Patient information from the BMJ Group

Pneumonia

In this section

Pneumonia

Pneumonia is an infection in your lungs that stops them from working properly. It can be very serious. If you think you have it, you need to get treatment quickly.

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

What is pneumonia?

If you've been diagnosed with pneumonia, it means you've got an infection in your lungs that stops them from working properly. Pneumonia is a serious illness, and you'll feel very ill. You'll almost certainly have a fever and a cough. You may also feel as though you can't catch your breath.

You're more likely to get pneumonia if you're older than 65, if you smoke, or if you drink a lot of alcohol. You're also more likely to get it if you've already got another serious illness that has weakened your body and its natural defences against infection (your immune system). Children under 2 are also at an increased risk of getting pneumonia.

Pneumonia can be dangerous, especially if you are older or already ill. If you think you have pneumonia, you should call your doctor straight away. If you get treatment quickly, and if you rest and follow your doctor's advice, you are likely to make a full recovery. If you are older or have another health condition, you may not recover as quickly as someone who is younger or healthier.

There are vaccines that may protect you against pneumonia. Your doctor will probably recommend getting these if you are at a high risk of getting pneumonia because you are older or in poor health. There is also a special vaccine for children. It should be given to all infants between 2 months and 23 months old.

Key points for people with pneumonia

- Pneumonia is serious and can sometimes kill people. If you think you have it, see a doctor straight away.

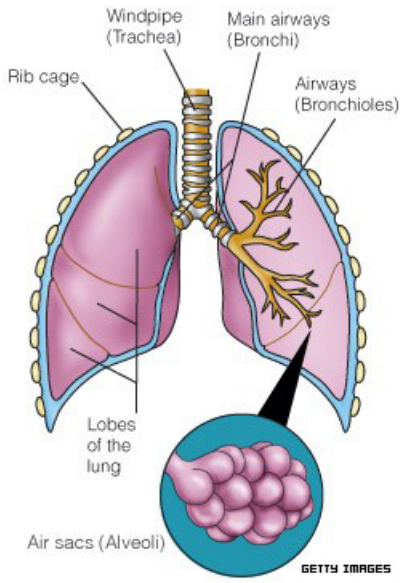
- Most people with pneumonia can be treated at home. You need to go to hospital only if you are very ill.

- Antibiotics are the main treatment for pneumonia. The sooner you take them, the better your chance of making a good recovery. Antibiotics will not work if your pneumonia is caused by a virus. But you may need them if you get a bacterial infection in addition to an infection caused by a virus.

- It's important to be sure that you recover completely. Go back to your GP if any symptoms, such as fever or cough, don't seem to be going away.

To learn more, see Antibiotics and Vaccines that help protect you against pneumonia .

How do your lungs work?



You have two lungs. They sit inside your rib cage.

You have two lungs. They sit in your chest, inside your rib cage. One sits on each side of your heart. Your lungs are a little like two spongy, elastic bags. They fill up with air as you breathe in, and empty as you breathe out.

Keeping your lungs healthy is important. They supply oxygen from the air you breathe to every cell in your body. When you breathe out, they get rid of carbon dioxide, which is a waste product made by your body.

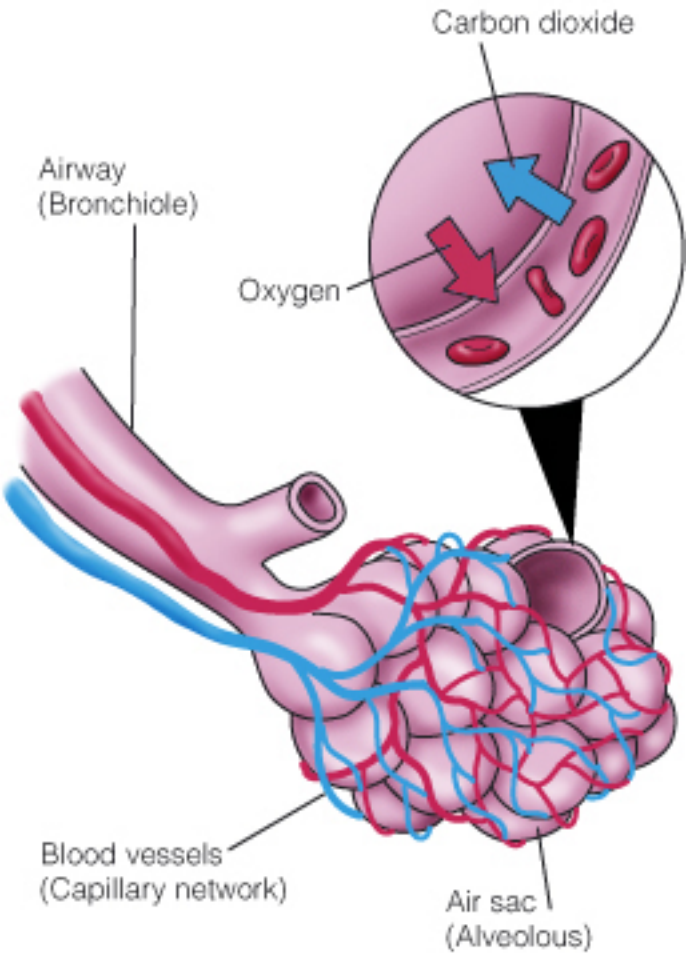
Here is how air travels into your lungs:

- Your windpipe (also called your trachea) is the air passage that leads from your throat into your chest

- In your chest, it divides into two smaller airways (called bronchi). Each airway leads into a lung

- Inside your lungs, the airways divide into even smaller airways (called bronchioles). At the end of each of these smaller airways are little air sacs (called alveoli). There are about 3 million of these tiny, grape-like sacs. [1]

When you breathe in, air travels down your windpipe, through the airways, into your lungs, and then into the smaller airways and the air sacs.



Oxygen passes from the air sacs in your lungs into your blood vessels.

The air sacs in your lungs are connected to the network of blood vessels that surrounds your lungs. Oxygen from the air you breathe in passes through the thin walls of the air sacs and into these blood vessels.

It is then carried back to your heart and pumped around your body.

At the same time, carbon dioxide (which is made as a by-product of breathing) passes from your blood into the air sacs. The carbon dioxide leaves your body when you breathe out.

Protecting you against infection

Your lungs have another important job. They filter the air you breathe. This stops your body being invaded by germs and other harmful things, such as pollution. Germs are all around you. They live in the air, soil, and water and sometimes in your nose and throat. If they get into your body, they can multiply. If they do this, you can get an infection.

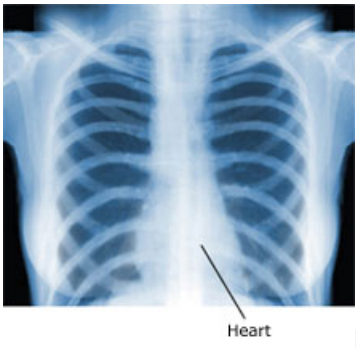
Your lungs stop you getting infections in several ways.

- The airways in your lungs are lined with tiny hairs. These are covered with a sticky substance that traps harmful germs and particles. These hairs wave back and forth. This pushes harmful things out of your lungs. [2]
- Further down in the lungs there are special cells that fight any infection that has made it past the tiny hairs.
- Coughing is another way your lungs get rid of harmful things. You don't need to think about coughing: it happens automatically. It's your body's way of trying to clear things out of your airways that might irritate them. This type of automatic action is called a reflex action.

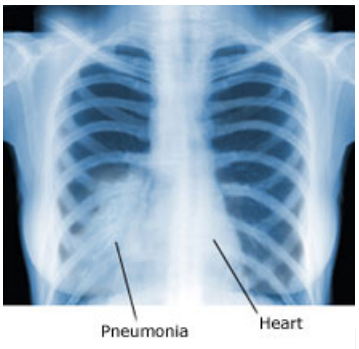
What happens when you get pneumonia?

You get pneumonia when harmful germs get past your lungs' defence systems and start to multiply. This causes an infection. The infection causes your lung tissue to get inflamed , and produce too much fluid. This clogs your lungs, so they can't work properly.

Often, these germs are already in your nose and throat. Sometimes they are in tiny drops in the air (for example, after someone sneezes), and you breathe them in. You can get an infection in just one of your lungs or in both of them.



An x-ray showing healthy lungs.



An x-ray showing pneumonia.

If an infection gets into your lungs, your lungs get inflamed. This is one of the ways that your body tries to fight an infection. Your body's cells release chemicals that make more blood flow to the infected area. Infection-fighting parts of your immune system (which protects your body against invading germs) travel to the site of the infection along with the blood.

Even though inflammation is one of the ways that your body responds to an infection or an injury, it can cause other problems in your body. In the case of pneumonia, it irritates your airways and makes your lungs heavy and stiff because of the extra blood. This is why you have trouble catching your breath. Also, fluid made by the inflamed tissue builds up in the tiny air sacs at the end of your airways. This makes it difficult for oxygen to get into your body and for carbon dioxide to leave.

Meanwhile, your immune system responds to the infection that has got into your lungs. For example, cells in your blood (called white blood cells) are an important part of your body's defence system. If you have an infection, the white blood cells travel to that area, where they surround the invading germs and destroy them.

If you have a serious infection, such as pneumonia, a blood test may show that you have more white blood cells than normal. This is often a sign that your body is working to fight off the infection. [3]

What causes pneumonia?

In most cases of pneumonia, the germs that cause the infection are bacteria. But pneumonia can also be caused by viruses. In rare cases, pneumonia is caused by another type of germ called a fungus. Sometimes pneumonia is caused by two different germs (bacteria and a virus).

Different types of germs cause different types of symptoms. Some germs may make you more ill than others. In about one-third of cases, doctors can't tell what type of germ caused the pneumonia.

The most common form of pneumonia is **pneumococcal pneumonia**. Pneumococci are bacteria. About half of all cases of pneumonia are caused by these germs. [4]

To learn more, see Germs that cause pneumonia.

There are vaccines that can help protect you against getting pneumococcal pneumonia. A vaccine is usually given as an injection, and stops you getting a specific disease. The vaccine may reduce your chances of getting pneumococcal pneumonia, but it won't help if you already have it. The vaccine may also protect you against some of the more severe complications of pneumonia , such as an infection in your bloodstream.

To learn more, see Vaccines that help protect you against pneumonia .

Is it easy to catch pneumonia?

People often have small amounts of some of the germs that cause infections, including pneumonia, in their nose and throat. And these can be passed on when someone sneezes or coughs or has other close contact, such as hugging or kissing. If you are older or already have a serious illness, these germs may get into your lungs and cause an infection that can lead to pneumonia.

Other types of germs, like the flu virus, pass around from person to person quite easily. But they don't cause pneumonia for most people. Some people who've had swine flu (the H1N1 strain of flu that emerged in 2009) have had pneumonia caused by the swine flu virus. To find out more, see Swine flu .

If you have pneumonia, there are some things you can do to avoid spreading the infection that caused it around. You should:

- Cover your mouth and nose when you cough or sneeze
- Throw away your used tissues. Don't leave them lying around
- Wash your hands regularly and well
- Avoid contact with anyone who has an increased risk of getting pneumonia, such as someone who has a weakened immune system. This could be someone having chemotherapy , someone who has HIV or AIDS , or an older person.

Pneumonia: why me?

Some people are more likely to get pneumonia than others.

You should be especially aware of the dangers of pneumonia if you or someone in your family:

- Is over 65 years old
- Is under 2 years old
- Is a heavy smoker (smoking damages your lungs, and this damage increases your chances of getting an infection)

- Is a heavy drinker
- Already has a lung disease, such as asthma or emphysema
- Has recently had another illness, such as flu, which could have weakened their immune system
- Has a long-term (chronic) disease, such as diabetes, heart disease, or sickle cell disease
- Takes medicine for an illness such as AIDS or cancer (some medicines can make it harder for your body to fight off an infection, such as those given for chemotherapy)
- Has a disease that weakens your body's ability to fight infection, such as leukaemia or another type of cancer, or AIDS
- Has had an organ transplant.

All these things affect your body's natural ability to fight off infections. This is why they put you at a higher risk of getting pneumonia.

If you fall into any of these groups, then there are steps you can take to protect yourself against getting pneumonia. You can take extra care and look after yourself. You may also want to consider being vaccinated.

To find out more, see Vaccines that help protect you against pneumonia .

Older people who are prescribed a type of drug called an antipsychotic are also at a higher risk of pneumonia. The risk is highest in the week after they start taking the drugs. Some types of antipsychotic drug, called atypical antipsychotics, are particularly likely to increase the risk of pneumonia. [18]

What are the symptoms of pneumonia?

If you have pneumonia, your symptoms will probably appear very quickly over a period of 24 hours. Although they're uncomfortable, many of these symptoms are actually your body's way of fighting the infection. But this may not be much comfort if you're feeling bad.

If your pneumonia isn't too bad, you may have only some of the symptoms listed below. If you are older, you may have fewer symptoms than younger people or your symptoms may not be as bad. [4]

The main symptoms of pneumonia are listed below.

High temperature

A high body temperature will make you feel sweaty and weak. It can also make you feel sick. You probably won't feel like eating much. A very high temperature can make you hallucinate (see things that aren't really there) and dream vivid dreams. A high temperature is one of your body's many ways of fighting infections. When you have a high temperature, it's more difficult for germs to survive and multiply. [19]

Cough

A cough is one of the most common symptoms of pneumonia. You may get severe coughing spells that leave you feeling exhausted. You could have a dry cough, which means that you don't cough up any phlegm (which doctors call **sputum**). Or you could have what doctors call a productive cough. This means that you cough up phlegm. [19]

Coughing is one of the ways that your lungs try to get rid of an infection. If the lining of your airways is irritated by inflammation or by fluid, then you will cough to clear your lungs.

For more information about the parts of your lungs and how they work, see What is pneumonia?

Phlegm

This is the name of the fluid you cough up from your lungs. It's produced by your airways. When you have pneumonia, the phlegm your body makes can be white or frothy or it can be thick phlegm that is yellow, green, or rust-coloured. Phlegm is a mix of the white blood cells that your body makes to fight the infection, dead germs, and damaged lung tissue. [19]

Trouble breathing

If you have pneumonia, you will find it more difficult to breathe after climbing the stairs or exerting yourself in some other way. You may also have trouble catching your breath even when you aren't doing anything. Your breathing may become faster. You may find that you are taking 28 breaths or more each minute. People who don't have pneumonia or other lung problems usually take about 12 to 20 breaths each minute. [19]

When you get an infection in your lungs, the airways and the air sacs at the end of the airways become inflamed. They can also be blocked by fluid. This makes it more difficult for your lungs to take in oxygen to feed your cells and to get rid of carbon dioxide, which is a waste product made by your body.

Chest pain

Your chest may get sore from coughing. If your pneumonia becomes more serious, you may develop chest pain that gets worse as you breathe in or out. This second type of chest pain happens when you get inflammation between the two layers of tissue that cover your lungs. (Doctors call these layers the **pleura**.) [19]

The inner layer of the pleura covers the lungs themselves. The outer layer lines the wall of your chest. Normally, these two surfaces slide smoothly across each other when you breathe in and out. But if they become inflamed, it hurts when you breathe. This is called **pleurisy**.

Blue lips and nails

You may notice that your lips look bluish and that the skin under your fingernails looks bluish too. [20] This happens because the infection is making it difficult for your lungs to do their job of supplying your body with oxygen. If you get this symptom, you should go to the accident and emergency (A&E) department of your local hospital as soon as possible.

Confusion

You may find that your dreams are vivid. And when you are awake you may feel unsure about the time of day or where you are. Several things can cause this:

- A high temperature can make you hallucinate (see things that aren't really there)
- Dehydration can make you confused. It's important to drink plenty of clear fluids to avoid this happening [20]
- Confusion can be a sign that there's not enough oxygen in your blood. This can be dangerous. You should contact your doctor or go to your nearest A&E department as soon as possible.

Different types of pneumonia give you different symptoms. To find out more about the symptoms of each type of pneumonia, see Germs that cause pneumonia .

Complications

If you are very ill with pneumonia, you may get extra problems called complications. These can include problems with your breathing, an infection in your bloodstream, and fluid around your lungs. Complications are more likely if you are older or in poor health already.

If you want to find out more, see Complications of pneumonia .

How do doctors diagnose pneumonia?

To find out if you have pneumonia, your doctor will look for:

- A cough that doesn't go away after a few days
- Pain in your chest that gets worse when you breathe in or out.

You may also have a high temperature (a fever) and not recover properly from a cough or cold.

You should be especially aware of the dangers of pneumonia if you or someone in your family:

- Is more than 65 years old
- Is less than 2 years old
- Is a heavy smoker (smoking damages your lungs, and this damage makes it more likely that you will get an infection)
- Is a heavy drinker
- Already has a lung disease, such as asthma or emphysema
- Has already had another illness, such as flu , which could have weakened their immune system and may make it harder for their body to fight off an infection
- Has a long-term (chronic) disease, such as diabetes , heart disease , or sickle cell disease
- Has a disease that weakens your body's ability to fight infections such as AIDS or leukaemia
- Takes medicine for an illness like AIDS or cancer (some medicines, such as those used in chemotherapy , can make it harder for your body to fight off an infection)
- Has had an organ transplant.

Usually, your doctor will be able to tell if you have pneumonia by:

- Asking you about your symptoms. Your doctor will want to know if you have a temperature (a fever), whether you are short of breath, what kind of cough you have, and whether your chest hurts
- Doing a physical examination. Your doctor will look at your chest to see if the shape of one side is different from the other. Your doctor will also tap your chest to see if areas of your lungs are blocked with mucus. Your doctor will also listen to your lungs through a stethoscope . If the doctor hears bubbles or crackling noises, this suggests that your lungs are inflamed or blocked. [26]

Sometimes if your symptoms are bad, your GP may also:

- Get a chest x-ray. An x-ray will show whether there is an infection and how far it has spread

- Order lab tests. Your blood and phlegm may contain germs that will show up in the laboratory. A blood test can also measure how many white blood cells are in your blood. These cells are part of your immune system. If you have more of these cells than is normal, it may indicate that your body is fighting an infection.

If you are young and you do not have any obvious health problem to explain why you have pneumonia, your doctor may suggest that you have an HIV test. Being infected with HIV increases your risk of getting pneumonia. [5] [7]

How common is pneumonia?

Pneumonia is very common.

About 1 in every 100 people will get it in the United Kingdom every year. [21] [22]

Pneumonia is also very serious. And sometimes it is life-threatening. Before antibiotics were discovered, about 1 person died for every 3 people who got bacterial pneumonia. [22] (Antibiotics are the drugs used to kill bacteria.)

Antibiotics work for most people with pneumonia. And the risk of dying from pneumonia has dropped dramatically since doctors started using them.

About 14 in 100 people who get pneumonia die from it, although the risk is lower for people who are otherwise healthy. [17] [23] Of people who have severe pneumonia and need intensive care in hospital, about 1 in 3 die. [17] Older people are especially likely to get seriously ill and die if they get pneumonia.

What treatments work for pneumonia?

Pneumonia can be dangerous. The sooner you are treated, the better.

The main aim of treating pneumonia is to get rid of the infection in your lungs as quickly as possible. This should make you feel better and should prevent you getting complications .

Key points about treating pneumonia

- Antibiotics (drugs that kill bacteria) are the main treatment for pneumonia. Treatment with antibiotics either cures pneumonia or improves the symptoms for more than 9 in 10 people.

- The sooner you get antibiotics, the better. If you are older, getting antibiotic treatment early reduces your chances of dying from pneumonia.

- We don't know for certain which antibiotics work best.
- Unless you're very ill, taking antibiotics as tablets works just as well as having them through a drip (sometimes called an intravenous infusion or IV).
- Antibiotics will not work if your pneumonia is caused by a virus. But you may need them if you get a bacterial infection in addition to an infection caused by a virus.
- Sitting up in bed or moving about and doing some breathing exercises can help you feel better sooner.

Which treatments 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 make the best decisions about treatment.

Treatment Group 1

Treatments for pneumonia

Treatments that work

- Antibiotics : These are drugs that kill bacteria. Some of the most common antibiotics (and their brand names) are amoxicillin (Amoxil), erythromycin (Erymax, Erythrocin), cefuroxime (Zinacef, Zinnat), cefotaxime (Claforan), levofloxacin (Tavanic), and doxycycline. More...

Treatments that are likely to work

- Getting active : This can mean sitting up often and taking deep breaths, sitting up and blowing through a tube into a bottle of water, or getting out of bed for brief periods soon after going into hospital. More...

Other treatments

We haven't looked at the research on these treatments in as much detail as we've looked at the research on most of the treatments we cover. (To learn more see Our method.) But we've included some information because you may have heard of them or be interested in them.

- Vaccines that help protect you against pneumonia : A vaccine may help protect you against the most common form of pneumonia. If you are older or in poor health, the vaccine is less likely to protect you, but it's still worth taking. The flu vaccine can also help stop you getting pneumonia. More...

What will happen to me?

How ill you get with pneumonia and how quickly you recover from it depend on your age, your general health, and the type of pneumonia that you have. Also, how quickly you get treated makes a big difference.

It's especially important that older people and people in poor health start treatment with antibiotics straight away. [24]

If you think you have pneumonia, you should contact your GP or go to A&E as soon as possible. If you do have pneumonia, you will usually start treatment immediately.

See What treatments work for pneumonia? to learn more.

If you have bacterial pneumonia (the most common type), there is a good chance that if you get started on antibiotics straight away, the bacteria will be killed and the infection in your lungs will go away.

If your pneumonia is caused by a virus, antibiotics won't get rid of the infection. Antibiotics work on bacteria, not on viruses. Most of the time, pneumonia that's caused by a virus will get better without treatment. If your doctor thinks that you have pneumonia because a flu virus has caused inflammation in your lungs, you may be given treatment that helps to kill the flu virus. You may need antibiotics if you get a bacterial infection in addition to the infection caused by a virus.

Pneumonia can be dangerous, especially if you are older and not in good health. If you think you have it, see your GP straight away.

How soon will I get better?

It's hard to say how long it will take for you to get better. If you're young and in good health, you'll probably get better sooner. If the pneumonia is caught early and the infection doesn't spread, you'll probably make a full recovery no matter how old you are.

- If you follow your doctor's advice and get treated straight away, you should start to feel better in about two days. [21] Your fever should get better. It should also be easier for you to breathe. Your appetite should start coming back.

- After five to seven days you should be feeling much better. You should start to feel more energetic, but you probably won't feel like you are back to normal. By this time in your illness, you shouldn't have a fever. Your breathing and your appetite will have improved even more. Your cough should be getting better. You should be coughing less often, and the cough should hurt less, too.

- It will take some time for you to feel as well as you did before you had pneumonia. If you are older or have another condition that affects your general health, it can take up to three months before you feel like you've made a complete recovery.

- If you have another illness or your defences against infection are lower for some other reason, then you are more likely to get complications . This means that your recovery will take longer. You are also more likely to need to go into hospital.

- If you are over the age of 50 or a smoker, you should ask your doctor if you need a follow-up x-ray to make sure that all the disease is gone from your lungs.

Keep an eye on how you're doing

If you notice that you aren't improving, you should speak to your GP. This is especially important if:

- You still have a high temperature (a fever) after two days [21]

- It's getting harder to breathe, not easier

- You are coughing up blood

- Your cough isn't getting better after five to seven days.

If you have pneumonia, it is important to look after yourself, rest, and make sure you make a full recovery. This will help you avoid getting complications. To learn more about looking after yourself, see How can I take care of myself?

Going into hospital

You'll probably be able to stay at home while you're getting better. Most people with pneumonia are treated at home by their GP. But about 1 in 10 people are too ill to stay at home. [6] Your GP may decide you need care in hospital. This may be because you have a severe case of pneumonia or because you have developed complications. You may be having a hard time breathing. Or you may not be able to drink enough fluids.

Your GP may also decide that you need to be cared for in hospital if you are older or not in good health. Or it may be that you live alone and do not have anyone nearby who can take care of you. [5]

In hospital you will probably be given fluids through a vein in your arm. This is called giving you intravenous (or IV) fluids. This will stop you getting dehydrated (where you don't have enough fluids in your body) if you are feeling too ill to drink enough. You'll also have your temperature and breathing checked regularly.

Complications

If you have a severe case of pneumonia, you may get complications, such as problems with your breathing, an infection in your bloodstream, and fluid around your lungs. These can be dangerous. You are more likely to have complications if you are older or in poor health already. For more information, see Complications of pneumonia .

Questions to ask your doctor

If you've been diagnosed with pneumonia, you may want to ask your doctor some questions to find out more about your illness and how to deal with it.

Here are some suggestions:

- Can my family and friends catch pneumonia from me?
- What should I be eating and drinking?
- When can I go out or go back to work?
- How long will my coughing last?
- How long will it be before I feel like my usual self?
- What can I do to keep from getting pneumonia again?
- Should I be vaccinated?
- Should I have a chest x-ray to see if the pneumonia has gone away? If yes, when should I have this x-ray?
- How will I know if I am getting worse? If I do get worse, how will I know when to come back to see you or go to the accident and emergency department?
- Is there any particular reason why I got pneumonia? Is my immune system working properly?

Treatments:

Antibiotics

In this section

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

Do they work?

Yes. If you are very ill with pneumonia, taking antibiotics as soon as possible after you've been diagnosed improves your chances of making a full recovery. Antibiotics also make

it less likely that you will die from pneumonia. But we don't know for certain which antibiotics work best.

What are they?

Antibiotics are drugs that kill bacteria, which are the germs that cause most cases of pneumonia. There are many different types of antibiotics. Some of the most common are listed below (with their brand names).

- Amoxicillin (Amoxil)
- Cefotaxime (Claforan)
- Cefuroxime (Zinacef, Zinnat)
- Clarithromycin (Klaricid)
- Erythromycin (Erymax, Erythrocin)
- Levofloxacin (Tavanic)
- Ofloxacin (Tarivid)
- Telithromycin (Ketek).

Some of the newer antibiotics are called broad-spectrum antibiotics. They work against many of the different kinds of bacteria that can cause pneumonia. You're more likely to be given one of these antibiotics if you are very ill and you need to be treated quickly, even though doctors may not yet know which germ is causing your pneumonia.

To learn more, see Antibiotics used to treat pneumonia .

Antibiotics come as tablets and as a drip (sometimes called an intravenous infusion or IV). Most people can take them as tablets.[45] But if you can't take tablets for some reason (for example, if you feel ill and are vomiting) you will probably be given an antibiotic as a drip.

How does your doctor choose an antibiotic?

In choosing an antibiotic, your doctor will take into account how severe your condition is, your age, your general health, what other illnesses you have, and what could be causing your pneumonia. Your doctor will also consider whether bacteria in the area where you live are known to be resistant to particular antibiotics. Resistance happens when germs change so that they are no longer destroyed by drugs that used to be able to kill them.

Your doctor will also want to know whether you've taken an antibiotic within the last three months. If you have, your doctor will probably prescribe a different type. This is because using the same antibiotic again can make bacteria resistant to it. [8]

If you are very ill with pneumonia, your doctor may give you an antibiotic that works against a lot of different germs. This may be a newer antibiotic. If you are not as ill, your doctor may prefer to stick with older drugs. This helps save the newer drugs so that doctors can use them when resistance has developed to the older ones.

To learn more, see Resistance to antibiotics .

What if I have to go to hospital?

If you're too ill to stay at home and are being treated in hospital, you will probably be given a combination of different antibiotics. The aim of this type of treatment is to improve your chances of surviving, to prevent you getting complications (or if you already have a complication, to make it less severe), and to enable you to leave hospital earlier. You might be treated with antibiotic tablets, drips (IVs), or a combination of both.

Why do I need to take all of my tablets if I feel better?

It's very important that you take all of the tablets that your doctor has prescribed, even if you feel better. If you do not finish all your tablets, some germs may not be killed. They can stay in your lungs and start to multiply, and the disease can come back. If you don't take all your tablets, you may also encourage antibiotic resistance. This is when germs are no longer destroyed by the antibiotics that used to be able to kill them.

For more information about how this happens, see Resistance to antibiotics .

How can they help?

If you have pneumonia, taking antibiotics will probably help you get better. Here is what we know from the research.

- About 9 in 10 people who are treated at home with antibiotic tablets are cured or get better. [46] [47] It doesn't seem to matter which antibiotic they take. All the antibiotics studied seem to work about the same.

- Around 8 in 10 people treated with an antibiotic in hospital for pneumonia also get better. [48] [49] [50] [51] Again, all antibiotics seem to work about the same.

- It doesn't matter if you're treated with antibiotic tablets or an antibiotic drip when you're in hospital. You're just as likely to get better whichever kind of antibiotics you have. [52] [24]

- Some people have an antibiotic drip followed by antibiotic tablets. One study found that patients who had a drip for two days and then switched to antibiotic tablets left hospital sooner than those who had a drip for longer. [24] Another study found that

some patients may not need antibiotic tablets if they've improved after having a drip for three days. Patients did equally well whether they had a drip followed by antibiotic tablets or a drip followed by a dummy treatment (called a placebo). [53] You should take the full course of antibiotic tablets that have been prescribed, even if you feel better.

- It's best to take antibiotics early, particularly if you're very ill. [54] [55] [56] Starting treatment early improves your chances of surviving.

Most adults need to take antibiotic tablets for seven days or less. [57]

How do they work?

Most cases of pneumonia are caused by germs called bacteria. These germs get into your lungs and multiply. This causes an infection. Antibiotics are drugs that kill bacteria.

Once you take an antibiotic, it enters your bloodstream and is carried to your lungs, the place where the infection is. It then starts fighting the bacteria. Antibiotics work the same way, whether you take them as tablets or get them in a drip.

Antibiotics will not work if your pneumonia is caused by a virus. But you may need them if you get a bacterial infection in addition to an infection caused by a virus. Some antibiotics are also effective against another germ that causes pneumonia. This germ is called a **mycoplasma**.

Can they be harmful?

Most antibiotics have side effects. Some of these side effects happen because the antibiotics also kill some of the harmless germs that normally live in your body and help you.

Some of the most common side effects are: [46] [47] [58] [59] [60] [61] [62]

- Nausea, vomiting, and diarrhoea
- A change in how things taste
- A yeast infection (thrush) in your mouth, vagina, or penis. This causes itching or white discharge from your genitals, or white patches in your mouth. It's easily treated, so talk to your doctor about it.

Whether you get these problems depends on the antibiotic you're treated with.

A small number of people will have a severe allergic reaction to an antibiotic called penicillin and to other similar antibiotics. [32]

Tell your doctor if you have ever had a reaction to an antibiotic before. If you are allergic to penicillin or similar drugs, there are other antibiotics that work just as well.

To learn more about different antibiotics and their side effects, see Antibiotics used to treat pneumonia .

To learn more about the things that stop antibiotics working, see Resistance to antibiotics .

How good is the research on antibiotics?

There's quite a lot of research that shows antibiotics can help if you have pneumonia.

We found a summary of the research (a systematic review) that looked at people who took antibiotic tablets at home. [63] About 9 in 10 people got better. It didn't matter which drug people took. The different antibiotics all worked about as well as each other.

Another review looked at people who took antibiotics in hospital. [48] People were given antibiotics as tablets or a drip (sometimes called an intravenous infusion or IV). Around 8 in 10 people improved after taking an antibiotic.

Another review looked at whether taking antibiotics as tablets or as a drip worked best. [62] It didn't find any difference.

One summary of the research (a systematic review) found that, for more severe forms of pneumonia, antibiotics called fluoroquinolones work better than other kinds called macrolides and beta-lactam antibiotics. However, some of the studies in the review could have been biased, because they weren't the best quality. [64]

Getting active

In this section

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

Does it work?

Probably. If you get up and about as soon as you can, you'll probably feel better sooner than if you don't. You might also recover faster if you sit up regularly and blow through a tube that goes into a bottle of water (called bottle blowing).

What is it?

Getting active can mean a few different things. In studies, people have been asked to: [65] [66]

- Get out of bed and move about for at least 20 minutes during their first 24 hours in hospital, then get out of bed for a bit longer each day
- Sit up 10 times a day and take 20 deep breaths
- Sit up 10 times a day and blow 20 breaths through a tube that goes into a bottle of water (this is called bottle blowing or **incentive spirometry**).

How can it help?

Getting active by sitting up in bed, getting out of bed, and bottle blowing can probably help you get better faster. [65] [66] In studies, people with pneumonia who did some or all of those things left hospital between one day and one and a half days earlier than people who did not. [65] [66]

How does it work?

Experts aren't certain why getting active can help people recover from pneumonia, but they have a few theories why the different ways of getting active are useful.

- Sitting up: Moving to a sitting position can make breathing easier and allow your lungs to work better.
- Moving about especially soon after starting your hospital stay or spending time in bed at home: Getting out of bed and moving about can help blood travel around your body. This helps bring oxygen to your cells and also allows any antibiotics you've been given to get to your lungs faster. [66]
- Blowing into a bottle: When you have pneumonia, the tiny air sacs at the end of the airways in your lungs become inflamed. This means oxygen cannot pass through them into your bloodstream. It's thought that bottle blowing helps push air into your lungs and open up these air sacs. Also, in order to blow into the bottle, you have to sit up in bed and take deep breaths. This is also likely to help your lungs. Bottle blowing may encourage you to cough and bring up phlegm (which doctors call sputum), and this helps the lungs recover.

Can it be harmful?

There is no evidence that getting active is harmful, although you shouldn't do more than your doctor recommends.

How good is the research on getting active?

There isn't a lot of research on getting active to treat pneumonia. But two studies did find that getting up and about earlier, or blowing into a bottle, can help you leave hospital sooner.

One study found that getting up earlier shortened people's stay in hospital by one day. [66] Another study found that people who got out of bed earlier and blew into a bottle of water to exercise their lungs left hospital a day and a half sooner. [65]

Vaccines that help protect you against pneumonia

In this section

This information is about preventing pneumonia. It tells you about vaccines that help protect you against the illness.

Do they work?

We haven't looked at the research on these treatments in as much detail as we've looked at the research on most of the treatments we cover. (To learn more, see Our method.) But we've included some information because you may have heard of them or be interested in them.

What are they?

Two types of vaccines are designed to help protect you against pneumonia. They are:

- The pneumococcal vaccine
- The flu vaccine .

Both these vaccines are very safe. They cannot give you flu or pneumonia.

How vaccines work

Your immune system is the part of your body that fights off infections . It goes on the attack when it finds something in your body that it doesn't recognise, such as bacteria or a virus . Special cells in your blood called white blood cells then make proteins (called antibodies) that destroy the invading germs.

Vaccinations work by introducing a weak, harmless version of bacteria or viruses into your body. You are usually given a vaccination as an injection into your muscle. Your immune system responds to the vaccine by making antibodies against it. Not only do the antibodies destroy the weakened version of the germ so you don't get ill, but they also make it easier for your body to recognise the germ the next time it invades your body.

This means that your body will react more quickly and produce infection-fighting antibodies straight away, before an infection can develop.

People respond to vaccines in different ways. Some people don't get as much protection from them. This can happen if you are older or if your body's defences have already been weakened by a disease or by a medicine that you are taking.

Who should be vaccinated?

You should have the **pneumococcal vaccine** if: [67]

- You are 65 or older
- You already have another disease in your lungs, such as emphysema or severe asthma
- Your health is poor because you have a long-term illness, such as diabetes, heart disease, kidney disease, liver disease, or sickle cell disease
- Your body's defences against infection are weak because of an illness or treatment, such as chemotherapy or radiotherapy for cancer, long-term steroids for asthma and another condition, problems with your spleen (an organ that helps fight infections), and diseases such as AIDS or leukaemia
- You have a cochlear implant (a device put inside in your ear to help with hearing loss).
- You have had cerebrospinal fluid leaking, possibly due to an accident or surgery (this fluid surrounds the brain and spine).

There is a special pneumococcal vaccine called Prevenar that is recommended for babies. It's usually given in three doses: one at 2 months of age, one at 4 month, and one at 12 to 13 months

You should consider having a **flu vaccination** if: [12]

- You are 65 or older
- You are pregnant
- You have a long-term illness, such as heart disease, emphysema, diabetes, kidney disease, liver disease, or multiple sclerosis or another neurological condition
- You have a problem with your spleen, such as sickle cell disease
- You have had a stroke or 'mini stroke' (transient ischaemic attack)

- Your body's defences against infection are weak because of an illness or treatment
- You live in a residential or nursing home
- You live with or care for someone for whom getting flu could be dangerous (for example, if you are a health care worker and want to protect your patients)

It's also important that children over the age of 6 months receive an annual flu vaccination if they have a long-term health condition that could get worse if they catch the flu. The NHS has also started offering an annual flu vaccination to all children aged 2, 3, and 4 years old. [13] This is gradually being expanded to include all children aged 2 to 16. [14] This vaccine is given as a nasal spray, not a jab.

If you belong to one of the groups of people who need a vaccination, talk to your doctor about getting one.

Some people aren't able to have a flu vaccination - for example, if they've had a serious reaction to a flu vaccination before. You also shouldn't have the vaccination while you have a fever. You can talk to your doctor if you have any questions or concerns about whether the flu vaccination is right for you.

To learn more about these vaccines, see Pneumococcal vaccine and Flu vaccine .

Further informations:

Germs that cause pneumonia

More than 100 different germs can cause pneumonia. [5] Germs are micro-organisms. This means they can only be seen with the help of a microscope. Germs live everywhere: in the soil, air, and water, and sometimes in your body. Pneumonia can be caused by bacteria , viruses , or, more rarely, by a fungus .

Bacterial pneumonia

This is the most common type of pneumonia. Several different types of bacteria can cause pneumonia. These bacteria live in the throats of many healthy people, but there aren't enough of them to cause an infection . However, if your body's immune system is weak because you are old or ill, these bacteria can invade your lungs and you can get pneumonia. [6]

Types of bacterial pneumonia

- **Pneumococcal pneumonia**: This is the most common type of bacterial pneumonia. It causes between 1 in 5 and 3 in 5 of all cases of bacterial pneumonia. [4] It's also known as **streptococcal pneumonia**.

- **Legionnaires' disease**: The bacteria that cause Legionnaires' disease usually grow in the water or ventilation systems of large public buildings. You are more likely to get this type of pneumonia if you smoke a lot or already have a lung disease.

- **Aspiration pneumonia**: You can get this type of pneumonia if you accidentally inhale phlegm, food and drink, swimming-pool water, or vomit. Doing this lets germs get into your lungs. [7] This type of pneumonia is more common in people who have difficulty swallowing properly because they have another condition (if they've had a stroke , for example).

Symptoms of bacterial pneumonia

If you have pneumonia that's caused by bacteria, you will probably:

- Have a fever
- Have shakes
- Have a cough. You might cough up phlegm that is green, rust-coloured, or yellow. Or you may have a dry cough where nothing comes up
- Have pain in your chest. This often hurts more when you take a deep breath
- Breathe faster than normal
- Have a faster pulse rate than usual
- Feel confused or disorientated.

To learn more, see What are the symptoms of pneumonia?

Viral pneumonia

Viruses are another type of germ. Viruses often cause pneumonia in young children. The flu is also caused by a virus. So if you've just had the flu, you may also get pneumonia. [8] You can also get bacterial pneumonia in addition to the flu if the flu has weakened your body.

If you have a flu vaccine , you may be less likely to get pneumonia. If you are protected against flu, it will be unable to weaken your immune system. A weak immune system can make you more vulnerable to pneumonia.

To learn more, see Vaccines that help protect you against pneumonia .

Symptoms of viral pneumonia

If you have pneumonia that's caused by a virus, you will probably:

- Have a fever
- Have a dry cough
- Have a headache
- Have weak muscles
- Feel tired
- Feel out of breath.

To learn more, see What are the symptoms of pneumonia?

Fungal pneumonia

A type of germ called a fungus can also cause pneumonia. Fungal pneumonia is rare. It usually affects only people whose immune systems are weak. The symptoms of fungal pneumonia are often similar to those of bacterial or viral pneumonia.

Other types of pneumonia

Another type of pneumonia is found in people whose defences have been weakened by diseases such as cancer and AIDS. It's called ***Pneumocysitis jiroveci*** pneumonia. It's also known as ***Pneumocystics carinii*** pneumonia.

Mycoplasma pneumonia is a less severe form of pneumonia. Its main symptom is a cough that comes in bouts. People can feel sick or vomit if they have this type of pneumonia. It spreads easily, and it often occurs in schools and nurseries. Mycoplasmas are not really bacteria, and they're not viruses. They're sometimes called **atypical bacteria**. They can be treated with antibiotics.

More unusual forms of pneumonia include **psittacosis** (caused by a germ caught from contact with birds) and **Q fever** (caught from farm animals).

Flu vaccine

If you get the flu, you have a bigger chance of getting pneumonia. This is because the flu can make your immune system weak. The flu is caused by a virus. It's possible for the virus to travel to your lungs. So, if you have the flu vaccine, it should lower your risk of getting not just flu but also pneumonia.

- In one review of 20 observational studies , the number of older people who caught flu was lower in the group that had flu jabs than in the group that didn't. Fewer people who got the jab died. And there weren't many side effects from the vaccination. [9]
- Another big review of 25 studies tried to work out how well the flu jab works in people over the age of 65 who live in the community rather than a nursing home. It found that getting a flu jab can help stop people getting the flu or dying of pneumonia. But the studies had some problems, so we can't be certain of the results. [10]
- A more recent review found that older people living in a care facility were less likely to get pneumonia if they had a flu jab. Only 4 in 100 who had the jab got pneumonia, compared with 8 in 100 who didn't have the jab. However, getting a flu jab didn't seem to prevent pneumonia among older people living in the community. [11]

In the UK, a flu jab is recommended if you: [12]

- Are 65 or older
- Are pregnant
- Have lung problems, such as asthma or chronic obstructive pulmonary disease (COPD)
- Have a heart problem, such as heart failure
- Have long-term kidney or liver problems
- Have had a stroke or 'mini stroke' (transient ischaemic attack)
- Have a neurological disease, such as Parkinson's disease or multiple sclerosis (MS)
- Have diabetes
- Have a weakened immune system because of an illness or treatment, such as chemotherapy or radiotherapy for cancer, long-term steroids for asthma and another condition, problems with your spleen (an organ that helps fight infections), and diseases such as AIDS or leukaemia
- Live in a nursing home
- Are a health care worker
- Are looking after someone who is older or disabled

It's also important that children over the age of 6 months receive an annual flu vaccination if they have a long-term health condition that could get worse if they catch the flu. The NHS has also started offering an annual flu vaccination to all children aged 2, 3, and 4 years old. [13] This is gradually being expanded to include all children aged 2 to 16. [14] This vaccine is given as a nasal spray, not a jab.

If you don't fall into one of the groups above but think you need a flu jab, talk to your doctor.

You need to get a new vaccination every year, usually in October or November, in time for the flu season (December to March). This is because the viruses that cause flu change all the time. And the flu vaccine has to be changed to match the strains of flu that are causing the infection .

The flu vaccine is safe. You cannot get flu from it. But you may get some soreness in your arm where you have the injection. Some people get a fever and joint and muscle pains, and generally feel unwell for a couple of days.

Guillain-Barré syndrome

In the flu seasons of 1992 to 1993 and 1993 to 1994 in the United States, there was a slightly higher risk of a condition called Guillain-Barré syndrome for people who had the flu vaccine. [15] Guillain-Barré syndrome causes muscle weakness, and sometimes stops you moving your arms or legs. [16] It usually goes away on its own in a few weeks, but in rare cases it can be more serious.

However, the risk of getting this condition after a flu jab is still very, very low. It's only about 1 in 1 million.

Complications of pneumonia

Here are some of the most common complications of pneumonia.

Problems with breathing

Your breathing can become very difficult. This is because your airways and air sacs are inflamed , and may also be blocked by fluid that has built up in your lungs. You may have trouble catching your breath if you do any sort of physical activity. Even walking up stairs may make it hard for you to catch your breath.

Or you may feel short of breath when you are resting and not doing anything much. You may need to breathe faster. And you may feel as if you are panting. If breathing becomes very difficult, you will be given oxygen through a face mask that fits over your nose and mouth.

An infection in your bloodstream

This happens in about one-third of all cases of bacterial pneumonia, which is the most common type of pneumonia. Doctors call it **bacteraemia** or **septicaemia**.

You get it when the germs (called bacteria) that cause the infection in your lungs spread to your blood and multiply there. If this happens, they can spread to other parts of your body, such as your nervous system. If you get an infection in your bloodstream, you will have a high fever and feel very ill.

Like other complications, bacteraemia can be dangerous. One study found that 1 in 5 people who got bacteraemia from pneumonia died. [17]

If you get bacteraemia, you will need to be treated in hospital. You will be given antibiotic drugs through a drip into a vein, usually in your arm. This is called having IV (intravenous) antibiotics. Antibiotics are drugs that kill bacteria.

Fluid around your lungs

This happens when fluid builds up in the space between your lungs and the wall of your chest. This makes it hurt when you breathe in and out. Doctors call it a **pleural effusion**.

Sometimes the fluid gets infected. Doctors call this **empyema**. If this happens, it might be necessary for the fluid to be drained off. This is done with a needle or a thin tube that is inserted between your ribs.

How can I take care of myself?

Pneumonia needs to be taken seriously, even if you are young and physically fit. [6] Pneumonia can be especially dangerous if you are older or your general state of health is not good.

Here are some ways to help yourself make a full recovery from pneumonia.

- Get plenty of rest and do not exert yourself by doing anything that is physically challenging.
- If you have signs of being dehydrated, your doctor may advise you to drink more fluids. But you should always get advice from your doctor on how much fluid to drink.
- If you are spending a lot of time in bed, make sure you turn over often. Turn over every hour while you are awake. Breathe deeply five to 10 times and then cough strongly a couple of times. This helps to clear any phlegm that is blocking the air sacs in your lungs.

- Start to do more as you feel better. But don't push yourself too hard. Don't do anything that you don't feel well enough to do.
- Make sure you finish taking all the antibiotics that your doctor has prescribed. Don't stop taking them just because you feel better. If you do, there is a danger that not all the germs will be killed off. And those that are left can start to multiply again. If you don't finish taking all of your antibiotics, it might also lead to the drugs becoming less effective against the bacteria. Doctors call this problem **antibiotic resistance**. To learn more about how drugs become less effective against germs, see Resistance to antibiotics.
- Call your doctor if you start to feel ill again. You may need a check-up to make sure the infection isn't coming back.
- Don't miss your follow-up appointments. This can help you be sure that you've made a full recovery.
- Don't smoke. [25] If you're a smoker, you should give up smoking to reduce your risk of getting pneumonia again. Smoking damages your lungs and makes it more likely that you will get an infection.

For more information about your lungs and how they work, see What is pneumonia?

Resistance to antibiotics

Bacteria are said to be resistant to antibiotics if they have developed ways to fight against the effects of these drugs. This means that the drugs are no longer able to kill the bacteria.

This often happens when a drug doesn't fight off all of the bacteria and completely get rid of an infection. The bacteria that are left are the stronger ones (they fought against the drug and survived). These stronger bacteria start to multiply and your infection comes back. But this time you have an infection caused by the strongest of the bacteria, and this makes it less likely that the same antibiotic will work.

Another way that antibiotic resistance develops is if you don't finish taking all of your antibiotics. The process is similar. The bacteria that weren't killed off when you took the first doses of your drug are more likely to grow in a form that can fight against the antibiotic. This is why it is important that you take all of your antibiotic tablets, even if you feel better.

Several strains of the bacteria that cause the most common form of bacterial pneumonia (called pneumococcal pneumonia) are becoming resistant to some antibiotics. This is especially true of penicillins. [21] But it is also true of other types of antibiotics, including cephalosporins, macrolides, fluoroquinolones, and doxycycline. [7]

Strains of the pneumococcus bacteria that are resistant to penicillin are often also resistant to other frequently used antibiotics, such as erythromycin and tetracycline.

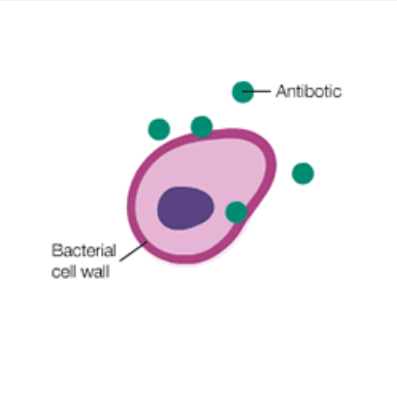
When your doctor decides which antibiotic to use to treat your pneumonia, he or she will take into account whether there is antibiotic resistance in the area where you live.

Antibiotics used to treat pneumonia

Antibiotics are divided into groups depending on how they work in your body and how they kill germs. Within each group there are several different drugs, and some drugs are newer than others. Sometimes your doctor may give you a combination of different antibiotics. [21]

Here's a brief comparison of some of the antibiotics used to treat pneumonia.

Penicillins



Penicillins kill bacteria by weakening their cell walls.

These were among the earliest antibiotics. They are still used to treat lots of infections. Occasionally, penicillins can cause an allergic reaction. This happens when the body's natural defences overreact to the drug. People who are allergic to one kind of penicillin may be allergic to others. Penicillins can also cause kidney problems and anaemia in some people, and reduce the number of white blood cells in the body (a condition called **leukopenia**). White blood cells help fight infections.

Some bacteria that cause pneumonia are becoming resistant to penicillins. Drugs that used to kill certain types of bacteria no longer work, and the bacteria can continue to multiply. Resistance to antibiotics is a growing problem. It is an especially big problem among pneumococci, the bacteria that cause most cases of bacterial pneumonia. [21] [27] [28] [29] To learn more, see Resistance to antibiotics.

The most common penicillins used to treat pneumonia (with common brand names) are:

- Amoxicillin (Amoxil)
- Amoxicillin-clavulanate (Augmentin)
- Ampicillin (Rimacillin)
- Benzylpenicillin (Crystapen)
- Piperacillin-tazobactam (Tazocin)
- Ticarcillin-clavulanate (Timentin).

The Committee on Safety of Medicines (the group that advises the government on which drugs work and are safe) warns there is a risk of a type of jaundice if you take amoxicillin-clavulanate. If you have jaundice, you get yellow colouring on your skin or in the whites of your eyes. This suggests your liver isn't working as well as it should.

Macrolides

These antibiotics are often prescribed for people with pneumonia.

Macrolides can make you feel sick and give you stomach cramps. They can also damage your liver, but this doesn't happen very often. If you take them for a long time, you should have regular tests to make sure your liver is working normally. Macrolides can also interfere with the way other medicines work. Your doctor will check what other drugs you are taking before prescribing macrolides for you.

The most common macrolides used to treat pneumonia (followed by their brand names) are:

- Azithromycin (Zithromax)
- Clarithromycin (Klaricid)
- Erythromycin (Erymax, Erythrocin).

The antibiotic telithromycin (brand name Ketek) is similar to erythromycin but acts against a wider range of bacteria. It belongs to a group of antibiotics called **ketolides**, which are like macrolides. Ketolides were developed because many bacteria were becoming resistant to macrolides. Telithromycin is the only ketolide available so far.

A very small number of people have had liver problems after taking telithromycin. [30] If you're taking telithromycin and you get any of the following symptoms, you should stop treatment and see your doctor straight away: [31]

- Loss of appetite

- Yellowing of your skin or eyes
- Dark-coloured urine
- Itching
- A tender abdomen.

Cephalosporins

Cephalosporins are often used when penicillin treatment hasn't worked. They are also often given to people who are in hospital with pneumonia. People who are allergic to penicillins may also be allergic to cephalosporins. These drugs have also been known to cause kidney problems and anaemia, and to reduce the number of white blood cells in the body (a condition called leukopenia). White blood cells help fight infections.

The cephalosporins used to treat pneumonia are either second-generation drugs or third-generation drugs. This means they are a newer type of antibiotic.

Some second-generation cephalosporins used to treat pneumonia (followed by their brand names) are:

- Cefpodoxime (Orelox)
- Cefprozil (Cefzil)
- Cefuroxime (Zinnat, Zinacef).

Some newer, third-generation cephalosporins, which are usually used only in hospital, are:

- Cefotaxime (Claforan)
- Ceftriaxone (Rocephin).

Fluoroquinolones

These antibiotics are sometimes used for pneumonia.

Fluoroquinolones can make you feel sick, restless, dizzy, or drowsy. Or they may give you a headache or a rash, or make your skin very sensitive to sunlight or other bright lights. They can also increase your chance of getting damage to your tendons (tendonitis) or rupturing a tendon. The risk is highest for people who are older or are being treated with drugs called corticosteroids. At the first sign of any pain, swelling, or inflammation, contact your doctor straight away. [32]

If you are younger than 18 or pregnant or breastfeeding, you should not take fluoroquinolones.

Some people who have been given fluoroquinolones have gone on to get infections with methicillin-resistant *Staphylococcus aureus* (MRSA) and *Clostridium difficile*. These are serious infections that are difficult to treat. So, most hospitals now try to use other types of antibiotic instead. [21]

Fluoroquinolones can interfere with the way other medicines work. Your doctor will check which other medicines you are taking before prescribing fluoroquinolones for you.

Some fluoroquinolones used to treat pneumonia (followed by their brand names) are:

- Levofloxacin (Tavanic)
- Ofloxacin (Tarivid).

Tetracyclines

These antibiotics are widely used. But they are used less now than they used to be because many bacteria have grown resistant to them. This means that tetracyclines are no longer able to fight against certain types of bacteria. (To learn more, see Resistance to antibiotics .) Tetracyclines are used to treat some unusual types of pneumonia including **psittacosis** (which is caused by a germ caught from contact with birds) and **mycoplasma pneumonia**. (Mycoplasmas are neither bacteria nor viruses , but they can be treated with antibiotics. They are sometimes called **atypical bacteria**.)

The most common side effects of tetracyclines are feeling sick and being sensitive to light.

Tetracyclines should not be taken if you are pregnant or breastfeeding, and they should not be given to children because they can discolour their teeth.

The tetracycline most often used for pneumonia is called **doxycycline** .

Pneumococcal vaccine

The pneumococcal vaccine is made to protect you against **pneumococcal pneumonia**, which is the most common type of pneumonia caused by bacteria . [33]

Once you have had the vaccine, you should be protected against this common type of pneumonia in about two weeks to three weeks. But the vaccine works better for some people than for others. Some people won't be protected at all.

You arm may be sore, red, and swollen where you have the injection. [33] But this will go after one or two days.

Most people need the pneumococcal vaccine only once. [34] You don't need a new one every year. Some people with a weak immune system or problems with their spleen may need another vaccination after five years. Ask your doctor if you think this may apply to you.

The pneumococcal vaccine is a safe vaccine. It cannot give you pneumonia or any other illness. Some people in studies have had minor side effects such as soreness where they got the injection. [33]

Here's what we know about how well pneumococcal vaccines work for different groups of people.

Pneumococcal vaccine for healthy people

If you are a healthy adult, the vaccine may protect you from getting pneumococcal pneumonia. [33]

A summary of the research (a systematic review) found that healthy people who'd had the vaccine were less likely to get this type of pneumonia than healthy people who didn't have the vaccine. But we're not sure how reliable these results are because the summary included an older study that isn't very high quality. [35]

The review also found that the vaccine may protect you against **invasive pneumonia**. [33] This is a serious condition that happens when the infection travels beyond your lungs. If the infection spreads to your blood, it is called **bacteraemia**. See Complications of pneumonia to learn more.

Another summary of the research chose slightly different studies to look at, and left out the old, low-quality study. This summary suggests that the vaccine is not effective in preventing pneumonia, even for people who are advised to have it (such as older people and people with lung disease). [36]

This second summary also questions the effectiveness of the vaccine in preventing invasive pneumonia (where the infection travels outside your lungs). However, this is controversial and has been challenged by other researchers. [37] [38]

Pneumococcal vaccine for older people or people in poor health

It's not clear whether the vaccine can protect you if you're older or in poor health, or if your immune system is weak. Different studies say different things. [36] [39] [40]

- A good-quality study looked at 1,006 older people living in nursing homes in Japan, mostly in their 70s and 80s. [40] It found that the vaccine protected against pneumonia. In particular, older people who had the vaccine were less likely to die from pneumococcal pneumonia, the type of pneumonia the vaccine was developed to prevent, compared with people who received a dummy (called a placebo) vaccine.

But, overall, a similar proportion of people died from all different types of pneumonia, whether they had the vaccine or not.

- Some research shows that if you're over 65, you have a 1 in 5 chance that the vaccine will not protect you. This happens if your body doesn't make antibodies when you get the vaccine. Antibodies are made by your immune system and help you fight off bacteria and other germs. [41]

- But some research has found that the vaccine can protect older people. One study of 1,898 older people who already had lung disease showed that fewer of those who had been vaccinated were admitted to hospital with pneumonia. And fewer of those who were vaccinated died. [42]

There is some uncertainty about how well the pneumococcal vaccine works, depending on which studies researchers judge to be reliable. The World Health Organization says that the vaccine does prevent invasive pneumonia in adults, including people over 65 (although it isn't as effective for older people as younger people). [43]

Pneumococcal vaccine for children

A newer vaccine is designed to prevent pneumococcal disease in children. It's called Prevenar. It is recommended for all infants under the age of 2 years. The vaccine is usually given in three separate doses. It will be given with the usual vaccines that your child gets at 2 months, 4 months, and 13 months.

This is the only pneumococcal vaccine that can be used in children under 2 years old. Ask your doctor about this vaccine if you have very young children who may be at risk of getting pneumonia.

A summary of six individual studies involving more than 100,000 children found that this vaccine was effective at preventing pneumonia. There was an 11 percent fall in the number of deaths in children who received the vaccine, compared with those who did not. [44]

Glossary:

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.

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.

antibiotics
These medicines are used to help your immune system fight infection. There are a number of different types of antibiotics that work in different ways to get rid of bacteria, parasites, and other infectious agents. Antibiotics do not work against viruses.

inflammation
Inflammation is when your skin or some other part of your body becomes red, swollen, hot, and sore. Inflammation happens because your body is trying to protect you from germs, from something that's in your body and could harm you (like a splinter) or from things that cause allergies (these things are called allergens). Inflammation is one of the ways in which your body heals an infection or an injury.

white blood cells
White blood cells are the cells in your blood that help your body fight infections. They are part of your immune system. The other cells in your blood, red blood cells, carry oxygen around your body.

bacteria
Bacteria are tiny organisms. There are lots of different types. Some are harmful and can cause disease. But some bacteria live in your body without causing any harm.

viruses
Viruses are microbes (tiny organisms) that need the cells of humans or other animals to exist. They use the machinery of cells to reproduce. Then they spread to other cells in the body.

fungus
A fungus is an organism that is sometimes considered to be a type of plant. A fungus lives by feeding on other organisms. The mushrooms we eat in salads are fungi, but so are candida and cryptococcus, which can cause infections in people's bodies.

flu
Flu is a bad infection that gives you a headache, sore throat, aching joints and a fever. Flu is caused by infection with a virus called influenza.

chemotherapy
The use of chemicals or drugs to treat or prevent disease, usually cancer.

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.

pulse rate
Your pulse rate is the number of times that your heart beats in one minute. A normal rate is between 60 and 100 beats per minute, but the heart can speed up under certain circumstances, such as when you exert yourself or when you have an infection.

AIDS
AIDS stands for acquired immunodeficiency syndrome. People who are infected with the human immunodeficiency virus (HIV) get AIDS when the virus has destroyed most of their immune system. When people have AIDS, their body isn't able to fight infections. So even common infections, such as colds, can cause serious problems.

observational studies
Observational studies examine how common a disease is or how risk factors affect the chances of getting a disease. There are three types of observational studies: cross-sectional studies, cohort studies and case-control studies.

asthma
Asthma is a disease of the lungs. It makes you wheeze, cough and feel short of breath. Asthma attacks are caused by inflammation and narrowing of your airways, which makes it hard for air to pass in and out of your lungs.

chronic obstructive pulmonary disease (COPD)
Chronic obstructive pulmonary disease (COPD) is an illness that causes coughing and difficulty breathing. Most of the people who get it have smoked for a long time. COPD can include both emphysema, which is the breakdown of air sacs (alveoli) in your lungs, and chronic bronchitis, which is a recurrent, long-lasting cough that brings up phlegm.

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).

leukaemia
Leukaemia is a type of cancer that affects your body's production of white blood cells. White blood cells are important for fighting infections. So, if you have leukaemia, you are more likely to catch an infectious disease.

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.

emphysema

Emphysema is a long-term disease of the lungs. The walls of the air sacs (alveoli) in the lungs become thin and less elastic. This makes it harder for oxygen to get in your blood and carbon dioxide to get out of your body. It makes you cough and feel short of breath. Smoking is the most common cause of emphysema.

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.

sickle cell disease
Sickle cell disease is a blood disorder that runs in families. Under certain conditions, the red blood cells of people with this disease change shape to look like a sickle. This causes a lot of pain and a range of other symptoms, including infections in the lungs.

high temperature
A high temperature is a general sign that there is an infection or inflammation in your body. Temperatures vary, but anything over about 38 degrees Celsius (100 degrees Fahrenheit) is considered high.

dehydrated
When you're dehydrated, you don't have enough fluid in your blood. This could be because you're not drinking enough or because you're losing water by sweating or having diarrhoea.

X-ray
X-rays are pictures taken of the inside of your body. They are made by passing small amounts of radiation through your body and then onto film.

stethoscope
A stethoscope is a tool doctors use to listen to people's bodies. One part of the stethoscope is a disc (called the bell), which doctors put over a part of someone's body (like their heart or a vein). The bell is connected to ear pieces, which the doctors put in their ears so they can listen to sounds that come from that part of the person's body.

allergic reaction
You have an allergic reaction when your immune system overreacts to a substance that is normally harmless. You can be allergic to particles in the air you are breathing, like pollen (which causes hay fever) or to chemicals on your skin, like detergents (which can cause a rash). People can also have an allergic reaction to drugs, like penicillin.

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.

tendons
Tendons are the tough, rope-like connections between muscles and bones.

spleen
Your spleen is an organ that sits on the left side of your body just below your ribs. It helps your body fight infections.

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.

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.

antibodies
Antibodies are an important part of your immune system. They are proteins made by white blood cells (another part of your immune system). They help destroy bacteria and other agents that cause infections.

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.

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