppra)
- oxcarbazepine (Trileptal)
- retigabine (Trobalt)

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- tiagabine (Gabitril)
- topiramate (Topamax)
- vigabatrin (Sabril)
- zonisamide (Zonegran)
- perampanel (Fycompa)

These drugs have come on the market since 1993, so they are all fairly new. They are usually used with an older epilepsy drug, such as valproate or carbamazepine.^[15]

Any of the older epilepsy drugs ([carbamazepine](#) , [phenobarbital](#) , [phenytoin](#) , and [valproate](#)) can also be used as add-on treatments. But we haven't yet reviewed the research on how well they work in this role.

These are the drugs (followed by their brand names) that have been tested as add-on treatments to reduce generalised seizures: lamotrigine (Lamictal) and levetiracetam (Keppra).

The drug you and your doctor choose will depend on the drugs you take already, your medical history and your lifestyle.

All epilepsy drugs come as tablets. For practical advice on managing your treatment, see [Taking epilepsy drugs](#) .

How can it help?

If one epilepsy drug doesn't reduce or stop seizures, then taking two or more drugs may help. Here's what we know from the research.

Among people who still get a lot of seizures when taking one drug, between 14 in 100 and 45 in 100 people can go on to reduce their seizures with two drugs. These people found that taking two drugs could cut their number of seizures by half.^{[32] [97] [98] [99] [100] [101] [102] [103] [104] [105] [106] [107] [108]}

We don't know which drug works best as an add-on medication, as the research doesn't give a clear answer. One summary of the evidence compared some of the studies looking at individual drugs. It found that people were more likely to get results from levetiracetam, compared with gabapentin or lamotrigine. But this type of study is less reliable, because the drugs were not compared directly.^[109] .

Research shows that two drugs, levetiracetam and lamotrigine, work as add-on treatments for people with **generalised epilepsy** that's not been controlled by one drug.

In one study, more than 7 in 10 people had at least half as many seizures after taking levetiracetam in addition to their usual epilepsy drug.^[110]

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In one study, 5 in 10 of the people had at least half as many seizures after taking lamotrigine as well as their usual epilepsy treatment. ^[111]

A second study on lamotrigine found that more than 7 in 10 people had at least half as many seizures after taking lamotrigine as well as their usual epilepsy treatment. ^[112]

How does it work?

When you have a seizure, the nerve cells in your brain become over-excited and produce electrical signals faster than usual and in bursts. Epilepsy drugs work by calming down this activity. But doctors know very little about exactly how epilepsy drugs work. Different epilepsy drugs work in different ways. ^[113]

- Gabapentin, tiagabine, and vigabatrin probably work by increasing the amount of a chemical called GABA in the brain. ^[114] ^[115] GABA stands for gamma-aminobutyric acid. It acts as a braking fluid in the brain, stopping an electrical signal passing from one brain cell to the next. This slows down electrical activity in the brain and reduces seizures. Doctors think that some people with epilepsy have too little GABA, so their brain cells fire off too many signals. ^[114] ^[115]
- Oxcarbazepine and lamotrigine seem to work by blocking the channels that electrical signals use to get into brain cells. ^[114] ^[115]
- Topiramate probably works by both increasing the activity of GABA and blocking the doors that let electrical signals into cells. ^[114]
- We don't know how levetiracetam works.
- Eslicarbazepine probably works by stabilising electrical signals in the brain cells. ^[116]

Can it be harmful?

Taking two or more drugs has disadvantages. Someone who takes two drugs is more likely to get side effects than someone who takes one drug. And there's also a risk that the drugs will react badly with each other. ^[15]

Here are the most common side effects for epilepsy drugs.

- Dizziness
- Feeling worn out
- Drowsiness
- Lack of co-ordination

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- Feeling sick
- Headaches
- Confusion, problems thinking clearly and difficulty concentrating
- Weight change. Topiramate can put you off your food and make you lose weight. Gabapentin can make you put on weight.

Rashes

You need to **see your doctor straight away if you or your child gets a rash** while taking epilepsy drugs. Although the rash will probably go away, it can develop into a serious (and sometimes fatal) skin condition called Stevens-Johnson syndrome. Warning signs that the rash is serious are: ^[8] ^[3]

- Raised lumps
- Flaky skin
- A swollen face
- Painful skin
- Purple blotches
- Sores on the lips or inside the mouth
- Asthma symptoms (for example, wheezing and difficulty breathing easily).

Lamotrigine can cause a rash. Starting on a low dose and then gradually increasing the dose can reduce the risk of getting a rash.

Gabapentin, eslicarbazepine, and levetiracetam rarely cause rashes. ^[8]

Eye problems

About 4 in 10 people taking vigabatrin get problems with their eyesight. These problems don't always get better even when treatment is stopped. Because of this, most specialists don't recommend vigabatrin. ^[117] If you have to take vigabatrin, your eyes should be tested at least every six months. ^[15]

Stopping contraceptives working

Some epilepsy drugs can stop the contraceptive pill and contraceptive injections working properly. ^[89] For more information, see [Contraception and epilepsy drugs](#) .

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Epilepsy drugs and pregnancy

Epilepsy drugs can cause birth defects. If you're pregnant, your doctor will probably try to control your seizures with just one drug, as taking more than one may increase the risk of birth defects. ^[118]

To learn more, see [Epilepsy and pregnancy](#) .

Self-harm and suicide

There is a very small risk that taking these epilepsy drugs might make you more likely to think about suicide or harming yourself. ^[75] If you are worried about any thoughts or feelings you have, see your doctor straight away.

How good is the research on taking more than one drug for epilepsy?

There is good evidence that taking two or more epilepsy drugs can help people who still have focal seizures after taking one drug. (A partial seizure is a seizure that affects just part of the brain. To learn more about seizures, see [What are the symptoms of epilepsy?](#))

We found eleven summaries of the evidence (called **systematic reviews**) that looked at studies on the following epilepsy drugs: ^[32] ^[97] ^[98] ^[99] ^[100] ^[101] ^[102] ^[103] ^[104] ^[105] ^[119]

- gabapentin. The reviews found five studies involving 997 people
- lamotrigine. The reviews found 11 studies involving 1,243 people
- levetiracetam. The reviews found four studies involving 1,023 people
- oxcarbazepine. The reviews found two studies involving 961 people
- tiagabine. The reviews found three studies involving 769 people
- topiramate. The reviews found ten studies involving 1,312 people
- vigabatrin. The reviews found 11 studies involving 982 people.

All of the studies compared people who took more than one drug for their epilepsy with people who took one drug plus a dummy treatment (a **placebo**). Everyone in the studies had focal seizures that they were unable to control with one drug alone.

We also found one good-quality study (a **randomised controlled trial**) looking at eslicabazepine and one looking at retigabine. ^[106] ^[107]

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Number of seizures

Overall, the people who took more than one epilepsy drug were much more likely to have fewer seizures. On average, between 25 in 100 and 35 in 100 people taking more than one drug reduced their seizures by half. But, results from the studies varied. The number of people who saw their seizures cut by half varied from just 14 in 100 to nearly 50 in 100.

Number of people stopping treatment

People taking gabapentin, lamotrigine, or levetiracetam were no more likely than those taking a placebo to have to stop their treatment.^{[97] [120]} People taking tiagabine, topiramate, vigabatrin, or oxcarbazepine were more likely than people taking a placebo to stop their treatment.^{[120] [121]} But the number of people who stopped was still small.

Side effects

Overall, people taking more than one drug treatment were two to three times more likely to get side effects than those taking just one drug and a placebo.^{[97] [120] [121] [56] [98] [122] [100] [123]} But it's difficult to say which combinations of drugs are most likely to cause side effects because studies haven't looked at this.

Generalised seizures

We found just three good-quality studies (randomised controlled trials) looking at add-on treatments for generalised seizures. Two studies looked at levetiracetam^{[110] [124]} and one at lamotrigine.^[111] The lamotrigine study was quite small (26 people). The levetiracetam studies were bigger (286 people in total). All the studies showed the drugs helped reduce people's seizures.

Problems with the research

Although the research so far has been fairly good, there are still some things we don't know.

- We don't know which combination of drugs works best.
- We don't know if some drugs are better than others for treating particular types of epilepsy.

Newer epilepsy drugs

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This information is for people who have epilepsy. It tells you about some of the newer epilepsy drugs. You might take them on their own, or in combination with an older drug.

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We haven't looked at the research on these drugs in the same detail we have for the other treatments we cover. However, we've included some information because you might be interested in them.

What are they?

There are several newer epilepsy drugs that your doctor might prescribe. They are:

- lacosamide (Vimpat)
- oxcarbazepine (Trileptal)
- tiagabine (Gabitril)
- vigabatrin (Sabril)
- zonisamide (Zonegran).

You may hear these drugs described as anti-epileptic drugs (AEDs) or anti-convulsants.

Doctors in the UK normally prescribe these newer drugs along with an older drug. The research we've looked at shows they are likely to work when taken with an older drug. To learn more, see [Taking more than one drug for epilepsy if you have focal seizures](#) .

Some adults and children may be prescribed one of the newer drugs on its own if older drugs for epilepsy cause bad side effects or don't help. ^[78] ^[32]

The National Institute for Health and Care Excellence (NICE), the government body that decides which treatments should be available on the NHS, says that, used alone, these drugs may help some people. ^[55] For more information, see [Drug treatments recommended by NICE](#) .

The newer drugs are also an option for women who want to have a baby. However, we don't know yet whether they might be less likely to cause birth defects than the older drugs, as not much research has been done. To learn more, see [Epilepsy and pregnancy](#) .

You should see your doctor for a check-up at least once a year to talk about how you are getting on with treatment, including any side effects. ^[55]

How do they work?

When you have a seizure, the nerve cells in your brain become over-excited and produce electrical signals faster than usual and in bursts. Epilepsy drugs calm down this activity. But doctors know very little about how the drugs actually do this. Also, different epilepsy drugs seem to work in different ways. ^[81]

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Some epilepsy drugs (for example, oxcarbazepine and zonisamide) seem to work by blocking the channels that electrical signals use to get into brain cells.^[64] ^[65] Nerve cells in the brain work by sending electrical signals to each other. On the surface of each cell, there are channels, like doors, to let electrical signals in. Some epilepsy drugs stick to the channels that are closed and keep them closed. This stops the over-excited cells making the rapid electrical signals that cause seizures.^[65]

Tiagabine and vigabatrin probably work by increasing the action of a chemical called GABA in the brain.^[64] ^[115] GABA stands for gamma-aminobutyric acid. It acts as a braking fluid in the brain, stopping electrical signals passing from one brain cell to the next. This slows down electrical activity in the brain and reduces seizures. Doctors think that some people with epilepsy have too little GABA, so their brain cells fire off too many signals.^[64] ^[115]

Another way epilepsy drugs may work is by blocking calcium from getting into cells. Cells need calcium to make electrical signals.^[113]

We don't know how lacosamide works.

Can they be harmful?

If you get side effects, your doctor may cut down the dose of your drug and wait a couple of weeks before increasing it again. Some people find the side effects pass. But if your side effects continue, your doctor may switch you to another drug.^[54] Your decision to stick with a drug or not will probably depend on the side effects you get.

The side effects you get will depend on the particular drug you take. For more, see:

- [lacosamide](#)
- [oxcarbazepine](#)
- [tiagabine](#)
- [vigabatrin](#)
- [zonisamide](#) .

Rashes

You should **see your doctor immediately** if you or your child gets a rash while taking an epilepsy drug. Although the rash will probably go away, it can develop into a serious (and sometimes fatal) skin condition called Stevens-Johnson syndrome.

Very rarely, another skin condition called toxic epidermal necrolysis (TEN) can develop. The risk of getting these serious skin reactions is especially high with the drug

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oxcarbazepine (brand name Trileptal).^[125] The rash tends to start within three weeks of starting oxcarbazepine. Warning signs that a rash is serious are:^[8]

- Raised lumps
- Flaky skin
- A swollen face
- Painful skin
- Purple blotches
- Sores on the lips or inside the mouth
- Asthma symptoms (for example, wheezing and difficulty breathing easily).

If you get a bad skin reaction, your doctor will usually change your epilepsy drug.

Stopping contraceptives working

Some epilepsy drugs can stop the contraceptive pill and contraceptive injections working properly.^[126] For more information, see [Contraception and epilepsy drugs](#) .

Epilepsy drugs and pregnancy

Epilepsy drugs can cause birth defects.^[67] However, it's important to continue preventing seizures while you're pregnant. If you're planning a pregnancy, talk to your doctor. He or she may suggest adjusting your drugs before you get pregnant. To learn more, see [Epilepsy and pregnancy](#) .

Serious allergic reactions

A few people have had a serious allergic reaction when they started to take oxcarbazepine.^[125] Most people had a fever and a rash, along with problems in other parts of their body, such as enlarged lymph nodes, itchiness and pains in their joints. This reaction usually needs to be treated in hospital because it can be life-threatening. If you get a rash and a fever when you're taking an epilepsy drug, see your doctor immediately.

Self-harm and suicide

There is a very small risk that taking these epilepsy drugs might make you more likely to think about suicide or harming yourself.^[75] If you are worried about any thoughts or feelings you have, see your doctor straight away.

Gabapentin

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[How good is the research on gabapentin?](#)

This information is for people with epilepsy. It tells you about gabapentin, a drug used for epilepsy.

Does it work?

Yes, taking gabapentin is likely to reduce the number of seizures you have, if you have partial epilepsy.^[130] There isn't much research about this, but doctors agree it can help. We don't know whether it works for generalised epilepsy because there hasn't been enough good-quality research.

What is it?

Gabapentin is a newer drug for epilepsy. The brand name is Neurontin. It can be used either alone, or along with other epilepsy drugs.

How can it help?

Doctors think that taking gabapentin will help reduce or control seizures for people who have partial epilepsy.

But there hasn't been much research. One study showed it seems to work as well as lamotrigine.^[131] Another showed it seems to work as well as lamotrigine and carbamazepine.^[132] In the second study, between 63 percent and 64 percent of people had no seizures while taking any of the drugs, after 3 months.

One summary of the research looked at studies that compared people with partial epilepsy who took either gabapentin or a placebo (dummy drug) along with another epilepsy drug. The summary found that adding gabapentin to another drug reduced seizures more than taking a placebo, after 3 months.^[130]

How does it work?

When you have a seizure, the nerve cells in your brain become over-excited and produce electrical signals faster than usual and in bursts. Epilepsy drugs calm down this activity. But doctors know very little about how the drugs actually do this^[113].

Gabapentin is likely to work by increasing the action of a chemical called GABA in the brain.^[64] ^[65] GABA stands for gamma-aminobutyric acid. It acts as a braking fluid in the brain, stopping electrical signals passing from one brain cell to the next. This slows down electrical activity in the brain and reduces seizures. Doctors think that some people with epilepsy have too little GABA, so their brain cells fire off too many signals.

Can it be harmful?

Very few people who take gabapentin get side effects or stop taking it. ^[92] The main problem with gabapentin is sleepiness. People who take this drug are about twice as likely to feel worn out, drowsy and dizzy as people who take a dummy treatment for comparison (a placebo). Gabapentin can make some people put on weight. ^[92] Here are the most common side effects for epilepsy drugs.

- Dizziness
- Feeling worn out
- Drowsiness
- Lack of co-ordination
- Feeling sick
- Headaches
- Confusion, problems thinking clearly and difficulty concentrating
- Weight change. Topiramate can put you off your food and make you lose weight. Gabapentin can make you put on weight.

Rashes

You need to **see your doctor straight away if you or your child gets a rash** while taking epilepsy drugs. Although the rash will probably go away, it can develop into a serious (and sometimes fatal) skin condition called Stevens-Johnson syndrome. Warning signs that the rash is serious are: ^[8] ^[3]

- Raised lumps
- Flaky skin
- A swollen face
- Painful skin
- Purple blotches
- Sores on the lips or inside the mouth
- Asthma symptoms (for example, wheezing and difficulty breathing easily).

Epilepsy

Lamotrigine can cause a rash. Starting on a low dose and then gradually increasing the dose can reduce the risk of getting a rash.

Gabapentin, eslicarbazepine, and levetiracetam rarely cause rashes. ^[8]

Eye problems

About 4 in 10 people taking vigabatrin get problems with their eyesight. These problems don't always get better even when treatment is stopped. Because of this, most specialists don't recommend vigabatrin. ^[117] If you have to take vigabatrin, your eyes should be tested at least every six months. ^[15]

Stopping contraceptives working

Some epilepsy drugs can stop the contraceptive pill and contraceptive injections working properly. ^[89] For more information, see [Contraception and epilepsy drugs](#) .

Epilepsy drugs and pregnancy

Epilepsy drugs can cause birth defects. If you're pregnant, your doctor will probably try to control your seizures with just one drug, as taking more than one may increase the risk of birth defects. ^[118]

To learn more, see [Epilepsy and pregnancy](#) .

Self-harm and suicide

There is a very small risk that taking these epilepsy drugs might make you more likely to think about suicide or harming yourself. ^[75] If you are worried about any thoughts or feelings you have, see your doctor straight away.

How good is the research on gabapentin?

We found two good quality studies (randomised controlled trials) looking at gabapentin. ^[132] ^[131] They compared it to other drugs for epilepsy, not to a placebo (dummy) drug. Both studies showed all the drugs seemed to work about as well as each other.

Levetiracetam

In this section

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[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on levetiracetam?](#)

This information is for people with epilepsy. It tells you about levetiracetam, a drug used for epilepsy.

Does it work?

Yes, levetiracetam is likely to reduce the number of seizures you have, if you get partial epilepsy. We don't know whether it works for generalised epilepsy because there hasn't been enough good-quality research.

What is it?

Levetiracetam is a newer drug for epilepsy. It can be used alone or together with other epilepsy drugs. The brand name is Keppra.

How can it help?

Levetiracetam is likely to reduce the number of seizures you have. In one study comparing levetiracetam with another epilepsy drug, carbamazepine, 67 percent of people who'd taken either drug had no seizures for at least six months.

One summary of the research looked at studies comparing children and adults who took levetiracetam with those who took a placebo (dummy) drug. The summary found that after 6 months, 39 in 100 adults and 52 in 100 children who took levetiracetam had 50 percent less seizures, compared with 16 in 100 adults and 25 in 100 children who took a placebo. ^[133]

How does it work?

Scientists don't know exactly how levetiracetam works. It seems to work in a different way to other anti-epileptic drugs.

Can it be harmful?

Very few people stop taking levetiracetam because of side effects. ^[133] People who take levetiracetam are more than twice as likely to feel dizzy as people who take a placebo (dummy treatment). Infections are also common, although we don't know why this is.

Some people have problems with co-ordination and feel worn out and drowsy. There are some other side effects, but they are less common. They include feeling sick, trembling and finding it hard to sleep. ^[15] Here are the most common side effects for epilepsy drugs.

- Dizziness
- Feeling worn out
- Drowsiness
- Lack of co-ordination
- Feeling sick

Epilepsy

- Headaches
- Confusion, problems thinking clearly and difficulty concentrating
- Weight change. Topiramate can put you off your food and make you lose weight. Gabapentin can make you put on weight.

Rashes

You need to **see your doctor straight away if you or your child gets a rash** while taking epilepsy drugs. Although the rash will probably go away, it can develop into a serious (and sometimes fatal) skin condition called Stevens-Johnson syndrome. Warning signs that the rash is serious are: ^[8] ^[3]

- Raised lumps
- Flaky skin
- A swollen face
- Painful skin
- Purple blotches
- Sores on the lips or inside the mouth
- Asthma symptoms (for example, wheezing and difficulty breathing easily).

Lamotrigine can cause a rash. Starting on a low dose and then gradually increasing the dose can reduce the risk of getting a rash.

Gabapentin, eslicarbazepine, and levetiracetam rarely cause rashes. ^[8]

Eye problems

About 4 in 10 people taking vigabatrin get problems with their eyesight. These problems don't always get better even when treatment is stopped. Because of this, most specialists don't recommend vigabatrin. ^[117] If you have to take vigabatrin, your eyes should be tested at least every six months. ^[15]

Stopping contraceptives working

Some epilepsy drugs can stop the contraceptive pill and contraceptive injections working properly. ^[89] For more information, see [Contraception and epilepsy drugs](#) .

Epilepsy drugs and pregnancy

Epilepsy drugs can cause birth defects. If you're pregnant, your doctor will probably try to control your seizures with just one drug, as taking more than one may increase the risk of birth defects. ^[118]

To learn more, see [Epilepsy and pregnancy](#) .

Self-harm and suicide

There is a very small risk that taking these epilepsy drugs might make you more likely to think about suicide or harming yourself. ^[75] If you are worried about any thoughts or feelings you have, see your doctor straight away.

How good is the research on levetiracetam?

We found one good quality study (a [randomised controlled trial](#) covering 579 people, which compared levetiracetam with carbamazepine, an older epilepsy drug. ^[134] The study found both seemed to work as well as each other.

Temporal lobectomy

In this section

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[What is it?](#)

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[Can it be harmful?](#)

[How good is the research on an operation to remove a small part of your brain?](#)

This information is for people who have epilepsy. It tells you about an operation to remove a small part of your brain, a treatment used for epilepsy. It is based on the best and most up-to-date research.

Does it work?

Probably. If your seizures start in parts of your brain called the **temporal lobes**, and if they are not well-controlled with drugs, removing part of a lobe may stop your seizures and improve the quality of your life.

What is it?

There are different types of surgery for epilepsy. This information is about an operation to remove part of one of your brain's two temporal lobes. (To learn more about your temporal lobes and other parts of your brain, see [The parts of your brain and what they do](#) .)

This operation is used for people who have seizures that start in the temporal lobes. If you have epilepsy that starts in the temporal lobe, you have a type of epilepsy (an epilepsy syndrome) called **temporal lobe epilepsy**. For more information, see [Epilepsy syndromes](#)

.

Epilepsy

The aim of surgery is to reduce the number of seizures you have, make them less severe or stop them altogether.

The most common operation involves removing some of the surface and parts of the inside of one of your temporal lobes. This is called a **temporal lobectomy**. During the operation: ^[135]

- Surgeons usually make a cut shaped like a question mark in front of your ear
- Next, they carefully drill a hole through your skull to reach your brain
- Surgeons then cut away parts of one of your temporal lobes. They usually remove about 3 centimetres (1.2 inches) from the surface and two small parts inside the lobe. These parts are called the **amygdala** and the **hippocampus**
- The surgeon will put a small metal plate inside your skull to hold together the gap made by the operation. The plate will be fixed using tiny screws
- Your skin will then be sealed with stitches and covered with a dressing.

Your surgeon will tell you whether surgery is safe for you. This depends on where in your brain your seizures are coming from and which side they are coming from.

Sometimes only the small parts inside the temporal lobe (amygdala and hippocampus) are removed and the outer layer of the lobe is left alone. This is called an **amygdalohippocampectomy**.

If there's a damaged area in your brain (such as a tumour or scar) that seems to be causing your seizures, your surgeon may only remove that. That operation is called a **lesionectomy**. (A lesion is tissue that has been damaged, by an injury for example.)

Surgery to remove part of your brain is a serious operation and isn't suitable for everyone. It may be used for adults or children who: ^[135]

- Have very severe epilepsy that interferes with their lives
- Have tried at least two different drugs over several years without getting any better
- Have seizures that definitely start in one part (the temporal lobe) of the brain, instead of in both sides
- Have complex focal seizures that are definitely because of epilepsy
- Are fit, healthy and prepared to put up with a lot of tests that might show they're not suitable for surgery.

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For those people, having surgery may be better than staying on drugs. This is because drugs can have bad side effects that affect your day-to-day life. ^[136]

The National Institute for Health and Care Excellence (NICE), the government body that decides which treatments should be available on the NHS, says that doctors should offer more people the chance of surgery. ^[15] It's not suitable for everyone, but some people with bad epilepsy could be missing out. NICE also says that all young people whose epilepsy is not controlled by drugs should get an appointment at a specialist centre where surgery is available. Those who want surgery and are suitable for it should be offered the chance.

People who are going to have epilepsy surgery may have several tests first. Sometimes, electrodes have to be implanted in a separate operation to locate seizure sites deep in the brain. These tests can take days or even weeks to complete. To learn more, see [Tests before epilepsy surgery](#) .

How can it help?

Most people who have surgery for epilepsy do well. Very few get worse.

In one study: ^[136] ^[138]

- Nearly 6 in 10 people with temporal lobe epilepsy had no more seizures a year after surgery
- But some people still had auras (warning signs before a seizure starts). About 4 in the same 10 people had neither seizures or auras after a year
- Less than 1 in 10 people with temporal lobe epilepsy who were treated only with drugs were free of seizures, auras, or both
- People who had surgery had a better quality of life than people who were treated only with drugs.

Researchers have also looked at how well people do several years after their surgery. Studies have found that after five or more years: ^[139] ^[140]

- More than 6 in 10 people are seizure-free
- More than 1 in 10 no longer need to take epilepsy drugs
- 5 in 10 are able to take only one drug.

These studies looked at people who had some of the surface and parts of the inside of one of their temporal lobes removed.

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There hasn't been any good research on surgery that removes less of the lobe (just the two parts called the amygdala and the hippocampus). But doctors agree that it is also likely to stop or reduce seizures.

Also, there hasn't been any good research on surgery on only lesions (a lesionectomy). Lesions are damaged areas of the brain, such as tumours or scars. So we can't say for certain if it reduces seizures.

Your seizures may get worse straight after surgery, but this usually doesn't last. It can take as long as a year for your symptoms to settle down and for you to know for certain whether surgery has worked. You will need to keep taking your drugs for several months after your operation. If you do not have any more seizures, you can gradually stop taking epilepsy drugs.

For some people, surgery stops them having so many seizures, but it doesn't stop them having seizures altogether. If you are still having seizures, you may need to stay on medication.

How does it work?

If the operation removes the part of your brain where abnormal electrical activity begins, this should stop the seizures. However, it may not work if your seizures start somewhere else.

Can it be harmful?

All operations have risks, and your surgeon should talk to you about the risks of this operation before you have it. The problems that may happen are called complications. It's difficult to say how often problems happen with epilepsy surgery because there isn't enough good research to tell us. It's important to talk to your doctor about how often problems happen in your hospital. Here's a list of the problems that can happen if you have brain surgery for epilepsy.

- You may **lose your sense of smell**. However, after a year, your sense of smell may come back because another part of your brain has taken over this job.
- You may **get blind spots** in your vision. In one study, about half of the people who'd had epilepsy surgery had this problem. ^[138] If this is very bad, you may not be able to drive.
- You may **get depressed**. This happens to about 1 in 10 people, even if surgery has worked. It usually gets better with time. Doctors are not certain that surgery causes depression, because in studies, people who take epilepsy drugs but haven't had surgery also get depression. ^[138]
- Your **IQ may fall** straight after surgery for epilepsy. (IQ stands for intelligence quotient. It is a scale used to rate a person's intelligence.) But after a few months,

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your IQ may be higher than it was before your operation. Fewer than 1 in 10 people have their IQ affected by this surgery.^[141]

- Your **memory may be affected**.^[138] This is because your temporal lobes control memory. You may not be able to remember certain words or recognise people's faces. Memory problems after epilepsy surgery may make it hard to learn new things, but it is rare for surgery to affect your memory of things in the past.
- You may have **bleeding in your brain** or have a **stroke**. This side effect can be very serious, but it's rare. It's also possible to get an infection in your wound.^[138]

Some of the complications may seem fairly minor compared with your seizures. And many side effects change as your brain recovers from the operation. Some parts of your brain may take over the jobs of the parts that have been removed.

However, it is possible, though rare, to die because of epilepsy surgery. Also, about 2 in 100 people have permanent nerve damage, which can affect how you move.

How good is the research on an operation to remove a small part of your brain?

There's not much research on an operation (called a temporal lobectomy) to remove a small part of your brain. However, most experts agree that it can help people who have very bad seizures that cannot be controlled with medication.

We found one summary of the research (called a **systematic review**) on temporal lobe surgery for epilepsy.^[142] The summary found one study (a **randomised controlled trial**) involving 80 people.^[143] This study looked at the number of people who were free of seizures one year after their operation.

Some of the people in the study had the surgery and some took epilepsy drugs.

After about one year around 6 in 10 were seizure-free. Some of these people had auras (warning signs before a seizure starts) and about 4 in 10 of the same people were free of seizures and didn't have an aura. People who had surgery continued to take their epilepsy drugs after their operation.

Two summaries of the research also looked at how well people did five or more years after their surgery.^[139] They found that more than 6 in 10 people were seizure-free, more than 1 in 10 no longer needed to take epilepsy drugs, and 5 in 10 were able to take only one drug.

We didn't find any good research on surgery to remove only small parts (the amygdala and hippocampus) from inside the temporal lobe (an operation called an **amygdalohippocampectomy**) So, we don't know for certain how well this operation works for people with temporal lobe epilepsy.

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We also don't know if only removing a lesion (a damaged area, such as a scar or a tumour) in the temporal lobe will reduce or stop seizures. (That operation is called a **lesionectomy**). We found one summary of the research (a systematic review). The summary looked at eight studies involving 131 people with temporal lobe epilepsy. It found that more than 6 in 10 people were free of severe seizures one year after surgery. However, the studies were very small and not very reliable. This means we can't say for certain how well the operation works. ^[144]

Nerve stimulation

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[How good is the research on nerve stimulation?](#)

This information is for people who have epilepsy. It tells you about nerve stimulation, a treatment used for epilepsy in addition to drugs. It is based on the best and most up-to-date research.

Does it work?

Probably. If drug treatments aren't helping you, your doctor may recommend vagus nerve stimulation. But it isn't used very often in the UK.

What is it?

This treatment uses an electrical device to stimulate a nerve in your neck called the vagus nerve. Pulses of energy prevent the electrical activity in your brain that leads to seizures.

Vagus nerve stimulation is an extra (add-on) treatment for epilepsy. If you have it, you do not stop taking your epilepsy drugs.

This treatment isn't used very often in the UK, partly because it's recommended only if you can't have [an operation to remove a small part of your brain](#) . ^[15]

Here's how it works. ^[15]

- A surgeon puts a battery (about the size of a small tape measure or pocket watch) under your skin in the upper-left part of your chest. A wire is placed under your skin, connecting the battery to the vagus nerve in the left side of your neck. The operation takes one to two hours. You will probably have a **general anaesthetic** .
- Over the next few days, your doctor will program the device to stimulate your vagus nerve at regular intervals (for example, for 30 seconds every five minutes). Regular stimulation can calm down the over-excited cells in your brain that cause seizures.

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- If a seizure does start, you can activate the device by swiping a magnet over it. This might stop the seizure getting worse. You can wear the magnet on your wrist like a watch, or clip it to your belt like a mobile phone. By activating the device, some people find that they can stop their seizures, shorten them, make them less severe or recover more quickly afterwards. Other people say that activating the device has little or no effect on their seizures.
- The battery lasts three to five years and can be replaced under **local anaesthetic** .

The National Institute for Health and Care Excellence (NICE), the government body that decides which treatments are available on the NHS, says that vagus nerve stimulation can be used for children and adults whose seizures are not controlled with drugs and who cannot have surgery. ^[15] ^[145]

How can it help?

Vagus nerve stimulation can reduce the number of seizures people have, and can sometimes reduce how long they last. ^[146] The treatment is unlikely to stop seizures completely.

If vagus nerve stimulation works for you, you may be able to reduce the number of drugs you take, or their doses. This can be particularly helpful if you're getting side effects from these drugs. But we don't know yet whether vagus nerve stimulation works for seizures other than focal seizures. (To learn more about seizures, see [What are the symptoms of epilepsy?](#))

Studies show that about 1 in 4 people had half as many seizures after they started using vagus nerve stimulation. ^[147]

How does it work?

If you or your child has epilepsy, the normal electrical activity in the brain gets disturbed from time to time. This leads to seizures. This treatment uses an electrical device to stimulate a nerve in your neck called the vagus nerve. Pulses of energy prevent the electrical activity in your brain that leads to seizures.

Can it be harmful?

The main side effects of vagus nerve stimulation are a hoarse voice, a cough, pain, breathlessness and tingling in your neck. ^[146] Also, all operations (and all general anaesthetics) carry risks. The operation to put in the device can damage your vagus nerve or cause bleeding.

How good is the research on nerve stimulation?

We found one summary (a **systematic review**) of all the best research on vagus nerve stimulation in adults and children. It found good evidence that: ^[146]

Epilepsy

- Vagus nerve stimulation can reduce the number of seizures people have, and can sometimes reduce how long seizures last
- The treatment is unlikely to stop seizures completely.

We don't know yet whether vagus nerve stimulation works for seizures other than focal seizures.

Education programmes

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[How good is the research on education programmes?](#)

This information is for people who have epilepsy. It tells you about education programmes that can help you understand your condition. It is based on the best and most up-to-date research.

Do they work?

Probably. If you attend an education programme, it can help you understand your condition better and teach you ways to cope and get the most out of your treatment. It may also help reduce the number of seizures you get.

After attending an education programme, children with epilepsy often say they know more about their condition and about managing their seizures. Many also find it easier to mix with other children and take part in sport and social activities.

What are they?

There are lots of different ways to learn about epilepsy. One way is to attend an epilepsy education programme. Different types of programmes cover different things. But the main aim is to teach you the facts about epilepsy and how these facts apply to you.

Education programmes are often held over a weekend at a medical centre and are usually run by doctors or nurses. Some programmes also involve patient support groups.^[148]

There are two parts to most education programmes.

Learning about your epilepsy

The aim is to help you make sense of your condition.

- You may be taught what's going on in your body during a seizure.
- You may also learn how drug treatments work, how best to take them and what will happen if you don't take your drugs properly.

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- You may talk about the impact of epilepsy on your life and the changes you need to make to live safely.
- You may learn how not to do things that can trigger a seizure, such as getting too tired or too stressed.
- You may practise ways to tell people about your condition and how to deal with their reactions. ^[148] ^[149]

Learning how to stay positive, control your condition and get support from your friends and family

Seizures happen out of the blue, and it can feel as if you don't have any control over your life. You may worry about when your next seizure could happen and be afraid of hurting yourself. Also, some people say they feel different or abnormal. They hide their condition because they worry about what people will think of them.

In an education programme, you will take control of how you think and feel about your epilepsy and learn skills to help you cope. ^[148]

Types of programmes

The way you're taught will vary from programme to programme. ^[148] ^[149] ^[150]

- The programme may involve role-playing. For example, you may rehearse telling others you have epilepsy.
- You may watch videos and listen to presentations.
- You may take part in group discussions where you can share your thoughts with other people who have epilepsy.
- Children may be taught skills to help them deal with teasing or bullying from other children.

How can they help?

Here's what the research on educational programmes tells us. ^[149] ^[150] ^[151] ^[152] ^[153]

- People who go to these programmes may have fewer seizures for six months afterwards than people who don't.
- After an education programme, you are likely to understand more about epilepsy and how it can affect your life. This can make it easier to explain your epilepsy to others.

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- If you understand how your epilepsy drugs work and what might happen if you don't take them, you are more likely to take your treatment in the right way.
- You may feel less scared of seizures if you understand what's happening to your body during a seizure and how to spot warning signs.
- You can learn ways of living with epilepsy that stop it interfering with your life too much. For example, you may learn about all the activities and jobs you can still do.
- You can learn to spot things that may trigger a seizure. To learn more, see [Things that trigger seizures](#) . If you know your triggers, you can try to avoid them. This may make you feel more in control of your condition.
- Education programmes can help children learn what epilepsy is and how it might affect them. These programmes can also get rid of any false ideas children have about their condition. Children say they feel more positive and confident once they know the facts, and this helps them to do better at school and in sport.
- If parents are involved in the programme, they may feel less anxious once they have heard how to deal with seizures and learned about all the activities their child can still do. ^[151]

How do they work?

If you know the facts about epilepsy and learn to adjust to it, you're more likely to feel in control. This may limit the effect epilepsy has on your life. If you know what your trigger factors are, you can try to avoid them. And if you know more about how your drugs work, you may remember to take them. Both these things can mean fewer seizures.

Can they be harmful?

It's unlikely that education programmes can be harmful, although the studies don't specifically check this. ^[154]

How good is the research on education programmes?

There is some research on education programs for people with epilepsy but we need more studies that look at whether learning about epilepsy can cut down the number of seizures you have. We found one summary (called a [systematic review](#)) of four studies. ^{[155] [156] [157] [158] [159]} People in the studies were taking drugs for their epilepsy.

One of the studies involved 242 adults. Some went on an educational program for two days. The rest were held on a waiting list for the program instead. Over the next six months those who were at the program had fewer seizures. They also:

- Knew more about their epilepsy

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- Coped with it better. ^[158]

All three other studies in the review also found that people who went to educational programs were more likely to understand epilepsy more and cope with it better. ^[156] ^[157]

^[159] One study found that those who were on the program were more likely to take their drugs properly. ^[156] In another study involving 252 children, those who were at the education program said they did better at school, took part in more sport and found it easier to mix with other children. ^[157]

Biofeedback

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[How good is the research on biofeedback?](#)

This information is for people who have epilepsy. It tells you about biofeedback, a treatment used for epilepsy in addition to drugs.

Does it work?

We don't know if biofeedback will help control your seizures. There's no reliable research on this treatment. ^[15] ^[152]

What is it?

Biofeedback is based on the theory that you can take control of some of the things that your body normally does automatically. ^[160]

If you have epilepsy, the nerve cells in your brain can get over-excited. They produce electrical signals faster than usual and in bursts. This surge in activity stops your brain working properly. Your body gets scrambled messages telling it what to do. The result is a seizure. (To learn more, see [What is epilepsy?](#))

Biofeedback teaches you to control your brain's activity in the hope that you can stop a seizure. It's used in addition to epilepsy drugs, not instead of them.

Here's what happens when you have biofeedback.

- During biofeedback, you wear a device that measures the activity in your brain. The activity shows up as a series of wavy lines (brain waves) on a computer. (This is called an electroencephalogram, or EEG.)
- The computer beeps or flashes when your brain is making normal waves. (This is the feedback part of biofeedback.)

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- After a series of sessions, your brain may start to recognise these normal waves and associate them with the lights or sounds.
- You'll then learn to use the cues from the lights or beeps to **train your brain to create the normal brain waves**. The idea is that your brain will then remember these normal waves and generate them when you feel a seizure coming on.

It can take quite a long time to learn biofeedback techniques. In the study we looked at, people learning biofeedback had 30-minute sessions, three times a week for six weeks.

Biofeedback is usually used along with an epilepsy drug. It may be useful for:

- People who still have seizures despite treatment with drugs
- People who want to cut their drug dose (this may lower their risk of side effects).

The National Institute for Health and Care Excellence (NICE), the government organisation that decides what treatments should be available on the NHS, says that biofeedback can be used for adults whose seizures are not controlled with drugs. Biofeedback is used together with the treatment you were having before. **You do not stop taking your drugs.**

[15]

How can it help?

We don't know if biofeedback will help control your seizures. The research isn't good enough to say either way. [152]

How does it work?

Some people can stop a seizure once they feel it coming on. Studies have described people who fight off a seizure by walking around and focusing on staying alert, or by hitting a part of their body that begins to move. This means they are controlling the electrical activity in their brains (they are changing the abnormal pattern into a normal one).

Biofeedback is based on the principle that you can teach people to generate normal brain waves to override the abnormal waves created during a seizure. So far, though, the research doesn't support this theory.

Can it be harmful?

Biofeedback is unlikely to be harmful, although the research we've looked at doesn't specifically check this. [160]

How good is the research on biofeedback?

There is very little research on biofeedback for people with epilepsy. So far, the studies have involved too few people, so we can't draw any firm conclusions from them.

We found one summary of the research (called a [systematic review](#)) that looked at one small study (a [randomised controlled trial](#)) involving 24 people with epilepsy and one other study involving 18 people who had galvanic skin responses biofeedback. ^[155] ^[161]

^[162] Both studies found that biofeedback helped to reduce the number of seizures people had. But the studies were very small and they were also organized in a way that makes it difficult to make sure the results were reliable. We need more research to know how useful biofeedback is for people with epilepsy.

Cognitive behaviour therapy

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on cognitive behaviour therapy?](#)

This information is for people who have epilepsy. It tells you about cognitive behaviour therapy, a treatment used for epilepsy in addition to drugs. It is based on the best and most up-to-date research.

Does it work?

We don't know if cognitive behaviour therapy will help you control your seizures because it hasn't been studied enough.

When used for other problems like anxiety or depression, this therapy can help people think more positively about themselves and cope better with everyday life. But there hasn't been enough research to know whether it helps people with epilepsy. ^[152]

If you have epilepsy and are also depressed, cognitive behaviour therapy may help ease your depression.

What is it?

Cognitive behaviour therapy is a type of [psychotherapy](#) or talking treatment. You talk about your problems with a specially trained therapist every week for several months. Your therapist could be a [psychologist](#), a [psychiatrist](#), a [psychiatric nurse](#), a [psychotherapist](#) or a GP.

Your doctor might recommend cognitive behaviour therapy on top of your usual drug treatments. It doesn't replace your medication.

Epilepsy

The goal is to help you think more positively about yourself and your condition. ^[163] ^[164]
^[165]

Knowing you have epilepsy can cause unhelpful thoughts. You may:

- Fear having a seizure
- Worry about what people think of you
- Feel different from other people and focus too much on the things you can't do
- Build up a set of false beliefs about your condition. It can be easy to blame your epilepsy for everything that doesn't go well in your life.

Because of these fears and worries, your epilepsy may stop you enjoying your day-to-day life, and it may stop you making friends and starting relationships. ^[166]

Cognitive behaviour therapy teaches you how to recognise and control these negative thoughts, feelings and behaviours, and replace them with good ones. ^[166]

This therapy is also used to help people who have [depression](#) or [anxiety](#) . Both of these conditions are common among people with epilepsy. About 1 in 5 people with epilepsy also have anxiety, and about 1 in 10 have depression. ^[166] ^[167]

The National Institute for Health and Care Excellence (NICE), the government organisation that decides what treatments should be available on the NHS, says that cognitive therapy can be used for people whose seizures are not controlled with drugs. Cognitive therapy is added to your drug treatment. **You do not stop taking your drugs.** ^[15]

To learn more about this treatment, see [More about cognitive behaviour therapy](#) .

How can it help?

There's not enough good research to say if cognitive behaviour therapy can help people with epilepsy. ^[152]

If you have epilepsy and are also depressed, then this therapy may help ease your symptoms of depression. (See [What are the symptoms of depression?](#)) But too few studies have been done to say for certain.

How does it work?

If you have epilepsy, you may have built up a negative way of thinking and behaving. Cognitive behaviour therapy helps you think and behave positively and manage your emotions. In theory, this should give you some control over your seizures, or at least stop them spoiling your day-to-day life. But, so far, the research doesn't support this theory.

Can it be harmful?

Unlike drugs, cognitive behaviour therapy doesn't cause side effects. We found no reports of people being harmed by this therapy.

How good is the research on cognitive behaviour therapy?

There isn't any evidence that cognitive behaviour therapy can help you to either control your seizures or adjust to life with epilepsy. We found one summary of the research (called a [systematic review](#)) that looked at one small study (a [randomised controlled trial](#)) that involved 27 people with epilepsy. ^[155] ^[171]

Some were given cognitive behaviour therapy (they had a two-hour group session once a week for eight weeks) and some weren't.

The study found that people who had cognitive behaviour therapy:

- Didn't have fewer seizures after their treatment
- Didn't appear to cope with their condition any better.

We also found another study that involved 15 people with epilepsy and depression. ^[172] People who had two-hour therapy sessions every week for six weeks were less likely to feel depressed or anxious. Another study looked at 30 teenagers who had epilepsy and were at high risk of getting depression. ^[173] It found that those who had cognitive behaviour therapy were less likely to get depression than those who just had usual epilepsy treatment and counselling.

But, these studies were very small and they were also organised in a way that makes it difficult to be sure that the results were reliable.

Family counselling

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on family counselling?](#)

This information is for people who have epilepsy. It tells you about family counselling, a treatment used to help families cope with epilepsy. It is based on the best and most up-to-date research.

Does it work?

We don't know if family counselling can help control your seizures because there is no good research on this treatment. Family counselling may help people adjust to having someone with epilepsy in the family, but there isn't enough research to say for certain.

Epilepsy

What is it?

In family counselling, all members of a family see a therapist. They explore how a change in one family member can affect the whole family. ^[166]

When children have epilepsy, how well they cope often depends on how well their family copes. Families need to live with a person's seizures without blaming or resenting that person.

Families can be a great source of support, but they can also cause problems. Some parents are too protective, which can make the child with epilepsy overly dependent. Other children in the family may feel left out.

Sometimes family problems have been developing for so long that it is hard for family members to see them or understand why they are happening. A counsellor can help family members:

- Understand how their family works as a unit
- Recognise and deal with any problems.

Because the problems you have are unique to your family, your counselling will be tailor-made to meet your needs. Each family member may have sessions with the therapist alone. You may also see the therapist together to find out how you all communicate with each other.

How can it help?

Family counselling seems to help families adjust to life with epilepsy. But the research on this is not very reliable.

How does it work?

Some people with epilepsy find that their illness affects different parts of their life, such as their home life, relationships and work. For example, some people find it hard to get or keep a job they like. ^[174]

Having epilepsy can affect not only you, but also your family. The idea behind family counselling is that some problems are best handled when your whole family is involved.

Can it be harmful?

It's unlikely that family counselling is harmful, although the research does not specifically check this.

How good is the research on family counselling?

There are no reliable studies that look at whether family counselling works for people with epilepsy.

Epilepsy

We found one small study (a [randomised controlled trial](#)) of 36 adults with epilepsy. All of them found it difficult to hold down a job. ^[174] The study compared people who had full family counselling with people who had a single session or no counselling.

Researchers found that people who had full family counselling were more likely to:

- Feel accepted by their family
- Cope with the emotional side of having epilepsy
- Adjust their lives to deal with having seizures
- Feel more positive about themselves and how others see them.

However, this study was very small, so the results are unreliable. It became even smaller when nearly one-quarter of the people taking part dropped out before the study finished.

Relaxation therapy

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on relaxation therapy?](#)

This information is for people who have epilepsy. It tells you about relaxation therapy, a treatment used for epilepsy in addition to drugs. It is based on the best and most up-to-date research.

Does it work?

We don't know if relaxation will help control your seizures. There hasn't been enough research to give a clear answer. But we do know that if epilepsy makes you anxious, relaxation therapy might help you feel calmer and worry less.

What is it?

Relaxation is a technique to calm your mind by releasing the tension in your body and relaxing your muscles. The idea is that once your muscles are relaxed, your mind relaxes too. You feel calmer and less worked up.

Your doctor may suggest you try relaxation techniques to help prevent stress and anxiety, both of which can trigger seizures. The idea is that once you learn these techniques, you can relax whenever you feel stressed and prevent a seizure happening. ^[175] ^[166]

You have relaxation therapy on top of your usual drug treatments. It doesn't replace your medication.

Epilepsy

If you have relaxation therapy, you normally have a session with a therapist once a week.

- You'll learn to relax your body and your mind.
- You'll learn how to relax in difficult situations. For example, if you don't like telling people you have epilepsy, you may learn to relax as you do this.

You should find a quiet spot and time to yourself to practise your exercises. You will need to practise at least once a day.

Your therapist may also help you look for things that trigger your seizures and for signs that a seizure is coming on. For example: ^[176]

- You may notice changes in the way you feel, move or behave before a seizure
- Your seizures may tend to happen at certain times of the day, or in particular places or situations.

Your therapist will then spend a few sessions helping you to imagine yourself in a situation where a seizure is likely. The therapist will teach you how to switch to a relaxed state. ^[176]

Once you have learned to relax, you can do this each time you find yourself in a situation where a seizure is likely. ^[176] We're not certain whether this can actually stop a seizure happening.

The National Institute for Health and Care Excellence (NICE), the government body that advises doctors about what treatments should be available on the NHS, says that relaxation therapy can be used for adults and children whose seizures are not controlled with drugs. You have relaxation therapy as well as continuing with the drug treatment you had before. **You do not stop taking your drugs.** ^[15]

How can it help?

We don't know for certain if relaxation therapy can help control your seizures. There's not enough research to give a clear answer. ^[152] There is some evidence that relaxation may help you feel calmer. But we don't know if it helps everyone. ^{[176] [177] [178]}

How does it work?

Relaxation therapy for epilepsy is based on the idea that stress and anxiety can trigger seizures. So if you learn to control your anxiety and stress through relaxation, you may have fewer seizures. Also, if you find yourself in a stressful situation and you feel a seizure coming on, you can use relaxation techniques to try to stop it. ^[176]

Can it be harmful?

No. It's unlikely that relaxation will harm you, although the studies do not specifically check this.

How good is the research on relaxation therapy?

There are no good studies showing that relaxation therapy can help control seizures.^[155] We found one summary of research (called a [systematic review](#)) that looked at the results of three studies on relaxation therapy.^{[155] [179] [180] [181]} These studies included a total of 50 people who were taking drug treatment but still had seizures. Some of the people learned relaxation techniques and some didn't. All the studies found that the people who learned to relax had fewer seizures.

These studies look promising but they were small and they were also organized in a way that makes it difficult to make sure the results were reliable.

Relaxation plus behaviour modification therapy

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on relaxation plus behaviour modification therapy?](#)

This information is for people who have epilepsy. It tells you about relaxation plus behaviour modification therapy, a treatment used for epilepsy in addition to drugs. It is based on the best and most up-to-date research.

Does it work?

We don't know if relaxation plus behaviour modification therapy will help control your seizures. The research on this treatment isn't very good.

There is some evidence that this treatment may help you if:

- You're stressed or anxious
- You're finding it hard to adjust to having epilepsy (for example, it's affecting your relationships).^[182]

What is it?

Relaxation plus behaviour modification therapy is used for both children and adults. The idea is that combining the two treatments might work better than having just one of them.

Your doctor might recommend these treatments on top of your usual drugs. They don't replace your medication.

Epilepsy

Here's an overview of each treatment.

Relaxation therapy

Relaxation is a technique to calm your mind by releasing the tension in your body and relaxing your muscles. The idea is that once your muscles are relaxed, your mind relaxes too. You feel calmer and less worked up.

People with epilepsy are sometimes advised to use relaxation techniques to help prevent stress and anxiety, both of which can trigger seizures. Once you learn these techniques, you can relax whenever you feel stressed and prevent a seizure happening. ^[175] ^[166]

If you have relaxation therapy, you normally have a session with a therapist once a week.

- You'll learn to relax your body and your mind.
- You'll learn how to relax in difficult situations. For example, if you don't like telling people you have epilepsy, you may learn to relax as you do this.

You should find a quiet spot and time to yourself to practise your exercises. You will need to practise at least once a day.

Your therapist may also help you look for things that trigger your seizures and for signs that a seizure is coming on. For example: ^[183]

- You may notice changes in the way you feel, move or behave just before a seizure
- Your seizures may tend to happen at certain times of the day, or in certain places or situations.

Your therapist will then spend a few sessions helping you to imagine yourself in a situation where a seizure is likely. The therapist will teach you how to switch to a relaxed state. ^[183]

Once you have learned to relax, you can do this each time you feel a seizure coming on. ^[183] We don't know whether this can actually stop a seizure happening.

Behaviour modification therapy

With this treatment, you work with a therapist to learn ways to change how you behave. The goal is to help you live a full life without ignoring that you have epilepsy or letting it interfere too much with what you do.

There are many different techniques for changing behaviour. Here are a few. Your therapist will teach you the ones you need.

Epilepsy

- Slowly start doing the things that you have always avoided. This could be talking to certain people or going to particular places. Start small and build up gradually. This is called graded exposure.
- Learn to be more confident and to recognise that epilepsy is a condition you have; it's not who you are.
- Set targets for things you want to do, and plan how you are going to reach them in small steps.

How can it help?

There is no good evidence that relaxation plus behaviour modification therapy helps to control seizures. ^[182] ^[183] ^[152]

But there is evidence that this combined treatment can make you feel less anxious. ^[152] It can also help you adjust to having epilepsy. For example, if your epilepsy is affecting your home life, work or relationships, relaxation plus behaviour modification may help you cope with these problems.

How does it work?

Relaxation therapy

Relaxation therapy for epilepsy is based on the idea that stress and anxiety can trigger seizures. So if you learn to control your anxiety and stress through relaxation, you may have fewer seizures. Also, if you find yourself in a stressful situation and you feel a seizure coming on, you can use relaxation techniques to try to stop it.

Behaviour modification therapy

If you have epilepsy, you may have built up a way of behaving that is very negative. The goal of behaviour modification therapy is to help you learn to behave positively. This may help you gain some control over your seizures and reduce the impact that epilepsy has on your day-to-day life.

But, so far, the research does not show that relaxation plus behaviour modification therapy helps to control seizures.

Can it be harmful?

We found no reports of harm from relaxation plus behaviour modification therapy.

How good is the research on relaxation plus behaviour modification therapy?

We found one summary of the research (a [systematic review](#)) that looked at the results of two small studies ([randomised controlled trials](#)) on relaxation and behaviour modification therapy. [\[155\]](#) [\[184\]](#) [\[185\]](#)

The first study looked at 18 children between the ages of 7 and 17. The children were divided into three groups. [\[184\]](#)

- Six children were treated with relaxation plus behavioural modification therapy.
- Six children saw a [psychologist](#) for general education about epilepsy.
- Six children received neither of these treatments.

The children who received relaxation plus behavioural modification therapy seemed to get fewer seizures than the other children did.

We can't be sure about the results from the second study.

These studies were very small and they were also organized in a way that makes it difficult to make sure the results were reliable.

Yoga

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on yoga?](#)

This information is for people who have epilepsy. It tells you about yoga, a treatment used for epilepsy. It is based on the best and most up-to-date research.

Does it work?

We don't know. If you find that stress triggers your seizures, then yoga may help you manage your stress and feel calmer and more relaxed. But we don't know if you're less likely to have a seizure if you do yoga.

What is it?

Yoga is an ancient spiritual practice from India. The yoga done by most people in the West focuses on stretching, breathing and deep relaxation or meditation. The word yoga has a number of different meanings, such as 'controlling the mind' and 'to unite or connect' the mind and body. The aim of yoga is to keep your mind and body healthy. [\[186\]](#)

Epilepsy

The use of yoga for epilepsy is based on the idea that you may have some control over your seizures. Seizures are sometimes triggered by the way you think, feel or behave. Many people say they are more likely to have seizures when they are very tense and stressed.^[187] And there's some evidence that yoga can reduce stress.^[186]

There are several different types of yoga, such as **Hatha yoga** and **Raja yoga**. Some focus on relaxation, while others are more energetic and focus on flexibility.

The type of yoga that has been studied for epilepsy is called **Sahaja yoga**. This is a simple form of meditation where you learn to control your breathing and alter your level of awareness. Each session lasted about 20 minutes.

- You **sit in a relaxed position** with your hands in front of you, palms turned upward and your eyes closed.
- To begin, you **repeat a chosen word** (or mantra) to yourself for several minutes. This helps to focus your attention and clear your mind.
- You then **sit silently and think about your breathing** to clear your mind of thoughts. If you do think of something, you recognise it but don't get caught up in the thought.
- The goal is a state of **thoughtless awareness**, where you feel deeply relaxed.

People who practise Sahaja yoga believe that it awakens energy in their body and that this can correct physical, mental and emotional imbalances.^[186] ^[187] ^[188]

How can it help?

If you have difficulty coping with stress, then practising yoga may help you feel calm and relaxed.

But we don't know if yoga can help you control your seizures, even if it helps reduce stress. There's not enough research on this.^[188] ^[189]

How does it work?

In theory, yoga may help people whose seizures are triggered by stress. Stress itself doesn't cause seizures. But being unable to cope with stress may overexcite the nerve cells in parts of the brain, and this can lead to a seizure.^[186]

If yoga helps you relax and manage stress, then this may remove a trigger for seizures and prevent them from happening. But, so far, there's no research to support this.^[186]

Yoga has also been found to affect the electrical activity in your brain, and this might help to reduce seizures.^[189]

Can it be harmful?

It's very unlikely that yoga will cause you any harm, although there aren't any studies that check for this. But:

- There have been some reports that meditating for long periods can trigger seizures in people with epilepsy ^[190]
- Types of yoga that put strain on your neck can be risky. They may damage the blood vessels in your neck that supply blood to your brain. And this can cause a **stroke** . ^[190]

Another possible downside is that yoga classes can be quite expensive, though some gyms offer free classes. Also, it can be difficult to find time to sit and meditate.

How good is the research on yoga?

There is very little evidence to show whether yoga helps control seizures for people with epilepsy. The studies had too few people in them to tell us for sure whether yoga works. We found one summary of the research (called a **systematic review**). ^[191] It looked at five studies, but only one of them was good quality. This was a small study involving 32 people with epilepsy. ^[192]

In the study, some people did yoga, some people did exercises that looked like yoga but weren't (as a **placebo**), and some didn't do anything. The study found that those people who did yoga were much less likely to have a seizure. People who did yoga were more likely not to have any seizures than those who didn't do yoga.

- Of the people doing yoga each day, about 4 in 10 were seizure-free for six months. None of the people who didn't do yoga was seizure-free for six months.
- There was very little change in either the number or the length of seizures among the people who did pretend yoga or no yoga.

This study looks promising but it was very small and it was also organized in a way that makes it difficult to make sure the results were reliable. ^[191]

Ketogenic diet

In this section

[The diet](#)

[The research](#)

[Problems with the diet](#)

This information is for people who have epilepsy. It tells you about the ketogenic diet, a treatment sometimes used for epilepsy in addition to drugs.

Epilepsy

We haven't looked at the research on the ketogenic diet in the same detail we have for the other treatments we cover. (To read more, see Our method.) But we've included some information because you may have heard of this treatment or be interested in it.

The research on this treatment is not very good. But some of it suggests that a ketogenic diet can help reduce seizures in some children with poorly controlled epilepsy. ^[3] ^[193]

The diet

This ketogenic diet is **high in fat** and **low in carbohydrate**. Foods that are high in fat include double cream, cheese and avocado pears. Foods that contain a lot of carbohydrate include bread, rice, and potatoes.

A ketogenic diet is quite strict, so children and their parents often find it hard to stick to. ^[194] The amounts of food and liquid at each meal have to be carefully worked out and weighed for each person. Each meal has about four times as much fat as carbohydrate.

If you want to try this diet, it should be in addition to epilepsy drugs. It doesn't replace medication.

A child on a ketogenic diet breaks down fat instead of carbohydrate for energy. Normally, our bodies run on energy from glucose. Glucose is a sugar that we get from foods that contain carbohydrate. At the start of the ketogenic diet, children have to go without food for 24 hours. So, they burn up all the stored glucose. With no more glucose to provide energy, the child's body begins to burn stored fat. This process is called **ketosis**.

Most experts say the diet is worth trying when you've tried two or more epilepsy drugs to stop seizures but they haven't worked. It is also worth trying when epilepsy drugs have caused side effects that are interfering with your child's life. ^[3]

The research

There isn't very much research on the ketogenic diet. One study of 150 children whose seizures were poorly controlled by medication found that about 1 in 2 children on the diet had 50 percent less seizures and 1 in 4 of the children had 90 percent less seizures. Some children remained free from seizures after they stopped the ketogenic diet. ^[3]

Doctors don't know why a high-fat diet affects seizures. And they also don't know why it works for some children and not for others. ^[195]

It may take a while for the diet to start working. Doctors often ask parents to try the diet for at least one month, and even as long as two or three, if it's not working at first.

Problems with the diet

Some children get side effects such as **constipation** and **dehydration**. In some cases children may not be able to follow the diet for very long because of these side effects.

Epilepsy

^[193] It's also possible to get stones (made from hard lumps of calcium) in the **kidney** or **gallbladder** .

If your child doesn't follow the diet properly, he or she may not get a balanced diet and this can affect his or her growth. There are some vitamins you can't get from a ketogenic diet, so your child will need to take supplements.

Although the ketogenic diet is high in fat, your child shouldn't gain weight. This is because the diet is low in carbohydrates and calories.

The National Institute for Health and Care Excellence (NICE), the government organisation that decides which treatments should be available on the NHS, says a ketogenic diet should be used **only for children who don't get better with drug treatments.** ^[15] The diet is an extra (an add-on) treatment for your child. **He or she should not stop taking epilepsy drugs.** NICE does not recommend the diet.

Further informations:

The parts of your brain and what they do

Your brain has three main parts:

- The cerebrum (the largest part)
- The brain stem
- The cerebellum.

Each part of your brain has its own special jobs, although the different parts also work together.

Cerebrum

The cerebrum is what most people think of when you mention the brain. It's the largest part of your brain and controls your movement and senses (sight, smell, hearing, touch and taste).

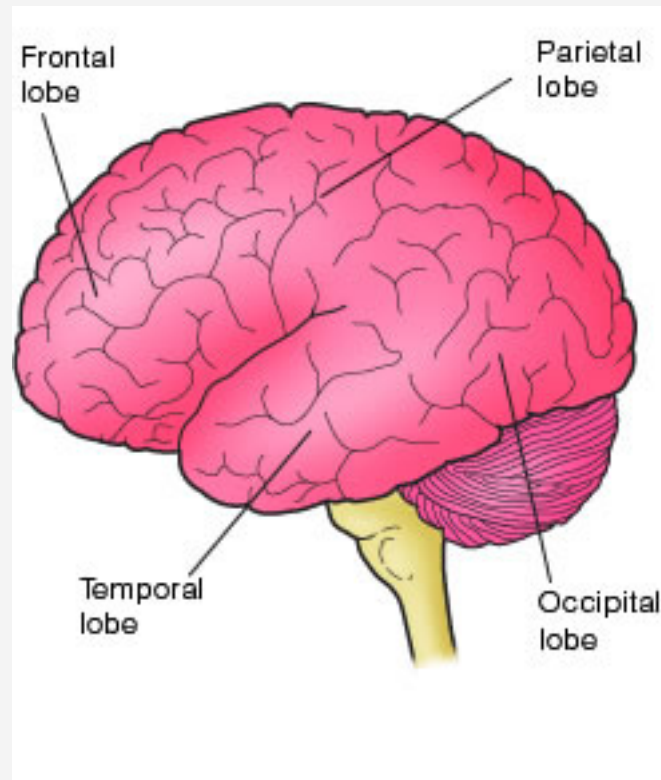
If you or your child has seizures that affect only part of your brain (partial seizures), unusual electrical activity begins in the cerebrum. (To learn about partial seizures, see [What are the symptoms of epilepsy?](#))

The cerebrum is split into two sides by a deep groove. The sides are called the **right and left cerebral hemispheres**. Each of these sides contains matching lobes or regions. And each lobe has its own jobs to do, although lobes may also share some jobs.

Here's a guide.

Epilepsy

Frontal lobe



Each half of your cerebrum is made up of four lobes.

In each hemisphere, the frontal lobe sits just behind your forehead and controls your muscles and movement. It's also involved in your behaviour and emotions.

If a seizure affects this part of your brain:

- Parts of your body may stiffen or move
- Your muscles may jerk and make you fall over.

Temporal lobe

This lobe controls two senses: hearing and smell. It also helps to control emotion, memory, speech and behaviour.

If a seizure affects this part of your brain:

- You may smell strange smells (such as onions being fried) and hear odd sounds that aren't really there
- You may get an odd feeling in your stomach
- Your speech may be slurred

Epilepsy

- You may have changes in your mood and behaviour. For example, you may get déjà vu (when something feels familiar even though it hasn't happened before).

Occipital lobe

This part of your cerebrum controls vision. It interprets what you see.

If a seizure affects this part of your brain:

- You may see things that aren't there, such as balls of colour. Or things may look different to how they really are (for example, rooms may seem a different shape).

Parietal lobe

This lobe sits behind your frontal lobe and in front of your occipital lobe. It helps you feel things like touch, temperature and pain. It also helps you be aware of where your body is and what it is doing.

If a seizure affects this part of your brain:

- You may have tingling feelings in your arms and legs
- Parts of your body may feel numb, especially your arms and legs.

Brain stem

The brain stem is in the lower part of your brain. It connects your brain to your spinal cord (this is the tube of nerves that sits inside your spine).

Your brain stem has many important jobs:

- It keeps your heart beating
- It makes you breathe
- It controls the muscles in your face, tongue and voice box (these are the muscles you use when you swallow food or talk)
- It controls your eye muscles
- It helps to keep you awake (conscious).

Seizures do not start in the brain stem.

Cerebellum

The cerebellum fits between your cerebrum and your brain stem. This part of your brain helps to coordinate your body's movements.

Seizures do not start in the cerebellum.

Things that trigger seizures

Trigger factors are things that set off seizures in some people. They don't cause epilepsy in the first place.

Here are some common triggers. ^[1] ^[3] ^[8]

- Lack of sleep. Many people say they are more likely to have a seizure if they haven't had enough sleep.
- Flickering lights. Some people with epilepsy are sensitive to light (photosensitive). This means that flashing lights or the flickering of televisions, video games, or computer monitors can set off a seizure. Only about 1 in 20 people with epilepsy are affected in this way.
- Fever. Having a **high temperature** can bring on a seizure in young children. This is less likely in adults.
- Your period. Some women find they have more seizures around their period. The seizures tend to happen in the week before or in the first few days of their period. Doctors think the change in **hormones** during this time affects seizures, but they don't know why.
- Stress. Sometimes, seizures happen when people are stressed or anxious. Finding ways to manage stress may help prevent seizures. To learn more, see [What treatments work for epilepsy?](#)
- Skipping doses of your medicine. To control epilepsy, you need a steady level of the right drug in your blood. If you skip a dose, this level can fall, which can trigger a seizure.
- Skipping meals. Not eating regularly or not eating a balanced diet may trigger seizures.
- Loud noise. A sudden, loud noise, such as a door banging or loud music, can trigger a seizure.

Epilepsy

- Drinking too much alcohol. Some people get seizures when they've had a lot of alcohol. This may be due to the effects of alcohol on the brain. Or it may be because of what happens in the body when the alcohol level in the blood drops. Also, drinking too much alcohol often means a late night, a missed dinner and forgotten doses of drugs, all of which can trigger a seizure. We're not sure how much alcohol you can safely drink if you have seizures. For some people, even a small amount can trigger a seizure.

Focal seizures that affect one part of the brain

These seizures are a result of abnormal electrical activity in one part of the brain (a focus).

What symptoms you or your child gets depends on where in the brain the seizure begins and what this part of the brain does. The seizure can affect your movements, senses, behaviour and emotions. But it won't make you lose consciousness. You or your child will be awake and may be able to talk during the seizure. These seizures are usually over in a minute.

Here are the main features of these seizures. [\[1\]](#) [\[7\]](#) [\[12\]](#)

- **Stiffness and twitching.** The seizure often starts by affecting one part of your body, such as your fingers. This area may stiffen and twitch. If your eyes are affected, you may blink rapidly or keep looking from side to side. The stiffness and twitching can sometimes spread to a larger part of your body, such as your hand or arm. The area affected may feel sore after the seizure.
- **Upset senses.** Seizures can have a strange effect on your senses. For example, you or your child may get a strong unpleasant smell, such as burning rubber. You might hear sounds that aren't there and see or feel things that aren't real. Sometimes people imagine that objects or rooms are getting larger or smaller.
- **Mood changes.** You or your child may feel strong emotions, and suddenly laugh, cry or feel angry. Many people feel scared or strangely distant from their surroundings. Some get the sense that the same things have happened before (*déjà vu*). Even though people stay awake during these seizures, they may lose track of the time.
- **Strange sensations.** Seizures can also affect your heart rate, body temperature and other things that the brain controls automatically. You or your child may feel flushed and sweat. Some people feel light-headed and as if they're falling (this is called vertigo). It's common to feel an odd rising sensation in your stomach, and some people also feel sick.

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After the seizure, many people feel weak or numb in a part of their body (often in one side of the face, or one hand or arm).

Sometimes the seizure starts in one area of your brain and spreads to other parts. If this happens, you or your child may have a generalised seizure (often, a [tonic-clonic seizure](#)). A seizure that starts in one part of the brain and spreads is called a **focal seizure evolving to a bilateral convulsive seizure**.^[13]

Tonic-clonic seizures

Tonic-clonic seizures affect the whole brain. These are the main type of seizure for about 1 in 10 people with epilepsy. Doctors used to call these seizures **grand mal seizures**.

Here's how a tonic-clonic seizure usually looks and feels.^{[1] [7] [8]}

- The seizure starts suddenly. Some people get warning signs (such as a funny smell or feeling) in the hours before the seizure, but many don't. (Doctors call these warning signs auras.)
- During the **tonic phase**, most people black out (lose consciousness), and many find it hard to breathe. Their lips and face may turn bluish because they are not getting enough oxygen. They fall over and their muscles tighten. This makes their arms, legs, back and chest very stiff. Sometimes, their back arches, their arms bend at the elbows, and their legs stay very straight. Some people scream or shriek as the tightened muscles in their chest force air out of their body.
- The **clonic phase** begins after about 20 seconds. The person's muscles will try to relax, which makes their body shake rhythmically. It's quite common for people to bite their tongue as their jaws clench. (If you see someone do this, **you should not put anything inside their mouth**.) Their mouth may fill with saliva, and this may froth out. Sometimes, their heart rate and blood pressure will increase, and the pupils of their eyes will become very large.
- As the seizure comes to an end, their muscles begin to relax and become limp. Some people wet themselves as they lose control of their bladder.
- Once all movement has stopped, the person will gradually come round. Many people feel tired, dazed, and confused once the seizure has passed. It can take a few minutes or hours before they feel fully awake. Many people get a headache afterwards and say their muscles feel weak and sore.

Tonic-clonic seizures get their name from the two phases of the seizure. Tonic is a word doctors use to describe muscle tension. Clonic means repetitive tightening of muscles

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in a rhythmic pattern. The tonic phase comes first, followed by the clonic phase. However, some people have just one phase, so they have either a tonic seizure or a clonic seizure.

Focal seizures that spread from one part of the brain

These are the most common type of seizure in adults. They start in one part of your brain (a focus) and then spread to a larger area.

These seizures cause more symptoms than focal seizures that affect one part of your brain. They also affect your consciousness. Most people aren't alert or able to talk during this type of seizure. Afterwards, they may not remember anything about it.

This type of focal seizure can affect any area of your brain, but they often take place in the temporal lobes. You have two temporal lobes, one in each half of your brain. (To learn more, see [The parts of your brain and what they do](#).) The temporal lobes are your brain's smell, speech and hearing centre. They are also linked to other parts of your brain, and help control emotions, memory and behaviour. Changes in the temporal lobes affect the way people feel and what they remember.

Here's how a seizure usually looks and feels when it spreads from one part of your brain. Most people get the same symptoms each time. ^[1] ^[7] ^[12] ^[14]

- **A strange feeling.** Many people get a warning sign (doctors call this an **aura**) before the seizure starts. This might be a rising feeling in their stomach, or a strange smell, taste or sound. People may also get an odd sensation or feeling (such as fear), or déjà vu (a sense that what's going on has happened before). Some people say their body feels tingly.. A person's aura may be the same every time.
- **Lack of awareness.** Most people will be awake but not fully alert or able to communicate normally. Seizures often begin with a blank stare. A person may suddenly stop what he or she is doing and look frozen and unresponsive. Some people may black out totally.
- **Changes in behaviour.** A person's behaviour and emotions may change. Many people make repetitive movements, such as chewing, making faces, or smacking their lips (doctors call these **automatisms**). Others start wandering around or running, or act as though they're afraid or angry. Some people strike out or throw things. And most also ramble or mumble odd words that don't make sense. Some people say they feel uncomfortable and undress or change their clothes.
- **Movement.** Parts of a person's body, often an arm, may become stiff and shaky.

These seizures may last a few minutes. People often feel dazed and confused afterwards, and they have problems talking for several minutes. These seizures affect the part of the

brain that helps control memory, so most people don't remember anything about their seizure.

Absence seizures

Absence seizures affect people's consciousness for a moment. They upset the electrical activity of the whole brain, but the body doesn't jerk and the person doesn't fall over. These seizures start without warning and usually last about 10 seconds or less. They can be brought on by breathing too fast or too deeply (hyperventilation).

Here's how an absence seizure usually looks and feels. ^[1] ^[7] ^[8]

- In this type of seizure, people suddenly stop what they're doing. For a short time, they aren't fully aware of things around them.
- To others, it looks as if the **person's mind is elsewhere**. Many people stare blankly into space for several seconds.
- Some people make a few **small movements**. For example, their eyes may flutter or their hands, arms, or legs may stiffen slightly.
- After a few seconds, the person becomes alert again and carries on with whatever he or she was doing before the seizure started. The person has **no memory of what happened** during the seizure.

These seizures usually begin in childhood (between the ages of 4 and 8) or in the early teenage years. ^[7] They are the main type of seizure in up to 1 in 5 children who have epilepsy. ^[1]

Absence seizures can happen dozens and even hundreds of times a day. But parents often think the child is just daydreaming. The seizures can be strange for children, who have to piece together experiences that have been interrupted by the seizures. Sometimes children with absence seizures are wrongly thought to have attention deficit hyperactivity disorder (ADHD). To learn about this condition, see our section on [ADHD](#).

Sometimes, it can be difficult to tell whether someone is having an absence seizure or a [focal seizure](#). (Focal seizures start in one part of the brain, whereas absence seizures affect the whole brain.) Some doctors assume that children have absence seizures and adults have focal seizures. But, in fact, adults and children can have either type of seizure.

- Absence seizures tend to be shorter than focal seizures, which can last up to a minute. They also start without warning and the person feels back to normal straight away.

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- People who have a focal seizure may have a strange sensation (called an aura) before the seizure starts, and they can feel dazed and confused afterwards.^[8] Also, during a focal seizure, people often make movements over and over, such as patting, chewing or lip-smacking. These movements seem more purposeful than the small movements caused by absence seizures (such as eye-fluttering).

Myoclonic seizures

Myoclonic seizures usually start very suddenly and without warning. Usually, a person's whole body jerks, but sometimes only a part of their body (such as an arm) will be affected. This happens because the seizure affects the part of the brain that makes muscles tighten. A person's body may jerk once or a few times.^[7]

Myoclonic seizures usually only last for a few seconds.^[1]

Atonic seizures

Atonic seizures affect the whole brain. They cause a person to lose awareness of their surroundings. They're most common in people who have a rare type of childhood epilepsy called Lennox-Gastaut syndrome .

Here's how an atonic seizure usually looks and feels.^{[1] [7] [8]}

- Most people who have an atonic seizure **suddenly fall to the ground**. This is because the seizure affects the part of the brain that controls muscle tone. The muscles go limp, and the body becomes unable to stay upright.^[1] But if the seizure is very brief, the only effect may be the person's head dropping forward.
- These things happen without any warning, and the person isn't fully aware of his or her surroundings for several seconds. Their body will not jerk or stiffen with this type of seizure, and most people don't feel dazed afterwards. Atonic seizures are sometimes called **drop attacks**.
- These seizures are serious because people can injure themselves if they fall.^[1] Children who get atonic seizures are often encouraged to wear helmets so they don't hurt their heads.

Epilepsy syndromes

Your doctor may say you or your child has an epilepsy syndrome. This is a set of symptoms that fits a particular pattern.^[15] Knowing which epilepsy syndrome you or your child has can help your doctor decide on the best treatment. It can also help predict how the epilepsy will progress and whether it can be passed on from parent to child.

Children are more likely than adults to have an epilepsy syndrome. About 70 in 100 children with epilepsy have a syndrome.^[16]

To diagnose an epilepsy syndrome, doctors need to find out:^[15]

- When the seizures started
- What the seizures look and feel like
- Whether the person has learning problems
- Why the seizures happen
- What tests show. Tests may include an EEG (electroencephalogram), a CT (computed tomography) scan or an MRI (magnetic resonance imaging) scan. (To learn more about tests, see [Tests for epilepsy](#) .)

But not everyone with epilepsy will be described as having an epilepsy syndrome. Often, people's epilepsy is described by the kind of seizures they have. Here we've described some epilepsy syndromes.

Temporal lobe epilepsy

This is the most common type of epilepsy that causes focal seizures (these affect only part of your brain). It usually begins in childhood. People with this type of epilepsy often get an aura before a seizure. An aura is a warning sign that a seizure is going to happen. It's often a strange feeling or smell. Repeated seizures can affect your memory and make learning difficult, so early treatment is especially important.

Childhood and juvenile absence epilepsy

Childhood absence epilepsy affects children between the ages of 4 and 10. It causes brief absence seizures. The child may stare blankly into space, flutter his or her eyes, or jerk slightly. Juvenile absence epilepsy starts during the teenage years. It causes absence seizures, most often when the person wakes up. It may also cause tonic-clonic seizures (the person falls and passes out) and myoclonic seizures (the person jerks as if being shocked). Both the childhood and juvenile types of absence epilepsy tend to run in families.

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Benign childhood epilepsy

This type of epilepsy begins between the ages of 3 and 13. It causes focal seizures. These affect a small part of the brain. People remain aware of what's going on, but their arms, legs and face may become stiff. Their limbs may twitch, and they may have unusual sensations. The seizures usually happen at night. The cause of this epilepsy is not usually known.

Juvenile myoclonic epilepsy

This form of epilepsy usually starts in the early teenage years. It causes myoclonic seizures (these affect your entire brain and make your body jerk). It may also cause tonic-clonic seizures (these cause the person to fall and pass out). Doctors don't know what causes this type of epilepsy.

Frontal lobe epilepsy

Frontal lobe epilepsy usually causes a cluster of short seizures that start and end suddenly. As the name suggests, the seizures affect only part of the brain: the frontal lobe. The frontal lobe helps control movement, behaviour, and emotions. Symptoms depend on where in the frontal lobe the seizures happen.

Occipital lobe epilepsy

Occipital lobe epilepsy usually begins with rapid eye blinking or other eye-related symptoms (for example, you may see things that aren't really there). As the name suggests, the seizures affect only part of your brain: the occipital lobe. The occipital lobe controls vision and interprets what you see.

Infantile spasms (West's syndrome)

This kind of epilepsy starts in babies less than 6 months old. During the seizure, the baby's upper-body muscles tighten (spasm), and the baby bends and may cry out. This type of epilepsy is more common among children with learning difficulties. It often happens because of brain damage caused by infections or injuries.

Lennox-Gastaut syndrome

This is a severe form of epilepsy that starts early in life. Children with Lennox-Gastaut have several different kinds of seizure and some mental disability. Lennox-Gastaut syndrome can continue to affect people when they're adults.

Sturge-Weber syndrome

This is associated with a deep red birth mark, which is usually on one side of the forehead and may stretch down to the cheek or nose. Seizures usually start at birth or in the first year of life. They are usually focal seizures with jerks on one side of the body. But they can develop into other seizures such as atonic seizures (drop attacks), myoclonic seizures, or infantile spasms. There are often many seizures and they can last a long time. About

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two-thirds of children with Sturge-Weber syndrome also have learning difficulties. They may develop a weakness on one side of their body or have problems with their vision.

Non-epileptic seizures

Non-epileptic seizures can look and feel like seizures caused by epilepsy. But they are not actually the result of abnormal electrical activity in your brain.^[17] To read more, see [What is epilepsy?](#)

There are two main types of non-epileptic seizures: **physiological seizures** and **psychogenic seizures**. It's important that your doctor does tests to check what kind of seizure you or your child is having. Drug treatments for epilepsy will not prevent non-epileptic seizures. Epilepsy drugs can also cause side effects, so you shouldn't take them if you don't need to.

Physiological seizures

These seizures make you black out, often because not enough oxygen gets to your brain or because the balance of chemicals in your bloodstream is upset. A change in heart rate (cardiac arrhythmias), heart failure, and a drop in the amount of sugar in your blood (hypoglycaemia) can cause these seizures.

Another type of physiological seizure can happen in children when they have a high temperature.^[18] These are called **febrile seizures**. Most children who have a febrile seizure do not have epilepsy.^[19] Doctors usually treat a febrile seizure with medicine that will bring down the child's temperature (such as Calpol).

Psychogenic seizures

Emotional or stressful events can make some people behave as though they're having a seizure caused by epilepsy. For example, their arms and legs can shake, they may cry and talk to themselves, and they may not seem to notice things going on around them. The person can't control the attack.^[20] These types of seizures are most common in people who have had mental health problems.

Taking epilepsy drugs

If a doctor has prescribed an epilepsy drug for you or your child, here are some things you should know.

Getting started

- It may take some time (a few months) for your doctor to find the right drug and the best dose with the least side effects for you.^[8]

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- Most people with epilepsy start taking one drug first to see if this helps control their seizures. ^[15]
- Your doctor will probably try a low dose first to see what happens. ^[8] If this doesn't work, your doctor will increase the dose.
- If you still get seizures at a higher dose or you get bad side effects, you may need to switch to another epilepsy drug that works in a different way. ^[15]
- Seizures that affect only a part of the brain (focal seizures) can be especially difficult to control. People with these seizures may need to take more than one drug. ^[32] (To learn about focal seizures, see [What are the symptoms of epilepsy?](#))
- It's important to tell your doctor if you are taking drugs for other medical conditions, as epilepsy drugs can affect how well they work. ^[15] If you take other drugs, your doctor may recommend you take gabapentin (brand name Neurontin) or levetiracetam (brand name Keppra). These don't affect the liver. This makes them less likely to interfere with other types of drug. ^[33]

Taking the drugs

- Most people need to take their epilepsy drugs two or three times a day (depending on the drug).
- Do not stop taking your drugs or change your dose without seeing your doctor. If you do, your seizures may become worse than they were before.
- It's hard to say how long you'll need to take drug treatment for epilepsy. Many people take epilepsy drugs for the rest of their lives.
- If you have been taking epilepsy drugs for two years and haven't had a seizure, you may want to talk to your doctor about stopping. See [Should someone who no longer has seizures stop taking epilepsy drugs?](#)
- If you're a woman planning to have a baby, you may be wondering what to do about your epilepsy drugs. To learn more, see [Epilepsy and pregnancy](#) .

It's important to have a **treatment plan** that you and your doctor agree on. The plan should be written down and should include the drug you chose and why, the dose, the side effects, and what you should do if you miss a dose, or if your seizures don't get better. ^[15]

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Side effects

- If side effects make you very unwell, you may need to switch to another drug.
- **See a doctor immediately if you get a rash.** Although the rash will probably go away, it can develop into a serious (and sometimes fatal) skin condition called Stevens-Johnson syndrome. Warning signs that a rash is serious are raised lumps, flaky skin, a swollen face, painful skin, purple blotches, sores on the lips or inside the mouth and asthma symptoms (for example, wheezing and difficulty breathing).
[8]
- Some epilepsy drugs can stop contraceptive pills (the pill) and contraceptive injections from working properly. To learn more, see [Contraception and epilepsy drugs](#) .

Regular check-ups for people with epilepsy

The National Institute for Health and Care Excellence (NICE), the government body that decides which tests and treatments should be available on the NHS, says: [15]

- Everyone with epilepsy should have a check-up at least once a year. You should have them more often if you have problems such as difficulties at school or at work
- At the check-up, you should discuss your treatment, how it's working, and any side effects you might be having
- The doctor should also make sure that you have all the help and information you need.

Check-ups are important because they help you:

- Stick with treatment
- Change your treatment if it's not working or if the side effects are bothering you
- Get extra help from different experts including epilepsy nurses, other specialists, social workers, counsellors and patients' organisations
- Learn about your epilepsy
- Get more tests if you need them.

If the drugs don't work

You may have tried different drugs for two years but still have seizures that are not under control. Or, you may have side effects from the drugs you take that are unbearable. If

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so, NICE says your specialist should refer you to a centre where doctors are experts in epilepsy that is difficult to treat.^[15] You may need further tests to check if you have epilepsy or another condition.

Should someone start drug treatment after only one seizure?

If you or your child has had a seizure, you may wonder whether you should start treatment for epilepsy. Experts generally agree that most people (but not all) should wait until they've had **at least two seizures** before starting treatment.^[34] This is because:

- Having one seizure doesn't mean you'll have another
- Having one seizure doesn't mean you have epilepsy
- Drugs have side effects, so it makes sense to be sure that you have epilepsy before you start taking them.

Nearly two-thirds of people who have had one seizure don't have another within the next two years. For these people, treatment may not be necessary.

The trouble is, it can be hard for doctors to work out your individual chances of having another seizure. There is little research to say why some people have further seizures and some people don't.

It's also hard to know for certain how many seizures you or your child have had. Some seizures are mild, so you might not have noticed them. This can make it difficult to decide whether you should start treatment.^{[34] [35]}

It's likely that you will cut your chances of having another seizure if you take epilepsy drugs. Research shows that taking an epilepsy drug straight away can:

- Reduce the risk of a second seizure in the next two years by more than half^{[35] [36] [37] [38]}
- Increase the length of time between your first and second seizures.^[39]

But taking epilepsy drugs may not stop you having more seizures in the long run.^{[35] [39]} One study found that as many people had been free of seizures five years later whether or not they'd started treatment straight away.^[39]

Taking epilepsy drugs can also cause side effects.^{[34] [37] [38] [39]} And having to take tablets every day can be a bind. This is why you might want to wait.

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To help you decide, your doctor will consider a couple of things.

- First, your doctor will work out if the symptoms you describe are actually a seizure. For example, a mild stroke (a mini-stroke) may look and feel like a seizure.
- If you did have a seizure, your doctor should send you to see a specialist.
- The specialist (usually a neurologist) will need to rule out other things that could have caused your seizure besides epilepsy. You may need to have tests, such as an electroencephalogram (EEG), to check the electrical activity in your brain. If this activity is abnormal, you may have epilepsy. An EEG may also tell you what type of seizure you had. (To learn more, see [How do doctors diagnose epilepsy?](#))

If you do need to see a specialist, you shouldn't have to wait more than two weeks for an appointment.^[15] That's according to guidelines from the National Institute for Health and Care Excellence (NICE), the government body that decides which tests and treatments should be available on the NHS.

You have a higher chance of having another seizure if:

- Your electroencephalogram (EEG) test is abnormal. An electroencephalogram (EEG) measures the amount of electrical activity in the nerve cells of your brain.
- There is a problem in your brain that caused the seizure
- You have had damage to your brain (from a stroke or head injury, for example).

You may also be at higher risk if your first seizure affected only a part of your brain (this is called a focal seizure), or if you have a brother or sister with epilepsy.

If you've had two or more seizures and you have epilepsy, you have a high chance of continuing to have seizures. So it's best to start drug treatment straight away. Delay can make your seizures worse and more difficult to treat in the future.

Should someone who no longer has seizures stop taking epilepsy drugs?

If you or your child has not had a seizure for a while, you may wonder about stopping drug treatment. Taking tablets each day can be a bind, especially if they cause side effects.

Your doctor will be able to help you weigh up the pros and cons of stopping treatment. Most doctors recommend that people have no seizures for **at least two years** before they think about stopping treatment.^[15]

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However long it's been since your last seizure, you could still have another one sooner or later if you stop taking your drugs.

- Around 3 in 5 people who have not had a seizure for at least two years will stay seizure-free for another two years after stopping treatment.
- But, this means that about 2 in 5 people will have another seizure within two years. [\[8\]](#) [\[26\]](#) [\[27\]](#)

It's hard for doctors to say exactly what your chances of having another seizure will be. The longer you are seizure-free after stopping treatment, the more likely it is that you will stay seizure-free. [\[27\]](#)

Some things can make it more or less likely that you will have another seizure. Your doctor may consider:

- Your age
- The type of seizures you have
- The number of drugs you take
- Whether you've had seizures since you started taking epilepsy drugs
- How long ago your seizures stopped.

Here is a list of things that can raise or lower your chance (or risk) of having a seizure after stopping treatment. [\[8\]](#) [\[26\]](#) [\[27\]](#)

Things that raise your risk	Things that lower your risk
You got epilepsy as a teenager or adult.	You got epilepsy as a child.
You have severe epilepsy and take at least two drugs for your seizures.	Your seizures were controlled quickly and easily with one drug.
You have had seizures since you started taking epilepsy drugs.	You have been seizure-free for a long time (at least two years).
Tests show abnormal electrical activity in your brain.	Tests show no abnormal electrical activity in your brain.
You have had a tonic-clonic seizure or myoclonic seizure. Both of these affect your whole brain (they are called generalised seizures). Tonic-clonic seizures cause you to black out, fall over and jerk your arms and legs. Myoclonic seizures cause all or part of your body to suddenly jerk, but you probably won't black out.	You have seizures that affect only part of your brain (focal seizures), and you have not had any tonic-clonic or myoclonic seizures.

To learn more about the different types of seizures, see [What are the symptoms of epilepsy?](#)

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Some types of epilepsy are more likely to go away than others.

- Children who have **benign childhood epilepsy** are very likely to stay seizure-free after they stop taking drugs.
- On the other hand, those with **juvenile myoclonic epilepsy** are unlikely to be able to stop their treatment. There's around a 90 percent chance they will have seizures if they stop taking their drugs, and these seizures can be severe. ^[15]

Making the decision

It can be difficult to decide whether to stop taking epilepsy drugs. Staying on a treatment doesn't guarantee that you won't have a seizure. If you've been seizure-free for a couple of years, you have about a 20 percent chance of having another seizure within the next two years if you continue treatment. But if you stop treatment, your risk of having another seizure doubles to about 40 percent. ^[26] ^[27]

You will need to weigh up the risks of having another seizure against the benefits of not taking drugs.

- Consider how much you mind taking the drugs each day. Think about how much any side effects bother you and whether they interfere with your life.
- Talk to your doctor about what will make it more likely that you will have another seizure if you stop your drugs.
- Think about how important it is for you to stay seizure-free. Can you risk another seizure? For example, if you have a seizure, could you lose your driving licence?

Think carefully about your everyday life. If the side effects don't bother you and it's important that you drive, you may decide to keep taking your drugs. On the other hand, if they make you drowsy and affect how well you work, you may want to stop taking them, even though this could increase your chance of another seizure.

Stopping drugs safely

You or your child **should not stop taking epilepsy drugs suddenly** or change the dose in any way. This could cause very serious seizures and permanently change the way your epilepsy responds to drugs. ^[3]

The National Institute for Health and Care Excellence (NICE), the body that advises the government on health care, says you or your child should see a specialist (usually a neurologist) if you want to stop or change your treatment. ^[15]

When people with epilepsy are coming off their drugs, their treatment is **tapered**. This means their dose gets gradually smaller and smaller until it's safe to stop taking the drug

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completely. The daily dose is normally reduced by about a quarter every two to four weeks.^[8]

If you take more than one drug, you should come off them **one at a time**. And, before you start, the specialist should make sure you know what to do if your seizures get worse.^[15]

You may not be able to drive while your drugs are being cut down, or for the six months after you stop taking them. This is because your risk of having a seizure is higher during this time.^[40]

Epilepsy and pregnancy

If you're a woman planning to have a child, you may have questions about how epilepsy can affect your pregnancy and your baby.

We've tried to answer these questions here. But more studies are needed in this area. So we don't know all the answers.

Some epilepsy drugs affect how well contraceptive pills (the pill) and contraceptive injections work. If you would like more information, see [Contraception and epilepsy drugs](#).

What if I'm thinking about getting pregnant?

Make sure you talk to your doctor. He or she may want to adjust your epilepsy drugs before you get pregnant.

Some experts think it's best to take only one epilepsy drug during pregnancy. If you're taking more than one, you may want to talk to your doctor about this.^[41]

It may take several months to change your treatment and get it right. So it's a good idea to see your doctor several months (six if possible) before you plan to get pregnant. This will give you lots of time to get used to any new drugs and change them if they don't suit you.

Your doctor may also want you to start taking some extra vitamins before you get pregnant, especially **folic acid** (a type of vitamin B that is also called folate). He or she may also want to see you more often during your pregnancy and do some extra tests on your baby.

For all these reasons, it's best to talk to your doctor before you get pregnant.

What if I'm already pregnant?

If you are already pregnant, you probably have lots of questions and some worries. **Your chances of having a healthy baby are very good.** More than 9 in 10 women with

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epilepsy have normal pregnancies.^[3] But you are more likely to have problems than a woman who does not have epilepsy. So, your obstetrician (a doctor who specialises in treating pregnant women) will probably suggest that you have your baby in a well-equipped hospital.^[15]

Here are some answers to common questions about epilepsy and pregnancy:

Will my baby be normal?

The worry most women have is that taking epilepsy drugs or having seizures during pregnancy will harm their baby. We know that if you take drugs for epilepsy while you are pregnant, your baby will be getting the drug in his or her system. But we don't know exactly what effect this will have on your baby.

We know that women who have epilepsy are more likely to have a baby with a birth defect than women who don't have the condition. One summary of the evidence (a systematic review) looked at the results of 59 studies, covering more than 65,000 pregnancies of women with epilepsy.^[42] The summary said:

- 7 in 100 women with epilepsy had a baby with a birth defect, compared to 2 in 100 women without epilepsy
- Taking two epilepsy drugs increased the risk from 10 in 100 for women taking one drug, to 17 in 100 for women taking two or more drugs
- Taking valproate increased the risk from 7 in 100 for women taking one drug that was not valproate, to 11 in 100 for women taking valproate only
- The highest risk was for women taking valproate plus two or more other drugs. These women had a 25 in 100 risk of having a baby with a birth defect.

The most common defects were problems with the heart, followed by malformed bones.

Birth defects can be serious or minor.^[43] ^[44]

- Serious problems include heart abnormalities, a cleft lip or palate (this is when parts of the mouth don't grow together properly), and spina bifida. In spina bifida, one or more of the bones that make up the backbone don't form properly. This leaves a gap in the backbone that can cause problems with the spinal cord.
- Minor problems usually have to do with how a baby looks. For example, a baby may have eyes that are set far apart, a short upper lip, or fingers and nails that don't have a normal shape.

We don't know for certain what causes these problems. But experts think it's likely to be the epilepsy drugs, and their doses, rather than the seizures.^[15] ^[45]

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If you have a seizure during your pregnancy, it is unlikely to harm your baby unless you fall or injure yourself. If you have generalised tonic-clonic seizures (where you lose consciousness and your body jerks), less blood may flow to your womb. There has been no research into exactly how likely this is, but experts agree that it's uncommon. ^[46]

The National Institute for Health and Care Excellence (NICE), the government organisation that decides which tests and treatments should be available on the NHS, says women with epilepsy should have a detailed **ultrasound** scan about halfway through their pregnancy, to check for birth defects. ^[15]

Will my baby have epilepsy?

The chances that your baby will get epilepsy are very small. The research on this isn't very good, but it suggests that between 9 and 12 in 100 babies born to women with generalised epilepsy (where you lose consciousness) get epilepsy. Fewer babies (about 3 in 100) born to women who have focal seizures get epilepsy. ^[47]

But if your epilepsy is inherited (it has been passed on from one or both of your parents) or if the baby's father has epilepsy, your child has a higher chance of getting the condition. ^[47]

If you're worried that you may have inherited your epilepsy, you may wish to speak to a **genetic counsellor**. This type of counsellor is specially trained to help you work out the chances of your passing epilepsy on to your baby.

Are some epilepsy drugs more harmful than others?

Doctors are trying to find out whether some drugs are more likely than others to cause birth defects in babies. Many studies are looking at this issue.

For now, doctors think **the most important thing is to take the drug that controls your seizures best**. By controlling your seizures, you'll be helping yourself and your baby. ^[48]

Studies of pregnant women with epilepsy suggest that a drug called valproate is more likely than other epilepsy drugs to cause birth defects. ^[42] ^[49] Another study suggested that children might have slightly lower IQs if their mothers take valproate while pregnant. ^[50] If you are taking valproate, you may want to talk to your doctor to see if you should change to a different drug. (To learn more about epilepsy drugs, see [What treatments work for epilepsy?](#))

We don't know yet if newer drugs for epilepsy (such as lamotrigine, topiramate, and oxcarbazepine) are any safer than older drugs. One small study on topiramate found that between 4 in 100 and 5 in 100 babies born to mothers taking this drug had major birth defects. ^[51] This is higher than normal but lower than the rate with some epilepsy

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drugs, especially valproate. We need more research to know which epilepsy drugs might be safest to use during pregnancy.

Your doctor may try to control your seizures with just one drug, as taking more than one drug may increase the risk of birth defects. ^[15]

Will I get more seizures during pregnancy?

Your body handles drugs in a different way when you are pregnant, partly because of the change in hormones in your body. So you may find you have more seizures than usual, but you could actually have fewer. There's no way to predict exactly what will happen, but research suggests that about 10 to 30 in 100 women have more seizures during their pregnancy. Feeling tired and not taking your drugs properly during your pregnancy increases the risk of seizures.

It's unlikely that you'll have a seizure during labour or soon after birth. Research suggests that between 1 and 2 in 100 women will have a bad seizure, for example a tonic-clonic seizure (where you lose consciousness and your body jerks), at this time. ^[15]

Will I be able to breastfeed my baby?

If you are taking epilepsy drugs, small amounts will get into your breast milk. Doctors don't think this will harm your baby. But, there is no good research on this, so it's hard to be certain. ^[46] ^[52]

Some epilepsy drugs could make your baby sleepy, and you should ask your doctor about this. Doctors think that women with epilepsy should still breastfeed their babies if they want to. ^[48]

Is there anything I should be doing?

Yes. It's important to take care of yourself.

- Make sure you see your doctor regularly, get plenty of rest, eat well, and take your epilepsy drugs. You should also take any vitamins your doctor prescribes.
- Talk to your doctor about **folic acid** if you are not already taking it.

You can help doctors find out more about the effects of epilepsy drugs in pregnancy by registering your pregnancy with the UK Epilepsy and Pregnancy Register at <http://www.epilepsyandpregnancy.co.uk>. ^[15]

Contraception and epilepsy drugs

Here's a list of drugs that can stop contraceptive pills and contraceptive injections from working properly. These drugs may also affect some intrauterine devices (coils or IUDs) that release hormones, such as the Mirena coil.

- carbamazepine
- lamotrigine (Lamictal)
- oxcarbazepine (Trileptal)
- phenytoin (Epanutin)
- phenobarbital
- primidone (Mysoline)
- topiramate (Topamax)

The National Institute for Health and Care Excellence (NICE), the government body that decides which treatments should be available on the NHS, says that if you are taking one of these drugs: ^[15]

- You should talk to your doctor about the pros and cons of using contraceptive pills or contraceptive injections. There are lots of other contraceptives, including condoms or an intrauterine device (IUD) that does not release hormones
- You should not use the mini pill (progesterone-only pill)
- You should not use contraceptive implants (one brand was Implanon, which has now been replaced with Nexplanon)
- If you decide to use combined contraceptive pills (pills that contain oestrogen and progesterone) you will need one containing at least 50 micrograms of oestrogen
- If you decide to use injections of progesterone such as Depo Provera, you will need a repeat injection after 10 weeks instead of the usual 12 weeks.

'Morning after pills' (such as Levonelle) may not work as well as they should. If you have had unprotected sex and don't want to get pregnant, see your doctor. He or she may recommend you take a higher dose of the morning after pill. Or you could have another kind of treatment, such as an IUD or coil.

What can I do if I see someone having a bad seizure?

If someone has a seizure lasting **more than five minutes**, or has **three or more seizures in an hour**, they need **urgent treatment**.^[15] The treatment can be given by health care professionals (often paramedics), or by a trained carer (often a parent or other member of the family).

Call for professional help by dialling 999 if:

- You are not trained to treat seizures
- This is the person's first seizure
- It's going to be difficult or unsafe to stay where you are and check how the person is doing.

If you are somewhere safe and you have been trained to treat seizures, you should:

- Make sure the person can breathe easily
- Check that their lungs and heart are working properly
- Give drugs to stop the seizures. Most people use a drug called **diazepam**. People can take it as a suppository (a drug that you put inside the rectum). Or you can use a similar drug called midazolam, which you put in the person's cheeks. Midazolam wasn't designed for treating bad seizures, but it works and you can use it in an emergency.^[15]

If the seizures don't stop, the person could be developing **status epilepticus** and you should call 999. Status epilepticus means the seizures last half an hour or more. People with status epilepticus need **urgent treatment in hospital**.

Tests for epilepsy

Doctors will do lots of tests to find out whether your seizures are caused by epilepsy. However, the tests aren't perfect, and may not be able to tell you for certain whether you have epilepsy. Here's a brief description of the tests you or your child may have.

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Electroencephalogram (EEG)



During an EEG, sticky pads with wires are placed around your head.

An electroencephalogram (EEG) measures the amount of electrical activity in the nerve cells of your brain. An EEG can tell your doctor: ^[8]

- If the electrical activity in your brain is normal
- Where in your brain any abnormal activity starts
- What type of seizure you or your child may be having and what sort of epilepsy might be causing it.

Guidelines from the National Institute for Health and Care Excellence (NICE), the government body that advises doctors about tests and treatments, say that if you need this test, you should have it within four weeks. ^[15]

The test can't tell your doctor why abnormal activity happens. For example, it can't find any problems in your brain caused by an injury or tumour.

During an EEG:

- Sticky pads are placed around your head and these are connected to wires
- The wires carry information to a computer about the electrical activity in your brain
- The computer records the activity in your brain as a pattern of waves and spikes across the screen.

People with epilepsy often have abnormal brain waves, even when they are not having a seizure. ^[53]

The EEG itself doesn't produce electricity, and it isn't painful.

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You may be asked to stay awake the night before the test. And if you're taking drug treatment for epilepsy, you may be asked to take a smaller dose before the test.

During the EEG, you may be asked to sleep or breathe deeply for several minutes, or a strobe light may be flashed in front of your eyes. These things can help trigger abnormal activity in your brain so doctors can see it during the test. ^[8]

An EEG can't say for certain that you or your child has epilepsy.

- If your EEG is abnormal, you still may not have epilepsy.
- And even if the EEG is normal, you still could have the condition. Sometimes abnormal brain waves happen deep inside the brain and they don't show up on the EEG.
- Only about half the people who keep having seizures have an abnormal EEG. ^[8]
^[12] ^[33]

If a first EEG doesn't show any problems, you may have another. The second test may last longer than the first, and a video may record how you act during a seizure (if you have one during the test). This can help doctors find the part of the brain where the seizure happens. ^[8]

Brain pictures



An MRI can produce detailed pictures of your brain.

Scans of your brain can tell doctors if there are any problems with its structure, such as tumours, cysts or injuries. This can show where any unusual electrical activity starts and help doctors decide what sort of seizure you or your child is having.

Two types of scans are usually used: **magnetic resonance imaging** (MRI) and **computed tomography** (CT).

- A CT scan uses a computer and X-rays to produce a picture of your brain.
- For an MRI, you are put inside a machine that uses a magnetic field and harmless radio waves to provide a detailed map of the tissues in your brain. The National Institute for Health and Care Excellence (NICE), the government organisation that advises doctors about tests and treatments, says MRI is better than a CT scan for

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people with epilepsy. It also says you should not have to wait more than four weeks for an MRI. ^[15]

Tests on how your body reacts

A doctor will check your movement, eyesight, co-ordination and reflexes. He or she will also do tests to see whether you can remember things, think and speak clearly, and process information. ^[1]

This information can provide clues about where in your brain the abnormal electrical activity happens. If you or your child has problems making certain movements, for example, it may indicate a problem in the frontal lobe of the brain, as this part of the brain tells the body how to move. ^[1] For more information, see [The parts of your brain and what they do](#) .

Blood tests

Doctors sometimes take blood samples to check for other conditions that can cause seizures. They might check for an infection, an imbalance in blood chemicals (such as calcium, glucose or magnesium), and liver or kidney disease. ^[1] High levels of alcohol and some drugs in the blood can also cause seizures, so doctors may check for these, too.

Lumbar puncture

Fluid may be taken from your spine using a long, thin needle. This is called a lumbar puncture. Like blood tests, a lumbar puncture is used to check for conditions other than epilepsy which may be causing your seizures. The test can detect infections such as meningitis and encephalitis . ^[53]

Side effects of gabapentin

Very few people who take gabapentin get side effects or stop taking it. ^[92] The main problem with gabapentin is sleepiness. Gabapentin can make some people put on weight. ^[92] People who take this drug are about twice as likely to feel worn out, drowsy and dizzy as people who take a dummy treatment for comparison (a placebo).

Side effects of lacosamide

In studies, about 6 in 10 people taking lacosamide got at least one side effect. ^[127] The most common problems were feeling dizzy, feeling sick, getting headaches or having double vision. Each one of these problems affected more than 1 in 10 people.

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Just over 1 in 10 people taking lacosamide in trials dropped out because they couldn't put up with the side effects.^[127] People usually stopped taking it because they felt dizzy.

Lacosamide can affect the way your heart beats.^[127] Some people might get problems such as a slow heartbeat or fainting, but this seems to be rare, affecting less than 1 in 100 people.

Side effects of oxcarbazepine

We don't know how many people get side effects from taking this drug. The studies don't say.^[99] People who take oxcarbazepine are about three times more likely to feel dizzy or sick or have problems with co-ordination than people who take a dummy treatment (a placebo) for comparison. Oxcarbazepine can reduce the amount of salt in your body. The studies didn't say how many people get this problem. Sleepiness and drowsiness may also be a problem. People who take oxcarbazepine are about four times more likely to get double vision than people who take a placebo.^[99] Oxcarbazepine can stop contraceptive pills or contraceptive injections from working properly.

Two serious skin conditions, called Stevens-Johnson syndrome and toxic epidermal necrolysis (TEN), have been seen in a few children and adults who were taking epilepsy drugs.^[101] These conditions usually need to be treated in hospital and can be fatal.

Serious allergic reactions that affect many different parts of the body have been seen in a few people taking oxcarbazepine.^[125] Most people who get these reactions have had a fever and a rash, along with problems in other parts of their body, such as enlarged lymph nodes, itchiness and pains in their joints. The rash tends to start within three weeks of starting oxcarbazepine. It can be fatal. See your doctor immediately if you get a rash and a fever.

Side effects of tiagabine

People who take this drug are almost twice as likely to feel dizzy as people who take a dummy treatment (a placebo) for comparison.^[32] Shakiness (tremors) can be a problem. People who take tiagabine are more than four times more likely to get tremors than those who take a placebo.^[125]

Tiagabine can affect your concentration. It can also make you feel low or depressed.^[15] During one study, 1 in 5 people stopped taking tiagabine. This is twice as many people as those who took a placebo.

Side effects of vigabatrin

Vigabatrin is unlikely to cause many of the common side effects associated with epilepsy drugs.^[120] ^[100] The side effects can include drowsiness and tiredness.^[128]

However, 4 in 10 people who took vigabatrin had problems with their vision. In some people, these problems were permanent.^[122] For this reason, most epilepsy experts wouldn't recommend this drug. Vigabatrin may also cause depression, tiredness or agitation.

Side effects of zonisamide

Side effects are quite common among people who take zonisamide. Studies show that people taking this drug are between four and seven times more likely to have problems with coordination than people taking a pretend treatment (a placebo). Tiredness and lost appetite also are a problem.

Some people in the studies said they feel agitated and irritable. About 1 in 10 people stop taking zonisamide. This is four times as many people as stop taking a placebo.

Zonisamide can sometimes cause a problem where your blood becomes too acidic.^[129] When this happens, it's called metabolic acidosis. Your doctor might suggest regular blood tests to check for this problem.

Tests before epilepsy surgery

Any type of surgery is serious. But when it's for your brain, doctors have to take extra care. So, you'll have lots of tests before your doctor decides if surgery is right for you and if it will help you. You may have one or more of the tests below.^[137]

EEG (electroencephalogram)

This records the electrical activity in your brain. It can help doctors decide what type of epilepsy you have, where in your brain your seizures start and where they spread to. Sticky pads are placed over your head and wires from these pads carry information from your brain to a computer. You may be awake during the EEG or you may be given a drug to make you sleep.

A Video EEG

Your seizures may be recorded on video to help doctors get a better idea of the type of seizures and epilepsy you have. This test is useful because it allows doctors to compare the EEG recording with the actual symptoms of the seizure, second by second.

CT (computed tomography) scan

This is used to check whether there's an abnormal area in your brain (such as a cyst or an abnormal blood vessel) that may be causing your seizures. The scan uses a computer to take an X-ray of your brain. But most patients with seizures will have an MRI scan (see below) rather than a CT scan, since an MRI gives a more detailed picture of the brain.

MRI (magnetic resonance imaging) scan

This is used to check for abnormal areas inside your brain that may be causing your epilepsy. You are put inside a machine that uses a magnetic field and radio waves to make a detailed map of the tissues in your brain.

A SPECT (single photon emission computed tomography) scan

This test checks your blood flow to find out where in your brain your seizures start. When you have a seizure, more blood flows to the part of the brain where the seizure began.

Psychiatric tests

You may talk to a psychiatrist to make sure you will be able to cope with the stresses of having brain surgery.

A neuropsychological test

This is done to check how well your temporal lobes are working. Your temporal lobes play an important part in remembering things. If you're going to have one temporal lobe operated on (the lobe where the seizures are coming from), your surgeon must first make sure that the other temporal lobe can remember things on its own. If it can't, an operation would harm your memory. A neuropsychological test can also help doctors work out which part of your brain the seizures are coming from.

Wada test

Doctors use this test to find out where speech is handled in your brain and which side of your brain controls the hand that you use most often. Doctors want to protect these areas during surgery, so it's important that they know exactly where they are in your brain. (These areas are different in different people.)

More about cognitive behaviour therapy

There are many different ways of doing cognitive behaviour therapy. But, in general, you and your therapist try to change the way you think to help you to get rid of negative thoughts. You do this together by: ^[168] ^[169] ^[165] ^[170] ^[166]

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- **Finding out the events and thoughts that make you worry.** These are sometimes called automatic thoughts. For example, you might worry about having a seizure each time you go out, or you might worry about telling others you have epilepsy
- **Learning about your seizures.** You may talk about when and where you have seizures, what you are doing when they come on, and how you feel during and after the seizure
- **Finding out what therapists call your rules for living or core beliefs.** These are the assumptions you make about your life and your epilepsy. You may not even know you have these beliefs. These can include views such as, "I'm no good at anything" or, "I can't be successful because I have epilepsy"
- **Getting rid of bad rules and bad thoughts, and replacing them with better ones.** The first step is to list your bad rules and bad thoughts. Then ask yourself, "Are they true?" For example, "Am I really no good at anything?"
- **Learning and practising ways to be more positive.** For example, you may turn the belief, "I would be a company executive if it wasn't for my epilepsy" into, "I am successful in my job".

You will also learn ways to **change the way you behave**. The goal is to help you live a full life without either ignoring that you have epilepsy or letting it control what you do. For example, this might mean that you explore new jobs where you won't have to worry about your condition. Or you learn how to tell people about your epilepsy, rather than avoiding certain people and conversations.

There are lots of techniques for changing behaviour. Here are a few examples. Your therapist will teach you the ones you need. [\[168\]](#) [\[169\]](#) [\[165\]](#) [\[170\]](#)

- Slowly start doing the things that you have always avoided. This could be talking to certain people, or going to certain places. Start small and build up gradually. This is called **graded exposure**.
- Learn how to relax your muscles and your mind so that you feel less stressed.
- Learn to be more confident and to recognise that epilepsy is a condition you have; it's not who you are.
- Set targets for things you want to do, and plan how you are going to reach them in small steps.
- Learn how to work through problems, such as how to tell your boss or new friends that you have epilepsy.

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Each session with a therapist lasts about 50 minutes. At the start of each session, you and your therapist decide what you want to achieve. At the end, your therapist gives you homework. Your homework could be to practise relaxation, make a diary of your thoughts each day or do a simple task. Homework is very important. It means your treatment continues between sessions. ^[170]

Treatment doesn't end when you stop going to a therapist. Cognitive behaviour therapy is designed to teach you how to help yourself. Then, if the old ways of thinking and doing things come back, you can be your own therapist.

The treatment is tailor-made for you. Most courses last between 12 weeks and 24 weeks, but they can continue for longer if you need it.

It's important to finish your course of treatment. It's also important that you feel comfortable with your therapist. If you are unhappy with your therapist for any reason, go back to your GP. He or she may be able to help you find a different therapist.

Glossary:

genes

Your genes are the parts of your cells that contain instructions for how your body works. Genes are found on chromosomes, structures that sit in the nucleus at the middle of each of your cells. You have 23 pairs of chromosomes in your normal cells, each of which has thousands of genes. You get one set of chromosomes, and all of the genes that are on them, from each of your parents.

stroke

You have a stroke when the blood supply to a part of your brain is cut off. This damages your brain and can cause symptoms like weakness or numbness on one side of your body. You may also find it hard to speak if you've had a stroke.

Alzheimer's disease

People who have Alzheimer's disease slowly lose their memory and ability to think clearly. As the disease gets worse, they get more confused and start acting differently. Several changes happen in the brain that stop it working properly. Small lumps called amyloid plaques grow in the parts of the brain used for memory and thinking. And bundles of twisted threads called 'neurofibrillary tangles' form inside brain cells. These stop brain cells communicating with each other, and they can cause cells to die. Also, in Alzheimer's disease, the brain does not have enough chemical messengers (neurotransmitters), and holes or gaps appear where brain cells have died.

brain tumour

A brain tumour is when a lump of cells that are growing out of control (a tumour) develops in your brain. Tumours can be malignant (cancerous), which means the cells in the tumour invade and destroy nearby cells and can spread to other parts of your body. Or tumours can be benign (non-cancerous), which means the cells in the tumour don't invade other cells or travel to other parts of your body. A tumour in your brain can cause problems by pushing on parts of your brain and affecting how they work.

meningitis

Meningitis is a swelling in the thin layers of tissue that surround your brain and your spinal cord. It usually happens because of an infection with certain kinds of bacteria or viruses. Meningitis can give you a severe headache and a stiff neck. And you may find it difficult to keep your eyes open in the light. Meningitis is a life-threatening disease. If you have these symptoms, you should go to hospital straight away.

AIDS

AIDS stands for acquired immunodeficiency syndrome. People who are infected with the human immunodeficiency virus (HIV) get AIDS when the virus has destroyed most of their immune system. When people have AIDS, their body isn't able to fight infections. So even common infections, such as colds, can cause serious problems.

encephalitis

Encephalitis is inflammation of the brain. Viruses are the most common cause. People with encephalitis may become less alert and have difficulty speaking and controlling their movements.

learning disability

People with a learning disability have trouble with the basic processes of learning. They may have problems in the way they think and find reading or writing very difficult.

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cerebral palsy

Children with cerebral palsy have disabilities because they were injured while they were in the womb or during birth. They often have trouble moving some or all of their limbs. They may also have learning difficulties or seizures.

high temperature

A high temperature is a general sign that there is an infection or inflammation in your body. Temperatures vary, but anything over about 38 degrees Celsius (100 degrees Fahrenheit) is considered high.

hormones

Hormones are chemicals that are made in certain parts of the body. They travel through the bloodstream and have an effect on other parts of the body. For example, the female sex hormone oestrogen is made in a woman's ovaries. Oestrogen has many different effects on a woman's body. It makes the breasts grow at puberty and helps control periods. It is also needed to get pregnant.

Lennox-Gastaut syndrome

Lennox-Gastaut syndrome is a severe form of epilepsy that starts early in life. Children with Lennox-Gastaut have various kinds of seizures and some learning difficulties. Unlike other kinds of childhood epilepsy, Lennox-Gastaut may still affect people when they're adults.

liver

Your liver is on the right side of your body, just below your ribcage. Your liver does several things in your body, including processing and storing nutrients from food, and breaking down chemicals, such as alcohol.

mini-stroke

When the supply of blood to a part of your brain is blocked off for a short time, but not long enough to cause permanent damage, it's called a mini-stroke. Doctors call it a transient ischaemic attack (or TIA for short). A mini-stroke can make you lose control of one side of your body, or you may lose the sight in one eye. But these problems go away within 24 hours.

neurologist

A neurologist is a doctor who specialises in diseases that affect your brain and your nervous system.

cleft palate

Babies who are born with a cleft palate have a hole in the roof of their mouth. Surgeons usually correct the problem during the first year of a child's life.

ultrasound

Ultrasound is a tool doctors use to create images of the inside of your body. An ultrasound machine sends out high-frequency sound waves, which are directed at an area of your body. The waves reflect off parts of your body to create a picture. Ultrasound is often used to see a developing baby inside a woman's womb.

migraine headaches

These are severe headaches that last four to 72 hours. They often cause other symptoms such as queasiness (nausea) or being extra-sensitive to sound or light.

cysts

A cyst is a sac or cavity that develops under your skin and is filled with fluid. Cysts are benign, which means that they are not cancerous.

X-ray

X-rays are pictures taken of the inside of your body. They are made by passing small amounts of radiation through your body and then onto film.

kidney

Your kidneys are organs that filter your blood to make urine. You have two kidneys, on either side of your body. They are underneath your ribcage, near your back.

systematic reviews

A systematic review is a thorough look through published research on a particular topic. Only studies that have been carried out to a high standard are included. A systematic review may or may not include a meta-analysis, which is when the results from individual studies are put together.

randomised controlled trials

Randomised controlled trials are medical studies designed to test whether a treatment works. Patients are split into groups. One group is given the treatment being tested (for example, an antidepressant drug) while another group (called the comparison or control group) is given an alternative treatment. This could be a different type of drug or a dummy treatment (a placebo). Researchers then compare the effects of the different treatments.

placebo

A placebo is a 'pretend' or dummy treatment that contains no active substances. A placebo is often given to half the people taking part in medical research trials, for comparison with the 'real' treatment. It is made to look and taste identical to the drug treatment

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being tested, so that people in the studies do not know if they are getting the placebo or the 'real' treatment. Researchers often talk about the 'placebo effect'. This is where patients feel better after having a placebo treatment because they expect to feel better. Tests may indicate that they actually are better. In the same way, people can also get side effects after having a placebo treatment. Drug treatments can also have a 'placebo effect'. This is why, to get a true picture of how well a drug works, it is important to compare it against a placebo treatment.

randomised controlled trials

Randomised controlled trials are medical studies designed to test whether a treatment works. Patients are split into groups. One group is given the treatment being tested (for example, an antidepressant drug) while another group (called the comparison or control group) is given an alternative treatment. This could be a different type of drug or a dummy treatment (a placebo). Researchers then compare the effects of the different treatments.

psychiatrist

A psychiatrist is a doctor who specialises in psychiatry. Psychiatry is the branch of medicine that covers mental, emotional or behavioural problems.

general anaesthetic

You may have a type of medicine called a general anaesthetic when you have surgery. It is given to make you unconscious so you don't feel pain when you have surgery.

local anaesthetic

A local anaesthetic is a painkiller that's used to numb one part of your body. You usually get local anaesthetics as injections.

psychotherapy

Psychotherapy is a talking treatment. It is given by trained therapists (such as a psychiatrists, psychologists or social workers). Psychotherapy usually consists of regular sessions (often weekly) between the therapist and the patient. There are many types of psychotherapy, including cognitive behavioural therapy and interpersonal therapy.

psychologist

A psychologist is trained to study the human mind and human behaviour. A clinical psychologist provides mental health care in hospitals, clinics, schools or to private patients.

psychiatric nurse

A psychiatric nurse is a nurse who specialises in helping people who have mental health problems.

psychotherapist

A psychotherapist is a health professional who treats mental disorders by talking with their patients, rather than by prescribing medicines. There are many types of psychotherapy, including cognitive behavioural therapy and interpersonal therapy.

constipated

When you're constipated, you have difficulty passing stools (faeces). Your bowel movements may be dry and hard. You may have fewer bowel movements than usual, and it may be a strain when you try to go.

dehydrated

When you're dehydrated, you don't have enough fluid in your blood. This could be because you're not drinking enough or because you're losing water by sweating or having diarrhoea.

gall bladder

The gall bladder is a small organ below the liver on the right side of the abdomen. Its job is to store bile, a chemical made in the liver that helps to break down food in the intestines. The chemicals in the gall bladder can, under certain circumstances, become solid and form small stones. If a stone gets stuck in the tubes that empty the gall bladder, there can be a backup of fluid, causing the gall bladder to swell and possibly become infected. This condition is called gall bladder disease.

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