

This infoKID topic is for parents and carers about children's kidney conditions. Visit www.infoKID.org.uk to find more topics about conditions, tests & diagnosis, treatments and supporting information.

Each topic starts with an overview followed by several sections with more information.

[Links to sections](#) in topic | [Other topics](#) available on website

Glomerulonephritis is a group of conditions that cause inflammation (swelling) in the kidneys. Children with glomerulonephritis have blood and protein in their urine, and may have swelling in their body, especially in their face and legs. Glomerulonephritis may lead to other complications, including high blood pressure.

All children with glomerulonephritis are carefully monitored by a team of healthcare professionals. Some need to stay in hospital for a few days, but most of the time they will need to visit the hospital during the day only.

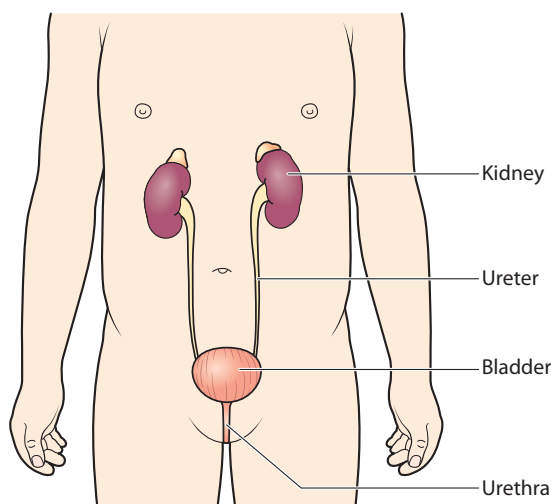
For many children, glomerulonephritis is quite mild and they will get better. Some need further care to help them get back to health. Some children will have long-term problems with their kidneys, and will need to be monitored and have specialist treatment when it is needed.

If your doctor has told you that your child has a specific type of glomerulonephritis, or a condition that causes glomerulonephritis, please go to the topic on www.infoKID.org

- **Post-infectious glomerulonephritis (PIGN)**
- **Membranoproliferative glomerulonephritis (MPGN)**
- **IgA nephropathy**
- **Henoch-Schönlein purpura (HSP)**



Overview



About the urinary system

The **urinary system** gets rid of things that the body no longer needs, so that we can grow and stay healthy.

The **kidneys** are bean-shaped organs. They filter blood to remove extra water, salt and waste in urine (wee). Most of us have two kidneys. They are at the back on either side of our spine (backbone), near the bottom edge of our ribs.

The two **ureters** are long tubes that carry urine from the kidneys to the bladder.

The **bladder** is a bag that stores urine until we are ready to urinate (wee). It sits low down in the tummy area.

The **urethra** is a tube that carries urine from the bladder to the outside of the body.

Symptoms and complications

Symptoms and signs

Some children with glomerulonephritis do not have any symptoms and signs, especially in the early stages of the disease. Common symptoms and signs of glomerulonephritis include:

- blood in the urine (**haematuria**) – you cannot always see the blood, but if there is a lot, the urine may be coloured red or dark brown (like a cola drink)
- protein in the urine (**proteinuria**) – you cannot usually see the protein, but sometimes it can make the urine look frothy. It can be found on a simple urine test.
- urinating less often or smaller amounts
- swelling or puffiness in different parts of the body, especially around the eyes, legs and feet – this is called **oedema**
- swelling in the abdomen (tummy) or breathlessness, but this is rare

Complications

Some children have complications – health problems that happen because of the condition or its treatment.

- Glomerulonephritis may lead to blood pressure that is too high (**hypertension**).
- Occasionally, the condition gets worse quickly and the kidneys work less well than normal – this is called **rapidly progressive glomerulonephritis (RPGN)**.
- RPGN is one cause of **acute kidney injury (AKI)** – when the kidneys quickly stop working as well as they should, over a short time.

» [More about symptoms and complications](#)

Causes

Glomerulonephritis can happen in people of all ages, including children.

Occasionally, it is not known why a child has glomerulonephritis. It may happen:

- because of a problem with your child's immune system, which normally protects the body against infection and disease
- after an infection
- as part of another condition
- because it has been inherited (runs in families)

» [More about causes](#)

Tests and diagnosis

Your child's doctor can **diagnose** (identify) glomerulonephritis with a **urine test**. It is often picked up during a urine test for another reason – such as a **urinary tract infection (UTI)**.

Your doctor will speak with you and your child about the symptoms and do a physical examination. Your child may also need other tests, such as **blood tests** and an **ultrasound scan**.

» [More about tests and diagnosis](#)

Treatment

Where will my child be treated?

Your child will be looked after by a **paediatrician**, a children's doctor.

A few children are referred to a **paediatric renal unit**. This is a special unit for children with kidney problems, which may be in a different hospital to your own. Your child will be looked after by a **paediatric nephrologist**, a doctor who treats children with kidney problems.

Your child may need to stay in hospital for a few days or longer. Most of the time, children with glomerulonephritis have their care as **outpatients**. This means that your child will visit the hospital during the day and go home.

About treatment

Your child may need to make changes to what he or she eats or drinks. Many children need to take medicines that aim to reduce the amount of protein lost in their urine. Occasionally, other medicines are needed.

» [More about treatment](#)

About the future

Follow up

All children with glomerulonephritis need to go back to the hospital or clinic for follow-up appointments to check for any health problems.

Long-term effects

Your healthcare team will speak with you and your child about any long-term effects your child might have with glomerulonephritis.

For many children, the disease is quite mild. They will get better with no long-term problems with their kidneys. Some need further care to help them get back to health.

In some children, the kidneys stop working as well as they should – this happens slowly, often over many years. This is called **chronic kidney disease (CKD)**. If your child develops CKD, you will learn more over time about what to expect and how to help manage the condition.

» [More about the future](#)

Symptoms and complications

Symptoms and signs

Many children with glomerulonephritis may not notice any symptoms at first. The symptoms can vary from child to child. Examples are given below.

Blood in the urine

When **red blood cells** leak through the kidney's filters into the urine, this causes **haematuria** (blood in the urine). Sometimes you cannot see the blood, but if there is a lot, the urine may be coloured red or dark brown (like blackcurrant squash or a cola drink).

Protein in the urine

When **protein** leaks through the kidney's filters into the urine, this causes **proteinuria** (more protein in the urine than normal). You cannot usually see the protein, but occasionally it can make the urine look frothy.

Protein is an important part of our diet and is in most foods. When we eat protein, it is digested (broken down) in the stomach and gut and taken into the blood.

Problems urinating

Some children pass urine less often or pass smaller amounts.

Swelling

Some children have swelling or puffiness in different parts of their body, especially around their eyes, legs and feet (**oedema**).

Swelling in the tummy and breathlessness

- A few children get a large swelling in their abdomen (tummy area). This is called **ascites**. It happens when fluid builds up in the area around the organs in the abdomen – the **peritoneal cavity**.
 - A very small number of children feel breathless. This happens when fluid builds up in the area around their lungs.
- If your child has glomerulonephritis and a very swollen tummy or feels breathless, contact your doctor as soon as possible.

Other symptoms and signs

The below are occasionally found in children with glomerulonephritis:

- feeling tired, low energy or difficulty concentrating

- decreased appetite (not wanting to eat)
- nausea (feeling sick) or vomiting (being sick), or diarrhoea
- pain in the tummy
- headaches that keep coming back or that do not go away
- pain, stiffness or swelling of the joints

Complications

Some children have more **complications** – health problems that happen because of the condition or its treatment. These are more rare. Your child's healthcare team will carefully check for these, and speak with you about any treatment that your child may need.

High blood pressure

Glomerulonephritis can cause blood pressure that is too high (**hypertension**). In some children, this causes headaches, vomiting or blurred (fuzzy) vision.

Nephrotic syndrome

If too much protein is lost in the urine, this causes **nephrotic syndrome**.

Children with nephrotic syndrome often have **oedema**, which is swelling or puffiness, especially around their eyes or their legs and feet.

Rapidly progressive glomerulonephritis

Occasionally, glomerulonephritis gets worse quickly – this is called **rapidly progressive glomerulonephritis (RPGN)** or **crescentic glomerulonephritis**.

If this happens, your child will need to take medicines and may need more intensive treatment, such as **dialysis**, which uses special equipment to clean the blood. Some children with RPGN will get better, but a few will need long-term dialysis before they can have a kidney transplant.

This is one cause of **acute kidney injury** – when the kidneys quickly stop working as well as they should, over a short time.

Symptoms: Read more about why swelling happens

There are two reasons why children with glomerulonephritis get oedema.

- Sometimes, the damaged kidney filters (**glomeruli**) are not able to filter enough salt and water out of the blood into urine. After a while, there is too much salt and water in the body, which causes the swelling.
- Sometimes, the kidneys leak a large amount of protein, especially a type called **albumin**, into the urine. This leads to **nephrotic syndrome**. Fluid moves in and out of the bloodstream to nourish (feed) the body's cells. Albumin helps keep fluid in the bloodstream – if there is not enough albumin, fluid stays outside the bloodstream and in parts of the body. This causes the swelling.

Causes

Your doctor will try to find out what is causing the glomerulonephritis in your child. Occasionally it is not clear why the glomeruli are inflamed or damaged.

What happens in the kidneys

Inside each kidney are about a million tiny filters called glomeruli. They help to remove extra water, salt and waste, which are passed out of the body in urine. They also make sure the body keeps what it needs, such as blood cells, protein and other important chemicals.

In glomerulonephritis, the glomeruli become inflamed (swollen) or damaged. This causes both blood and protein to leak into the urine.

» [Read more about how glomerulonephritis happens on the next page](#)

After infection

Most children with glomerulonephritis get it after an infection – usually affecting the throat, nose or sinuses, or occasionally the skin. This type of glomerulonephritis is called **post-infectious glomerulonephritis (PIGN)**.

If the infection is caused by a type of bacteria called *Streptococcus*, it may be called **post-streptococcal glomerulonephritis (PSGN)**.

Most children recover from these infections. However, a small number of children get glomerulonephritis after about two weeks from the start of the infection. It is not always clear why a few children get this condition after an infection, though it may be because of problems with their immune system.

The immune system

Many germs – including bacteria and viruses – can make us sick if they get into the body. The immune system can kill these germs. However, if the immune system is not working properly, it can start to cause problems.

» [Read more about the immune system on the next page](#)

Types of glomerulonephritis linked to the immune system

- **IgA nephropathy**: proteins called IgA, which are part of the immune system, get trapped in the glomeruli. This is also called **Berger disease**.
- **Henoch–Schönlein purpura (HSP)**: IgA settles on blood vessels throughout the body. Children with HSP have a rash, and may have joint pain and tummy pain. Some cases of HSP affect the kidneys, causing glomerulonephritis.

- **Membranoproliferative glomerulonephritis (MPGN)**: a protein called complement, which is also part of the immune system, gets trapped in the glomeruli. This is also called **mesangiocapillary glomerulonephritis (MCGN)**.

Other conditions or infections

Sometimes glomerulonephritis is caused by another condition or infection.

- **Systemic lupus erythematosus (SLE, or lupus)**: the immune system does not work properly and attacks different parts of the body, sometimes including the kidneys.
- **ANCA-positive nephritis**: blood vessels in the kidney and other parts of the body become inflamed. ANCA is a type of antibody – instead of killing germs as other antibodies do, ANCA attack the body's own tissues and cells.
- **Other infections**: a small number of children who have infections such as HIV, hepatitis B or hepatitis C, get glomerulonephritis.

Hereditary causes

Rarely, glomerulonephritis is **hereditary**, which means that it is inherited from the mother and/or father.

- **Alport syndrome** is a very rare condition, which may also be called hereditary nephritis. Children are born with an abnormality (problem) in the walls of the blood vessels that make up their glomeruli. These children may also have problems with hearing or seeing. The complications are usually more serious in boys than in girls.

Will it affect other family members?

Most types of glomerulonephritis do not run in families. If one of your children has glomerulonephritis, it is unlikely that another of your children or family members will get it.

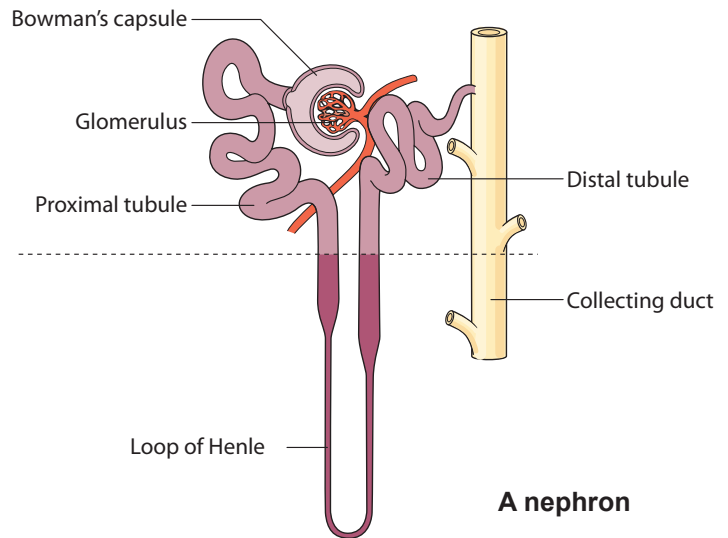
If your child has a hereditary form of glomerulonephritis, such as Alport syndrome, your doctor will give you more information.

» [More about some types of glomerulonephritis on \[www.infoKID.org.uk\]\(http://www.infoKID.org.uk\)](#)

How the kidney works

Inside each kidney, there are about one million **nephrons**. Each nephron is made up of a **glomerulus** (when we talk about more than one glomerulus, we say glomeruli), and a **renal tubule**.

- Each glomerulus acts like a sieve, helping to remove extra water and waste from the body, and holding on to blood cells and protein, which the body needs.
- Blood flows into the kidneys and to each glomerulus.
- Most of the water and some other substances in the blood pass through the glomeruli.
- This liquid flows into the renal tubule. Most of this liquid moves back into the bloodstream. The rest of it becomes urine.
- The urine leaves the kidney by the ureters and goes into the bladder, where it is stored until we are ready to go to the toilet.



» More about what the kidney does

About the name

Nephritis means inflammation, or swelling, in the kidneys. **Glomerulonephritis** is specifically about inflammation of the glomeruli.

Immune system

Germ

The immune system protects the body against germs such as bacteria and viruses that can cause illness. These germs can enter the body in lots of ways, such as by the nose and throat or the urinary system. If we get a cold or flu, this means that a virus germ has got into the body and started to infect some of our body's cells.

Germs have special 'markers' that are different from the markers on our own body's cells. This means that the immune system can recognise that they are germs and kill them. We often feel sick for a few days or a few weeks while this is happening.

Parts of the immune system

The immune system has many different ways to protect the body against disease. Some of the parts include those listed below.

- **White blood cells** are living cells in the blood. Often, the number of white blood cells found in a blood test can give information about someone's immune system. The two main types of white blood cells in the immune system are neutrophils and lymphocytes.
- **Antibodies** or **immunoglobulins** recognise the germs that have come into the body, and can bind (stick) to them. There are five types: immunoglobulin A (IgA), immunoglobulin D (IgD), immunoglobulin E (IgE), immunoglobulin G (IgG) and immunoglobulin M (IgM).
- The **complement system** is made up of other proteins that float in the blood. These proteins work with (complement) other parts of the immune system to help kill germs or cells infected by germs. Normally, the body controls when complement is activated, so it does not attack the body itself.

When the immune system does not work properly

Sometimes the immune system does not work as expected and can cause problems. For example, sometimes the immune system cannot recognise the body's own cells and may attack them as if they were invaders like germs.

Tests and diagnosis

Your child will need some tests to diagnose (or identify) glomerulonephritis and find out whether he or she needs any treatment. Your child may need an examination, including measurement of blood pressure, urine tests, blood tests, imaging tests and a kidney biopsy.

Examination

Your doctor will talk to you or your child about their symptoms and any medicines that he or she takes. The doctor will examine your child – for example, to see whether they have **oedema** (swelling in their body).

Your doctor or nurse will check your child's blood pressure. This is because glomerulonephritis may cause high blood pressure (**hypertension**).

Urine tests

If your child has symptoms of glomerulonephritis, such as red or brown urine, your doctor may arrange a **urine test**.

You, or a nurse, will need to collect some of your child's urine in a small, clean container for a urine test.

A **dipstick** will be dipped into the urine – this is a strip with chemical pads that change colour depending on what substances are in the urine. This shows whether there are blood cells and/or protein, which are signs of glomerulonephritis. The sample may also be sent to a laboratory for more accurate tests.

Blood tests

A small amount of blood will be taken from a vein, with a needle and syringe, for a **blood test**. A special gel or cream can be used to help your child stop feeling any pain.

The blood test results can give the doctor more information, including:

- about the immune system, and whether there has been a recent infection
- how well his or her kidneys are working – this is called the **kidney function**
- the amount of protein in your child's blood – in glomerulonephritis, the kidneys leak protein into urine and this is sometimes enough to affect how much is in the blood
- the amount of other substances and of types of blood cells

Imaging tests

Some children need **imaging tests** (scans). These use special equipment to get images (pictures) of the inside of their body.

- **Ultrasound scan** – looks at the shape and size of kidneys and other parts of the urinary system. A small handheld device is moved around your child's skin and uses sound waves to create an image on a screen.
- **Chest x-ray** – for children with breathing problems, this test checks for any fluid (liquid) around the lungs. Your child sits or lies still for a few seconds while a machine takes x-ray images.

Occasionally, other imaging tests are needed.

Tests: Read more about blood tests

A blood test can check whether there are any **antibodies** – the body's immune system makes these special proteins to identify and kill specific germs. This gives information about whether there has been an infection, and sometimes which germ caused it. Antibodies can also cause problems if they get trapped in the glomeruli.

Urea and **creatinine** are chemicals that are made in the body. They are waste products and are normally removed by the kidneys into urine. In glomerulonephritis, these may build up in the blood.

The **kidney function** can be measured with the **glomerular filtration rate (GFR)**. The GFR is the amount of fluid (liquid) the kidneys filter each minute. It can be estimated by measuring the amount of creatinine in the blood.

Children with glomerulonephritis lose protein in their urine. Some children lose a lot of protein, which means there is less protein in their blood. **Albumin** is one type of protein in the blood – because it is small, albumin is more likely to leak through the glomeruli.

Electrolytes are important chemicals in the body. We need the right balance of these to stay healthy. Some important electrolytes include the following:

- **sodium** helps balance the amount of water in the body
- **potassium** is needed for the muscles, including the heart muscle, to work properly
- **bicarbonate** balances the amount of acid in our body, or the pH balance (also called the acid–base balance)
- **phosphate** is important for bones, teeth and muscles
- **calcium** is important for bones and teeth, helps blood to clot and also helps the muscles, including the heart muscle, to work.

The numbers of different types of blood cells can be measured in a **full blood count**. A **full blood count (FBC)** counts the numbers of different types of blood cells – a higher or lower level of these may be a sign of infections or other health problems.

Kidney biopsy

A few children need a **kidney biopsy**. A tiny piece of one kidney is removed from the body with a needle, and examined under microscopes. Special medicines are used so your child does not feel any pain or can sleep through the procedure.

A kidney biopsy can give more information about how much damage there is in your child's kidney, and confirm which type of glomerulonephritis he or she has. It can take a few weeks to get the results.

Treatment

Many children with glomerulonephritis do not need any treatment, but will be monitored by a healthcare team.

Some children need to make changes to what they eat or drink, or take medicines – for example, to control their blood pressure, reduce swelling in their body or treat infections.

Some types of glomerulonephritis are caused by problems with the immune system. These children may need to take medicines that suppress the immune system, or make it less active.

A small number of children will need further treatment if their kidney function gets worse, such as medicines or dialysis, which uses special equipment to remove waste from the body.

If another condition is causing glomerulonephritis, this will be treated.

→ It is important that your child follows any treatment plan outlined by your doctor.

Where will my child be treated?

Your child will be looked after by a **paediatrician**, a doctor who treats babies, children and young people.

Your child may be referred to a **paediatric renal unit**, a specialised unit that treats babies, children and young people with kidney conditions and may be in a different hospital to your own. He or she will be looked after by a team, including a **paediatric nephrologist**, a doctor who treats children with kidney problems.

Visiting the hospital during the day

Most children with glomerulonephritis have care as outpatients. This means that they visit the hospital during the day and can go home.

Staying in hospital

Children with serious glomerulonephritis or complications may need to be treated in hospital. This is usually needed if:

- your child has severe swelling in the body (**oedema**), especially if there is a lot of fluid around their lungs that makes them breathless
- your child has very high blood pressure (**hypertension**)
- your child's kidneys have stopped working properly – this is called **acute kidney injury**
- your child needs to take medicines, but is not able to take them.

Treatment: Read more about hospital stay and the healthcare team

A team of healthcare professionals will:

- check your child's **kidney function** (how well his or her kidneys are working)
- measure how much your child is drinking and how much urine he or she is passing
- test your child's urine with a dipstick
- check your child's **blood pressure**
- weigh your child to help find out if he or she has too much or too little fluid in their body.

Your child's healthcare team may include:

- **paediatric nephrologist** – a doctor who treats children with kidney problems
- **radiologist** – a healthcare professional who uses imaging tests to help identify a condition

- **renal nurse** – a nurse who cares for children with kidney problems
- **paediatric dietitian** – a professional who advises what your child should eat and drink during different stages of a kidney condition
- **renal social worker** – a professional who supports you and your family, especially with any concerns about money, travel and housing related to looking after your child with kidney disease
- **renal psychologist** – a healthcare professional who supports your child and family, especially with emotional stresses and strains from having or looking after a child with kidney disease
- **play specialist** – a professional who uses dolls and other toys to help your child prepare for procedures, such as blood tests

Changes to eating and drinking

Your child may need to make temporary changes to what he or she eats – for example, less salt and less of certain foods. He or she may also need to drink less fluid, such as water, squash and soft drinks.

Your doctor, nurse or a **paediatric dietitian** will help you and your child make these changes.

Treating complications

Controlling blood pressure

Children with glomerulonephritis may have high blood pressure (**hypertension**). Their blood pressure will need to be controlled so it is in a healthy range.

If your child has hypertension, he or she may need to change what they eat and drink. Some children need to take medicines.

Reducing oedema

Very occasionally, children with glomerulonephritis need to take **diuretics**, medicines that help reduce **oedema**.

Diuretics work on the kidneys to increase the amount of water and salt they remove from the body in urine.

If your child is taking diuretics, he or she will need to go to follow-up appointments. Your doctor will examine your child for oedema and measure his or her weight. This helps find out how well the medicine is working.

Common diuretics are: furosemide, spironolactone and metolazone. Some of the other diuretics that may be used are: amiloride, bendroflumethiazide and chlorothiazide.

Suppressing the immune system

Some types of glomerulonephritis are caused by a problem with the **immune system**, which normally protects the body against disease and infection.

Medicines may be used that suppress the immune system – they make it less active so it does not harm the kidneys. These medicines are called **steroids** and **immunosuppressants**. They are usually taken by mouth – as tablets, capsules or liquid medicine.

Your doctor will work out the amount of medicine (the dose) that is right for your child. The dose will be shown on the medicine label.

» **Read more about giving steroids and immunosuppressants on next page**

Plasma exchange

Antibodies are proteins that are part of the immune system and, in some types of glomerulonephritis, they harm the kidneys. **Plasma exchange**, which is also called **plasmapheresis**, is a procedure that removes antibodies from the blood. It may be used if your child's glomerulonephritis is getting worse.

Managing reduced kidney function

For some children, the kidneys do not work as well as normal during this illness – they have reduced kidney function. The severity of this varies, but most do not need any special treatment and their kidney function will return to normal.

A very small number will have more serious kidney problems and will need further treatment. This may include **dialysis**, which uses special equipment or a machine to 'clean' the blood, removing waste products and extra water and salts.

Questions to ask the doctor or nurse

- What treatment will my child need?
- How will this help my child?
- How can I help my child prepare for procedures and treatments?
- If the first treatment does not work in my child, what happens next?
- How will I know if we need to go back to the hospital or see the doctor?
- Will the glomerulonephritis come back? How will I know?

Treatment: Read more about plasma exchange

Plasma is the liquid or watery part of blood. It helps carry blood cells, protein and other substances around the body.

Each plasma exchange takes about 2–3 hours and is done in hospital. Children will usually need more than one exchange.

- A **catheter**, which is a flexible tube, is inserted into one of the large veins in their neck. Your child's blood is taken from their body through the catheter.
- Using special equipment, your child's blood is separated into two parts: their plasma and some other substances, including the harmful antibodies; and their blood cells.

- Your child's blood cells are added to a **plasma substitute** – this is either plasma or a protein called albumin from a donor.
- This is returned to your child's body through the catheter.
- As blood is taken from your child and returned to them at the same rate, only a small amount of blood is outside their body at any time.

Your child's doctor or nurse will give you more information about plasma exchange and how you and your child can prepare for it.

- It is important that you follow your doctor's instructions about when and how much to give. Continue to give the medicine to your child as your doctor has told you, even if he or she is getting better.

Vaccines

It is important that your child has the **vaccines** (immunisations) that he or she needs to reduce the risk of some diseases. Speak with your doctor about these – some vaccines are not safe to give while a child is taking steroids or immunosuppressants.

Your child should have the flu vaccine each year.

Infections

Children taking these medicines are more likely to get infections. Speak with your doctor or nurse, and your child's teacher or daycare manager, about how you can help prevent infection. Contact your doctor straight away if your child:

- has been in contact with someone who has chicken pox (if they have not had this illness before) or measles (if they have not had the MMR vaccine, which protects against measles, mumps and rubella); or
- is unwell and you are worried about an infection.

If your child does get an infection, he or she may need to take an antibiotic medicine, which kills the germs that cause infection. Your child must take the medicine for the number of days that the doctor has told you, or until all of the medicine has been taken.

» Medicines for Children: General advice about antibiotics

Side-effects you need to do something about

We use medicines to help children get better, but sometimes they have effects we do not want – **side-effects**.

Contact your doctor straight away if your child has any of the following while on steroid medicines:

- fever (temperature above 38°C), with a sore throat or a cough
- a rash or severe bruising
- bad stomach pain or repeated vomiting – sometimes steroids can cause ulcers in the stomach

Other side-effects

Other side-effects that affect some children are below – speak with your doctor or nurse if you are concerned or need more support:

- nausea, vomiting, stomach pain and/or indigestion (heartburn) due to irritation to the lining of the

stomach – your doctor may give your child some medicine to treat this

- behavioural problems – you may find that your child is more likely to have tantrums, be moody, feel depressed, have difficulty sleeping or have nightmares
- weight gain and larger appetite – you can help by making sure your child has lots of physical activity and eats fruits, vegetables and low-calorie food, rather than food that is high in calories (such as cakes, biscuits, sweets and crisps), and by reducing the portion size
- high blood pressure (**hypertension**) – your child's blood pressure will be regularly checked, and if it is too high, will need to be controlled by eating a no-added salt diet or taking medicines

There may, sometimes, be other side-effects that are not listed above. If you notice anything unusual and are concerned, contact your doctor.

Side-effects of long-term use of steroids

- Steroids can slow growth and affect puberty. They can also cause growth of body hair and irregular periods in girls. Your doctor will check your child's growth and development. If you have any concerns, talk to your doctor.
- All steroid medicines, including prednisolone, may affect the **adrenal glands** so that they produce less of a hormone called cortisol when the body is stressed (e.g. during illness or injury). This means that your child may have more difficulty fighting off an infection, or may recover less quickly from injury or after surgery. If your child is unwell and you are worried about an infection, contact your doctor straight away.
- Your child's skin may become thinner, and heal more slowly than usual. **Acne** (spots) may become worse, or your child may develop mouth ulcers or thrush (**candidiasis**). If you are concerned, contact your doctor.
- Your child may develop problems with their hip bones, or their bones may become weaker (**osteoporosis**). The muscles around their hips and shoulders may also become weaker. If your child has any difficulty walking or moving around, contact your doctor.
- Occasionally, steroids cause **diabetes**. If your child seems more thirsty than normal, needs to pass urine (wee) often, or starts wetting the bed at night, contact your doctor.

About the future

Your healthcare team will speak with you and your child about any long-term effects your child might have with glomerulonephritis. Most children fully recover from this disease. Some will need further care.

Follow up

Children who have been treated for glomerulonephritis have follow-up appointments throughout their childhood. It is important to go to these appointments even if your child seems well. You will also have the opportunity to ask any questions. At these appointments, your child may have:

- his or her height and weight checked
- a physical examination
- **urine tests** – to check for blood, protein and other substances in his or her urine
- **blood tests** – to check for the amount of protein and other substances in his or her blood, and measure his or her kidney function
- his or her **blood pressure** measured.

Long-term effects

Mild disease

For many children with glomerulonephritis, the disease is quite mild and they will get better after treatment. When the disease goes away, this is called **remission**. These children will usually have no more kidney problems in childhood.

Further care

If your child needs more treatment, or if their glomerulonephritis keeps coming back, your doctor will monitor them over a long period of time. If the glomerulonephritis is caused by another condition, this will need to be treated.

Acute kidney injury

Children with glomerulonephritis are at risk for **acute kidney injury (AKI)** – when the kidneys suddenly stop working. Some children with AKI get better after a few weeks, and some need to take medicines or have more intensive treatment.

» **More about AKI on www.infoKID.org.uk**

Long-term problems

A few children develop long-term problems with their kidneys. Their kidneys stop working as well as they should – this happens slowly, often over many years. This is called **chronic kidney disease (CKD)**. These children may need

further care. They will need to go back to the hospital or clinic for regular follow-up appointments.

If this happens to your child, you will learn more over time about how to help manage the condition, and what to expect.

» **More about CKD on www.infoKID.org.uk**

Impact on your child and your family

Children who have been successfully treated for glomerulonephritis can usually do the things that other children their age do. They should be able to continue going to school or nursery. They can play with other children and stay active.

Living healthily

Your child can help protect his or her kidneys by leading a healthy lifestyle through their child and adult years. This includes:

- eating a healthy diet – with at least five servings of fruit and vegetables a day, taking care not to eat too much salt, sugar and fats (especially saturated fats)
- getting plenty of exercise
- not smoking

Further support

This can be a difficult and stressful experience for your child and the whole family, including other children.

→ **If you have any concerns or need additional support, speak with your doctor or nurse.**

Further information

This is the end of the information on glomerulonephritis – overview. If you would like to read more about other kidney conditions, tests and diagnosis, treatment or supporting information, you can find a list of topics covered on the infoKID website at www.infoKID.org.uk.

Your notes and contact information

www.infoKID.org.uk



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For details on any sources of information used in this topic, please contact us through our website www.infoKID.org.uk. We take great care to make sure that the information in this leaflet is correct and up-to-date. However, it is important that you ask the advice of your child's doctor or nurse if you are not sure about something. This information is intended for use in the United Kingdom, and may not apply to other countries.

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