

## Patient information from the BMJ Group

# Pre-eclampsia

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## Pre-eclampsia

Pre-eclampsia is an illness that women can get during pregnancy. It usually starts with high blood pressure. It can be so mild that you don't know you have it. But if it gets worse, it can make you and your baby seriously ill.

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

## What is pre-eclampsia?

Pre-eclampsia is an illness that happens only in pregnancy and can affect both you and your baby. It starts with a problem in the placenta, which is the organ that joins you and your baby in your womb.

Getting **high blood pressure** while you're pregnant can be an early sign of pre-eclampsia.



Nearly all women with pre-eclampsia get high blood pressure.

For many women, pre-eclampsia is so mild that they don't even know they have it. But it can get bad enough to make you and your baby seriously ill. Pre-eclampsia doesn't get better until after your baby is born. So you may need to have your baby early.

Pregnancy can be stressful, so if you have pre-eclampsia as well it can be frightening. But with specialist care, most women have healthy babies and get better very quickly afterwards. And most women who get pre-eclampsia have normal pregnancies next time.

## Key points for women with pre-eclampsia

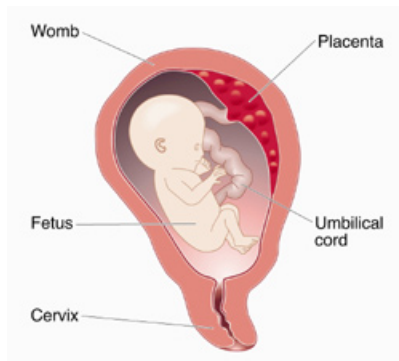
- Pre-eclampsia is a serious illness that you can get when you are pregnant.
- Doctors think it starts when the organ that joins you and your baby in the womb doesn't grow as it should. That organ is called the **placenta**.

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- Because of this problem with the placenta, your baby may not get enough blood to grow properly.
- Also, harmful chemicals from the placenta can get back into your bloodstream and make your **blood pressure** high. You can have problems (complications) from this.
- Most women with pre-eclampsia don't feel ill. So you **need to go to all of your regular check-ups** when you are pregnant, to pick it up early.
- If you get severe pre-eclampsia, you should stay in hospital until your baby is born. You may need to have your baby early.
- Having pre-eclampsia once doesn't mean you will get it again. Many women who've had it go on to have a normal pregnancy the next time.

The 'pre' in pre-eclampsia means before. The 'eclampsia' means **seizure** (fit). So, pre-eclampsia refers to the illness women get before it becomes so serious that they have a seizure. But the name is confusing because very few women with pre-eclampsia ever have a seizure. That's because doctors treat the illness or deliver the baby early to avoid any problems.

### What happens in normal pregnancy



The placenta nourishes your baby with nutrients and oxygen it takes from your blood.

To understand what goes wrong in pre-eclampsia, it helps to know something about what happens in a normal pregnancy.

Let's look at how the placenta grows in your womb. That's where things seem to go wrong in pre-eclampsia.

The placenta takes nutrients and oxygen from your blood to nourish your baby in your womb. So for a healthy pregnancy, the placenta needs a good supply of blood from you. [\[1\]](#)

Here are some of the changes that happen in your body to give the placenta enough blood.

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- During the first half of your pregnancy, blood vessels in your womb get much bigger.
- These bigger blood vessels will carry blood to the placenta. To find out more, see [How the placenta grows](#) .
- Your heart starts to pump out more blood with each heartbeat. It stays like this until your baby is born. <sup>[2]</sup>
- Some of the extra blood flowing through your body goes to your womb to feed your baby.

### What goes wrong in pre-eclampsia

We can't be sure about what goes wrong in pre-eclampsia. It's a complicated illness.

But what seems to happen is that the placenta doesn't get enough blood from you. This is because the blood vessels that go to the placenta don't grow properly.

Whether your baby is affected by this, and how badly, depends on how much blood gets through.

This problem in the placenta can affect both your baby and you.

- Your baby may not grow as well as he or she should. That's because your baby can't get enough food from the placenta. For more, see [Pre-eclampsia and your baby](#) .
- The unhealthy placenta sends harmful chemicals back into your bloodstream. The chemicals damage the lining of your blood vessels. This can cause **high blood pressure** , problems with your **kidneys** , swelling, and other problems. <sup>[3]</sup> For more, see [Pre-eclampsia and you](#) .

No one knows what causes pre-eclampsia. But there are so many ideas that it has been called 'the disease of theories'. Probably more than one thing goes wrong.

The latest thinking is that two things have to happen together for a pregnant woman to get pre-eclampsia. <sup>[4]</sup>

- The woman has to have some things that increase her chances of getting pre-eclampsia. For example, she may have high blood pressure or **diabetes** or be overweight. Or she may be carrying twins or triplets. It may be pre-eclampsia runs in her family.
- The placenta doesn't grow normally in the first half of pregnancy. This means not enough blood reaches the placenta in the second half of pregnancy.

## Pre-eclampsia

Nearly all women with pre-eclampsia get high blood pressure. But not all women with high blood pressure get pre-eclampsia. You may hear high blood pressure during pregnancy called **pregnancy-induced hypertension** or **gestational hypertension**. It is not as serious as pre-eclampsia.<sup>[5]</sup> But it can turn into pre-eclampsia at any time. For more, see [Blood pressure during pregnancy](#) .

Pre-eclampsia affects different women and their babies in different ways. Here is what we know.

- It can affect you, your baby, or both you and your baby.
- It can be so mild that you don't notice it. Or it can be so severe that it puts both your lives in danger.
- It usually happens in the last few weeks of pregnancy. But it can start any time from 20 weeks of pregnancy to during or even just after the birth.
- It can come on very slowly, over weeks or months. Or it can get very bad in just a few days.

### Pre-eclampsia: why me?

We don't know for sure why some women get pre-eclampsia and others don't. But certain things make you more likely to get it. Things that make you more likely to get an illness are called **risk factors**.

There are lots of risk factors for pre-eclampsia. They include:<sup>[14]</sup>

- Being pregnant for the first time
- Having had pre-eclampsia before
- Having high blood pressure before you get pregnant
- Having health problems, such as kidney problems or a condition called [rheumatoid arthritis](#)
- Being older than 40
- Carrying two or more babies.

For more, see [Risk factors for pre-eclampsia](#) .

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## What are the symptoms of pre-eclampsia?

If you have pre-eclampsia, you probably won't know it. That's because it doesn't usually cause symptoms unless it gets serious. But early signs of pre-eclampsia can be picked up during the regular check-ups that you have while you are pregnant.

The first signs of pre-eclampsia may show up in you, your baby, or both of you some time after 20 weeks of pregnancy.

There are two main signs of pre-eclampsia in **you (the mother)**.<sup>[28]</sup>

- **High blood pressure**, with a bottom (diastolic) number of at least 90. **High blood pressure** doesn't always mean pre-eclampsia. But half of all women who get high blood pressure before 32 weeks of pregnancy go on to get pre-eclampsia. Your blood pressure should be checked at every check-up. For more, see [Blood pressure during pregnancy](#) .
- **Protein in your urine**. Normally, you have only a tiny bit of **protein** in your urine. If you have more, it can mean pre-eclampsia. Your urine should be checked for protein every time you have your blood pressure checked.<sup>[29]</sup> For more, see [Urine checks for protein](#) .

You can also get swelling in your hands, feet, or face with pre-eclampsia. But swelling is not a reliable sign. That's because it can also happen if your pregnancy is normal.<sup>[30]</sup>

The main sign of pre-eclampsia in your unborn baby is that he or she **grows more slowly than normal**. Doctors can see this on an **ultrasound scan** . For more, see [Checks on your baby's health](#) .

If you have just the early signs of pre-eclampsia (high blood pressure and protein in your urine), you will probably feel fine. If you do start to feel ill, this probably means the pre-eclampsia is getting worse. These are the symptoms to watch out for:<sup>[31]</sup>

- A bad, throbbing headache that is not helped by normal painkillers, such as paracetamol
- Changes in your vision, such as blurred vision, double vision, or flashing lights before your eyes
- Bad pain just under your ribs, probably on your right side
- Throwing up.

If you get any of these symptoms, see your doctor or midwife straight away.

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Even if you haven't had any signs of pre-eclampsia, see your doctor or midwife straight away if you feel ill between your check-ups. This could be the first sign that something is wrong.

Pre-eclampsia doesn't get better until after your baby is born. In fact, it usually gets worse. Once you have symptoms, you may need to have your baby in the next few days.

### How do doctors diagnose pre-eclampsia?

It is not always easy to diagnose pre-eclampsia. That is because there is not any simple test that says for sure whether you have the condition.

Instead, doctors diagnose pre-eclampsia when you get certain signs and symptoms together. The most important signs are **high blood pressure** and **protein** in your urine, showing up for the first time after 20 weeks of pregnancy. <sup>[57]</sup>

Most women with pre-eclampsia don't feel ill. That's why it is very important to go to all of your regular check-ups during pregnancy. Your **blood pressure** and urine should be checked at these check-ups. That way, pre-eclampsia can be picked up early.

Feeling ill is usually a sign of more serious pre-eclampsia. So if you feel unwell between your check-ups, **see your doctor or midwife straight away**. For more, see [What are the symptoms of pre-eclampsia?](#)

If your doctor thinks you have pre-eclampsia, you should be sent to hospital for some more tests. These tests can help tell if you have it. And they can show how the illness is affecting you and your baby.

Here are some things your doctor or midwife may do to find out if you have pre-eclampsia.

### Questions your doctor may ask

Your doctor or midwife may ask you these questions. <sup>[58]</sup>

- **Have you noticed any swelling of your face, hands, feet?** This is not a reliable sign of pre-eclampsia. That's because swelling often happens in normal pregnancies. But if you suddenly get swelling, particularly in your face, it is more likely to mean you have pre-eclampsia.
- **Have you gained a lot of weight lately?** A gain of more than 1 kilogram (2.2 pounds) a week over two to three weeks, or a gain of more than 2 kilograms (4.5 pounds) in a week, can be a warning sign of pre-eclampsia. This is especially true if you also have sudden swelling.
- **Have you been feeling unwell?** Bad, throbbing headaches, problems with your vision (like flashing lights before your eyes), severe pain under your ribs, and being sick can all be signs of severe pre-eclampsia.

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- **Is your baby moving well?** If your baby has become less active, this can be a sign that he or she is being affected by pre-eclampsia. <sup>[57]</sup>

### Physical examination

There aren't any specific signs of pre-eclampsia. But your doctor or midwife may do some or all of the following during an examination:

- Weigh you
- Listen to your baby's heartbeat
- Check you for swelling
- Feel your tummy.

### Tests you may have

Your doctor or midwife will probably do two tests if he or she thinks you may have pre-eclampsia:

- **Measure your blood pressure** (for more, see [Blood pressure during pregnancy](#) )
- **Check your urine for protein** (for more, see [Urine checks for protein](#) ).

These tests are quick and simple. You may have them in a health centre or surgery, or even at home.

Your doctor or midwife will say you have pre-eclampsia if you have: <sup>[57]</sup>

- A bottom blood pressure number (diastolic pressure) of 90 or higher **and**
- At least one 'plus' (+) of protein in your urine.

### Seeing a specialist

If your GP thinks you have pre-eclampsia, you should be seen by an obstetrician in your local maternity unit. He or she will arrange for more tests. These can help tell if you have pre-eclampsia. This doctor can also find out more about how the illness is affecting you and your baby.

How quickly you need to be seen depends on how severe your doctor thinks the pre-eclampsia is. But it should be **within 48 hours**.

Most women with pre-eclampsia feel fine. So you may wonder what all the fuss is about. You may even feel annoyed about having to go to hospital. But pre-eclampsia can get worse very quickly. So it is better for you and your baby to be on the safe side.

## Pre-eclampsia

Most maternity hospitals now have an area called a day care unit. There, you can have all your tests done on one day. You will get the results within 24 hours. <sup>[57]</sup>

These are the tests you are likely to have in hospital. <sup>[59]</sup>

- Several blood pressure readings taken over three hours. Your blood pressure can vary quite a lot. So it is important to have it taken several times.
- Blood tests to check how well your **kidneys** and **liver** are working and how well your blood is clotting. These can all be affected by pre-eclampsia.
- A test to check for protein in your urine.

The following tests will probably be done to check your baby's health.

- **A cardiocotograph (CTG).** For this test, a small device is strapped around your tummy. The test checks how fast your baby's heart is beating.
- **An ultrasound scan.** An **ultrasound scan** check on your baby's growth and wellbeing.
- **An umbilical Doppler scan.** A small device is strapped around your tummy for this test. The test checks how much blood is getting through to your baby.

All of these tests are fairly simple. But the ones for your baby can take some time.

When the results of all these tests are ready, your obstetrician will do one of three things:

- Send you home if most of your results are normal and there is no cause for worry right now (but you will need to have check-ups more often from now on)
- Keep you in hospital for more tests and watching if there are worries about you or your baby
- Keep you in to deliver your baby if there is a serious risk to either you or your baby.

### How common is pre-eclampsia?

We can't say exactly how many pregnant women get high blood pressure or get pre-eclampsia. That's because these conditions are defined differently from country to country, and even from doctor to doctor.

But here are some things we do know.

- About 1 in 10 pregnant women get **high blood pressure** .
- Between 2 and 8 in 100 pregnant women get pre-eclampsia. <sup>[36]</sup>



## Pre-eclampsia

- High blood pressure and pre-eclampsia are most common in women who are pregnant for the first time.
- Black women are more likely to get high blood pressure and pre-eclampsia than white women. <sup>[37]</sup>
- Pre-eclampsia can put your life in danger, even if you live in a developed country like the UK. It is one of the main reasons why some pregnant women have to be treated in a part of the hospital called the intensive care unit (ICU). <sup>[38]</sup>
- It is rare for pregnant women to die from pre-eclampsia in the UK. In the UK, 14 women died from pre-eclampsia between 2000 and 2002. <sup>[39]</sup>

### What treatments work for high blood pressure during pregnancy and pre-eclampsia?

Pre-eclampsia is an illness that happens only in pregnancy. It usually starts with high blood pressure. Pre-eclampsia can be so mild that you feel fine. But it can get severe enough to make you and your baby very ill.

If you are pregnant, finding out that you have high blood pressure or pre-eclampsia can be frightening. But there are treatments that can help keep you well. And if you are [at risk for pre-eclampsia](#), there are also treatments that can help prevent it.

You can get some of these treatments over the counter. But always check with your doctor before you start taking anything new when you are pregnant. Your doctor can tell you if it is safe for you and your baby.

### Key points about treating high blood pressure and pre-eclampsia

- If you are at risk of pre-eclampsia, taking a **small dose of aspirin** every day during pregnancy can help stop you getting it.
- Taking **calcium supplements** every day can also lower your risk.
- If your blood pressure gets very high, there are **drugs that can bring it down**.
- If you have severe pre-eclampsia, a drug called **magnesium sulphate** can help stop you having seizures (fits).
- And if you have already had one seizure, magnesium sulphate can lower your risk of having more.

### Treatments for high blood pressure and pre-eclampsia

Which treatments work best for high blood pressure during pregnancy and for pre-eclampsia? We've looked closely at the research in the three areas below.

- [Treatments for high blood pressure during pregnancy](#) : These include resting in bed and taking drugs to bring down your blood pressure. [More...](#)
- [Treatments for preventing pre-eclampsia](#) : These include aspirin and calcium supplements. [More...](#)
- [Treatments for severe pre-eclampsia](#) : These include magnesium sulphate and drugs to lower blood pressure that is very high. [More...](#)

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

### Treatment Group 1

#### Treatments for high blood pressure during pregnancy

If you have high blood pressure while you are pregnant, your risk of getting pre-eclampsia goes up. So doctors take high blood pressure very seriously.

#### Key points about treating high blood pressure during pregnancy

- Unfortunately, there has not been much good research on how treatments for high blood pressure can help women who are pregnant.
- The treatments that have been studied are **drugs that reduce blood pressure** (called antihypertensive drugs) and **bed rest** in hospital or at home. But we need more research to know if and how these can help.
- If your blood pressure is high, then **taking drugs to lower it** may stop your blood pressure getting very high. But we don't know yet if drugs will stop high blood pressure turning into pre-eclampsia.

There are several treatments for high blood pressure during pregnancy. But which ones work best? We usually weigh up the research and put treatments into categories, according to how well they work and how safe they are. But there isn't much good research on treatments for high blood pressure in pregnancy. All the treatments below **need further study**.

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

### Treatments for high blood pressure during pregnancy

#### Treatments that need further study

- [Drugs that lower blood pressure](#) : These are called antihypertensive drugs. There are many different types. Some examples (with brand names) are methyldopa (Aldomet), labetalol (Trandate), nifedipine (Adalat), and hydralazine (Apresoline). [More...](#)
- [Staying in hospital and resting in bed](#) : Staying in hospital means you don't go home. Resting in bed means staying in bed. [More...](#)

### Treatment Group 2

#### Treatments for preventing pre-eclampsia

If you're at risk for pre-eclampsia, you may worry about what will happen to you and your baby. But there are treatments that can help stop you getting the condition, either for the first time or again in future.

#### Key points about preventing pre-eclampsia

- Taking **small doses of aspirin** helps lower your risk of getting pre-eclampsia.
- **Calcium supplements** also work.
- But **always check with your doctor** before you start taking something new. He or she will help you decide if one of these treatments is right for you.
- Many other treatments have been studied. They include **eating less salt** and **taking fish oil**. But we need more research to tell whether they help.

There are several treatments for preventing pre-eclampsia. But which ones work best? We've looked at the best research and given a rating for each treatment according to how well it works.

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

#### Treatments for preventing pre-eclampsia

##### Treatments that work

- [Aspirin](#) : This drug can help to stop your blood clotting too much and help keep your blood vessels open. [More...](#)
- [Calcium supplements](#) : Calcium is a mineral. It helps to control many natural processes in your body, including how your blood clots. [More...](#)

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## Treatments that need further study

- [Fish oil, evening primrose oil, or both](#) : Oil from fatty fish (like salmon and mackerel) and oil from the evening primrose plant have lots of substances called essential fatty acids. These substances help your body stay healthy. [More...](#)
- [Glyceryl trinitrate](#) : This drug belongs to a group of drugs known as nitrates. They make your blood vessels open wider. That means more blood can flow through. [More...](#)
- [Magnesium supplements](#) : Magnesium is a mineral. It helps to regulate your blood pressure. [More...](#)
- [Eating less salt](#) : Salt may play a part in raising your blood pressure and causing your body to hold on to fluid. [More...](#)
- [Antioxidants](#) : These are vitamins and other nutrients. They help to protect the cells of your body from natural wear and tear. The main ones that have been tried for preventing pre-eclampsia are vitamin C, vitamin E, and selenium. [More...](#)

## Treatments that are unlikely to work

- [Atenolol](#) : This drug belongs to a group called beta-blockers. They are used to treat high blood pressure. The brand names include Antipressan, Atenix, and Tenormin. [More...](#)

## Treatment Group 3

### Treatments for severe pre-eclampsia

If you get severe pre-eclampsia, you will need to be looked after in hospital. Your doctor will keep a close eye on you and your baby. And you will probably have some treatments to help stop you getting complications.

### Key points about treating severe pre-eclampsia

- If your blood pressure gets very high while you are pregnant, **taking drugs to bring it down** can help. There are different kinds of drugs. They all work about the same.
- If you have severe pre-eclampsia, treatment with a drug called **magnesium sulphate** can help stop you having a seizure (fit).
- If you get severe pre-eclampsia early in your pregnancy, we don't know if it is better to **have your baby as soon as possible** or to wait. There hasn't been enough good research to say.

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- There also isn't enough research to say if the **type of pain relief** you have during labour makes a difference to your health and your baby's health.
- Many other treatments have been tried. But we need more good research to say whether they can help.
- If you have a seizure, that means you have eclampsia. Treatment with **magnesium sulphate** can help stop you having more seizures.

There are several treatments for very high blood pressure, severe pre-eclampsia, and eclampsia. But which ones work best? We've looked at the best research and given a rating for each treatment according to how well it works.

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

### Treatments for severe pre-eclampsia

#### Treatments that work

- [Magnesium sulphate for treating severe pre-eclampsia or eclampsia](#) : This drug can stop you having a seizure, whether you have already had one or not. [More...](#)

#### Treatments that are likely to work

- [Drugs to lower very high blood pressure](#) : These drugs bring down your blood pressure. Some examples (with brand names) are hydralazine (Apresoline), nifedipine (Adalat), labetalol (Trandate), methyldopa (Aldomet), and diazoxide (Eudemine). [More...](#)

#### Treatments that need further study

- [Antioxidants for treating severe pre-eclampsia](#) : These are vitamins and other nutrients. They help to protect the cells of your body from natural wear and tear. One study has looked at a combination of vitamin E and vitamin C, plus a drug called allopurinol (Zyloric). [More...](#)
- [Pain relief during labour for treating severe pre-eclampsia](#) : You may have an injection into a gap in your spine (called epidural analgesia). Or you may be given a painkiller through a drip into a vein (an intravenous infusion). [More...](#)
- [Early delivery for treating severe pre-eclampsia that starts early in pregnancy](#) : This means having your baby straight away, rather than waiting for your baby to mature in your womb. [More...](#)

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- [Making more blood fluid for treating severe pre-eclampsia](#) : The fluid part of your blood is called plasma. It carries your blood cells. To make more plasma, you are given fluid by a drip (an intravenous infusion). [More...](#)

### What will happen?

Once you have pre-eclampsia, it doesn't get better until after your baby is born. If you get it near the end of your pregnancy, you may be able to give birth naturally. Otherwise, you will probably need to have your baby early.

Pre-eclampsia varies a lot from woman to woman. That means it is hard to say exactly what will happen to you.

What we can say is that the only cure for pre-eclampsia is for you to **have your baby**. How soon that needs to happen depends on two things:

- How badly you and your baby are affected by the illness
- How near you are to your due date.

You may get just **high blood pressure** or very mild pre-eclampsia near the end of your pregnancy. In that case, you may not need to stay in hospital before the birth. And you may be able to go into labour naturally.

But you should have check-ups **more often than usual** for the rest of your pregnancy. And you and your baby should be watched closely during and after the birth. That's because pre-eclampsia often gets worse at that time.

Some women don't get the first signs of pre-eclampsia until they are in labour or have just given birth. If this happens to you, your doctor will watch you until the signs go away. If your blood pressure is very high, you may need to be given drugs to bring it down.

If you have **severe pre-eclampsia** at any time during pregnancy, you will need to stay in hospital. For more, see [Hospital care for pre-eclampsia](#) . Your doctor may say you have severe pre-eclampsia if:

- You have two blood pressure measurements that show you have a bottom blood pressure number (diastolic pressure) of 110 or higher, or a top blood pressure number (systolic pressure) of 170 or higher (for more, see [Blood pressure during pregnancy](#) )

And:

- You have at least two 'plusses' (++) of **protein** in your urine (for more, see [Urine checks for protein](#) ).

## Pre-eclampsia

If your blood pressure is lower than this but you have other signs or symptoms too, you may also have severe pre-eclampsia. <sup>[40]</sup>

If you get severe pre-eclampsia at **34 weeks or later**, your baby will probably be delivered as soon as your doctor thinks that it's safe. <sup>[40]</sup> But if you get severe pre-eclampsia **earlier than this**, your doctor may decide to look after you in hospital for a while. This is to give your baby more time to grow in your womb. <sup>[41]</sup>

Pre-eclampsia is most dangerous when you get it earlier in pregnancy. You will need to have your baby well before your due date. That is done to stop either of you getting serious problems (complications). For more, see [Complications of pre-eclampsia](#) .

You and your baby will be watched very closely during delivery. And you will be watched very closely for a few days afterwards too. See [Delivery and after](#) .

How well your baby does after the birth depends on two things:

- How badly your baby was affected by the pre-eclampsia
- How early your baby was born.

For more, see [Your baby's health after delivery](#) .

If you have had severe pre-eclampsia, you and your partner should talk to your obstetrician after the delivery. This is so that you can ask questions about what happened and get advice about your next pregnancy. <sup>[42]</sup> For more, see [Your next pregnancy](#) .

### Questions to ask your doctor

Finding out that you have pre-eclampsia can be frightening. You will probably have lots of questions.

Here are some questions that you may want to ask your doctor if **you just found out that you have pre-eclampsia**.

- What is the best treatment for me?
- How does it work?
- Does it have side effects?
- Will I need to stay in hospital?
- How do you know if my baby is OK?
- Will my baby need to be born early?
- If my baby has to be born early, will he or she be all right?

## Pre-eclampsia

- How will you know if the pre-eclampsia is getting worse?
- Is there anything I can do to help myself?

Here are some questions that you may want to ask your doctor **before your next pregnancy, if you have had pre-eclampsia before.**

- What are my chances of getting pre-eclampsia again?
- Is there anything I can do to stop it coming on?
- Are there any tests I can have to find out if I have medical problems that will make me more likely to get pre-eclampsia again?
- What sort of care will I need in my next pregnancy?
- How will you know if I am getting pre-eclampsia again?
- I had to have an operation to deliver my first baby. Will I need to have one again? (This operation is called a **caesarean section**.)

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## Treatments:

### Drugs that lower high blood pressure during pregnancy

In this section

[Do they work?](#)

[What are they?](#)

[How can they help?](#)

[How do they work?](#)

[Can they be harmful?](#)

[How good is the research on drugs that lower high blood pressure during pregnancy?](#)

This information is for women with high blood pressure during pregnancy. It tells you about drugs that lower high blood pressure. It is based on the best and most up-to-date research.

#### Do they work?

We don't know. If your **blood pressure** is mildly or moderately high during pregnancy, taking an **antihypertensive drug** will stop it getting very high. But it's not clear if this lowers your risk of getting pre-eclampsia.

#### What are they?

Drugs that lower your blood pressure are called **antihypertensive drugs**. You need a prescription from your doctor to get them.



## Pre-eclampsia

There are different types of antihypertensive drugs. They bring down your blood pressure in different ways.

These are the main types (with brand names) used to treat **high blood pressure** that is mild or moderate in women who are pregnant.

- **Methyldopa.** This drug works by relaxing your blood vessels. Then blood can flow through your blood vessels more easily. It comes as tablets and as a liquid. The brand name is Aldomet.
- **Beta-blockers.** These work by slowing down your heartbeat and making your heart pump less blood with each beat. They come as tablets and injections. The ones most likely to be used in pregnancy are labetalol (Trandate) and metoprolol (Betaloc, Lopresor).
- **Calcium channel blockers.** These calm the electrical activity in your heart and blood vessels. This makes your heart beat more slowly and more gently. They also relax some of your blood vessels, making them open wider. These drugs come as tablets and injections. The one most likely to be given if you are pregnant is nifedipine (Adalat).
- **Vasodilators.** These work by relaxing your blood vessels. They come as tablets. The one most likely to be given if you are pregnant is hydralazine (Apresoline).

In the studies we looked at, drugs to lower blood pressure were used to treat blood pressure that was **mildly or moderately high**. This is normally defined as:

- A top blood pressure number (systolic pressure) between 140 and 169
- A bottom blood pressure number (diastolic pressure) between 90 and 109.

For more on these numbers, see [Blood pressure during pregnancy](#) .

### How can they help?

If you are pregnant and you have high blood pressure that is mild or moderate, taking a drug to lower it can reduce the risk of it getting very high.<sup>[60]</sup> <sup>[61]</sup>

All the drugs that have been tried seem to work as well as each other in preventing very high blood pressure.<sup>[60]</sup> <sup>[61]</sup>

But the research done so far is not good enough to show whether taking one of these drugs lowers your risk of pre-eclampsia or helps your baby in any way. And it isn't clear how far your blood pressure needs to be lowered for you to benefit.<sup>[62]</sup>

### How do they work?

Drugs used to lower high blood pressure work in people who are not pregnant. So it isn't any surprise that they also work in pregnant women.

Doctors thought these drugs may also stop women getting pre-eclampsia. That's because this condition usually starts with high blood pressure. But there isn't any evidence that they do this.

### Can they be harmful?

Many of the studies we looked at didn't say anything about the harms of these drugs for either mothers or babies. But this is what some of them did tell us.

- Taking beta-blockers may slow down your baby's growth in your womb. <sup>[61]</sup>
- Another group of drugs that lower blood pressure, known as ACE inhibitors, may give your baby kidney problems. <sup>[63]</sup> <sup>[64]</sup> They can also cause birth defects. <sup>[65]</sup> Because of these problems, you're unlikely to be given ACE inhibitors if you are pregnant.

All drugs used to lower blood pressure can cause side effects, and most of these drugs can cause headaches and an upset stomach. These are some of the other side effects that certain drugs can cause.

**Methyldopa** can: <sup>[66]</sup> <sup>[67]</sup>

- Make you sleepy
- Make your muscles feel weak
- Make your ankles or feet swell
- Make your mouth dry
- Give you a rash
- Make you depressed.

**Beta-blockers** can: <sup>[68]</sup>

- Make you feel tired
- Make your hands and feet cold.

**Calcium channel blockers** can make you feel dizzy.

## Pre-eclampsia

**Hydralazine** can cause: <sup>[69]</sup>

- Diarrhoea or constipation
- A fast or pounding heartbeat
- Headaches
- Loss of appetite
- Nausea or vomiting
- Dizziness or light-headedness
- Redness in the face
- Shortness of breath
- A blocked nose
- Watery eyes.

Sometimes hydralazine can cause more serious problems. See your doctor as soon as possible if you get any of the following:

- Blisters on your skin
- A skin rash or itching
- Chest pain
- A general feeling of discomfort, illness, or weakness
- Joint pain or muscle pain
- Numbness, tingling, pain, or weakness in your hands or feet
- A sore throat and fever
- Swelling of your feet or lower legs
- Swelling of lymph nodes.

Some people may get other side effects not listed above. Check with your doctor if you notice any other problems.

### How good is the research on drugs that lower high blood pressure during pregnancy?

There is some evidence that if your blood pressure is mildly or moderately high during pregnancy, taking an **antihypertensive drug** will stop it getting very high. But we don't know if these treatments will help prevent pre-eclampsia.

There are many kinds of antihypertensive drugs. They work in different ways.

We found one summary of the research (called a **systematic review**).<sup>[60]</sup> It looked at 40 good studies (called **randomised controlled trials**) of these drugs. The studies compared different antihypertensive drugs with a dummy treatment (a **placebo**) or with each other. The summary included more than 4,200 women.

We found another summary of the research.<sup>[61]</sup> It looked at 29 good studies (randomized controlled trials). They compared antihypertensive drugs called **beta-blockers** with a dummy treatment or with another kind of antihypertensive drug. This summary included 2,500 women.

Here is what these summaries showed.

- Drugs that lower blood pressure worked much better than a dummy treatment at stopping women's blood pressure getting very high.
- All the drugs seemed to work about the same.
- But there wasn't any clear evidence that these drugs lowered the risk of the mothers getting pre-eclampsia.
- And there wasn't any clear evidence that they lowered the risk of the babies dying.

But the individual studies included in the summaries were very small. Also, there were problems in the way the studies were done. These things mean that the results are not very reliable.

A third summary looked to see whether trying to lower blood pressure, but not all the way back to normal, was as good as bringing it right the way back to normal levels (tight control) or below (very tight control).<sup>[62]</sup> In this summary, tight control usually meant bringing the top blood pressure number (systolic pressure) down to below 140, and the bottom number (diastolic pressure) below 90. Very tight control meant bringing the top number to 130 or less and the bottom one to 80 or below. The summary only found two studies, which included 256 women. There was no difference between the number of women in the tight and very tight control groups who went on to get more serious pre-eclampsia. There also didn't seem to be any difference in the number of women who needed surgery to deliver their babies early, or in the number of babies who were underweight or who needed special care after birth. But the way the studies were done, and their small size, means that it's hard to judge how reliable these results are.

# Staying in hospital and resting in bed for treating high blood pressure during pregnancy

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 staying in hospital and resting in bed for treating high blood pressure during pregnancy?](#)

This information is for women with high blood pressure during pregnancy. It tells you about staying in hospital and resting in bed, a treatment used for high blood pressure during pregnancy. It is based on the best and most up-to-date research.

## Does it work?

We don't know. It's hard to say what kind of care is best if you are pregnant and have high blood pressure or pre-eclampsia. That's because there isn't enough good research to tell us.

## What is it?

There are many different ways you may be looked after if you have high blood pressure or pre-eclampsia while you are pregnant.

- You may stay in hospital day and night, resting in bed.
- You may visit an outpatient clinic that is part of a hospital. You go there for tests and a check-up. Then you go home.
- You may go to a special unit to be checked for a whole day at a time. This is called an **antenatal day care unit**. At the end of the day, depending on your test results, you either go home or go to stay in hospital.
- Your doctor may say you need **bed rest**. That means you stay at home, but you spend all your time resting in bed.

## How can it help?

Some research has found that if you have high blood pressure resting in hospital rather than resting at home can stop your blood pressure getting higher.<sup>[70]</sup> It may also reduce your risk of having your baby early. But more research is needed to say for certain whether rest in hospital helps in these ways as some of these studies were very small.<sup>[70]</sup>

Other research has shown that women cared for by specialist day units, compared with women admitted to hospital, did about the same in terms of how high their blood pressure

## Pre-eclampsia

went. Women said they preferred being cared for in specialist day units, and wanted to avoid being admitted to hospital. <sup>[71]</sup>

### How does it work?

High blood pressure can turn into pre-eclampsia at any time. And if you already have pre-eclampsia, it can get worse suddenly. So it's important for your doctor to watch you and your unborn baby closely.

These are some ways that special types of care may work.

- Pre-eclampsia can come on and get worse suddenly. The good thing about being in hospital is that someone is watching you all the time. Also, your baby can be delivered very quickly, if necessary.
- Some experts think that bed rest helps to control your blood pressure and can stop pre-eclampsia getting worse.
- The good thing about day care units is that you can have all the testing and watching you would have in hospital, but you get to go home at night.

### Can it be harmful?

If you stay in hospital, some doctors worry that you may be more likely to get dangerous blood clots from resting in bed and infections. But the studies we looked at didn't show any evidence of this.

### How good is the research on staying in hospital and resting in bed for treating high blood pressure during pregnancy?

There hasn't been much research on which works if you have high blood pressure during pregnancy: staying in hospital and resting in bed, staying at home and resting, or going to a day clinic.

We found one review of the research (called a systematic review). <sup>[70]</sup> The review looked at four good studies (called randomised controlled trials) that altogether involved 449 pregnant women with high blood pressure. The review compared what happened to women who had some rest in hospital with women who carried on with their normal activities at home. Women who stayed in hospital were less likely to get very high blood pressure than those who stayed at home. Women who stayed in hospital were also slightly less likely to give birth early.

But these studies are now old and some of them were small. Nowadays women with high blood pressure are often looked after in day units and return home at night. More research is needed to find out how beneficial this type of care is.

## Pre-eclampsia

Another review compared admission to hospital with care in specialist day units. It included three studies and just over 500 women.<sup>[71]</sup> But this review also included some quite old studies. We need more up to date research in this area.

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### Aspirin for preventing pre-eclampsia

In this section

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[How good is the research on aspirin for preventing pre-eclampsia?](#)

This information is for women at risk of pre-eclampsia. It tells you about aspirin, a treatment used for preventing pre-eclampsia. It is based on the best and most up-to-date research.

#### Does it work?

Yes. If you are at risk of getting pre-eclampsia, taking aspirin can help to stop you getting it. Aspirin can also help to stop your baby being born early and dying.

#### What is it?

You have tiny particles in your blood called **platelets**. They stick together to form clots.

Aspirin belongs to a group of drugs called **antiplatelet drugs**. These drugs stop your platelets sticking together. Then you are less likely to get clots that block off your blood vessels. So blood can keep flowing through.

Aspirin, taken in low doses, is the most widely used of these drugs. It is the only one recommended for preventing pre-eclampsia.

Your doctor may tell you to take aspirin if you are at risk of pre-eclampsia. You would normally start taking it any time from 12 weeks of pregnancy onwards.<sup>[72]</sup>

Aspirin comes as tablets. You take it once a day. The usual dose is 75 milligrams. That's a quarter of the normal dose used to treat pain.

You can buy aspirin from a pharmacy. But **always check with your doctor** before you start taking anything new during your pregnancy. Your doctor can tell you if this treatment is right for you.

Other antiplatelet drugs (with brand names) include:

- clopidogrel (Plavix)
- dipyridamole (Persantin, Persantin Retard)
- abciximab (ReoPro)

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- eptifibatide (Integrilin)
- tirofiban (Aggrastat).

Your doctor may prescribe one of these for you if you can't take aspirin for some reason.

### How can it help?

If you are at risk of pre-eclampsia, taking aspirin while you are pregnant can help to: <sup>[72]</sup>  
<sup>[73]</sup>

- Lower your risk of pre-eclampsia, from 9 in 100 to 8 in 100.
- Lower the risk of your baby being born early (before 37 weeks) from 18 in 100 to 17 in 100..

Taking aspirin may also reduce the risk of harm to your baby, although this isn't clear in all studies. <sup>[74]</sup>

Most of the women in the studies took low dose aspirin, between 50 milligrams and 75 milligrams a day.

### How does it work?

Platelets are small particles found in your blood. When you cut yourself, they stick together to form clots. These clots stop the bleeding. Normally, they do this without stopping your blood flowing properly.

In pre-eclampsia, your platelets tend to be **too active**. They stick together to form unwanted clots. These clots can block off your blood vessels. Then blood can't get through.

Antiplatelet drugs work by making your platelets less sticky. Then they don't form unwanted clots.

### Can it be harmful?

The biggest worry about taking aspirin for a long time is that it can cause heavy bleeding, especially in your stomach. <sup>[75]</sup> Heavy bleeding is also called **haemorrhage**.

Normally, platelets plug up any holes in your blood vessels. This stops bleeding before it gets serious. Antiplatelet drugs make your platelets less sticky and less able to fix any holes. So you can bleed more easily.

Also, when you are pregnant, any drug you take can also get into your baby's bloodstream. So there is some worry about how the aspirin could affect your baby.



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But aspirin does not seem to increase the risk of bleeding for either mothers or their unborn babies. <sup>[72]</sup>

Some studies have looked at babies 12 months old to 18 months old whose mothers took aspirin during pregnancy. <sup>[76]</sup> <sup>[77]</sup> These studies did not show any evidence that the aspirin had harmed the babies in any way.

The drug clopidogrel may not work as well with heartburn drugs called proton pump inhibitors (PPIs). These drugs reduce the amount of acid produced in the stomach and are used to protect against acid reflux ( [GORD](#) ) and stomach ulcers. The brand name is Plavix. But research shows these drugs may stop the body from breaking down clopidogrel properly, so it may not work as well. Doctors have been advised to avoid using PPIs along with clopidogrel. <sup>[78]</sup>

### How good is the research on aspirin for preventing pre-eclampsia?

There is good evidence that taking a low dose of aspirin each day during pregnancy helps women who are at risk for pre-eclampsia and their babies.

We found two large summaries of the research (called [systematic reviews](#) ). <sup>[72]</sup> <sup>[73]</sup> The summaries covered more than 60 studies (randomised controlled trials) between them, looking at data from many thousands of women. The studies showed that, for women at risk of getting high blood pressure in pregnancy, taking aspirin cut the risk of getting pre-eclampsia.

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## Calcium supplements for preventing pre-eclampsia

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[How do they work?](#)

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[How good is the research on calcium supplements for preventing pre-eclampsia?](#)

This information is for women at risk of pre-eclampsia. It tells you about calcium supplements, a treatment used for preventing pre-eclampsia. It is based on the best and most up-to-date research.

### Do they work?

Yes. If you are at risk of getting pre-eclampsia, you are less likely to get it if you take a calcium supplement once a day during your pregnancy. Calcium supplements can be especially helpful if you don't get much calcium in the foods you eat.

Taking calcium supplements also lowers your risk of having a baby that is very small.

### What are they?

Calcium is a mineral. It is best known as the building block for your bones and teeth. But it also keeps your heart pumping and your nerves working properly.

You get calcium from some of the foods you eat, such as dairy products. But you can also get calcium as tablets. These are also called calcium supplements. A supplement is something that you take on top of the food that you eat.

You can buy calcium supplements from a pharmacy. But **always check with your doctor** before you start taking anything new during pregnancy. Your doctor can tell you if it is safe for you and your baby.

The dose of calcium that has been used in studies is 2 grams a day.

### How can they help?

If you are at risk of getting pre-eclampsia, taking calcium every day (at a dose of 2 grams a day) during pregnancy makes you less likely to get it.<sup>[79]</sup> You're also less likely to have a very small baby.

Results from 11 studies showed that 6 in 100 women who took calcium supplements got pre-eclampsia.<sup>[79]</sup> But 9 in 100 who took a dummy treatment (a placebo) got pre-eclampsia.

Calcium supplements work best in women who don't get enough calcium in the foods they eat.

### How do they work?

We're not sure how calcium may work in your body to prevent pre-eclampsia. But studies show that people who get a lot of calcium in the food they eat tend to have lower blood pressure and are less likely to get pre-eclampsia than people who don't get enough calcium from their food.<sup>[79]</sup>

It may be that if you don't have enough calcium, your blood vessels don't relax enough. This makes it harder for blood to flow through them. Then your blood pressure goes up.

### Can they be harmful?

The studies we looked at didn't talk about any harms that happened to women who took calcium supplements while pregnant.

One study followed 500 children up to the age of 7 years after their mothers took calcium supplements while they were pregnant.<sup>[80]</sup> It did not show any harms in the children.

Some people who take calcium supplements get mild pain in their stomach and constipation.

### How good is the research on calcium supplements for preventing pre-eclampsia?

There is good evidence that calcium supplements can help women who are at risk for pre-eclampsia and their babies.

We found one summary of the research (called a [systematic review](#)). <sup>[79]</sup> It looked at 11 good studies (called [randomised controlled trials](#)) involving more than 7,000 women.

The summary showed that compared with women who took a dummy treatment (a placebo), women who took calcium supplements during pregnancy (mainly 2 grams a day):

- Were less likely to get pre-eclampsia, especially if they did not get enough calcium from the foods they ate
- Were less likely to have babies that were very small (weighing less than 2,500 grams, or 5 pounds, 8 ounces).

But there were some problems with the research that may make the results less reliable.

- Most of the women in the studies were at low risk for pre-eclampsia. And most were getting enough calcium from food. So the number of women the tablets may have helped was low.
- A lot of the women in the studies didn't take their tablets every day.
- Calcium worked better in the smaller studies than in the larger ones. Smaller studies aren't always so reliable.

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### Fish oil, evening primrose oil, or both for preventing pre-eclampsia

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[Can they be harmful?](#)

[How good is the research on fish oil, evening primrose oil, or both for preventing pre-eclampsia?](#)

This information is for women at risk of pre-eclampsia. It tells you about fish oil and evening primrose oil, treatments used for preventing pre-eclampsia. It is based on the best and most up-to-date research.

#### Do they work?

We don't know. There hasn't been enough good research to tell us if these oils help to prevent pre-eclampsia.

### What are they?

Fish such as trout, mackerel, sardines, and salmon have a lot of oil in them. You can get oil from these fish as capsules. This oil has substances called **omega-3 fatty acids**, in particular ones called **DHA** (short for docosahexaenoic acid) and **EPA** (eicosapentaenoic acid).

The evening primrose is a plant. You can get oil from this plant as capsules. This oil has substances called **omega-6 fatty acids**, in particular one called **GLA** (short for gamma-linolenic acid).

You can buy both types of capsules over the counter from pharmacies or health food shops. But **always check with your doctor** before you start taking anything new while you are pregnant. Your doctor can tell you if it is safe for you and your baby.

### How can they help?

We don't know if these oils can help to prevent pre-eclampsia. But the research so far suggests they may not make any difference. <sup>[81]</sup> <sup>[82]</sup> <sup>[83]</sup>

### How do they work?

Doctors have noticed that people who eat lots of fish have lower **blood pressure** and are less likely to have **heart disease** than people who don't eat much fish. And we know that taking fish oil can lower your blood pressure slightly. <sup>[84]</sup> But we are not sure how it does this.

Experts think that evening primrose oil affects chemicals in your blood called **prostaglandins**. These chemicals may play a role in pre-eclampsia. <sup>[85]</sup>

### Can they be harmful?

In studies, about half the women taking fish oil said the capsules made them belch. <sup>[82]</sup> And some women didn't like the fishy taste of the capsules.

People taking capsules of evening primrose oil sometimes get headaches, pain in their stomach, nausea, or loose stools. <sup>[85]</sup>

### How good is the research on fish oil, evening primrose oil, or both for preventing pre-eclampsia?

There isn't enough good-quality evidence for us to tell if fish oil or evening primrose oil help to prevent pre-eclampsia. <sup>[81]</sup> <sup>[82]</sup> <sup>[83]</sup>

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## Glyceryl trinitrate for preventing pre-eclampsia

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# Pre-eclampsia

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[How good is the research on glyceryl trinitrate for preventing pre-eclampsia?](#)

This information is for women at risk of pre-eclampsia. It tells you about glyceryl trinitrate, a treatment used for preventing pre-eclampsia. It is based on the best and most up-to-date research.

## Does it work?

We don't know. There hasn't been enough good research to tell us if glyceryl trinitrate helps to prevent pre-eclampsia.

## What is it?

Glyceryl trinitrate belongs to a group of medicines called **nitrates**. These are drugs that make your blood vessels open wider. That lets more blood flow through. Doctors also call these drugs **vasodilators**.

Nitrates are normally used to treat and prevent chest pain (called angina) and other heart conditions.

Glyceryl trinitrate is called GTN for short. It comes in the following forms (with brand names):

- Tablets
- A spray to go under your tongue (Coro-Nitro Pump Spray, Glytrin Spray, Nitrolingual Pump Spray)
- A patch you put on your skin (Nitro-Dur, Transiderm-Nitro)
- An ointment that you put on your skin (Percutol).

Other nitrates that come as tablets are:

- isosorbide dinitrate (Isoket Retard)
- isosorbide mononitrate (Elantan, Imdur, Ismo).

Some nitrates start working quickly, but their effects don't last long. These come as tablets or a spray that you put under your tongue. But the type of nitrate that has been tried for preventing pre-eclampsia has effects that last longer. This type comes as tablets, skin patches, and ointment.

If you get a nitrate as a patch, you stick it on your skin. The medicine in the patch crosses your skin and gets into your bloodstream.

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If you get a nitrate as an ointment, you put it on a place on your skin that doesn't have hair. That can be your stomach, chest, or thigh.

### How can it help?

We don't know if GTN helps to prevent pre-eclampsia. That's because there hasn't been enough good research to tell us. <sup>[86]</sup>

### How does it work?

Nitrates make your blood vessels open wider. That means more blood can flow through them. Nitrates do this by relaxing the muscles in the walls of your blood vessels.

Women who get pre-eclampsia tend to have too much of the chemicals in their blood that make their blood vessels narrower and not enough of the chemicals that make them wider. <sup>[87]</sup>

Researchers think that giving GTN to women at risk for pre-eclampsia may help to fix this situation. But there isn't enough evidence to say if they are right.

### Can it be harmful?

One of the studies we looked at showed that women taking GTN were more likely to get headaches. <sup>[86]</sup>

### How good is the research on glyceryl trinitrate for preventing pre-eclampsia?

There isn't enough evidence for us to tell whether glyceryl trinitrate (GTN for short) helps to prevent pre-eclampsia.

We found one review of the evidence (a [systematic review](#)) which included six studies ([randomised controlled trials](#)). But the evidence from the studies was not strong enough to be sure whether GTN works or not. <sup>[86]</sup>

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## Magnesium supplements for preventing pre-eclampsia

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[How do they work?](#)

[Can they be harmful?](#)

[How good is the research on magnesium supplements for preventing pre-eclampsia?](#)

This information is for women at risk of pre-eclampsia. It tells you about magnesium supplements, a treatment used for preventing pre-eclampsia. It is based on the best and most up-to-date research.

### Do they work?

We don't know. There isn't any research so far that shows that taking magnesium supplements can help to stop you getting pre-eclampsia.

### What are they?

Magnesium is a mineral. It does lots of important things in your body. One of them is regulating your **blood pressure**.

You get magnesium naturally from certain foods. Green vegetables such as spinach, nuts, seeds, and some whole grains have lots of magnesium.

But you can also get magnesium as tablets. You may hear them called magnesium supplements. A supplement is something that you take on top of the food that you eat.

You can buy magnesium supplements over the counter from a pharmacy or health food shop. But **always check with your doctor** before you start taking anything new while you are pregnant. Your doctor can tell you if it is safe for you and your baby.

### How can they help?

We don't know. The research done so far has found that taking magnesium supplements made no difference to whether women got pre-eclampsia or not.<sup>[88]</sup> More research is needed on this treatment to say whether it can prevent pre-eclampsia.

### How do they work?

People who eat a lot of foods that have magnesium in them tend to have lower blood pressure. But many women don't get enough magnesium this way.<sup>[88]</sup> Women who are poor or who have other problems in their lives tend not to get enough magnesium.

Doctors thought that giving magnesium supplements to pregnant women would make them less likely to get pre-eclampsia. But there isn't any evidence that this assumption is right.

### Can they be harmful?

The study we looked at showed that women who took magnesium did not have any more side effects than women who took a dummy treatment (a **placebo**).<sup>[88]</sup>

The side effects of magnesium supplements can include **diarrhoea** and cramps in your tummy.<sup>[89]</sup>

### How good is the research on magnesium supplements for preventing pre-eclampsia?

There isn't any good evidence that magnesium supplements help to prevent pre-eclampsia.

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We found one summary of the research (a [systematic review](#)).<sup>[88]</sup> It looked at two good studies (called [randomised controlled trials](#)) that involved 474 pregnant women. The women took either magnesium supplements or a dummy treatment (a [placebo](#)).

The women taking magnesium were just as likely to get pre-eclampsia as the women taking the dummy treatment. In other words, the magnesium didn't work.

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## Eating less salt for preventing pre-eclampsia

In this section

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[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on eating less salt for preventing pre-eclampsia?](#)

This information is for women at risk of pre-eclampsia. It tells you about eating less salt, a treatment used for preventing pre-eclampsia. It is based on the best and most up-to-date research.

### Does it work?

We don't know. There hasn't been enough good research to show whether eating less salt can help stop you getting pre-eclampsia.

### What is it?

Eating less salt means:

- Changing the types of food you eat. Processed foods are often high in salt
- Adding less salt to your food
- May be using 'low salt' instead of regular table salt.

Most of us eat more salt than we need. And about three-quarters of this salt comes from processed foods such as ready meals, canned vegetables and soups, tinned meats, hard cheeses, and salty snacks.

Generally, a low-salt diet means eating less than 6 grams (about 1 teaspoon) of table salt a day.<sup>[90]</sup>

### How can it help?

We don't know whether eating less salt can help stop you getting pre-eclampsia. That's because there hasn't been enough research to tell us. But eating a low salt diet is generally healthier.



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## How does it work?

When people cut down on how much salt they eat, their **blood pressure** goes down. But we don't know exactly how salt affects blood pressure.

Doctors thought that advising pregnant women to eat less salt would make them less likely to get pre-eclampsia. But there isn't any evidence that this is true.

## Can it be harmful?

The study we looked at didn't find any harms from cutting down on salt. <sup>[91]</sup> There isn't any reason to expect it would be harmful. That's because most people eat too much salt in the first place.

## How good is the research on eating less salt for preventing pre-eclampsia?

There isn't any good evidence to show that cutting down on how much salt you eat will make you less likely to get pre-eclampsia.

We found one summary of the research (called a **systematic review**). <sup>[88]</sup> It looked at two good studies (called **randomised controlled trials**) that involved 600 women. Some of the women got advice about how to eat foods low in salt. The other women did not get any advice about how to eat.

The women who got the advice about eating less salt were just as likely to get pre-eclampsia. That means that the advice didn't work. But the studies may have been too small to be reliable.

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## Atenolol for preventing pre-eclampsia

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[How good is the research on atenolol for preventing pre-eclampsia?](#)

This information is for women at risk of pre-eclampsia. It tells you about atenolol, a treatment used for preventing pre-eclampsia. It is based on the best and most up-to-date research.

## Does it work?

No. There's no good research to show that atenolol can stop you getting pre-eclampsia. But there is evidence that it may harm your baby.

### What is it?

Atenolol is a drug that lowers your **blood pressure** . Doctors call drugs like this **antihypertensive drugs**.

Atenolol belongs to a group of antihypertensive drugs called **beta-blockers**. These work by slowing down your heartbeat and making your heart pump less blood with each beat. Atenolol is the only beta-blocker that has been tried for preventing pre-eclampsia.

You need a prescription from your doctor to get atenolol. It comes as tablets. You will probably take it once or twice a day. The brand names include Antipressan, Atenix, and Tenormin.

### How can it help?

We don't know for certain if atenolol can help to prevent pre-eclampsia. One study found it didn't help.<sup>[92]</sup> But this drug seems to be harmful for the babies of pregnant women.

### How does it work?

You may get **high blood pressure** while you are pregnant because your heart is beating too fast and too hard. This means there is more blood moving around your body each time your heart beats. The extra blood has to go through your blood vessels. So your blood pressure goes up.

Atenolol works by slowing down your heartbeat and making your heart pump less blood with each beat. It does this by stopping the action of certain chemicals that make your heart beat faster and more strongly. Nerves around your heart give off these chemicals.

### Can it be harmful?

The study we looked at showed that women who took atenolol had **smaller babies** than women who took a dummy treatment (a **placebo** ).<sup>[92]</sup> And other research on pregnant women has found the same thing.<sup>[93]</sup>

Other side effects of atenolol include:<sup>[94]</sup>

- Getting dizzy or light-headed
- Feeling tired or sleepy
- Having an upset stomach or **diarrhoea** .

### How good is the research on atenolol for preventing pre-eclampsia?

There isn't any good evidence yet that women at risk for pre-eclampsia are less likely to get it if they take atenolol during pregnancy.

## Pre-eclampsia

We found one small good study (called a [randomised controlled trial](#) ) that looked at 68 women who were at risk for pre-eclampsia.<sup>[92]</sup> The study was not able to tell if atenolol worked or not.

We need much more research. We need to know if atenolol helps and if it has more benefits than harms for babies.

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## Antioxidants for preventing pre-eclampsia

In this section

[Do they work?](#)

[What are they?](#)

[How can they help?](#)

[How do they work?](#)

[Can they be harmful?](#)

[How good is the research on antioxidants for preventing pre-eclampsia?](#)

This information is for women at risk of pre-eclampsia. It tells you about antioxidants, a treatment used for preventing pre-eclampsia. It is based on the best and most up-to-date research.

### Do they work?

We don't know. Most studies say they make no difference, but a few studies have shown good results. The research is not strong enough to be sure.

There are hundreds of types of antioxidants. The ones most studied for their effects in women with pre-eclampsia are **vitamin C**, **vitamin E**, and **selenium**.

### What are they?

Substances called **free radicals** can have a damaging effect on the cells in your body. Chemicals called antioxidants help to mop up free radicals, and stop them causing damage.<sup>[95]</sup>

There are lots of types of antioxidants. The main ones that have been studied for women at risk of pre-eclampsia are vitamin C, vitamin E, and selenium.

You can get these antioxidants from some of the foods that you eat. For example, vitamin C is found in lots of fruits and vegetables, such as broccoli, peppers, and oranges. But you can also get them as tablets. Often, different antioxidants are put together in a single tablet.

You can buy these tablets over the counter from a pharmacy or health food shop. But **always check with your doctor** before taking anything new when you are pregnant. Your doctor can tell you if it is safe for you and your baby.

### How can they help?

It's not clear that they help. The research is mixed.

## Pre-eclampsia

One large summary of the research (called a [systematic review](#)) and one large study found that: <sup>[95]</sup> <sup>[96]</sup>

- Taking antioxidant tablets made no difference to whether or not women got pre-eclampsia
- Taking antioxidant tablets did not reduce the risk of high blood pressure or an early birth.

But two other studies did find that women were less likely to get pre-eclampsia. One looked at a mixture of antioxidants in a single supplement. <sup>[97]</sup> The other looked at co-enzyme Q-10. <sup>[98]</sup> Because both these studies are quite small, we need further research to find out whether their results are reliable.

### How do they work?

Antioxidants are thought to protect cells from damage caused by free radicals. And free radicals may be partly to blame for the damage to blood vessels that happens in pre-eclampsia. <sup>[95]</sup>

### Can they be harmful?

The studies we looked at didn't say anything about harms. But some antioxidants, such as vitamin E and beta-carotene, may be harmful in high doses. <sup>[95]</sup> High doses of vitamin C can cause diarrhoea. Also, doctors don't know what doses of antioxidants are safe, especially during pregnancy.

Some supplements are recommended for pregnant women, such as vitamin D and folic acid. But make sure you check that any supplements you take are suitable for pregnant women. Some vitamins, such as vitamin A, could harm your baby if you have too much of them. <sup>[99]</sup>

### How good is the research on antioxidants for preventing pre-eclampsia?

We found two large summaries of the research (called [systematic reviews](#)) <sup>[100]</sup> <sup>[101]</sup> and five other studies. <sup>[97]</sup> <sup>[98]</sup> <sup>[102]</sup> <sup>[103]</sup> <sup>[104]</sup> But although there is quite a lot of research, many of the studies were quite small and not of good quality. There is not enough clear evidence to say whether antioxidants can prevent pre-eclampsia.

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## Magnesium sulphate for treating severe pre-eclampsia or eclampsia

In this section

[Does it work?](#)

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[How does it work?](#)

# Pre-eclampsia

[Can it be harmful?](#)

[How good is the research on magnesium sulphate for treating severe pre-eclampsia or eclampsia?](#)

This information is for women with severe pre-eclampsia. It tells you about magnesium sulphate, a treatment used for severe pre-eclampsia. It is based on the best and most up-to-date research.

## Does it work?

Yes. If you have **severe pre-eclampsia**, magnesium sulphate can lower your risk of having **seizures** (fits). Women with severe pre-eclampsia are at risk of getting seizures. On its own, the word **eclampsia** means you get seizures during pregnancy. So, taking magnesium sulphate stops severe pre-eclampsia turning into eclampsia. This drug may also lower your risk of dying.

If you have **already had a seizure**, magnesium sulphate can lower your risk of having more of them. Also, your baby is likely to be healthier and to need fewer days of special care if you have this treatment than if you take a different drug to prevent seizures.

Magnesium sulphate works better than some other drugs that have been tried for preventing seizures.

## What is it?

Magnesium sulphate is a drug that has magnesium in it. Magnesium is a mineral. You usually get it from food.

Magnesium sulphate comes in different forms. It can be given by injections for certain serious problems. You may have this treatment if you have severe pre-eclampsia or if you have already had a seizure. (If you have already had a seizure, that means you have eclampsia.)

Magnesium sulphate is given in hospital. You get it either by several injections or as a drip (an **intravenous infusion**) for up to 24 hours.

## How can it help?

**If you have severe pre-eclampsia**, having injections of magnesium sulphate can help in several ways. <sup>[105]</sup>

- It can lower your risk of getting **eclampsia**. This can mean you get liver problems, blood clotting problems, and could have a seizure. About 1 in 100 women who take magnesium sulphate injections get eclampsia. But about 2 in 100 women who have a dummy treatment (a **placebo**) got eclampsia.
- It can lower the risk that your placenta will pull away from the wall of your womb. Doctors call this **placental abruption**. It can be very dangerous for you and your baby.
- It can lower your risk of dying.

## Pre-eclampsia

Magnesium sulphate is also beneficial for your baby, if you have pre-eclampsia. It helps reduce the chances that your baby will get cerebral palsy. <sup>[106]</sup>

Magnesium sulphate works better for preventing eclampsia than two drugs called phenytoin and nimodipine. But it may slightly increase your risk of having a **caesarean section**.

**If you have eclampsia** (that means you have already had a seizure), magnesium sulphate works better than any other drug at stopping you having more seizures. <sup>[105]</sup> For example, it works better than the drugs phenytoin and diazepam and better than a mixture of meperidine, chlorpromazine, and promethazine. <sup>[107]</sup>

After one seizure, having magnesium sulphate also helps to:

- Lower your risk of dying
- Make your baby healthier at birth
- Lower the chance that your baby will need special care for more than a week
- Stop you getting **pneumonia**
- Prevent your baby dying in your womb or after birth.

### How does it work?

Magnesium sulphate relaxes muscles in various parts of your body. These include the muscles in the walls of your blood vessels. We don't know exactly how it helps to prevent seizures. But that is partly because we don't know what causes the seizures in the first place.

### Can it be harmful?

In one of the studies we looked at, about a quarter of the women had side effects from magnesium sulphate. <sup>[108]</sup> Going red in the face (flushing) was the most common one. About 2 in 10 women had flushing.

Less common side effects included feeling sick or throwing up, slurred speech, muscle weakness, **low blood pressure**, dizziness, drowsiness or confusion, headaches, and breathing problems.

You may also get soreness and redness where you have the injections or the drip.

Studies looking at women who already had eclampsia showed that magnesium sulphate was **safer for mothers** than diazepam, phenytoin, or a combination of different drugs (meperidine, chlorpromazine, and promethazine). <sup>[105]</sup> It also seemed to be **safer for babies** than phenytoin or the combination of the three drugs.

## Pre-eclampsia

There doesn't seem to be any long-term side effects for mothers who take magnesium sulphate, or for their babies.<sup>[109]</sup> Researchers followed women for two years, and babies for 18 months. They didn't find any side effects during this time.

### How good is the research on magnesium sulphate for treating severe pre-eclampsia or eclampsia?

#### If you have severe pre-eclampsia

There is good evidence that magnesium sulphate helps to stop women with severe pre-eclampsia getting seizures (fits). Once you have a seizure, doctors say you have eclampsia. So that means that magnesium sulphate works to stop your pre-eclampsia turning into eclampsia.

We found one summary of the research (called a systematic review) that looked at 13 good studies (called randomised controlled trials).<sup>[105]</sup> The summary involved 15,558 women.

The studies showed that for preventing seizures, magnesium sulphate worked much better than:

- A dummy treatment (a placebo)
- No treatment
- Two other drugs used to prevent seizures called phenytoin and diazepam.

#### If you have eclampsia

There is also good evidence that magnesium sulphate works for preventing more seizures in women who have already had one. In other words, it also works in women who have eclampsia.

We found one summary of the research (a systematic review).<sup>[105]</sup>

The summary showed that magnesium sulphate worked better and was safer for mothers and babies than three other drug treatments for eclampsia:

- Phenytoin
- Diazepam
- A combination of three drugs (meperidine, chlorpromazine, and promethazine).

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## Drugs to lower very high blood pressure during pregnancy

In this section

# Pre-eclampsia

[Do they work?](#)

[What are they?](#)

[How can they help?](#)

[How do they work?](#)

[Can they be harmful?](#)

[How good is the research on drugs to lower very high blood pressure during pregnancy?](#)

This information is for women with severe pre-eclampsia. It tells you about drugs to lower very high blood pressure during pregnancy, a treatment used for severe pre-eclampsia. It is based on the best and most up-to-date research.

## Do they work?

Probably. But we can't say for sure because there has not been any good research showing that these drugs work better than a dummy treatment (a placebo) or no treatment in pregnant women with very high blood pressure. That's because doctors agree that if a woman has very high blood pressure, she should have drugs to try to bring her blood pressure down. So it would not be fair to do studies in which some women got the treatment and others did not.

## What are they?

Drugs that lower your blood pressure are called **antihypertensive drugs**. You need a prescription from your doctor to get them.

There are different types of antihypertensive drugs. They bring down blood pressure in different ways.

These are the ones (with brand names) that have been studied for treating very high blood pressure during pregnancy:

- diazoxide (Eudemine)
- epoprostenol (Flolan)
- hydralazine (Apresoline)
- labetalol (Trandate)
- magnesium sulphate
- methyldopa (Aldomet)
- nifedipine (Adalat)
- nimodipine (Nimotop)
- prazosin (Hypovase).



## Pre-eclampsia

Your doctor probably will prescribe one of these drugs if you have to stay in hospital because of very high blood pressure.

They come as tablets and injections. But you will probably be given injections if your blood pressure is very high.

Doctors say your blood pressure is very high if:

- Your top blood pressure number (systolic pressure) is 170 or higher, **or**
- Your bottom blood pressure number (diastolic pressure) is 110 or higher.

For more, see [Blood pressure during pregnancy](#) .

Once your blood pressure reaches these levels, it can damage the walls of your blood vessels. This can lead to a **stroke** or serious problems with your **liver** or **kidneys** .

It can also cause problems for your baby.<sup>[110]</sup> For example, it can make the organ that joins you and your baby (the **placenta** ) pull away from the wall of your womb. Doctors call that **placental abruption**. It can be dangerous for both of you.

### How can they help?

Most of these drugs work equally well at bringing down your blood pressure.<sup>[110]</sup> <sup>[111]</sup>  
<sup>[112]</sup>

### How do they work?

High blood pressure is one of the main signs of pre-eclampsia. If you have severe pre-eclampsia, your blood pressure may get very high.

Drugs that lower high blood pressure work in people who are not pregnant. So it is not a surprise that they also work in pregnant women. They all work in slightly different ways.

### Can they be harmful?

Most of the studies we looked at didn't talk about side effects, but those that did mentioned the following.<sup>[110]</sup>

- **Diazoxide** caused some women's blood pressure to go too low in one study. But this can happen with most drugs for high blood pressure.
- **Hydralazine** caused headaches, redness in the face, dizziness, and tingling of the scalp.
- **Labetalol** caused redness in the face, dizziness, and tingling of the scalp.
- **Nifedipine** caused redness in the face, nausea, and throwing up.

### How good is the research on drugs to lower very high blood pressure during pregnancy?

There hasn't been any good research showing that drugs that lower blood pressure work better than a dummy treatment (a [placebo](#)) for bringing down very [high blood pressure](#) during pregnancy.

This is because doctors agree that pregnant women with very high blood pressure should have this treatment. So it would be unfair to do studies in which some women would not get the treatment that doctors think is best for them.

Drugs that lower blood pressure are called **antihypertensive drugs**. There are different kinds. They bring down blood pressure in different ways.

There is good evidence that most of these drugs work as well as each other in bringing down blood pressure.

We found one summary of the research (a [systematic review](#)) that looked at 35 good studies (called [randomised controlled trials](#)).<sup>[110]</sup> The studies compared many antihypertensive drugs. They involved 3,573 women. The summary showed that all the drugs worked about the same.

We also found one good study (a randomised controlled trial) of 126 women. This study showed that the drug nifedipine worked better for controlling blood pressure than the drug hydralazine.

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## Antioxidants for treating severe pre-eclampsia

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[How can they help?](#)

[How do they work?](#)

[Can they be harmful?](#)

[How good is the research on antioxidants for treating severe pre-eclampsia?](#)

This information is for women with severe pre-eclampsia. It tells you about antioxidants, a treatment used for severe pre-eclampsia. It is based on the best and most up-to-date research.

### Do they work?

We don't know. There hasn't been enough research to tell whether antioxidants help women with severe pre-eclampsia or their babies.

### What are they?

Substances called **free radicals** can have a damaging effect on the cells in your body. Chemicals called antioxidants help to mop up free radicals, and stop them causing damage.<sup>[95]</sup>

## Pre-eclampsia

There are lots of different types of antioxidants. For treating severe pre-eclampsia, one study has looked at a combination of vitamin E and vitamin C, plus a drug called allopurinol (one brand name is Zyloric).

You can get vitamin C and vitamin E from some of the foods that you eat. For example, vitamin C is found in citrus fruit like oranges.

But you can also get antioxidants as tablets. Often, different antioxidants are put together in a single tablet.

You can buy tablets of vitamin C and capsules of vitamin E over the counter from a pharmacy or from a health food shop. But **always check with your doctor** before taking anything new when you are pregnant. Your doctor can tell you if it is safe for you and your baby.

Allopurinol is a medicine that is normally given to prevent a condition called **gout**. You need a prescription from your doctor to get it.

### How can they help?

We don't know if they can help. There hasn't been enough research to tell us.

### How do they work?

We don't know exactly why antioxidants should help in severe pre-eclampsia. But we do know that they protect your cells from damage caused by free radicals. And free radicals may be partly to blame for the damage that happens to your blood vessels in pre-eclampsia.

Doctors thought that giving antioxidants to women with severe pre-eclampsia could slow down the condition. But there isn't any evidence that this is true.

### Can they be harmful?

The study we looked at didn't show any clear harms from antioxidants.<sup>[113]</sup> But we do know they can cause the following side effects.

- **Vitamin C** in high doses (more than 2,000 milligrams a day) can give you an upset stomach and **diarrhoea**.<sup>[114]</sup>
- **Vitamin E** can cause bleeding problems if you take more than 1,500 international units (IU for short) a day.<sup>[115]</sup>
- **Allopurinol** can cause an upset stomach, diarrhoea, and drowsiness.<sup>[116]</sup>

### How good is the research on antioxidants for treating severe pre-eclampsia?

There isn't enough evidence to tell if antioxidants work for treating severe pre-eclampsia.

We found one good study (a [randomised controlled trial](#)).<sup>[117]</sup> The study involved 56 women. All of them had to stay in hospital because of severe pre-eclampsia at 24 weeks to 32 weeks of pregnancy.

Some of the women in the study took a combination of vitamin C, vitamin E, and allopurinol. Other women took a dummy treatment (a [placebo](#)).

Unfortunately, the study was too small to give us reliable results.

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### Pain relief during labour for treating severe pre-eclampsia

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 pain relief during labour for treating severe pre-eclampsia?](#)

This information is for women with severe pre-eclampsia. It tells you about pain relief during labour, a treatment used for severe pre-eclampsia. It is based on the best and most up-to-date research.

#### Does it work?

We don't know. There isn't any evidence that the kind of pain relief you have during labour makes any difference if you have severe pre-eclampsia.

But we do know that having a kind of pain relief called [epidural analgesia](#) works best for dulling or stopping the pain.

#### What is it?

If you need pain relief during labour, your doctor may offer you two choices.

- **Epidural analgesia.** Pain medicine is put in the space surrounding the covering of your spinal cord (this is called the epidural space). It blocks the pain signals coming from your womb and birth canal.
- **A painkiller given by injection or by a drip into a vein** (an [intravenous infusion](#)). The main drug used is meperidine, also called pethidine. You can control how much pain relief you get.

## How can it help?

We don't know if the kind of pain relief used in labour makes any difference to the pre-eclampsia.

But epidural analgesia works better than meperidine for **stopping the pain**. And it doesn't seem to increase your risk of having a **caesarean section**, as some doctors used to think.

But epidurals can also: <sup>[118]</sup>

- Make the second stage of your labour longer (this is the 'pushing stage' of labour, which ends when your baby is born)
- Increase the risk that your baby will get an **infection**
- Make it more likely that your doctor will have to use instruments, such as forceps or a special vacuum, to deliver your baby.

## How does it work?

Epidural analgesia can bring down your **blood pressure**. So doctors thought it may help in the treatment of high blood pressure or pre-eclampsia during labour. But there isn't any evidence that this is true.

## Can it be harmful?

The studies we looked at found that, compared with meperidine, epidural analgesia: <sup>[118]</sup>  
<sub>[119]</sub>

- Made the second stage of labour longer by 53 minutes on average
- Made some women's blood pressure go too low, so they needed treatment to bring it back up (this didn't happen at all with meperidine)
- Made the risk of infection in the newborn baby about three times higher
- Made the risk of needing a delivery using instruments about two times higher.

But babies born to women given meperidine were much more likely to need treatment with a drug called naloxone for breathing problems after delivery. That is because drugs like meperidine can slow down your baby's breathing a lot.

### How good is the research on pain relief during labour for treating severe pre-eclampsia?

There isn't any evidence that the kind of pain relief you have during labour makes a difference to **high blood pressure** or severe pre-eclampsia.

But a type of pain relief called **epidural analgesia** can relieve your pain better than the drug meperidine.

We found two good studies (called **randomised controlled trials**). In the studies, some women had an epidural, while other women had meperidine by a drip (an **intravenous infusion**) that they could control themselves. One of the studies involved 105 women with severe pre-eclampsia.<sup>[120]</sup> The other involved 738 women with high blood pressure that came on during pregnancy.<sup>[121]</sup>

The studies showed that the epidural analgesia worked better at relieving pain. But it didn't work better in any other way.

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### Early delivery for treating severe pre-eclampsia that starts early in pregnancy

In this section

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[Can it be harmful?](#)

[How good is the research on early delivery for treating severe pre-eclampsia that starts early in pregnancy?](#)

This information is for women with severe pre-eclampsia. It tells you about early delivery, a treatment used for severe pre-eclampsia that starts early in pregnancy. It is based on the best and most up-to-date research.

#### Does it work?

We don't know. There hasn't been enough research to show if it is better for women who get severe pre-eclampsia **early in their pregnancy** to have their babies straight away or to wait.

#### What is it?

If you get severe pre-eclampsia **before 34 weeks of pregnancy**, you can have one of two types of care.

- **Early delivery.** This means delivering your baby straight away. You may be given drugs to start your labour (called inducing labour). Or you may have an operation to deliver your baby (called a **caesarean section**). Another name for early delivery is interventionist management.

## Pre-eclampsia

- **Delayed delivery.** This means waiting days or even weeks to deliver your baby. It is done to give your baby more time to mature in your womb. Another name for delayed delivery is expectant management.

If you have severe pre-eclampsia, you will probably be looked after in hospital. Your doctor will decide what's best for you by checking your health and your baby's health. For more, see [Hospital care for pre-eclampsia](#) .

### How can it help?

There isn't enough evidence to say whether early delivery or delayed delivery is best for mothers and babies. <sup>[122]</sup>

### How does it work?

**Early delivery** may seem to be a better choice **for mothers**. That is because putting off delivery is likely to increase their risk of getting dangerous problems like **seizures** (fits). If you get these, doctors say you have eclampsia.

**Delayed delivery** may seem to be a better option **for babies**. That is because it gives them more time to grow.

But in fact we can't say whether either type is best for mothers or for babies. <sup>[122]</sup>

### Can it be harmful?

The studies we looked at didn't find any evidence that early delivery was harmful to mothers. But they showed some harms for babies. <sup>[122]</sup>

#### **Babies delivered early were more likely to:**

- Have trouble breathing (called respiratory distress syndrome)
- Have a serious **infection** (called necrotising enterocolitis)
- Have to stay in a special part of the hospital called the neonatal intensive care unit (NICU for short).

But **babies delivered early were less likely** to be small for their delivery date than babies who were born later. <sup>[122]</sup>

### How good is the research on early delivery for treating severe pre-eclampsia that starts early in pregnancy?

If you get severe pre-eclampsia **early** in your pregnancy, there isn't any good evidence that having your baby early is better for you or your baby than waiting to give your baby more time to mature in your womb.

## Pre-eclampsia

We found one summary of the research (called a [systematic review](#)).<sup>[122]</sup> It looked at four good studies (called [randomised controlled trials](#)). The studies compared early delivery with delayed delivery. They involved 425 women with severe pre-eclampsia who were 24 weeks to 34 weeks pregnant.

There wasn't enough evidence to show whether either type of care:

- Made it more likely that babies would die in the womb or after delivery
- Made any difference to the mother's health.

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## Making more blood fluid for treating severe pre-eclampsia

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[What is the evidence for making more blood fluid for treating severe pre-eclampsia?](#)

This information is for women with severe pre-eclampsia. It tells you about making more blood fluid, a treatment used for severe pre-eclampsia. It is based on the best and most up-to-date research.

### Does it work?

We don't know. There hasn't been enough research to show whether making more blood fluid can help if you have severe pre-eclampsia.

### What is it?

The liquid part of your blood is called **plasma**. It carries the cells in your blood.

Making more of this liquid is called **plasma volume expansion**. For this treatment, you are given fluid by a drip into a [vein](#) (an [intravenous infusion](#)). This boosts the amount of plasma.

This treatment is a very specialised one. It has to be done in hospital while your doctor watches you closely. This is because your doctor needs to make sure you get **just enough** fluid but not too much.

Only some doctors give this treatment. And it may be done only as part of a study.

If you get more fluid than your system can take up or get rid of, you can get serious problems (complications). One of these is fluid building up in your lungs. Doctors call that **pulmonary oedema**.



## How can it help?

There isn't enough research to say whether this treatment helps mothers and babies. [\[123\]](#) [\[124\]](#)

## How does it work?

Normally, the amount of plasma in your body increases slowly during the second half of your pregnancy. But in pre-eclampsia, you don't have as much plasma as you should have.

Doctors thought that giving women more plasma may help them and their babies. But there isn't any evidence that this is true.

## Can it be harmful?

In the studies we looked at, women who had treatment to make more plasma were no more likely to need extra treatment or to have a **caesarean section** than women who had a dummy treatment (a **placebo**) or no treatment.

Other studies have been done on men and on women who were not pregnant. [\[125\]](#) [\[126\]](#)  
In these studies, people were more likely to die if they got one type of fluid (called colloid solution) than if they did not have any treatment or had treatment with another type of fluid (called a crystalloid solution).

## What is the evidence for making more blood fluid for treating severe pre-eclampsia?

There isn't enough evidence to say whether making more blood fluid works for treating severe pre-eclampsia. The fluid part of your blood is called **plasma**. So doctors call this treatment **plasma volume expansion**.

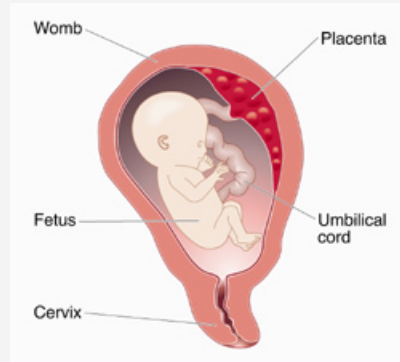
We found one summary of the research (called a **systematic review**). [\[124\]](#) It looked at three good studies (called **randomised controlled trials**). The studies involved 61 pregnant women with either pre-eclampsia or **high blood pressure**.

Some women had treatment to make more plasma. They got a fluid called colloid solution. Other women had a dummy treatment (a **placebo**) or no treatment at all.

Unfortunately, the studies were too small to have reliable results.

## Further informations:

### How the placenta grows



The placenta joins you and your baby in your womb.

The placenta grows in your womb when you get pregnant. It is shaped like a plate. It joins your circulation to your baby's circulation. That lets certain substances pass back and forth between the two of you:

- **Nutrients and oxygen** from you pass to your baby through the placenta
- **Waste products** from your baby pass back to you through the placenta.

It takes a while for the placenta to grow enough to do its job. In fact, it doesn't start working fully until you are about 14 weeks pregnant.

The placenta needs to get more and more blood from you as your baby grows. To make this happen, cells from your baby grow into the tiny blood vessels in your womb. This makes the blood vessels bigger. There are about 150 of these big blood vessels.<sup>[6]</sup> They are shaped like funnels. They bring blood to the placenta.

By the time you are about 20 weeks pregnant, these blood vessels are four times to six times wider than they were before. They can carry much more blood. They stop growing at this point.

In women who get pre-eclampsia, these blood vessels don't grow properly early on in pregnancy. But it can take weeks or months for this to lead to the illness we call pre-eclampsia.

### Pre-eclampsia and your baby

Pre-eclampsia can affect both you and your unborn baby. That's because it starts with a problem in the organ that joins the two of you. That organ is called the **placenta**.

In pre-eclampsia, the placenta does not get as much blood from you as it should. Whether this affects your baby, and how badly, depends on how much blood gets through to your baby.

The main thing that can happen if your baby doesn't get enough blood is that he or she may not grow properly in your womb. It happens to about 3 in 10 babies whose mothers have pre-eclampsia. <sup>[7]</sup>

If you have severe pre-eclampsia and it's not treated, some other things may happen.

- Your baby may not get enough oxygen. If this is serious, your baby could die.
- There may not be enough fluid around your baby in your womb. This can stop your baby growing properly too.
- The placenta may break loose from where it is joined to your womb. This can cause heavy bleeding and other problems for you. And your baby can die.
- Your baby may need to be born early. Doctors call this being premature. In that case, your baby may need special care.

But the good news is that with modern care before and after birth, doctors can usually pick up these problems in time to save the baby.

### Pre-eclampsia and you

There is a lot more to pre-eclampsia than just high blood pressure. In fact, pre-eclampsia can cause problems in virtually any part of your body. And it affects different women in different ways. <sup>[8]</sup>

Pre-eclampsia can affect you as well as your unborn baby. That's because it starts with a problem in the organ that joins you and your baby in your womb. That organ is called the **placenta**.

No one knows exactly how the unhealthy placenta makes you ill. But experts think that harmful chemicals from the placenta get back into your bloodstream. Then they damage the lining of your blood vessels. <sup>[9]</sup>

Because of the damage to your blood vessels, you get:

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- High blood pressure
- Protein leaking out of your blood vessels and into your urine
- Water leaking out of your blood vessels, causing swelling in your face, hands, or feet (but this doesn't always happen).

These changes in themselves don't make you ill. But they can lead to serious problems (complications), such as:<sup>[10]</sup>

- Eclampsia ( seizures or fits)
- Kidney problems
- Liver damage
- Lung problems
- Heart problems
- Eye problems
- Problems with the way your blood clots, leading to heavy bleeding ( haemorrhage )
- Stroke .

Fortunately, these problems are now quite rare in the UK. This is partly because the care women get during and after pregnancy helps to pick up and treat pre-eclampsia before it gets dangerous. It may also be because women who get pregnant in the UK are healthier than they used to be.

### Blood pressure during pregnancy

Blood pressure is the pressure with which blood moves through your arteries . These are the blood vessels that carry blood from your heart to all parts of your body.<sup>[11]</sup>

Doctors and nurses measure your blood pressure by putting an inflatable cuff around your upper arm. The measurement is usually taken automatically by a machine.

The result is given as **two numbers**.

- The first (top) number is your **systolic blood pressure**. That's the pressure when your heart squeezes blood out during beats.

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- The second (bottom) number is your **diastolic blood pressure**. That's the pressure when your heart relaxes between beats.

Blood pressure varies between people. But a typical normal reading for a young pregnant woman is a top number (systolic pressure) of 110 to 120 millimetres of mercury (mm Hg for short) and a bottom number (diastolic pressure) of 70 to 80 mm Hg.

This would be written down as, for example, 120/80 mm Hg. Your doctor or nurse will say your blood pressure is "120 over 80".<sup>[12]</sup>

If your blood pressure is lower than normal, it's not usually a problem. But if it is higher than normal, it can damage your arteries. This puts you at risk for heart disease, stroke, and kidney disease.

Your blood pressure is high if the top reading (your systolic pressure) is **higher than 140** and the bottom reading (diastolic pressure) is **higher than 90**.<sup>[13]</sup> In other words, your blood pressure is higher than 140 over 90.

During the first half of your pregnancy, your blood pressure will probably go lower than normal. This is because your hormones make your arteries open wider. During the second half of your pregnancy, your blood pressure will slowly rise back to normal.

If your blood pressure is higher than normal **in the first half of pregnancy**, it probably means you have had a blood pressure problem since before you got pregnant. Maybe you just didn't know about it.

If you get high blood pressure **in the second half of pregnancy**, it means one of three things.

- You had high blood pressure before you got pregnant (and maybe you didn't know it).
- Your blood pressure became high for the very first time in pregnancy. This means you may get high blood pressure later in your life.
- You have pre-eclampsia. In this case, you will also have protein in your urine. You may have other signs and symptoms too.

If your doctor thinks you have just high blood pressure (but not pre-eclampsia), he or she will watch you carefully until after your baby is born. This is because you could still get pre-eclampsia at any time.

### Risk factors for pre-eclampsia

Something that increases your chances of getting an illness is called a **risk factor**. Having a risk factor for pre-eclampsia does not mean that you will get it for sure. It just means you are more likely to get it than a woman who does not have that risk factor.

You are most likely to get pre-eclampsia if you have one or more of the risk factors listed below. <sup>[15]</sup>

- **Being older.** If you are over 40, you are nearly twice as likely to get pre-eclampsia as a woman under 40.
- **First pregnancy.** If you are pregnant for the first time, you are almost three times more likely to get pre-eclampsia than with a second or later pregnancy.
- **Having had pre-eclampsia before.** If you had pre-eclampsia in your first pregnancy, you are much more likely to get it next time than a woman who had a normal first pregnancy. For more, see [Your next pregnancy](#) .
- **Pre-eclampsia runs in your family.** If other women in your family have had pre-eclampsia, you are almost three times more likely to get it.
- **Carrying twins or more babies.** If you are pregnant with twins, you are nearly three times more likely to get pre-eclampsia. The more babies you are carrying, the greater your risk.
- **Being overweight.** If you are overweight before you get pregnant, you are two-and-a-half times more likely to get pre-eclampsia than someone who is not overweight.
- **Diabetes.** If you have the kind of **diabetes** where you need to have **insulin** injections, you are nearly four times more likely to get pre-eclampsia. You may hear that kind called insulin-dependent diabetes.
- **Antiphospholipid syndrome.** This is a disorder that affects the way your blood clots. It increases your risk of getting pre-eclampsia by almost 10 times.
- **Other health problems.** **High blood pressure** , **kidney disease** , and diseases where your immune system is too active, like **rheumatoid arthritis** , all increase your risk of pre-eclampsia. But we don't know by how much.
- **Longer time between pregnancies.** You are more likely to get pre-eclampsia in a second or later pregnancy if it has been 10 years or more since your last pregnancy.

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- **Change of partner.** Your risk of getting pre-eclampsia in a second or later pregnancy is higher if you became pregnant by a new partner. <sup>[16]</sup>
- **A pregnancy from donor eggs.** Women who get pregnant using eggs from a woman who donated them are more likely to get pre-eclampsia than women who use their own eggs. <sup>[17]</sup>

Surprisingly, women who smoke cigarettes are **less likely** to get pre-eclampsia than women who don't smoke. <sup>[18]</sup> We don't know why. But this benefit is far outweighed by the harms of smoking in pregnancy. Also, when women who smoke do get pre-eclampsia, it tends to be **worse for their babies** than for the babies of women who don't smoke.

### Your next pregnancy

If you have had pre-eclampsia in one pregnancy, you may worry that you will get it again in your next pregnancy.

Women who have had pre-eclampsia are much more likely to get it in their next pregnancy than women who have not had it before. <sup>[19]</sup> But the good news is that **most women don't get it again**. And those who do tend to get it later on in their next pregnancy, when it is likely to be less serious for mother and baby. <sup>[20]</sup>

You are most likely to get pre-eclampsia again if any of these things apply to you.

- You had pre-eclampsia **early** in your first pregnancy. Women who got pre-eclampsia before 30 weeks have a 4 in 10 chance of getting it again in their next pregnancy. <sup>[21]</sup> <sup>[22]</sup>
- You have a problem with the way your **blood clots**. You may have found out about this when you had pre-eclampsia the first time. <sup>[23]</sup>
- You had pre-eclampsia for the first time in a **second or later pregnancy**. <sup>[24]</sup>
- You become pregnant by a **new partner**.

If you had severe pre-eclampsia early in your first pregnancy, you may not have an entirely normal pregnancy the next time, even if you don't get pre-eclampsia. For example, you may have a smaller baby and an earlier delivery than a woman who didn't have pre-eclampsia before. <sup>[25]</sup>

If you are thinking about getting pregnant again after pre-eclampsia, **see a specialist doctor first**. This will give you a chance to:

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- Ask questions about what happened in the earlier pregnancy
- Have tests that will show if there are any things about your health that would put you at risk for pre-eclampsia next time
- Talk about what care you will need during your next pregnancy.

In your next pregnancy, you should be cared for by a specialist doctor. And you should have check-ups more often than usual during this pregnancy. <sup>[26]</sup>

There is no sure way to prevent pre-eclampsia. But you may be able to lower your risk by: <sup>[27]</sup>

- Taking a very **small dose of aspirin** every day during pregnancy, under strict supervision by your doctor
- Taking **calcium supplements** every day.

To learn more, see [Treatments for preventing pre-eclampsia](#) .

**Always check with your doctor** before you start taking anything new if you are pregnant. He or she can tell you if it is safe for you and your baby.

There is also no sure way for your doctor to tell if you will get pre-eclampsia again. That's why he or she needs to keep an eye on you with more frequent check-ups.

### Urine checks for protein

Normally, your urine has only a tiny bit of **protein** in it. That's because your **kidneys** work to keep protein in your bloodstream.

If you get protein in your urine when you are *not* pregnant, it probably means you have a kidney problem. If you get protein in your urine when you are pregnant, it probably means you have pre-eclampsia.

You get protein in your urine with pre-eclampsia because the illness damages the lining of your blood vessels. This lets protein in your blood leak out of your blood vessels. The protein that leaks out in your **kidneys** goes into your urine.

Your urine should be checked for protein every time you have your blood pressure checked. <sup>[32]</sup> To do this, you pass urine into a cup. Then a special paper strip is dipped into the urine. The strip is called a dipstick. So this test is known as a **dipstick test**.

This test shows whether you have protein in your urine and roughly how much. A tiny bit of protein is nothing to worry about. Doctors call this a **trace**.



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If you have more than a trace of protein, it is written as one or more 'plus' signs (+). The most you can have is four plusses (++++). The more plusses you have, the more protein you have in your urine and the more serious your pre-eclampsia is.

If you have just one plus (+) of protein in your urine, it may mean you have an infection instead. Your doctor may ask you to give some more urine to do a different test for this.

Dipstick tests are not always reliable. So if this test shows protein in your urine, you will have another test.

To get a better idea of how much protein you have in your urine, you'll be asked to collect all the urine you make in a 24-hour period.<sup>[33]</sup> This big sample of urine is then tested in a laboratory.

### Checks on your baby's health

During your pregnancy, you will have regular check-ups with your doctor or midwife. You may hear these called **antenatal check-ups**. Your doctor or midwife will check on your health and on your baby's health and development as well.

In the UK, the National Institute for Health and Care Excellence advises doctors and midwives to check on baby's growth and wellbeing at the following times during your pregnancy.<sup>[34]</sup>

**Between 10 weeks and 13 weeks**, you should have an ultrasound scan to:<sup>[35]</sup>

- See how many babies you are carrying
- See if your baby looks healthy
- Tell your baby's exact age
- Check your baby for any clear sign of problems.

**Between 18 weeks to 20 weeks**, you may have an extra ultrasound scan to check for problems in the way your baby is formed.

**At 25 weeks**, your doctor or midwife will measure how big your tummy is, from the top to the bottom of your womb. This is called the **symphysis-fundal height**. It is a way of working out how big your baby is. The test is then done again at 28, 31, 34, 36, 38, and 40 weeks (and 41 weeks if you have not yet had your baby). This is to track your baby's growth.

**At 36 weeks**, your doctor or midwife will check which way your baby is facing in your womb by feeling your tummy.

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These are the standard checks for a normal pregnancy. If any of these tests suggest your baby is not growing properly, you will be offered extra tests and be checked more often from then on.

Doctors and midwives don't regularly check to see how much your baby is moving in your womb. But if you notice your baby is much less active than before, tell your doctor or midwife.

### Hospital care for pre-eclampsia

If you get severe pre-eclampsia and need to go to hospital, your health and your baby's health are in danger. **Having your baby is the only cure.** You may be able to keep your pregnancy going for a week or two. But you may have to have your baby within a few days. <sup>[43]</sup>

If you are **34 weeks pregnant or more**, it won't help your baby very much to spend more time in your womb. Your doctor will probably deliver your baby as soon as he or she thinks it is safe. <sup>[44]</sup>

But if you are **less than 34 weeks pregnant**, your doctor may decide to look after you in hospital for a while. This is to give your baby more time to grow in your womb. <sup>[45]</sup>

While you are in hospital, you are likely to be treated with two types of drugs.

- Drugs to control your high blood pressure . These don't cure the pre-eclampsia. But they do lower your risk of having a stroke . And your baby may be more healthy after he or she is born. <sup>[46]</sup>
- A drug called magnesium sulphate. This is to lower your risk of having seizures (fits). This drug is usually given by injection after your doctor has decided to deliver your baby. You will keep having this drug for 24 hours after your baby is born. <sup>[44]</sup>

To read more about these treatments, see [Treatments for severe pre-eclampsia](#) .

You may be less than 34 weeks pregnant but still likely to have your baby within the next few days. In that case, you will probably also be given injections of drugs called **steroids**. Steroids help your baby's lungs to mature. And they help your baby to cope better with being born early. <sup>[44]</sup>

While you are in hospital, you and your unborn baby will be checked and tested regularly. This is to watch the pre-eclampsia.

**You** should have:

- A blood pressure measurement at least four times a day

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- Blood tests two times each week to check how well your kidneys and liver are working, and how well your blood is clotting
- A test to measure how much protein you have in your urine.

**Your baby** should have:

- An ultrasound scan to check his or her weight
- A test called an umbilical Doppler ultrasound two times each week to see how much blood is getting through to your baby
- A check of how fast his or her heart is beating every day
- A check of how much fluid is around him or her every day.

### Complications of pre-eclampsia

Pre-eclampsia is an illness that usually gets worse once it has started. It can cause problems (complications) in many parts of your body.

You may be frustrated and upset to have to stay in hospital with severe pre-eclampsia. This is especially so if, like many women, you feel fine.

But it's important to be in hospital. That's because your doctor can watch you closely and make sure your baby is delivered before serious problems happen.

Here are the main complications you can get from severe pre-eclampsia. <sup>[47]</sup>

- **Seizures (fits).** Doctors call this **eclampsia**. The seizures make you black out (lose consciousness) for a short time.
- **Problems with your liver.** This can cause severe pain under your ribs. Your liver swells. It can even burst. But this is rare. <sup>[48]</sup>
- **Problems with the way your blood clots.** Your body's system for making your blood clot may go out of control. You can get blockages in small blood vessels. You can get heavy bleeding ( haemorrhage ) too.
- **HELLP syndrome.** This affects your liver and your blood-clotting system. It can lead to heavy bleeding. H stands for haemolysis (red cells in your blood burst), EL stands for elevated liver enzymes (a sign of liver damage), and LP stands for low platelets (platelets are tiny particles that help your blood to clot).

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- **The placenta pulls away from your womb.** Doctors call this placental abruption. It can kill your baby. And it can cause heavy bleeding and other problems for you.
- **A stroke caused by a blood vessel bursting in the brain.** This type of stroke is most likely to happen if you have very high blood pressure and drugs don't work to bring it down.
- **Kidney problems.** Your kidneys may not work properly. Or they may just stop working. But they should get better on their own after you have your baby. <sup>[49]</sup>
- **Eye problems.** You can lose your eyesight, but this is temporary.
- **Heart problems.** These include heart attack and heart failure .
- **Lung problems.** One of these problems is that fluid builds up in your lungs. Doctors call that **pulmonary oedema**.

Most of these problems are bad enough for you to need treatment in a part of a hospital called a high-dependency unit, and to have your baby delivered as soon as it's safe.

But sometimes complications happen during labour or even after delivery. In fact, more women have seizures after delivery than before. <sup>[49]</sup>

But the good news is that these complications are quite rare in the UK. And it's very rare for a woman to die. One large study looked at women in a part of Scotland over 20 years. <sup>[50]</sup> More than 4,100 women had pre-eclampsia during that time. But only 6 in 100 women got serious complications.

The most common complications were:

- The placenta pulling away from the womb, which happened in about 3 in 100 women
- Problems with blood clotting, which happened in about 3 in 100 women too
- Seizures (eclampsia), which happened in about 2 in 100 women.

## Delivery and after

### Your delivery

If you have pre-eclampsia, you may need to deliver your baby early. If you do, your doctor will advise you about the way to deliver that is best for you and your baby. There are two ways.

## Pre-eclampsia

- You can have your baby by being given drugs that start your labour. This is called **inducing labour**.
- You can have your baby by having an operation. Your doctor makes a cut in your tummy and in your womb, and then pulls your baby out. This is called a **caesarean section**.

In the UK, you are more likely to have a caesarean section if you are less than 32 weeks pregnant. That's because it is hard to start up labour at that time in pregnancy. <sup>[51]</sup>

If you have a caesarean section, it is better for you to have pain relief that lets you stay awake during the operation. That means having pain relief with either epidural analgesia or spinal analgesia. These block pain signals coming from your womb, but they don't put you to sleep. If you have a general anaesthetic, which puts you to sleep, your blood pressure can go up even more. <sup>[52]</sup>

If you have your labour induced, your doctor may advise you to have pain relief with epidural analgesia. This is because labour can be more painful and stressful when it is induced. Also, having an epidural makes it easier to have a caesarean section, if you need to have one later on.

If you are being given drugs for high blood pressure or drugs to prevent seizures (fits), you will keep having these throughout your labour and delivery. Your blood pressure and your baby's heartbeat will probably be watched all this time too.

### After your baby is born

Most women who have had severe pre-eclampsia get back to normal health after they have their baby. But sometimes pre-eclampsia gets worse in the first day or two after delivery. So you will probably be looked after at first in a part of the hospital called a high-dependency unit. There, your doctor can keep a close eye on you until tests show you are getting better. <sup>[53]</sup>

You will probably need to stay in hospital for a few days. You may have to stay longer if you've had a caesarean section.

Your blood pressure will probably be the last thing to get back to normal. For most women, it falls in the first few days after delivery. But it can stay high for up to three months. <sup>[51]</sup> If this happens to you, you may need to keep taking tablets to lower your blood pressure after you go home. There are lots of different drugs. Some of them are safe to take while you are breastfeeding.

Your GP or midwife should check your blood pressure regularly until it gets back to normal. If your blood pressure is still high 12 weeks after delivery, you will probably have a blood pressure problem for a long time. So you will likely need to carry on having treatment. <sup>[54]</sup>

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Even if your blood pressure has come down, you will have a higher risk of getting heart disease later in your life if you: <sup>[54]</sup>

- Got pre-eclampsia early in your pregnancy
- Had pre-eclampsia in a second or later pregnancy.

But you may be able to lower your risk by making some changes to the way you live. Ask your doctor what you can do.

### Your baby's health after delivery

What happens to your baby after delivery depends on several things:

- How early he or she was born
- How small he or she is
- How well developed his or her organs are
- Whether he or she was harmed in the womb by the pre-eclampsia.

All babies born **before 37 weeks** of pregnancy are said to be early. Doctors call this being premature. Lots of babies used to die because they were born premature. But better medical care nowadays means that most babies live.

The more mature your baby is, the more likely he or she is to live. But these days, even a baby born three months early, at 28 weeks, has a good chance of living. Eight in 10 babies born at 28 weeks survive. <sup>[55]</sup>

If your baby is premature, he or she will probably need special care in a part of a hospital called a neonatal intensive care unit (NICU for short). Babies stay there until their organs have matured enough so that they can breathe and feed on their own.

Premature babies can get several serious health problems:

- Breathing problems, known as respiratory distress syndrome
- Bleeding into their brain
- Feeding problems
- Kidney problems

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- Eye problems
- Infections
- Anaemia
- Low blood sugar
- Lung disease
- Heart disease .

Your baby may need to spend weeks or even months in special care before going home.

Many babies who are born early go on to have healthy, normal lives. But some have health problems or problems with development that carry on into childhood or even later life. The very smallest babies may never catch up completely on the growth they missed out on in the womb.

Some very small babies born to mothers with pre-eclampsia have high blood pressure themselves in the first week of life. But doctors aren't sure what this means for their health later on. <sup>[56]</sup>

Girls born to women with pre-eclampsia are more likely to get pre-eclampsia if they get pregnant as adults.

### Glossary:

#### placenta

The placenta is an organ that grows in the womb during pregnancy. It joins the woman to the growing baby. The placenta provides the baby with oxygen, water and nutrients from the mother's blood. It also produces the hormones that are involved in pregnancy.

#### blood pressure

Blood pressure is the amount of force that's exerted by your blood on to your blood vessels. You can think of it like the water pressure in your home: the more pressure you have, the faster and more forcefully the water flows out of the shower. Blood pressure is measured in millimetres of mercury (written as mm Hg). When your blood pressure is taken, the measurement is given as two numbers, for example 120/80 mm Hg. The first, higher, number is called the systolic pressure, and the second, lower, number is the diastolic pressure. The systolic number is the highest pressure that occurs while your heart is pushing blood into your arteries. The diastolic number is the lowest pressure that happens when your heart is relaxing and is not pushing your blood.

#### seizure

A seizure (or fit) is when there is too much electrical activity in your brain, which results in muscle twitching and other symptoms.

#### high blood pressure

Your blood pressure is considered to be high when it is above the accepted normal range. The usual limit for normal blood pressure is 140/90. If either the first (systolic) number is above 140 or the lower (diastolic) number is above 90, a person is considered to have high blood pressure. Doctors sometimes call high blood pressure 'hypertension'.

#### 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.

#### diabetes

Diabetes is a condition that causes too much sugar (glucose) to circulate in the blood. It happens when the body stops making a hormone called insulin (type 1 diabetes) or when insulin stops working (type 2 diabetes).

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## proteins

A lot of your body's tissues are made out of proteins. Proteins can be made in your cells. Proteins are also part of the food you eat, particularly meat and dairy products. Your body breaks down the protein you eat into amino acids. Your cells then use these amino acids to build new proteins, which make up muscles, joints, hair and other parts of your body.

## 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.

## haemorrhage

Haemorrhage is a word doctors use for bleeding. Any time blood escapes from a vessel, it's called a haemorrhage.

## 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.

## arteries

Arteries are the blood vessels that take blood that is rich in oxygen and food away from your heart. The arteries carry this blood to all the tissues in your body.

## heart disease

You get heart disease when your heart isn't able to pump blood as well as it should. This can happen for a variety of reasons.

## kidney disease

Your kidneys are the organs in your body that make urine. Kidney diseases are diseases in which your kidneys have been damaged. Kidney disease can be caused by several things, including high blood pressure (hypertension).

## 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.

## rheumatoid arthritis

If you have rheumatoid arthritis, your joints get painful, swollen, and stiff. Rheumatoid arthritis is caused by inflammation inside your joints. It happens when your immune system attacks the lining of your joints.

## insulin

Insulin is a hormone that helps your body use glucose. Glucose is a type of sugar that gives you energy. Insulin keeps the levels of glucose in your body steady. Insulin also helps glucose to be carried in your blood, so that the glucose can get into your cells. People who have diabetes do not have enough insulin or do not react to insulin strongly enough. This means they can get too much glucose in their blood.

## immune system

Your immune system is made up of the parts of your body that fight infection. When bacteria or viruses get into your body, it's your immune system that kills them. Antibodies and white blood cells are part of your immune system. They travel in your blood and attack bacteria, viruses and other things that could damage your body.

## 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.

## infection

You get an infection when bacteria, a fungus, or a virus get into a part of your body where it shouldn't be. For example, an infection in your nose and airways causes the common cold. An infection in your skin can cause rashes such as athlete's foot. The organisms that cause infections are so tiny that you can't see them without a microscope.

## steroids

Steroids are a type of chemical. Your body naturally produces steroids, which play a part in many of its processes. For example, steroids are involved in how your immune system, reproductive system and metabolism work. Steroids can also be given as medicines and are used for a number of different conditions: including asthma, rheumatoid arthritis and eczema. Corticosteroids are not the same as the steroids used by some body builders and athletes. Those steroids are called 'anabolic steroids'.

## enzymes

Enzymes are chemicals in your body. They have lots of different functions, including playing a part in helping to digest food and starting other chemical reactions that keep the body working.

## acute myocardial infarction



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Acute myocardial infarction is what doctors call a heart attack. A heart attack is when your heart muscle gets damaged because it isn't getting enough blood and oxygen. This can happen if a branch of your coronary arteries becomes blocked. During a heart attack, you may have pain or heaviness over your chest, and pain, numbness or tingling in your jaw and left arm.

## heart failure

When the heart loses its ability to push enough blood through the blood vessels, it is called heart failure.

## epidural

Layers of tissue cover your brain and spinal cord. The epidural space is the space between two of these layers. Before surgery or a procedure, you may be given pain medicine in the epidural space of your spinal cord. You'll have no feeling in your body below where the medicine was injected.

## spinal anaesthesia

Spinal anaesthesia involves injecting painkillers into the canal next to your spinal cord (your spinal canal). The painkiller numb your lower body. Spinal anaesthesia is often used for surgery involving the pelvis, hips and legs, as well as for childbirth. It allows people to stay awake but not feel any pain.

## 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.

## anaemia

Anaemia is when you have too few red blood cells. Anaemia can make you get tired and breathless easily. It can also make you look pale. Anaemia can be caused by a number of different things, including problems with your diet, blood loss and some diseases.

## caesarean section

A caesarean section is an operation to take a baby out of a mother's womb. The surgeon makes a cut through her abdomen to take the baby out. You have this if there's a risk that a normal delivery through your vagina would cause harm to you or your baby.

## diarrhoea

Diarrhoea is when you have loose, watery stools and you need to go to the toilet far more often than usual. Doctors say you have diarrhoea if you need to go to the toilet more than three times a day.

## 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.

## lymph nodes

Lymph nodes (also called lymph glands) are small, bean-shaped lumps that you can't usually see or feel easily. You have them in various parts of your body, such as your neck, armpits, and groin. Lymph nodes filter lymph and remove unwanted things from your body, such as bacteria and cancer cells.

## 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 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.

## platelets

Platelets are small disc-shaped particles found in your blood (along with red blood cells and white blood cells). Platelets form the clots that stop the bleeding when you've been cut. People who don't have enough platelets have problems with bleeding too much.

## 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

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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.

## **intravenous infusion**

When a medicine or a fluid, such as blood, is fed directly into a vein, it's called an intravenous infusion (or IV). To give you an intravenous infusion, a nurse, technician or a doctor places a narrow plastic tube into a vein (usually in your arm) using a needle. The needle is then removed and the fluid is infused (or dripped) through the tube into the vein.

## **pneumonia**

Pneumonia is an infection in your lungs. Anything that causes infections (bacteria, viruses or fungi, for example) can give you pneumonia.

## **low blood pressure**

If your blood pressure is about 100/60 or less, your doctor may say that you have low blood pressure. Low blood pressure is usually not a problem unless it becomes too low to push blood to your brain and the rest of the body. If you have low blood pressure, you may sometimes feel dizzy when you stand up.

## **gout**

This is a disease of the joints that is caused by a buildup of a chemical called uric acid. This chemical actually forms a crystal within the blood that gets stuck in the joints, causing swelling and pain. Gout attacks often occur in the big toe, but the disease can affect other joints in the body as well. Attacks are excruciatingly painful, but, fortunately, can be treated with a variety of medicines and a special diet.

## **veins**

Veins are blood vessels that carry blood back to your heart after your blood has delivered oxygen and food to the tissues.

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