Common Cold

The common cold is a mild viral infection that primarily affects the upper respiratory tract, including the nose and throat. It is caused by various viruses, with the rhinovirus being the most common. The infection is generally harmless, but it can be uncomfortable and lasts about a week or two.

Diagnosis: You usually don't need medical care for a common cold. But if symptoms get worse or don't go away, see your health care provider.Most people with a common cold can be diagnosed by their symptoms. Your care provider may take a nasal or throat swab to rule out other illnesses. A chest X-ray may be ordered to rule out a lung illness.

Treatment : There's no cure for the common cold. Most cases of the common cold get better without treatment within 7 to 10 days. But a cough may last a few more days.The best thing you can do is take care of yourself while your body heals. Care tips include: Rest , Drink plenty of liquids, Humidify the air ,Use saline nasal rinses. Antibiotics do not treat cold viruses. They are used to treat illnesses caused by bacteria.

Pain relievers : Pain relievers you can buy without a prescription can lessen the discomfort of a sore throat, headache or fever.

For adults. Nonprescription pain relief for adults includes:

Acetaminophen (Tylenol, others).

Ibuprofen (Advil, Motrin IB, others).

For children. Guidelines for pain relief medicines for children include the following:

Do not give children or teenagers aspirin. Aspirin has been linked to Reye's syndrome, a rare life-threatening condition, in children or teenagers who have the flu or chickenpox.

Use children-strength, nonprescription pain relievers. These include children's acetaminophen (Tylenol, others) or ibuprofen (Advil, Motrin, others).

For children younger than 3 months old, don't use acetaminophen until your baby has been seen by a health care provider.

Don't give ibuprofen to a child younger than 6 months old or to children who are vomiting frequently.

Use these medicines for the shortest time possible and follow label directions to avoid side effects.

Call your health care provider if you have questions about the right dose.

Decongestant nasal sprays

For adults. Adults can use decongestant drops or sprays for up to five days. These help a stuffy nose. Prolonged use can cause the return of symptoms.

For children. Children younger than 6 years old shouldn't use decongestant drops or sprays. Talk to your doctor before using nasal decongestants in children older than 6 years.

Cough syrups

Nonprescription cough and cold medicines are used to treat the symptoms of coughs and colds, not the underlying disease. Research suggests that these medicines don't work any better to treat colds than a placebo, an inactive medicine used in research.

For adults. Follow these tips for nonprescription cough and cold medicines:

- Read and follow the label directions.
- Don't take two medicines with the same active ingredient, such as an antihistamine, decongestant or pain reliever. Too much of a single ingredient could lead to an accidental overdose.

For children. Nonprescription cough and cold medicines aren't typically recommended for children. These medicines have potentially serious side effects, including fatal overdoses in children younger than 2 years old. Talk to your child's doctor before using any nonprescription cough and cold medicine in children.

Lifestyle and home remedies

To make yourself as comfortable as possible when you have a cold, try these tips:

- **Drink plenty of fluids.** Water, juice, clear broth or warm lemon water are good choices. Avoid caffeine and alcohol, which can increase fluid loss.
- **Sip warm liquids.** Chicken soup, tea, warm apple juice or other warm liquids can soothe a sore throat and loosen a stuffy nose. Honey may help coughs in adults and children who are older than age 1. Try it in hot tea. Do not give honey to children younger than 1 year old because of the risk of an illness called infant botulism.
- **Rest.** Rest as much as possible. Stay home from work or school if you have a fever or a bad cough. Do not go out if you are drowsy after taking medicine.
- **Adjust your room's temperature and humidity.** Keep your room warm, but not overheated. If the air is dry, a cool-mist humidifier can help with stuffiness and coughing. Clean your humidifier as directed to prevent the growth of bacteria and molds.
- **Use a saltwater gargle.** A saltwater gargle of 1/4 to 1/2 teaspoon (1250 to 2500 milligrams) of table salt in 4 to 8 fluid ounces (120 to 240 milliliters) of warm water can help soothe a sore throat. Gargle the solution and then spit it out. Most children younger than 6 years aren't able to gargle properly.
- **Try other throat soothers.** Use ice chips, lozenges or hard candy to soothe a sore throat. Use caution when giving lozenges or hard candy to children because they can choke on them. Don't give lozenges or hard candy to children younger than 6 years.
- **Try saline nasal drops or sprays.** Saline nasal drops or sprays can keep nasal passages moist and loosen mucus.
- **Use a suction bulb for younger children.** In infants and younger children, apply saline nasal drops, wait for a short period and then use a suction bulb to draw mucus out of each nostril. Insert the bulb syringe about 1/4 to 1/2 inch (6 to 12 millimeters).

Influenza(Flu)

Diagnosis

Flu vaccines at Mayo Clinic

To diagnose the flu, also called influenza, your healthcare professional does a physical exam, looks for symptoms of flu and possibly orders a test that detects flu viruses.

The viruses that cause flu spread at high levels during certain times of the year in the Northern and Southern hemispheres. These are called flu seasons. During times when flu is widespread, you may not need a flu test.

But a test for flu may be suggested to help guide your care or to know if you could spread the virus to others. A flu test may be done by a pharmacy, your healthcare professional's office or in the hospital.

Types of flu tests you may have include:

- **Molecular tests.** These tests look for genetic material from the flu virus. Polymerase chain reaction tests, shortened to PCR tests, are molecular tests. You also may hear this type of test called an NAAT test, short for nucleic acid amplification test.

- **Antigen tests.** These tests look for viral proteins called antigens. Rapid influenza diagnostic tests are one example of antigen tests.

It's possible to have a test to diagnose both flu and other respiratory illness, such as COVID-19, which stands for coronavirus disease 2019. You may have both COVID-19 and influenza at the same time.

Treatment

If you have a severe infection or are at high risk of complications from a flu infection, your healthcare professional may prescribe an antiviral medicine to treat the flu. These medicines can include oseltamivir (Tamiflu), baloxavir (Xofluza) and zanamivir (Relenza).

You take oseltamivir and baloxavir by mouth. You inhale zanamivir using a device similar to an asthma inhaler. Zanamivir shouldn't be used by anyone with certain chronic respiratory problems, such as asthma and lung disease.

People who are in the hospital may be prescribed peramivir (Rapivab), which is given in a vein.

These medicines may shorten your illness by a day or so and help prevent serious complications.

Antiviral medicine may cause side effects. The side effects often are listed on the prescription information. In general, antiviral medicine side effects may include breathing symptoms, nausea, vomiting or loose stools called diarrhea.

Lifestyle and home remedies

If you have the flu, these measures may help ease your symptoms:

- **Drink plenty of liquids.** Choose water, juice and warm soups to help keep fluids in your body.

- **Rest.** Get more sleep to help your immune system fight infection. You may need to change your activity level, depending on your symptoms.

- **Consider pain relievers.** Use acetaminophen (Tylenol, others) or ibuprofen (Advil, Motrin IB, others) for fever, headache or achiness associated with influenza. Children and teens recovering from flu-like symptoms should never take aspirin because of the risk of Reye's syndrome, a rare but potentially fatal condition.

To help control the spread of influenza in your community, stay home and keep sick children home until the fever is gone, without the use of medicine, for 24 hours. Unless you're going to

a medical appointment, avoid being around other people until you're feeling better. If you need to leave your home to get medical care, wear a face mask. Wash your hands often.

COVID-19

Diagnosis

If you have symptoms of coronavirus disease 2019, known as COVID-19, or you've been exposed to the COVID-19 virus, contact your healthcare team. Let them know if you've had close contact with anyone diagnosed with COVID-19.

In the United States, at-home COVID-19 tests are available. Free tests can be mailed to U.S. addresses, or you can purchase tests in stores, pharmacies or online. The U.S. Food and Drug Administration, also known as the FDA, approves or authorizes the tests. On the FDA website, you can find a list of the tests that are validated and their expiration dates. You also can check with your healthcare professional before buying a test if you have any concerns.

When taking a test at home, read the directions that come with the test carefully. Follow the instructions exactly to get as accurate a result as possible.

COVID-19 tests also are available from healthcare professionals, some pharmacies and clinics, or at community testing sites.

Here are some guidelines for when to take a COVID-19 test:

- If you have COVID-19 symptoms, test for the illness right away.
- If you were exposed to the COVID-19 virus but don't have symptoms, wait at least five days after exposure then test.
- If you have symptoms and tested positive for COVID-19 within the last 30 days, you can test again. But if you were just exposed to the coronavirus and don't have symptoms, you don't need to test.

Also, testing before an event or contact with people at high risk of serious illness helps prevent the spread of the virus that causes COVID-19.

COVID-19 tests use a sample taken from your nose or throat, or a sample of saliva.

Two types of tests can help diagnose COVID-19.

- **Molecular tests.** These tests look for genetic material from the COVID-19 virus. Polymerase chain reaction tests, shortened to PCR tests, are molecular tests. You may also see this type of test called an NAAT test, short for nucleic acid amplification test.
  PCR tests are more accurate than the other type of COVID-19 test, called an antigen test. PCR tests may be done at home. But they are much more likely to be done by a healthcare professional and processed in a lab.
- **Antigen tests.** These tests look for viral proteins called antigens.
  Antigen tests also may be called rapid COVID-19 tests or at-home COVID-19 tests. These tests are useful if you need a quick result.
  Antigen tests are reliable and accurate, but they are less accurate than PCR tests. This is especially true if you don't have symptoms. If you take an antigen test and are negative for COVID-19, take another antigen test after 48 hours to get the most accurate result.

Understanding test results

If you have a positive COVID-19 PCR or antigen test, you almost certainly have COVID-19. Another test isn't needed.

If you get a negative PCR test, you most likely do not have COVID-19.

If you have a negative antigen test, the FDA recommends that you repeat an antigen test two days after the first test. With or without symptoms, repeating the test helps get the correct diagnosis.

If you test positive, call a healthcare professional immediately to find out what options are available.

Preventing the spread of the COVID-19 virus while sick

To prevent the spread of the COVID-19 virus to others, stay home and apart from anyone you live with for as long as you have worsening symptoms. If you have a weakened immune system, you will likely need to isolate for longer. How long depends on your symptoms and personal health history. Your healthcare professional can advise you on what's best in your situation.

If you must be around others, a face mask helps lower the spread of this coronavirus. During this time, try not to share things like cups or towels, and use a separate bathroom and bedroom. It can help to get more airflow in your home as well.

Once you're feeling better and haven't had a fever for a full 24 hours, and you haven't taken medicine for fever during that time, you can go back to being around others. If your fever returns or you start to feel worse, return to isolation until your symptoms improve and you are fever-free without medicine for 24 hours. But listen to the advice of your healthcare professional.

In the five days after isolation, to help prevent the spread of the COVID-19 virus you can wear a mask, wash your hands, keep your distance from others, test for COVID-19 infection and improve airflow. These actions are helpful even if you never had symptoms but tested positive for COVID-19.

Treatment

Many people with COVID-19 recover with rest, plenty of fluids and care that manages symptoms. Medicine you can get without a prescription can help, such as:

- Fever reducers.
- Pain relievers, such as ibuprofen or acetaminophen.
- Cough syrup or medicine.

If you are at high risk of serious COVID-19 illness, your healthcare professional may suggest medicine to prevent mild illness from getting worse. These medicines can include nirmatrelvir and ritonavir (Paxlovid), remdesivir (Veklury) or molnupiravir (Lagevrio).

Paxlovid and Lagevrio are taken by mouth as pills. Veklury is given through a needle in a vein.

If you're very ill, you may need to be treated in the hospital.

Treatment for serious COVID-19 illness

For people who are in the hospital for COVID-19 care, care is given based on a person's immune system response and the need for oxygen support.

Added oxygen may be given through a tube in the nose. Some people may need to have a tube placed in their airway to push air into the lungs. That's called mechanical ventilation. In very severe situations, a machine called extracorporeal membrane oxygenation, also known as ECMO, can be used to mimic the function of the heart and lungs.

Medicines for severe COVID-19 may be remdesivir, baricitinib (Olumiant) and tocilizumab (Actemra), or a corticosteroid such as dexamethasone.

Baricitinib is a pill. Tocilizumab is an injection. Dexamethasone may be either a pill or given through a needle in a vein.

Another option may come from blood donated by people who have recovered from COVID-19, called convalescent plasma. The blood is processed to remove blood cells, leaving behind a liquid called plasma that has immune system proteins called antibodies. Convalescent plasma with high antibody levels may be used to help people with a weakened immune system recover from COVID-19.

Measles

Measles is caused by the rubeola virus. It spreads through direct contact with a person with the virus or through droplets in the air. Measles is a highly contagious condition that can lead to life-threatening complications.

Symptoms

Measles is a viral disease that causes uncomfortable symptoms and can lead to life-threatening or life-changing complications.

The CDC state that symptoms usually appear 7–14 days

after exposure. However, according to the WHO, they can take up to 23 days.

Symptoms include:

- a fever, possibly up to 104°F (40°C)
- a cough
- a runny nose
- Sneezing
- watery eyes
- body aches

small white spots in the mouth, appearing 2–3 days after early symptoms

a red rash, appearing around 3–5 days after symptoms start

The rash usually starts at the hairline and spreads down through the body. It may begin as flat, red spots, but small bumps may appear on top. The spots may join together as they spread.

Complications

Complications can arise, some of which can be severe.

They include : vision loss, encephalitis, an infection that causes brain swelling ,severe diarrhea and dehydration ,additional infections: pneumonia and other respiratory infection

During pregnancy, measles can lead to: loss of pregnancy, early delivery, low birth weight

Those most at risk of complications include: people with a weakened immune system, very young children, adults over the age of 20 years, pregnant women

Causes

Infection with the rubeola virus causes measles.

How symptoms develop

The virus enters the body through the mouth, nose, or eyes

. Once there, it most likely enters the lungs, where it infects immune cells.

These cells move to the lymph nodes, where the virus transfers to other cells. These cells travel through the body, releasing virus particles into the blood.

As the blood travels around the body, it carries the virus to different body organs, including the liver, the skin, the central nervous system, and the spleen.

In the skin, the measles virus causes inflammation in the capillaries. This gives rise to the hallmark measles rash.

The virus crosses the blood-brain barrier and enters the brain in around 1 in 1,000 people

. This can cause swelling in the brain that may be life-threatening.

An infection in the lungs causes a person to cough, which transmits the virus to other people.

Anyone who has never had measles or the vaccination can become ill if they breathe in infected droplets or are in close physical contact with someone who has measles.

How does it spread?

The disease is contagious. The CDC indicate that a person can transmit the virus from 4 days before and about 4 days after the rash appears.

The infection spreads through:

physical contact with a person who has measles

being near a person with measles when they cough or sneeze

touching a surface with the virus on and then putting fingers into the mouth, or rubbing the nose or eyes

After a person coughs or sneezes, the virus remains active in the air for around 2 hours

If one person has measles, they can pass it to up to 90% of those around them, unless they have immunity or have had the vaccination Measles only affects humans. No animal species can transmit it.

When to see a doctor

A person should see a doctor if:

they have symptoms that could indicate measles

the fever rises over 100.4º F (38º C)

there is chest pain or breathing difficulty

they cough up blood

there are signs of confusion or drowsiness

they experience a convulsion

A doctor can usually diagnose measles by looking at the signs and symptoms, but they may order a blood test to confirm a diagnosis.

Treatment

There is no specific treatment for measles, and symptoms usually go away within 7 to 10 days.

If there are no complications, the doctor will recommend rest and plenty of fluids to prevent dehydration. If there is a risk of complications, the doctor may recommend spending time in the hospital.

If a child needs treatment in the hospital, a doctor will prescribe vitamin A.

The following tips may help manage symptoms:

Pain and fever: Tylenol or ibuprofen can help manage a fever, aches, and pains. A doctor can advise on options for young children. Children under 16 years should not take aspirin.

A cough: Use a humidifier or put a wet towel on a warm radiator to moisten the air. A warm lemon and honey drink may help, but do not give honey to babies under 1 year.

Dehydration: Encourage the person to drink plenty of fluids.

Eyes: Remove any crustiness with cotton wool soaked in water. Dim the lights if the eyes are hypersensitive.

The measles is a viral infection, and antibiotics will not help. However, a doctor may prescribe them if a person develops an additional bacterial infection.

Tylenol or ibuprofen are available for purchase online.

Prevention

After a person has measles once, they usually have immunity and are unlikely to have it again.

A doctor will usually recommend vaccination for those who have not had measles and do not have immunity.

Measles vaccination

In the United States, the CDC recommend that people have the measles, mumps, and rubella (MMR) vaccine as follows:

one shot at 12–15 months of age

a booster shot at 4–6 years, before starting school

Newborns have immunity from their mother for several months after birth if the mother has immunity.

In some cases, however, a doctor may recommend vaccination before the age of 12 months. This may happen if there is a risk of an outbreak in the area where they live.

Adults do not need a vaccine in the U.S. if:

They were born or lived in the U.S. before 1957 unless they work in a healthcare setting

and have no evidence of immunity.

They received at least one MMR shot after the age of 12 months, or two doses for those at high risk, such as healthcare workers.

A blood test shows they have immunity.

Some people should not have the vaccine. They include those who:

are pregnant or may be pregnant

have certain allergies

have a personal or family history of immune system problems

have tuberculosis

currently feel moderately to severely unwell

have had another vaccination within the last 4 weeks

Anybody who is not sure whether they should have the vaccine should ask their doctor for advice.

Chickenpox

Chickenpox is an illness caused by the varicella-zoster virus. It brings on an itchy rash with small, fluid-filled blisters. Chickenpox spreads very easily to people who haven't had the disease or haven't gotten the chickenpox vaccine. Chickenpox used to be a widespread problem, but today the vaccine protects children from it.

The chickenpox vaccine is a safe way to prevent this illness and the other health problems that can happen during it.

A Book: Mayo Clinic Guide to Your Baby's First Years

Symptoms

The rash caused by chickenpox appears 10 to 21 days after you're exposed to the varicella-zoster virus. The rash often lasts about 5 to 10 days. Other symptoms that may appear 1 to 2 days before the rash include:

- Fever.
- Loss of appetite.

- Headache.
- Tiredness and a general feeling of being unwell.

Once the chickenpox rash appears, it goes through three phases:

- Raised bumps called papules, which break out over a few days.
- Small fluid-filled blisters called vesicles, which form in about one day and then break and leak.
- Crusts and scabs, which cover the broken blisters and take a few more days to heal.

New bumps keep showing up for several days. So you may have bumps, blisters and scabs at the same time. You can spread the virus to other people for up to 48 hours before the rash appears. And the virus stays contagious until all broken blisters have crusted over.

The disease is by and large mild in healthy children. But sometimes, the rash can cover the whole body. Blisters may form in the throat and eyes. They also may form in tissue that lines the inside of the urethra, anus and vagina.

When to see a doctor

If you think you or your child might have chickenpox, call your health care provider. Often, chickenpox can be diagnosed with an exam of the rash and other symptoms. You may need medicines that can help fight off the virus or treat other health problems that can happen because of chickenpox. To avoid infecting others in the waiting room, call ahead for an appointment. Mention that you think you or your child may have chickenpox.

Also, let your provider know if:

- The rash spreads to one or both eyes.
- The rash gets very warm or tender. This might be a sign that the skin is infected with bacteria.
- You have more serious symptoms along with the rash. Watch for dizziness, new confusion, fast heartbeat, shortness of breath, shakiness, loss of the ability to use muscles together, a cough that becomes worse, vomiting, stiff neck or a fever higher than 102 F (38.9 C).
- You live with people who've never had chickenpox and haven't gotten the chickenpox vaccine yet.
- Someone in your household is pregnant.
- You live with someone who has a disease or takes medicines that affect the immune system.

Causes

A virus called varicella-zoster causes chickenpox. It can spread through direct contact with the rash. It also can spread when a person with chickenpox coughs or sneezes and you breathe in the air droplets.

Risk factors

Your risk of getting infected with the virus that causes chickenpox is higher if you haven't already had chickenpox or if you haven't had the chickenpox vaccine. It's extra important for people who work in child care or school settings to be vaccinated.

Most people who have had chickenpox or have gotten the vaccine are immune to chickenpox. If you've been vaccinated and still get chickenpox, symptoms are often milder. You may have fewer blisters and mild or no fever. A few people can get chickenpox more than once, but this is rare.

Complications

Chickenpox is often a mild disease. But it can be serious and can lead to other health problem including:

- Infected skin, soft tissues, bones, joints or bloodstream caused by bacteria.
- Dehydration, when the body runs too low on water and other fluids.
- Pneumonia, an illness in one or both lungs.
- Swelling of the brain called encephalitis.
- Toxic shock syndrome, a dangerous complication of some illnesses caused by bacteria.
- Reye's syndrome, a disease that causes swelling in the brain and liver. This can happen in children and teens who take aspirin during chickenpox.

In very rare cases, chickenpox could lead to death.

Who's at risk?

People who are at higher risk of chickenpox complications include:

- Newborns and infants whose mothers never had chickenpox or the vaccine. This includes children under age 1, who have not yet had the vaccine.
- Teens and adults.
- Pregnant women who haven't had chickenpox.
- People who smoke.
- People with cancer or HIV who are taking medication that has an effect on the immune system.
- People with a chronic condition, such as asthma, who take medicine that calms immune response. Or those who have had an organ transplant and take medicine to limit the immune system's action.

Chickenpox and pregnancy

Low birth weight and limb problems are more common in babies born to women who are infected with chickenpox early in their pregnancies. When a pregnant person catches chickenpox in the week before birth or within a couple of days after giving birth, the baby has a higher risk of getting a life-threatening infection.

If you're pregnant and not immune to chickenpox, talk to your health care provider about these risks.

Chickenpox and shingles

If you've had chickenpox, you're at risk of a complication called shingles. The varicella-zoster virus stays in your nerve cells after the chickenpox rash goes away. Many years later, the virus can turn back on and cause shingles, a painful cluster of blisters. The virus is more likely to come back in older adults and people who have weaker immune systems.

The pain of shingles can last long after the blisters go away, and it can be serious. This is called postherpetic neuralgia.

In the United States, the Centers for Disease Control and Prevention (CDC) suggests you get the shingles vaccine, Shingrix, if you're 50 or older. The agency also suggests Shingrix if you're 19 or older and you have a weaker immune system because of diseases or treatments. Shingrix is recommended even if you've already had shingles or you've gotten the older shingles vaccine, Zostavax.

Other shingles vaccines are offered outside of the United States. Talk to your provider for more information on how well they prevent shingles.

Prevention

The chickenpox vaccine, also called the varicella vaccine, is the best way to prevent chickenpox. In the United States, experts from the CDC report that two doses of the vaccine prevent illness over 90% of the time. Even if you get chickenpox after receiving the vaccine, your symptoms may be much milder.

In the United States, two chickenpox vaccines are licensed for use: Varivax contains only the chickenpox vaccine. It can be used in the United States to vaccinate people age 1 or older. ProQuad combines the chickenpox vaccine with the measles, mumps and rubella vaccine. It can be used in the United States for children ages 1 to 12. This is also called the MMRV vaccine.

In the United States, children receive two doses of the varicella vaccine: the first between ages 12 and 15 months and the second between ages 4 and 6 years. This is part of the routine vaccination schedule for children.

For some children between the ages of 12 and 23 months, the MMRV combination vaccine may raise the risk of fever and seizure from the vaccine. Ask your child's health care provider about the pros and cons of using the combined vaccines.

Children 7 to 12 years old who haven't been vaccinated should receive two doses of the varicella vaccine. The doses should be given at least three months apart.

People age 13 or older who haven't been vaccinated should receive two catch-up doses of the vaccine at least four weeks apart. It's even more important to get the vaccine if you have a higher risk of getting exposed to chickenpox. This includes health care workers, teachers, child-care employees, international travelers, military personnel, adults who live with young children and all nonpregnant women of childbearing age.

If you don't remember whether you've had chickenpox or the vaccine, your provider can give you a blood test to find out.

Other chickenpox vaccines are offered outside the United States. Talk to your health care provider for more information on how well they prevent chickenpox.

Do not get the chickenpox vaccine if you're pregnant. If you decide to get vaccinated before pregnancy, don't try to get pregnant during the series of shots or for one month after the last dose of the vaccine.

Other people also shouldn't get the vaccine, or they should wait. Check with your health care provider about whether you should get the vaccine if you:

- Have a weaker immune system. This includes people who have HIV or take medicines that have an effect on the immune system.
- Are allergic to gelatin or the antibiotic neomycin.
- Have any kind of cancer or are getting cancer treatment with radiation or medicines.
- Recently received blood from a donor or other blood products.

Talk to your provider if you're not sure whether you need the vaccine. If you plan on getting pregnant, ask your provider if you're up to date on your vaccines.

Is it safe and effective?

Parents often wonder whether vaccines are safe. Since the chickenpox vaccine became available, studies have found that it's safe and it works well. Side effects are often mild. They include pain, redness, soreness and swelling at the site of the shot. Rarely, you might get a rash at the site or a fever.

Diagnosis

Most often, health care providers find out you have chickenpox based on the rash.

Chickenpox also can be confirmed with lab tests, including blood tests or a tissue study of samples of affected skin.

Treatment

In otherwise healthy children, chickenpox often needs no medical treatment. Some children may be able to take a type of medicine called an antihistamine to calm itching. But for the most part, the disease just needs to run its course.

If you're at high risk of complications

For people who are at high risk of complications from chickenpox, providers sometimes prescribe medicines to shorten the length of the illness and to help lower the risk of complications.

If you or your child is at high risk of complications, your provider may suggest antiviral medicine to fight the virus, such as acyclovir (Zovirax, Sitavig). This medicine may lessen the symptoms of chickenpox. But they work best when given within 24 hours after the rash first appears.

Other antiviral drugs, such as valacyclovir (Valtrex) and famciclovir, also might make the illness less severe. But these may not be approved or right for everyone. In some cases, your provider may suggest that you get the chickenpox vaccine after you've been exposed to the virus. This can prevent the disease or help make it less severe.

Treating complications

If you or your child gets complications, your provider will figure out the right treatment. For example, antibiotics can treat infected skin and pneumonia. Brain swelling, also called encephalitis, is often treated with antiviral medicine. Treatment in the hospital may be needed.

Lifestyle and home remedies

To help ease the symptoms of mild chickenpox, you can follow these self-care tips.

Try not to scratch

Scratching the skin can cause scarring and slow healing. It also can raise the risk that the sores will get infected. If your child can't stop scratching, trim your child's fingernails. It also may help to put gloves on a child's hands, especially at night.

Relieve the itch and other symptoms

The chickenpox rash can be very itchy, and broken blisters called vesicles sometimes sting. For relief of these and other symptoms, you can try:

- A cool bath with added baking soda, aluminum acetate or uncooked oatmeal. Or you could add colloidal oatmeal, a finely ground oatmeal that is made for soaking.
- Calamine lotion dabbed on the itchy spots.
- A soft, bland diet if chickenpox sores form in the mouth.
- Antihistamines such as diphenhydramine (Benadryl) for itching. But ask your provider if your child can safely take antihistamines.
- Acetaminophen (Tylenol) for a mild fever.

Call your provider if a fever lasts longer than four days and is higher than 102 F (38.9 C). And don't give aspirin to children and teenagers who have chickenpox. This can lead to a serious medical problem called Reye's syndrome.

Talk with your provider before you give any type of nonsteroidal anti-inflammatory drug (NSAID), such as ibuprofen (Advil, Motrin IB, others), to someone who has chickenpox. Some studies suggest this type of medicine may lead to skin infections or tissue damage.

Preparing for your appointment

Call your family health care provider if you or your child has symptoms of chickenpox. Here's some information to help you get ready for your appointment.

What you can do in the meantime

Rest as much as possible. Try not to touch skin with chickenpox on it. And think about wearing a face mask over the nose and mouth in public. Chickenpox is highly contagious until skin blisters have fully crusted.

Whooping Cough

Whooping cough (pertussis) is a highly contagious respiratory tract infection. In many people, it's marked by a severe hacking cough followed by a high-pitched intake of breath that sounds like "whoop."

Before the vaccine was developed, whooping cough was considered a childhood disease. Now whooping cough primarily affects children too young to have completed the full course of vaccinations and teenagers and adults whose immunity has faded

Symptoms

Once you become infected with whooping cough, it takes about seven to 10 days for signs and symptoms to appear, though it can sometimes take longer. They're usually mild at first and resemble those of a common cold:

- Runny nose
- Nasal congestion
- Red, watery eyes
- Fever
- Cough

After a week or two, signs and symptoms worsen. Thick mucus accumulates inside your airways, causing uncontrollable coughing. Severe and prolonged coughing attacks may:

- Provoke vomiting
- Result in a red or blue face
- Cause extreme fatigue
- End with a high-pitched "whoop" sound during the next breath of air

However, many people don't develop the characteristic whoop. Sometimes, a persistent hacking cough is the only sign that an adolescent or adult has whooping cough.

Infants may not cough at all. Instead, they may struggle to breathe, or they may even temporarily stop breathing.

When to see a doctor

Call your doctor if prolonged coughing spells cause you or your child to:

- Vomit
- Turn red or blue
- Seem to be struggling to breathe or have noticeable pauses in breathing
- Inhale with a whooping sound

Causes

Whooping cough is caused by a type of bacteria called Bordetella pertussis. When an infected person coughs or sneezes, tiny germ-laden droplets are sprayed into the air and breathed into the lungs of anyone who happens to be nearby.

Risk factors

The whooping cough vaccine you receive as a child eventually wears off. This leaves most teenagers and adults susceptible to the infection during an outbreak — and there continue to be regular outbreaks.

Infants who are younger than age 12 months who are unvaccinated or haven't received the full set of recommended vaccines have the highest risk for severe complications and death.

Complications

Teens and adults often recover from whooping cough with no problems. When complications occur, they tend to be side effects of the strenuous coughing, such as:

- Bruised or cracked ribs
- Abdominal hernias
- Broken blood vessels in the skin or the whites of your eyes

Infants

In infants — especially those under 6 months of age — complications from whooping cough are more severe and may include:

- Pneumonia
- Slowed or stopped breathing
- Dehydration or weight loss due to feeding difficulties
- Seizures
- Brain damage

Because infants and toddlers are at greatest risk of complications from whooping cough, they're more likely to need treatment in a hospital. Complications can be life-threatening for infants younger than 6 months old.

Prevention

The best way to prevent whooping cough is with the pertussis vaccine, which doctors often give in combination with vaccines against two other serious diseases — diphtheria and tetanus. Doctors recommend beginning vaccination during infancy.

The vaccine consists of a series of five injections, typically given to children at these ages:

- 2 months
- 4 months
- 6 months
- 15 to 18 months
- 4 to 6 years

Vaccine side effects

Side effects of the vaccine are usually mild and may include a fever, crankiness, headache, fatigue or soreness at the site of the injection.

Booster shots

- **Adolescents.** Because immunity from the pertussis vaccine tends to wane by age 11, doctors recommend a booster shot at that age to protect against whooping cough (pertussis), diphtheria and tetanus.
- **Adults.** Some varieties of the every-10-year tetanus and diphtheria vaccine also include protection against whooping cough (pertussis). This vaccine will also reduce the risk of your transmitting whooping cough to infants.
- **Pregnant women.** Health experts now recommend that pregnant women receive the pertussis vaccine between 27 and 36 weeks of gestation. This may also give some protection to the infant during the first few months of life.

Preventive medications

If you've been exposed to someone who has whooping cough, your doctor may recommend antibiotics to protect against infection if you:

- Are a health care provider
- Are pregnant
- Are younger than age 12 months
- Have a health condition that could put you at risk of severe illness or complications, such as a weakened immune system or asthma
- Live with someone who has whooping cough
- Live with someone who is at high risk of developing severe illness or complications from a whooping cough infection

Diagnosis

- Diagnosing whooping cough can be tough early on due to symptoms similar to a cold or flu. Doctors may rely on symptom review and cough sound but often confirm with:

- Nose/throat swab for bacteria.
- Blood test for white cell count.
- Chest X-ray for lung inflammation.
- These tests help confirm infection and assess severity.

Treatment

Infants are typically hospitalized for treatment because whooping cough is more dangerous for that age group. If your child can't keep down liquids or food, intravenous fluids may be necessary. Your child will also be isolated from others to prevent the infection from spreading.

Treatment for older children and adults usually can be managed at home.

Medications

Antibiotics kill the bacteria causing whooping cough and help speed recovery. Exposed family members may be given preventive antibiotics.

Unfortunately, not much is available to relieve the cough. Over-the-counter cough medicines, for instance, have little effect on whooping cough and are discouraged.

Self care

The following tips on dealing with coughing spells apply to anyone being treated for whooping cough at home:

- **Get plenty of rest.** A cool, quiet and dark bedroom may help you relax and rest better.
- **Drink plenty of fluids.** Water, juice and soups are good choices. In children, especially, watch for signs of dehydration, such as dry lips, crying without tears and infrequent urination.
- **Eat smaller meals.** To avoid vomiting after coughing, eat smaller, more-frequent meals rather than large ones.
- **Clean the air.** Keep your home free of irritants that can trigger coughing spells, such as tobacco smoke and fumes from fireplaces.
- **Prevent transmission.** Cover your cough and wash your hands often; if you must be around others, wear a mask.

Tuberculosis

Overview

Tuberculosis (TB) is a serious illness that mainly affects the lungs. The germs that cause tuberculosis are a type of bacteria.

Tuberculosis can spread when a person with the illness coughs, sneezes or sings. This can put tiny droplets with the germs into the air. Another person can then breathe in the droplets, and the germs enter the lungs.

Tuberculosis spreads easily where people gather in crowds or where people live in crowded conditions. People with HIV/AIDS and other people with weakened immune systems have a higher risk of catching tuberculosis than people with typical immune systems.

Drugs called antibiotics can treat tuberculosis. But some forms of the bacteria no longer respond well to treatments.

Symptoms

When tuberculosis (TB) germs survive and multiply in the lungs, it is called a TB infection. A TB infection may be in one of three stages. Symptoms are different in each stage.

Primary TB infection. The first stage is called the primary infection. Immune system cells find and capture the germs. The immune system may completely destroy the germs. But some captured germs may still survive and multiply.

Most people don't have symptoms during a primary infection. Some people may get flu-like symptoms, such as:

- Low fever.
- Tiredness.
- Cough.

Latent TB infection. Primary infection is usually followed by the stage called latent TB infection. Immune system cells build a wall around lung tissue with TB germs. The germs can't do any more harm if the immune system keeps them under control. But the germs survive. There are no symptoms during latent TB infection.

Active TB disease. Active TB disease happens when the immune system can't control an infection. Germs cause disease throughout the lungs or other parts of the body. Active TB disease may happen right after primary infection. But it usually happens after months or years of latent TB infection.

Symptoms of active TB disease in the lungs usually begin gradually and worsen over a few weeks. They may include:

- Cough.
- Coughing up blood or mucus.
- Chest pain.
- Pain with breathing or coughing.
- Fever.
- Chills.
- Night sweats.
- Weight loss.
- Not wanting to eat.
- Tiredness.
- Not feeling well in general.

Active TB disease outside the lungs. TB infection can spread from the lungs to other parts of the body. This is called extrapulmonary tuberculosis. Symptoms vary depending on what part of the body is infected. Common symptoms may include:

- Fever.
- Chills.
- Night sweats.
- Weight loss.
- Not wanting to eat.
- Tiredness.
- Not feeling well in general.
- Pain near the site of infection.

Active TB disease in the voice box is outside the lungs, but it has symptoms more like disease in the lungs.

Common sites of active TB disease outside the lungs include:

- Kidneys.
- Liver.
- Fluid surrounding the brain and spinal cord.
- Heart muscles.
- Genitals.
- Lymph nodes.
- Bones and joints.
- Skin.
- Walls of blood vessels.
- Voice box, also called larynx.

Active TB disease in children. Symptoms of active TB disease in children vary. Typically, symptoms by age may include the following:

- **Teenagers.** Symptoms are similar to adult symptoms.
- **1- to 12-year-olds.** Younger children may have a fever that won't go away and weight loss.
- **Infants.**The baby doesn't grow or gain weight as expected. Also, a baby may have symptoms from swelling in the fluid around the brain or spinal cord, including:
    - Being sluggish or not active.
    - Unusually fussy.

- Vomiting.
- Poor feeding.
- Bulging soft spot on the head.
- Poor reflexes.

When to see a doctor

The symptoms of tuberculosis are similar to symptoms of many different illnesses. See your health care provider if you have symptoms that don't improve with a few days of rest.

Get emergency care if you have:

- Chest pain.
- Sudden, severe headache.
- Confusion.
- Seizures.
- Difficulty breathing.

Get immediate or urgent care if you:

- Cough up blood.
- Have blood in your urine or stool.

Causes

Tuberculosis is caused by a bacterium called Mycobacterium tuberculosis.

People with active TB disease in the lungs or voice box can spread the disease. They release tiny droplets that carry the bacteria through the air. This can happen when they're speaking, singing, laughing, coughing or sneezing. A person can get an infection after inhaling the droplets.

The disease is more likely to spread when people spend a lot of time together in an indoor space. So the disease spreads easily in places where people live or work together for long periods. Also, the disease spreads more easily in crowded gatherings.

A person with a latent TB infection cannot pass the disease to other people. A person taking drugs to treat active TB disease usually can't pass the disease after 2 to 3 weeks of treatment.

Drug-resistant TB

Some forms of the TB bacteria have become drug resistant. This means that drugs that once cured the disease no longer work.

This happens, in part, because of naturally occurring genetic changes in bacteria. A random genetic change in a bacterium might give it some quality that makes it more likely to survive the attack of an antibiotic. If it does survive, then it can multiply.

When antibiotic drugs aren't used correctly — or drugs fail to kill all the bacteria for another reason — the conditions are ideal for more-resistant versions of the bacteria to get established and multiply. If these bacteria are passed on to other people, a new drug-resistant strain can grow over time.

Problems that can lead to such drug-resistant strains of bacteria include the following:

- People didn't follow directions for taking the drugs or stopped taking the drugs.
- They weren't prescribed the right treatment plan.
- Drugs were not available.
- The drugs were of poor quality.
- The body didn't absorb the drugs as expected.

Risk factors

Anyone can get tuberculosis, but certain factors increase the risk of getting an infection. Other factors increase the risk of an infection becoming active TB disease.

The Centers for Disease Control and Prevention recommends a TB test for people who have an increased risk of TB infection or active TB disease. Talk to your health care provider if you have one or more of the following risk factors.

Risk of TB infection

Certain living or working conditions make it easier for the disease to pass from one person to another. These conditions increase the risk of getting a TB infection:

- Living with someone with active TB disease.
- Living or traveling in a country where TB is common, including several countries in Latin America, Africa, Asia and the Pacific Islands.
- Living or working in places where people live close together, such as prisons, nursing homes and shelters for homeless people.
- Living in a community identified as being at high risk of tuberculosis.
- Working in health care and treating people with a high risk of TB.

Risk of active TB disease

A weakened immune system increases the risk of a TB infection becoming active TB disease. Conditions or treatments that weaken the immune system include:

- HIV/AIDS.
- Diabetes.
- Severe kidney disease.
- Cancers of the head, neck and blood.
- Malnutrition or low body weight.
- Cancer treatment, such as chemotherapy.
- Drugs to prevent rejection of transplanted organs.

- Long-term use of prescription steroids.
- Use of unlawful injected drugs.
- Misuse of alcohol.
- Smoking and using other tobacco products.

Age and active TB disease

The risk of a TB infection becoming active TB disease changes with age.

- **Under 5 years of age.** Until children reach age 5, they have high risk of a TB infection becoming active TB disease. The risk is greater for children under age 2. Tuberculosis in this age group often leads to serious disease in the fluid surrounding the brain and spinal column, called meningitis.
- **Age 15 to 25.** People in this age group have an increased risk of developing more-severe active TB disease in the lungs.
- **Age 65 and older.** The immune system weakens during older age. Older adults have a greater risk of active TB disease. Also, the disease may be more difficult to treat.

Prevention

If you test positive for latent TB infection, you may need to take drugs to prevent active TB disease.

Preventing the spread of disease

If you have active TB disease, you'll need to take steps to prevent other people from getting an infection. You will take drugs for four, six or nine months. Take all of the drugs as directed during the entire time.

During the first 2 to 3 weeks, you will be able to pass TB bacteria to others. Protect others with these steps:

- **Stay home.** Don't go to work or school.
- **Isolate at home.** Spend as little time as possible among members of your household. Sleep in a separate room.
- **Ventilate the room.** Tuberculosis germs spread more easily in small, closed spaces. If it's not too cold outdoors, open the windows. Use a fan to blow air out. If you have more than one window, use one fan to blow air out and another to blow air in.
- **Wear face masks.** Wear a mask when you have to be around other people. Ask other members of the household to wear masks to protect themselves.
- **Cover your mouth.** Use a tissue to cover your mouth anytime you sneeze or cough. Put the dirty tissue in a bag, seal it and throw it away.

Vaccinations

In countries where tuberculosis is common, infants often are vaccinated with the bacille Calmette-Guerin (BCG) vaccine. This protects infants and toddlers who are more likely to have active TB disease in the fluid surrounding the brain and spinal cord.

The vaccine may not protect against disease in the lungs, which is more likely in the United States. Dozens of new TB vaccines are in various stages of development and testing.

Diagnosis

To diagnosis a tuberculosis (TB) infection, your health care provider will do an exam that includes:

- Listening to you breathe with a stethoscope.
- Checking for swollen lymph nodes.
- Asking you questions about your symptoms.

TB tests

Your health care provider will order tests if:

- Tuberculosis is suspected.
- You were likely exposed to a person with active tuberculosis (TB) disease.
- You have health risks for active TB disease.

Your provider will determine whether a skin test or blood test is the best option.

Skin test

A tiny amount of a substance called tuberculin is injected just below the skin on the inside of one forearm. Within 48 to 72 hours, a health care worker will check your arm for swelling at the injection site. The size of the raised skin is used to determine a positive or negative test.

This test is seeing if your immune system reacts, or has made an antibody, to tuberculosis. A positive test indicates you likely have either a latent TB infection or active TB disease. People who had a TB vaccination might get a positive test even if they have no infection.

A negative test means that your body didn't react to the test. It doesn't necessarily mean you don't have an infection.

Blood tests

A sample of blood is sent to a lab. One lab test finds out whether certain immune system cells can "recognize" tuberculosis. A positive test shows that you have either a latent TB infection or active TB disease. Other tests of the blood sample can help determine if you have active disease.

A negative result means you likely do not have a TB infection.

X-ray

A chest X-ray can show irregular patches in the lungs that are typical of active TB disease.

Sputum tests

Your health care provider may take a sample of the mucus that comes up when you cough, also called sputum. If you have active TB disease in your lungs or voice box, lab tests can detect the bacteria.

A relatively quick laboratory test can tell if the sputum likely has the TB bacteria. But it may be showing bacteria with similar features.

Another lab test can confirm the presence of TB bacteria. The results often take several weeks. A lab test also can tell if it's a drug-resistant form of the bacteria. This information helps your health care provider choose the best treatment.

Other lab tests

Other lab tests that may be ordered include:

- Breath test.
- Procedure to remove sputum from your lungs with a special tube.
- Urine test.
- Test of the fluid around the spine and brain, called cerebrospinal fluid.

Treatment

If you have a latent TB infection, your health care provider may begin drug treatments. This is especially true for people with HIV/AIDS or other factors that increase the risk of active TB disease. Most latent TB infections are treated for three or four months.

Active TB disease may be treated for four, six or nine months. Specialists in TB treatment will determine which drugs are best for you.

You will have regular appointments to see if you're improving and to watch for side effects.

Take all of the drugs

It is important to take every dose as instructed. And you must complete the full course of treatment. This is important for killing the bacteria in your body and preventing new drug-resistant bacteria.

Your public health department may use a program called directly observed therapy (DOT). With directly observed therapy (DOT), a health care worker visits you at home to watch you take your dose of drugs.

Some health care departments have programs that let you take your drugs on your own. The Centers for Disease Control and Prevention has printable forms you can use to keep track of your daily doses.

Most common TB drugs

If you have a latent TB infection, you might need to take only one or two types of drugs. Active TB disease requires taking several drugs. Common medications used to treat tuberculosis include:

- Isoniazid.
- Rifampin (Rimactane).
- Rifabutin (Mycobutin).
- Rifapentine (Priftin).
- Pyrazinamide.
- Ethambutol (Myambutol).

You may be prescribed other drugs if you have drug-resistant tuberculosis or other complications from your illness.

Medication side effects

Most people can take TB drugs without serious side effects. If you have serious side effects, your care provider may ask you to stop taking a drug. You may have to change the dose of a drug.

Talk to your health care provider if you experience any of the following:

- Upset stomach.
- Vomiting.
- Loss of appetite.
- Severe diarrhea.
- Light-colored stool.
- Dark urine.
- Yellowish skin or eye color.
- Changes in vision.
- Dizziness or trouble with balance.
- Tingling in hands or feet.
- Easy bruising or bleeding.
- Unexplained weight loss.
- Unexplained tiredness.
- Sadness or depression.
- Rash.
- Joint pain.

It is important for you to list all drugs, dietary supplements or herbal remedies you take. You may need to stop taking some of these during your treatment.

Coping and support

The long treatment plan for tuberculosis can be challenging. Anger or frustration are normal. Talking to someone, such as a therapist, might help you develop coping strategies.

Pneumonia

Pneumonia is an infection that inflames the air sacs in one or both lungs. The air sacs may fill with fluid or pus (purulent material), causing cough with phlegm or pus, fever, chills, and difficulty breathing. A variety of organisms, including bacteria, viruses and fungi, can cause pneumonia.

Pneumonia can range in seriousness from mild to life-threatening. It is most serious for infants and young children, people older than age 65, and people with health problems or weakened immune systems.

Symptoms

The signs and symptoms of pneumonia vary from mild to severe, depending on factors such as the type of germ causing the infection, and your age and overall health. Mild signs and symptoms often are similar to those of a cold or flu, but they last longer.

Signs and symptoms of pneumonia may include:

- Chest pain when you breathe or cough
- Confusion or changes in mental awareness (in adults age 65 and older)
- Cough, which may produce phlegm
- Fatigue
- Fever, sweating and shaking chills
- Lower than normal body temperature (in adults older than age 65 and people with weak immune systems)
- Nausea, vomiting or diarrhea
- Shortness of breath

Newborns and infants may not show any sign of the infection. Or they may vomit, have a fever and cough, appear restless or tired and without energy, or have difficulty breathing and eating.

When to see a doctor

See your doctor if you have difficulty breathing, chest pain, persistent fever of 102 F (39 C) or higher, or persistent cough, especially if you're coughing up pus.

It's especially important that people in these high-risk groups see a doctor:

- Adults older than age 65
- Children younger than age 2 with signs and symptoms
- People with an underlying health condition or weakened immune system
- People receiving chemotherapy or taking medication that suppresses the immune system

For some older adults and people with heart failure or chronic lung problems, pneumonia can quickly become a life-threatening condition.

Causes

Many germs can cause pneumonia. The most common are bacteria and viruses in the air we breathe. Your body usually prevents these germs from infecting your lungs. But sometimes these germs can overpower your immune system, even if your health is generally good.

Pneumonia is classified according to the types of germs that cause it and where you got the infection.

Community-acquired pneumonia

Community-acquired pneumonia is the most common type of pneumonia. It occurs outside of hospitals or other health care facilities. It may be caused by:

- **Bacteria.** The most common cause of bacterial pneumonia in the U.S. is Streptococcus pneumoniae. This type of pneumonia can occur on its own or after you've had a cold or the flu. It may affect one part (lobe) of the lung, a condition called lobar pneumonia.
- **Bacteria-like organisms.** Mycoplasma pneumoniae also can cause pneumonia. It typically produces milder symptoms than do other types of pneumonia. Walking pneumonia is an informal name given to this type of pneumonia, which typically isn't severe enough to require bed rest.
- **Fungi.** This type of pneumonia is most common in people with chronic health problems or weakened immune systems, and in people who have inhaled large doses of the organisms. The fungi that cause it can be found in soil or bird droppings and vary depending upon geographic location.

- **Viruses, including COVID-19.** Some of the viruses that cause colds and the flu can cause pneumonia. Viruses are the most common cause of pneumonia in children younger than 5 years. Viral pneumonia is usually mild. But in some cases it can become very serious. Coronavirus 2019 (COVID-19) may cause pneumonia, which can become severe.

Hospital-acquired pneumonia

Some people catch pneumonia during a hospital stay for another illness. Hospital-acquired pneumonia can be serious because the bacteria causing it may be more resistant to antibiotics and because the people who get it are already sick. People who are on breathing machines (ventilators), often used in intensive care units, are at higher risk of this type of pneumonia.

Health care-acquired pneumonia

Health care-acquired pneumonia is a bacterial infection that occurs in people who live in long-term care facilities or who receive care in outpatient clinics, including kidney dialysis centers. Like hospital-acquired pneumonia, health care-acquired pneumonia can be caused by bacteria that are more resistant to antibiotics.

Aspiration pneumonia

Aspiration pneumonia occurs when you inhale food, drink, vomit or saliva into your lungs. Aspiration is more likely if something disturbs your normal gag reflex, such as a brain injury or swallowing problem, or excessive use of alcohol or drugs.

Prevention

To help prevent pneumonia:

- **Get vaccinated.** Vaccines are available to prevent some types of pneumonia and the flu. Talk with your doctor about getting these shots. The vaccination guidelines have changed over time so make sure to review your vaccination status with your doctor even if you recall previously receiving a pneumonia vaccine.
- **Make sure children get vaccinated.** Doctors recommend a different pneumonia vaccine for children younger than age 2 and for children ages 2 to 5 years who are at particular risk of pneumococcal disease. Children who attend a group child care center should also get the vaccine. Doctors also recommend flu shots for children older than 6 months.
- **Practice good hygiene.** To protect yourself against respiratory infections that sometimes lead to pneumonia, wash your hands regularly or use an alcohol-based hand sanitizer.
- **Don't smoke.** Smoking damages your lungs' natural defenses against respiratory infections.
- **Keep your immune system strong.** Get enough sleep, exercise regularly and eat a healthy diet.

Treatment

Treatment for pneumonia involves curing the infection and preventing complications. People who have community-acquired pneumonia usually can be treated at home with medication. Although most symptoms ease in a few days or weeks, the feeling of tiredness can persist for a month or more.

Specific treatments depend on the type and severity of your pneumonia, your age and your overall health. The options include:

- **Antibiotics.** These medicines are used to treat bacterial pneumonia. It may take time to identify the type of bacteria causing your pneumonia and to choose the best antibiotic to treat it. If your symptoms don't improve, your doctor may recommend a different antibiotic.

- **Cough medicine.** This medicine may be used to calm your cough so that you can rest. Because coughing helps loosen and move fluid from your lungs, it's a good idea not to eliminate your cough completely. In addition, you should know that very few studies have looked at whether over-the-counter cough medicines lessen coughing caused by pneumonia. If you want to try a cough suppressant, use the lowest dose that helps you rest.
- **Fever reducers/pain relievers.** You may take these as needed for fever and discomfort. These include drugs such as aspirin, ibuprofen (Advil, Motrin IB, others) and acetaminophen (Tylenol, others).

Meningitis

Symptoms

Early meningitis symptoms may be like those of the flu. Symptoms may come on over several hours or over a few days.

Symptoms in people older than 2 years

The following may be symptoms of meningitis in people older than 2 years:

- Sudden high fever.
- Stiff neck.
- Bad headache.
- Nausea or vomiting.
- Confusion or trouble concentrating.
- Seizures.
- Sleepiness or trouble waking.
- Sensitivity to light.
- No desire to eat or drink.
- Skin rash sometimes, such as in meningococcal meningitis.

Symptoms in newborns and infants

The following may be symptoms of meningitis in newborns and infants:

- High fever.
- Constant crying.
- Being very sleepy or irritable.
- Trouble waking from sleep.
- Being not active or sluggish.
- Not waking to eat.
- Poor feeding.
- Vomiting.
- A bulge in the soft spot on top of the baby's head.
- Stiffness in the body and neck.

When to see a doctor

Seek medical care right away if you or someone in your family has meningitis symptoms such as:

- Fever.
- Bad headache that doesn't go away.
- Confusion.
- Vomiting.
- Stiff neck.

Bacterial meningitis can cause death within days without fast antibiotic treatment. Delayed treatment also increases the risk of long-term brain damage.

Talk with your healthcare professional if you've been near someone with meningitis. That may be a family member or someone you live or work with. You may need to take medicines to prevent getting an infection.

Causes

Viral infections are the most common cause of meningitis in the United States, followed by bacterial infections and, rarely, fungal and parasitic infections. Because bacterial infections can lead to death, finding the cause is vital.

Bacterial meningitis

Germs that enter the bloodstream and travel to the brain and spinal cord cause bacterial meningitis. But bacterial meningitis also can happen when bacteria directly enter the meninges. This may be caused by an ear or sinus infection or a skull fracture. Rarely, some surgeries can cause it.

Several strains of bacteria can cause bacterial meningitis. The most common are:

- **Streptococcus pneumoniae.** This germ is the most common cause of bacterial meningitis in infants, young children and adults in the United States. It more often causes pneumonia or ear or sinus infections. A vaccine can help prevent this infection.
- **Neisseria meningitidis.** This germ causes a bacterial meningitis called meningococcal meningitis. These germs most often cause an upper respiratory infection. But they can cause meningococcal meningitis when they enter the bloodstream.
  This is an easy-to-catch infection that affects mainly teenagers and young adults. It may cause local outbreaks in college dorms, boarding schools and military bases.
  A vaccine can help prevent infection. Even if vaccinated, anybody who has been in close contact with a person with meningococcal meningitis should get an oral antibiotic. This can help prevent the disease.
- **Haemophilus influenzae.** Haemophilus influenzae type b bacteria, also called Hib bacteria, was once the leading cause of bacterial meningitis in children. But new Hib vaccines have greatly cut this type of meningitis.
- **Listeria monocytogenes.** These bacteria can be found in cheeses that aren't pasteurized, hot dogs and lunch meats. People who are pregnant, newborns, older adults and people with weakened immune systems are most likely to be affected. During pregnancy, listeria can cross the placenta. Infections in late pregnancy may be fatal to the baby.

Viral meningitis

Viral meningitis is most often mild and clears on its own. A group of viruses known as enteroviruses is most often the cause in the United States. Enteroviruses are most common in late summer and early fall. Viruses such as herpes simplex virus, HIV, mumps virus, West Nile virus and others also can cause viral meningitis.

Chronic meningitis

Chronic meningitis is meningitis whose symptoms last at least four weeks without letup. There are many causes of chronic meningitis. Symptoms can be like those of new-onset meningitis. But they come on slower and last longer. Symptoms may include headache, fever, vomiting and brain fog.

Fungal meningitis

Fungal meningitis isn't common in the United States. It may act like bacterial meningitis. But symptoms may start slower and build over time. Breathing in fungal spores found in soil, decaying wood and bird droppings can be the cause.

Fungal meningitis doesn't spread from person to person. Cryptococcal meningitis is a common fungal form of the disease. It affects people with weakened immune systems, such as from AIDS. It can cause death if not treated with an antifungal medicine. Even with treatment, fungal meningitis may come back.

Tuberculous meningitis

This type of meningitis is a rare complication of tuberculosis, also called TB. But it can be serious. Like fungal meningitis, its symptoms can start slowly and build up over days to weeks. Tuberculosis passes easily from person to person. Tuberculous meningitis needs treatment with TB medicines.

Parasitic meningitis

Parasites can cause a rare type of meningitis called eosinophilic meningitis. A tapeworm infection in the brain or cerebral malaria also can cause parasitic meningitis. Amoebic meningitis is a rare type that sometimes comes from swimming in fresh water. It can quickly become life-threatening.

The main parasites that cause meningitis most often infect animals. People can get infected by eating foods that have these parasites. Parasitic meningitis isn't spread from person to person.

Other meningitis causes

Causes of meningitis that aren't infections include chemical reactions, medicines, allergies, some types of cancer and diseases such as sarcoidosis.

Prevention

Common germs that can cause meningitis can spread through coughing, sneezing or kissing. Germs also can spread by shared eating utensils, toothbrushes or cigarettes.

These steps can help prevent meningitis:

- **Wash your hands.** Careful hand-washing helps prevent the spread of germs. Teach children to wash their hands often. Teach them to wash hands before eating and after using the toilet, spending time in a crowded public place, or petting animals. Show them how to wash and rinse their hands well.
- **Practice good hygiene.** Don't share drinks, foods, straws, eating utensils, lip balms or toothbrushes with anyone. Teach children and teens to avoid sharing these items too.
- **Stay healthy.** Keep your immune system strong by getting enough rest, exercising regularly, and eating a good diet with fresh fruits, vegetables and whole grains.
- **Cover your mouth.** When you need to cough or sneeze, be sure to cover your mouth and nose. Even better, cough or sneeze into your shoulder.
- **If you're pregnant, watch what you eat.** Reduce your risk of a listeria infection by cooking meat, including hot dogs and lunch meats, to 165 degrees Fahrenheit (74 degrees Celsius). Eat only cheeses made from milk that has been pasteurized to kill germs. Check labels to be sure cheeses are made with pasteurized milk.

Vaccinations

Vaccinations can help prevent some forms of bacterial meningitis. Vaccinations include:

- **Haemophilus influenzae type b vaccine.** This vaccine is called Hib for short. The U.S. Centers for Disease Control and Prevention, also called the CDC, suggest this vaccine for children starting at about 2 months of age. The vaccine also is for some adults. This includes adults who have sickle cell disease or AIDS and those who don't have a spleen.
- **Pneumococcal conjugate vaccine.** This vaccine also is called PCV15 or PCV20. The CDC suggests this vaccination for children younger than 2 years. The vaccine is also for children ages 2 through 18 who are at high risk of pneumococcal disease.
- **Pneumococcal polysaccharide vaccine.** This vaccine also is called PPSV23. Older children and adults who need protection from pneumococcal germs might get this vaccine. The CDC suggests the PPSV23 vaccine for all adults older than 65.
  It's also for younger adults and children ages 2 and older who have weak immune systems or ongoing illnesses such as heart disease, diabetes or sickle cell anemia. And it's for anyone who doesn't have a spleen.
- **Meningococcal conjugate vaccine.** This vaccine also is called MenACWY. The CDC suggests giving a single dose of MenACWY to children ages 11 to 12, with a booster shot given at age 16. Children who get the first vaccine between ages 13 and 15 can have the booster between ages 16 and 18. Those who get the first shot at age 16 or older don't need a booster.
  Children between the ages of 2 months and 10 years who are at high risk of bacterial meningitis can get this vaccine. So can children in this age range who have been around someone with the disease. It's also a vaccine for people who haven't been vaccinated who have been exposed to meningitis but aren't sick.

- **Serogroup B meningococcal vaccine (MenB).** The CDC suggests this vaccine for adults and children 10 years and older who are at increased risk of meningococcal disease. They include adults and children with sickle cell disease, those who have a damaged spleen or those who have had their spleen removed.
  This vaccine also is for people with the rare immune disorder called complement component deficiency or who take certain medicines. People who are exposed to an outbreak of serogroup B meningococcal disease also might get this vaccine.

Treatment

Treatment depends on the type of meningitis.

Bacterial meningitis

New-onset bacterial meningitis needs treatment right away with antibiotics given through a vein, called intravenous antibiotics. Sometimes corticosteroids are part of the treatment. This helps you recover and cuts the risk of complications, such as brain swelling and seizures.

The antibiotic or mix of antibiotics depends on the type of germ causing the infection. Until your healthcare professional knows the exact cause of the meningitis, you may get a broad-spectrum antibiotic that fights a range of germs.

Your healthcare professional may prescribe corticosteroids to reduce swelling in the brain and a medicine to control seizures. If a herpes virus caused your meningitis, you may get an antiviral medicine.

Viral meningitis

Antibiotics can't cure viral meningitis. Viral meningitis tends to get better in a few weeks. Treatment of mild viral meningitis includes:

- Bed rest.
- Plenty of fluids.
- Pain medicine to help reduce fever and relieve body aches.

Other types of meningitis

If the cause of your meningitis is not known, you may need to wait to start antibiotic treatment until your healthcare professional finds the cause.

Treatment for ongoing meningitis, called chronic meningitis, depends on the cause.

Antifungal medicines treat fungal meningitis. A mix of antibiotics can treat tuberculous meningitis. But these medicines can have serious side effects. So you might wait for treatment until a lab confirms that the cause is fungal or tuberculous.

Corticosteroids may treat meningitis due to allergic reaction or autoimmune disease. Sometimes, you don't need treatment because the condition clears up on its own. Cancer-related meningitis needs treatment for the cancer.

HIV/AIDS

Symptoms

The symptoms of HIV and AIDS vary depending on the person and the phase of infection.

Primary infection, also called acute HIV

Some people infected by HIV get a flu-like illness within 2 to 4 weeks after the virus enters the body. This stage may last a few days to several weeks. Some people have no symptoms during this stage.

Possible symptoms include:

- Fever.
- Headache.
- Muscle aches and joint pain.
- Rash.
- Sore throat and painful mouth sores.
- Swollen lymph glands, also called nodes, mainly on the neck.
- Diarrhea.
- Weight loss.
- Cough.
- Night sweats.

These symptoms can be so mild that you might not notice them. However, the amount of virus in your bloodstream, called viral load, is high at this time. As a result, the infection spreads to others more easily during primary infection than during the next stage.

Clinical latent infection, also called chronic HIV

In this stage of infection, HIV is still in the body and cells of the immune system, called white blood cells. But during this time, many people don't have symptoms or the infections that HIV can cause.

This stage can last for many years for people who aren't getting antiretroviral therapy, also called ART. Some people get more-severe disease much sooner.

Symptomatic HIV infection

As the virus continues to multiply and destroy immune cells, you may get mild infections or long-term symptoms such as:

- Fever.
- Fatigue.
- Swollen lymph glands, which are often one of the first symptoms of HIV infection.
- Diarrhea.
- Weight loss.
- Oral yeast infection, also called thrush.
- Shingles, also called herpes zoster.
- Pneumonia.

Progression to AIDS

Better antiviral treatments have greatly decreased deaths from AIDS worldwide. Thanks to these lifesaving treatments, most people with HIV in the U.S. today don't get AIDS. Untreated, HIV most often turns into AIDS in about 8 to 10 years.

Having AIDS means your immune system is very damaged. People with AIDS are more likely to develop diseases they wouldn't get if they had healthy immune systems. These are called opportunistic infections or opportunistic cancers. Some people get opportunistic infections during the acute stage of the disease.

The symptoms of some of these infections may include:

- Sweats.
- Chills.
- Fever that keeps coming back.
- Ongoing diarrhea.
- Swollen lymph glands.
- Constant white spots or lesions on the tongue or in the mouth.
- Constant fatigue.
- Weakness.
- Rapid weight loss.
- Skin rashes or bumps.

When to see a doctor

If you think you may have been infected with HIV or are at risk of contracting the virus, see a healthcare professional as soon as you can.

Causes

HIV is caused by a virus. It can spread through sexual contact, shooting of illicit drugs or use of shared needles, and contact with infected blood. It also can spread from parent to child during pregnancy, childbirth or breastfeeding.

HIV destroys white blood cells called CD4 T cells. These cells play a large role in helping the body fight disease. The fewer CD4 T cells you have, the weaker your immune system becomes.

How does HIV become AIDS?

You can have an HIV infection with few or no symptoms for years before it turns into AIDS. AIDS is diagnosed when the CD4 T cell count falls below 200 or you have a complication you get only if you have AIDS, such as a serious infection or cancer.

How HIV spreads

You can get infected with HIV if infected blood, semen or fluids from a vagina enter your body. This can happen when you:

- **Have sex.** You may become infected if you have vaginal or anal sex with an infected partner. Oral sex carries less risk. The virus can enter your body through mouth sores or small tears that can happen in the rectum or vagina during sex.
- **Share needles to inject illicit drugs.** Sharing needles and syringes that have been infected puts you at high risk of HIV and other infectious diseases, such as hepatitis.
- **Have a blood transfusion.** Sometimes the virus may be transmitted through blood from a donor. Hospitals and blood banks screen the blood supply for HIV. So this risk is small in places where these precautions are taken. The risk may be higher in resource-poor countries that are not able to screen all donated blood.
- **Have a pregnancy, give birth or breastfeed.** Pregnant people who have HIV can pass the virus to their babies. People who are HIV positive and get treatment for the infection during pregnancy can greatly lower the risk to their babies.

How HIV doesn't spread

You can't become infected with HIV through casual contact. That means you can't catch HIV or get AIDS by hugging, kissing, dancing or shaking hands with someone who has the infection.

HIV isn't spread through air, water or insect bites. You can't get HIV by donating blood.

Risk factors

Anyone of any age, race, sex or sexual orientation can have HIV/AIDS. However, you're at greatest risk of HIV/AIDS if you:

- **Have unprotected sex.** Use a new latex or polyurethane condom every time you have sex. Anal sex is riskier than is vaginal sex. Your risk of HIV increases if you have more than one sexual partner.
- **Have an STI.** Many STIs cause open sores on the genitals. These sores allow HIV to enter the body.
- **Inject illicit drugs.** If you share needles and syringes, you can be exposed to infected blood.

Cancers common to HIV/AIDS

- **Lymphoma.** This cancer starts in the white blood cells. The most common early sign is painless swelling of the lymph nodes most often in the neck, armpit or groin.
- **Kaposi sarcoma.** This is a tumor of the blood vessel walls. Kaposi sarcoma most often appears as pink, red or purple sores called lesions on the skin and in the mouth in people with white skin. In people with Black or brown skin, the lesions may look dark brown or black. Kaposi sarcoma also can affect the internal organs, including the lungs and organs in the digestive system.
- **Human papillomavirus (HPV)-related cancers.** These are cancers caused by HPV infection. They include anal, oral and cervical cancers.

Other complications

- **Wasting syndrome.** Untreated HIV/AIDS can cause a great deal of weight loss. Diarrhea, weakness and fever often happen with the weight loss.
- **Brain and nervous system, called neurological, complications.** HIV can cause neurological symptoms such as confusion, forgetfulness, depression, anxiety and difficulty walking. HIV-associated neurological conditions can range from mild symptoms of behavior changes and reduced mental functioning to severe dementia causing weakness and not being able to function.
- **Kidney disease.** HIV-associated nephropathy (HIVAN) is swelling and irritation, called inflammation, of the tiny filters in the kidneys. These filters remove excess fluid and waste from the blood and pass them to the urine. Kidney disease most often affects Black and Hispanic people.
- **Liver disease.** Liver disease also is a major complication, mainly in people who also have hepatitis B or hepatitis C.

Prevention

There's no vaccine to prevent HIV infection and no cure for HIV/AIDS. But you can protect yourself and others from infection.

To help prevent the spread of HIV:

- **Consider preexposure prophylaxis, also called PrEP.** There are two PrEP medicines taken by mouth, also called oral, and one PrEP medicine given in the form of a shot, called injectable. The oral medicines are emtricitabine-tenofovir disoproxil fumarate (Truvada) and emtricitabine-tenofovir alafenamide fumarate (Descovy). The injectable medicine is called cabotegravir (Apretude). PrEP can reduce the risk of sexually transmitted HIV infection in people at very high risk.
  PrEP can reduce the risk of getting HIV from sex by about 99% and from injecting drugs by at least 74%, according to the Centers for Disease Control and Prevention. Descovy hasn't been studied in people who have sex by having a penis put into their vaginas, called receptive vaginal sex.
  Cabotegravir (Apretude) is the first U.S. Food and Drug Administration-approved PrEP that can be given as a shot to reduce the risk of sexually transmitted HIV infection in people at very high risk. A healthcare professional gives the shot. After two once-monthly shots, Apretude is given every two months. The shot is an option in place of a daily PrEP pill.
  Your healthcare professional prescribes these medicines to prevent HIV only to people who don't already have HIV infection. You need an HIV test before you start taking any PrEP. You need to take the test every three months for the pills or before each shot for as long as you take PrEP. You need to take the pills every day or closely follow the shot schedule. You still need to practice safe sex to protect against other STIs. If you have hepatitis B, you should see an infectious disease or liver specialist before beginning PrEP therapy.
- **Use treatment as prevention, also called TasP.** If you have HIV, taking HIV medicines can keep your partner from getting infected with the virus. If your blood tests show no virus, that means your viral load can't be detected. Then you won't transmit the virus to anyone else through sex.
  If you use TasP, you must take your medicines exactly as prescribed and get regular checkups.
- **Use post-exposure prophylaxis, also called PEP, if you've been exposed to HIV.** If you think you've been exposed through sex, through needles or in the workplace, contact your healthcare professional or go to an emergency room. Taking PEP as soon as you can within the first 72 hours can greatly reduce your risk of getting HIV. You need to take the medicine for 28 days.
- **Use a new condom every time you have anal or vaginal sex.** Both male and female condoms are available. If you use a lubricant, make sure it's water based. Oil-based lubricants can weaken condoms and cause them to break.
  During oral sex, use a cut-open condom or a piece of medical-grade latex called a dental dam without a lubricant.
- **Tell your sexual partners you have HIV.** It's important to tell all your current and past sexual partners that you're HIV positive. They need to be tested.
- **Use clean needles.** If you use needles to inject illicit drugs, make sure the needles are sterile. Don't share them. Use needle-exchange programs in your community. Seek help for your drug use.
- **If you're pregnant, get medical care right away.** You can pass HIV to your baby. But if you get treatment during pregnancy, you can lessen your baby's risk greatly.
- **Consider male circumcision.** Studies show that removing the foreskin from the penis, called circumcision, can help reduce the risk of getting HIV infection.

Treatment

There's no cure for HIV/AIDS. Once you have the infection, your body can't get rid of it. But there are medicines that can control HIV and prevent complications.

Everyone diagnosed with HIV should take antiretroviral therapy medicines, also called ART. This is true no matter what stage the disease is in or what the complications are.

ART is usually a mix of two or more medicines from several classes. This approach has the best chance of lowering the amount of HIV in the blood. There are many ART options that mix more than one HIV medicine into a single pill, taken once daily.

Each class of medicines blocks the virus in different ways. Treatment involves mixing medicines from different classes to:

- Account for medicine resistance, called viral genotype.
- Keep from creating new medicine-resistant strains of HIV.
- Suppress the virus in the blood as much as possible.

Two medicines from one class, plus a third medicine from another class, are most often used.

The classes of anti-HIV medicines include the following:

- **Non-nucleoside reverse transcriptase inhibitors (NNRTIs)** turn off a protein needed by HIV to make copies of itself.
  Examples include efavirenz, rilpivirine (Edurant) and doravirine (Pifeltro).
- **Nucleoside or nucleotide reverse transcriptase inhibitors (NRTIs)** are faulty versions of the building blocks that HIV needs to make copies of itself.
  Examples include abacavir (Ziagen), tenofovir disoproxil fumarate (Viread), emtricitabine (Emtriva), lamivudine (Epivir) and zidovudine (Retrovir). Retrovir is no longer suggested for routine use in the U.S. because of high rates of toxic

effects.
Mixes of medicines also are available, such as emtricitabine-tenofovir disoproxil fumarate (Truvada) and emtricitabine-tenofovir alafenamide fumarate (Descovy).

- **Protease inhibitors (PIs)** make HIV protease inactive. HIV protease is another protein that HIV needs to make copies of itself.
  Examples include atazanavir (Reyataz), darunavir (Prezista) and lopinavir-ritonavir (Kaletra).
- **Integrase inhibitors** stop the action of a protein called integrase. HIV uses integrase to put its genetic material into CD4 T cells.
  Examples include bictegravir sodium-emtricitabine-tenofovir alafenamide fumarate (Biktarvy), raltegravir (Isentress), dolutegravir (Tivicay) and cabotegravir (Vocabria).
- **Entry or fusion inhibitors** block HIV's entry into CD4 T cells.
  Examples include enfuvirtide (Fuzeon) and maraviroc (Selzentry). Newer medicines include ibalizumab-uiyk (Trogarzo) and fostemsavir (Rukobia).

Starting and staying on treatment

Everyone with HIV infection, no matter what the CD4 T cell count or symptoms are, should be offered antiviral medicine.

Staying on ART that keeps your HIV viral load in the blood from being detected is the best way for you to stay healthy.

For ART to work, you must take the medicines as prescribed. Don't miss or skip doses. Staying on ART with an undetectable viral load helps:

- Keep your immune system strong.
- Lower your chances of getting an infection.
- Lower your chances of getting treatment-resistant HIV.
- Lower your chances of giving HIV to other people.

Staying on HIV therapy can be hard. Talk to your healthcare professional about possible side effects, trouble you have taking medicines, and any mental health or substance use issues that may make it hard for you to stay on ART.

Have regular follow-up appointments with your health professional to check your health and response to treatment. Let your health professional know right away if you have problems with HIV therapy. Then you can work together to find ways to deal with those issues.

Treatment side effects

Treatment side effects can include:

- Nausea, vomiting or diarrhea.
- Heart disease.
- Kidney and liver damage.
- Weakened bones or bone loss.
- Cholesterol levels that are not typical.
- Higher blood sugar.
- Problems with thinking, emotions and sleep.

Treatment for age-related diseases

Some health issues that are a part of aging may be harder to manage if you have HIV. Some medicines that are common for age-related heart, bone or metabolic conditions, for example, may not mix well with anti-HIV medicines. Talk with your healthcare professional about your other health conditions and the medicines you take for them.

If another health professional prescribes a medicine for another condition, let that health professional know about your HIV therapy. Then the health professional can make sure there are no problems with taking the medicines together.

Treatment response

Your healthcare professional will watch your viral load and CD4 T cell counts to see your response to HIV treatment. The first check is at 4 to 6 weeks. After that, you see your health professional every 3 to 6 months.

Treatment should lower your viral load so that can't be found in the blood. That doesn't mean your HIV is gone. Even if it can't be found in the blood, HIV is still in your body.

Lifestyle and home remedies

Besides getting medical treatment, you need to take an active role in your own care. The following may help you stay healthy longer:

- **Eat healthy foods.** Fresh fruits and vegetables, whole grains, and lean protein help keep you strong, give you more energy and support your immune system. Eat enough calories to keep your weight stable.
- **Avoid raw meat, eggs and more.** Foodborne illnesses can be severe in people who are infected with HIV. Cook meat until it's well done. Don't use dairy products that aren't treated for bacteria, called pasteurized. Don't eat raw eggs and raw seafood such as oysters, sushi or sashimi. Don't drink water you don't know is safe.
- **Get the right vaccinations.** These may prevent common infections such as pneumonia, influenza, COVID-19 and mpox. Your healthcare professional also may suggest other vaccinations, including those for HPV, hepatitis A and hepatitis B. Vaccines that don't have live viruses mostly are safe. But most vaccines with live viruses are not safe because of your weakened immune system.
- **Take care with pets.** Some animals may carry parasites that can cause infections in people who are HIV positive. Cat stool can cause toxoplasmosis, reptiles can carry salmonella, and birds can carry cryptococcus or histoplasmosis. Wash hands thoroughly after handling pets or emptying litter boxes.

Alternative medicine

People who are infected with HIV sometimes try dietary supplements that claim to boost the immune system or help with side effects of anti-HIV medicines. But there are no studies that show these claims are true. And many supplements can get in the way of other medicines you take.

Always check with your healthcare professional before taking any supplements or alternative therapies to make sure they won't affect the way your medicines work.

Supplements that may be helpful

There's little evidence to show that any supplements for HIV work. Some examples with limited research include:

- **Acetyl-L-carnitine.** Researchers have used acetyl-L-carnitine to treat nerve pain, numbness or weakness, called neuropathy, in people with diabetes. It may also ease neuropathy linked to HIV for people who don't have enough acetyl-L-carnitine in their bodies.
- **Whey protein and certain amino acids.** Early evidence suggests that whey protein, a cheese byproduct, can help some people with HIV gain weight. The amino acids L-glutamine, L-arginine and hydroxymethylbutyrate (HMB), also may help with weight gain.
- **Probiotics.** There is some evidence that the probiotic Saccharomyces boulardii may help with HIV-related diarrhea. Use only as your healthcare professional directs. Bovine colostrum also is being studied for treating diarrhea. But more research is needed.
- **Vitamins and minerals.** Vitamins A, D, E, C and B and the minerals zinc, iron and selenium may help if you have low levels of them. Talk to your health professional before taking them. Too much of some vitamins and minerals can be harmful.

Supplements that may be dangerous

- **St. John's wort.** Often used for depression, St. John's wort can reduce how well several types of anti-HIV medicines work by more than half.
- **Garlic supplements.** Garlic itself may help strengthen the immune system. But garlic supplements can reduce how well some anti-HIV medicines work. Eating some garlic in food seems to be safe.
- **Red yeast rice extract.** Some people use this to lower cholesterol. Don't take it if you take a protease inhibitor or a statin.

Mind-body practices

Practices such as yoga, meditation and massage have been shown to reduce stress as well as provide relaxation and improve quality of life. While they need more study, these practices may be helpful if you're living with HIV/AIDS.

Coping and support

Getting a diagnosis of any life-threatening illness can cause distress. The emotional, social and financial effects of HIV/AIDS can make coping with this illness very hard for you and for those close to you.

But there are many services and resources for people with HIV. Most HIV/AIDS clinics have social workers, counselors or nurses who can help you or put you in touch with people who can help you.

They may be able to:

- Arrange transportation to and from medical appointments.
- Help with housing and child care.
- Assist with employment and legal issues.
- Provide support during financial crises.

It's important to have a support system. Many people with HIV/AIDS find that talking with someone who knows about their disease gives them comfort.

Hepatitis A

Symptoms

Hepatitis A symptoms typically appear a few weeks after you've had the virus. But not everyone with hepatitis A develops symptoms. If you do, symptoms can include:

- Unusual tiredness and weakness
- Sudden nausea and vomiting and diarrhea
- Abdominal pain or discomfort, especially on the upper right side beneath your lower ribs, which is over your liver
- Clay- or gray-colored stool
- Loss of appetite
- Low-grade fever
- Dark urine
- Joint pain
- Yellowing of the skin and the whites of your eyes (jaundice)
- Intense itching

These symptoms may be relatively mild and go away in a few weeks. Sometimes, however, hepatitis A results in a severe illness that lasts several months.

When to see a doctor

Make an appointment with your health care provider if you have symptoms of hepatitis A.

Getting the hepatitis A vaccine or an injection of an antibody called immunoglobulin within two weeks of exposure to the hepatitis A virus may protect you from infection.

Ask your health care provider or your local health department about receiving the hepatitis A vaccine if:

- You traveled recently to areas where the virus is common, particularly Mexico, Central America and South America or to areas with poor sanitation
- You ate at a restaurant with a hepatitis A outbreak
- You live with someone who has hepatitis A
- You recently had sexual contact with someone who has hepatitis A

Causes

Hepatitis A is caused by a virus that infects liver cells and causes inflammation. The inflammation can affect how your liver works and cause other symptoms of hepatitis A.

The virus spreads when infected stool, even just tiny amounts, enters the mouth of another person (fecal-oral transmission). You may get hepatitis A when you eat or drink something contaminated with infected stool. You may also get the infection through close contact with a person who has hepatitis A. The virus can live on surfaces for a few months. The virus does not spread through casual contact or by sneezing or coughing.

Here are some of the specific ways the hepatitis A virus can spread:

- Eating food handled by someone with the virus who doesn't thoroughly wash hands after using the toilet
- Drinking contaminated water
- Eating food washed in contaminated water
- Eating raw shellfish from water polluted with sewage
- Being in close contact with a person who has the virus — even if that person has no symptoms
- Having sexual contact with someone who has the virus

Complications

Unlike other types of viral hepatitis, hepatitis A does not cause long-term liver damage, and it doesn't become an ongoing (chronic) infection.

In rare cases, hepatitis A can cause a sudden (acute) loss of liver function, especially in older adults or people with chronic liver diseases. Acute liver failure requires a stay in the hospital for monitoring and treatment. Some people with acute liver failure may need a liver transplant.

Prevention

The hepatitis A vaccine can prevent infection with the virus. The vaccine is typically given in two shots. The first shot is followed by a booster shot six months later. The hepatitis A vaccine can be given in a combination that includes the hepatitis B vaccine. This vaccine combination is given in three shots over six months.

The Centers for Disease Control and Prevention recommends the hepatitis A vaccine for the following people:

- All children at age 1 year, or older children who didn't receive the childhood vaccine
- Anyone age 1 year or older who is homeless
- Infants ages 6 to 11 months traveling to parts of the world where hepatitis A is common
- Family and caregivers of adoptees from countries where hepatitis A is common
- People in direct contact with others who have hepatitis A
- Laboratory workers who may come into contact with hepatitis A
- Men who have sex with men
- People who work or travel in parts of the world where hepatitis A is common
- People who use any type of recreational drugs, not just injected ones
- People with chronic liver disease, including hepatitis B or hepatitis C
- Anyone wishing to obtain protection (immunity)

If you're concerned about your risk of hepatitis A, ask your health care provider if you should be vaccinated.

Follow safety precautions when traveling

If you're traveling to parts of the world where hepatitis A outbreaks occur, take these steps to prevent infection:

- Wash all fresh fruits and vegetables in bottled water and peel them yourself. Avoid pre-cut fruit and vegetables.
- Don't eat raw or undercooked meat and fish.
- Drink bottled water and use it when brushing your teeth.
- Avoid all beverages of unknown purity. The same goes for ice.
- If bottled water isn't available, boil tap water before drinking it or using it to make ice.

Practice good hygiene

Thoroughly wash your hands often, especially after using the toilet or changing a diaper and before preparing food or eating.

Treatment

No specific treatment exists for hepatitis A. Your body will clear the hepatitis A virus on its own. In most cases of hepatitis A, the liver heals within six months with no lasting damage.

Hepatitis A treatment usually focuses on keeping comfortable and controlling symptoms. You may need to:

- **Rest.** Many people with hepatitis A feel tired and sick and have less energy.
- **Get adequate food and liquid.** Eat a balanced healthy diet. Nausea can make it difficult to eat. Try snacking throughout the day rather than eating full meals. To get enough calories, eat more high-calorie foods. For instance, drink fruit juice or milk rather than water. Drinking plenty of fluids is important to prevent dehydration, especially if vomiting or diarrhea occurs.
- **Avoid alcohol and use medications with care.** Your liver may have difficulty processing medications and alcohol. If you have hepatitis, don't drink alcohol. It can cause liver damage. Talk to your health care provider about all the medications you take, including medications available without a prescription.

Hepatitis B

Symptoms

Symptoms of acute hepatitis B range from mild to serious. The symptoms usually start about 1 to 4 months after you've been infected with HBV. But you could notice them as early as two weeks after you're infected. Some people with acute or chronic hepatitis B may not have any symptoms, especially young children.

Hepatitis B symptoms may include:

- Pain in the stomach area, also called the abdomen.
- Dark urine.
- Fever.
- Joint pain.
- Loss of appetite.
- Upset stomach and vomiting.
- Weakness and extreme tiredness.
- Jaundice, which is a yellowing of the whites of the eyes and the skin. Depending on skin color, this change may be harder or easier to see.

When to see a doctor

If you know you've been exposed to the hepatitis B virus, call your healthcare professional right away. A preventive treatment may lower your risk of infection if you get the treatment within 24 hours of exposure to the virus.

If you think you have symptoms of hepatitis B, call your healthcare professional.

Causes

Hepatitis B is caused by the hepatitis B virus (HBV). The virus passes from person to person through blood, semen or other body fluids. It does not spread by sneezing or coughing.

Common ways that HBV can spread are:

- **Sexual contact.** You may get hepatitis B if you have sex with someone who is infected and you don't use a condom. The virus can pass to you if the person's blood, saliva, semen or vaginal fluids enter your body.
- **Sharing of needles.** HBV easily spreads through needles and syringes that are tainted with infected blood. Sharing equipment used to inject illicit drugs puts you at high risk of hepatitis B.
- **Accidental needlesticks.** Hepatitis B is a concern for healthcare workers and anyone else who comes in contact with human blood.
- **Pregnant person to newborn.** Pregnant people infected with HBV can pass the virus to their babies during childbirth. But the newborn can be vaccinated to prevent getting infected in almost all cases. Talk with your healthcare professional about being tested for hepatitis B if you are pregnant or want to become pregnant.

Acute versus chronic hepatitis B

HBV infection may be short-lived, also called acute. Or it might last a long time, also known as chronic.

- **Acute HBV infection** lasts less than six months. Your immune system likely can clear the hepatitis B virus from your body. You should recover fully within a few months. Most people who get HBV infections as adults have an acute infections. But these can lead to a chronic infections.
- **Chronic HBV infection** lasts six months or longer. It lingers because the immune system can't fight off the infection. Chronic hepatitis B virus infection may last a lifetime. It can lead to serious illnesses such as cirrhosis and liver cancer. Some people with chronic hepatitis B may have no symptoms at all. Some may have ongoing tiredness and mild symptoms of acute hepatitis.

The younger you are when you get hepatitis B, the higher your risk of the condition becoming chronic. That's especially true for newborns or children younger than 5. Chronic hepatitis B may not be detected for decades until a person becomes very ill from liver disease.

Complications

Having a chronic HBV infection can lead to serious health conditions called complications. These include:

- **Scarring of the liver, also called cirrhosis.** Swelling called inflammation is linked with hepatitis B. The inflammation can lead to cirrhosis that may prevent the liver from working as it should.
- **Liver cancer.** People with chronic hepatitis B have a higher risk of liver cancer.
- **Liver failure.** Acute liver failure is a condition in which the vital functions of the liver shut down. When that happens, a liver transplant is needed to stay alive.
- **Sudden increase in the level of hepatitis B virus.** In some people with chronic hepatitis B, levels of the virus are low or haven't yet been found by tests. If the virus starts to quickly make copies of itself, tests may spot this rise or find the virus. This is called reactivation of the virus. It can lead to liver damage or even liver failure. Reactivation tends to affect people who have weakened immune systems, also called suppressed immune systems. This includes people on medicines that weakens the immune system, such as high-dose corticosteroids or chemotherapy. Before taking these medicines, you should be tested for hepatitis B. If testing shows that you have hepatitis B, see a liver specialist called a hepatologist before you start these medicines.
- **Other conditions.** People with chronic hepatitis B may develop kidney disease or inflammation of blood vessels.

Prevention

The hepatitis B vaccine is the main way to prevent infection with HBV. The vaccine is given as two shots one month apart, or three or four shots over six months. How many shots you get depends on the type of hepatitis B vaccine that you're given. You can't get hepatitis B from the vaccine.

In the United States, the Advisory Committee on Immunization Practices recommends that infants get their first shot of the vaccine after they're born. If you didn't get vaccinated as a baby or child, the committee still recommends the vaccine for everyone through age 59. If you're age 60 or older and haven't gotten vaccinated, get the vaccine if you're at risk of being exposed to the hepatitis B virus. People 60 and over who haven't been vaccinated and are not at high risk also can choose to get the vaccine.

The hepatitis B vaccine is strongly recommended for:

- Newborns.
- Children and adolescents not vaccinated at birth.
- Those who work or live in centers for people who have developmental disabilities.
- People who live with someone who has hepatitis B.
- Healthcare workers, emergency workers and other people who come into contact with blood.
- Anyone who has a sexually transmitted infection, including HIV.
- People born male who have sex with men.
- People who have multiple sexual partners.
- Sexual partners of someone who has hepatitis B.
- People who inject street drugs or share needles and syringes.
- People with chronic liver disease.
- People with end-stage kidney disease.
- Travelers planning to go to an area of the world with a high HBV infection rate.

Take safety measures to help prevent HBV infection

Other ways to lower your risk of infection with the hepatitis B virus include:

- **Know the HBV status of any sexual partner.** Don't have sex without a condom unless you know that your partner doesn't have hepatitis B or another sexually transmitted infection.
- **Use a new latex or polyurethane condom every time you have sex** if you don't know the health status of your partner. Condoms can lower your risk of catching HBV, but they don't get rid of the risk completely.
- **Don't use street drugs.** If you use drugs, get help to stop. If you can't stop, use a sterile needle each time you inject drugs. Never share needles.
- **Be cautious about body piercing and tattooing.** If you want to get a piercing or tattoo, look for a reputable shop. Ask about how the equipment is cleaned. Make sure the employees use sterile needles. If you can't get answers, look for another shop.
- **Ask about the hepatitis B vaccine before you travel.** If you're traveling to a region where hepatitis B is common, ask your healthcare professional about the hepatitis B vaccine in advance. It's usually given in a series of three shots over a six-month period.

Screening healthy people for hepatitis B

Healthcare professionals sometimes test certain healthy people for hepatitis B. This is called screening. Screening is done because HBV can damage the liver before the infection causes symptoms. Talk with your healthcare professional about screening for hepatitis B if you:

- Are pregnant.
- Live with someone who has hepatitis B.
- Have had many sexual partners.
- Have had sex with someone who has hepatitis B.
- Were born male and have sex with men.
- Have a history of a sexually transmitted infection.
- Have HIV or hepatitis C.
- Have a liver enzyme test with irregular results that can't be explained.
- Receive kidney dialysis.
- Take medicines that suppress the immune system, such as those used to prevent rejection after an organ transplant.
- Use injected street drugs.
- Are in prison.
- Were born in a country where hepatitis B is common, including Asia, the Pacific Islands, Africa and Eastern Europe.
- Have parents or adopted children from places where hepatitis B is common, including Asia, the Pacific Islands, Africa and Eastern Europe.

Treatment

Treatment to prevent HBV infection after exposure

If you know you've been exposed to the hepatitis B virus, call a healthcare professional right away. It's important to know if you've been vaccinated for hepatitis B. A healthcare professional asks you when you were exposed and what kind of exposure you had.

Medicine called immunoglobulin may help protect you from getting sick with hepatitis B. You need to receive a shot of the medicine within 24 hours of exposure to the hepatitis B virus. This treatment only provides short-term protection. So you also should get the hepatitis B vaccine at the same time if you never received it.

Treatment for acute HBV infection

You might not need treatment for an acute hepatitis B virus infection. The infection is short lived and most often it goes away on its own. A healthcare professional might recommend:

- Rest.
- Proper nutrition.
- Plenty of fluids.
- Close monitoring while your body fights the infection.

If your symptoms are severe, you may need antiviral medicines or a hospital stay to prevent complications.

Treatment for chronic HBV infection

Most people with chronic hepatitis B virus infection need treatment for the rest of their lives. The decision to start treatment depends on many factors, including whether:

- The virus is causing inflammation or scarring of the liver, also called cirrhosis.
- You have other infections, such as hepatitis C or HIV.
- Your immune system is weakened by medicine or illness.

Treatment helps lower the risk of liver disease and prevents you from passing the infection to others.

Treatment for chronic hepatitis B may include:

- **Antiviral medicines.** Many antiviral medicines can help fight the virus and slow its ability to damage your liver. These medicines include entecavir (Baraclude), tenofovir (Viread), lamivudine (Epivir) and adefovir (Hepsera). You take them by mouth, most often for the long term. Your healthcare professional may recommend combining two of these medicines. Or the healthcare professional may have you take one of these medicines with interferon to improve treatment response.
- **Interferon shots.** Interferon is a lab-made version of a substance that the body makes to fight infection. This type of medicine includes peginterferon alfa-2a (Pegasys). One upside of interferon shots is that they're taken for a much shorter time than are oral antiviral medicines. But interferon has a high rate of side effects, such as upset stomach, vomiting, trouble breathing and depression.
  Interferon mainly is used for young people with hepatitis B who wish to not need long-term treatment. It's also used for women who might want to get pregnant within a few years. Women should use birth control during interferon treatment. Do not take interferon during pregnancy. Interferon also is not right for people with cirrhosis or acute liver failure.
- **Liver transplant.** If your liver has been badly damaged, a liver transplant may be an option. During a liver transplant, the surgeon removes your damaged liver and replaces it with a healthy liver. Most transplanted livers come from deceased donors. A small number come from living donors who donate a part of their livers.

Other medicines to treat hepatitis B are being developed.

Hepatitis C

Symptoms

Every long-term hepatitis C infection starts with what's called an acute phase. Acute hepatitis C usually isn't diagnosed because it rarely causes symptoms. When there are symptoms in this phase, they may include jaundice, fatigue, nausea, fever and muscle aches.

Long-term infection with the hepatitis C virus is called chronic hepatitis C. Chronic hepatitis C usually has no symptoms for many years. Symptoms appear only after the virus damages the liver enough to cause them.

Symptoms can include:

- Bleeding easily.
- Bruising easily.
- Fatigue.
- Not wanting to eat.
- Yellowing of the skin, called jaundice. This might show up more in white people. Also, yellowing of the whites of the eyes in white, Black and brown people.
- Dark-colored urine.
- Itchy skin.
- Fluid buildup in the stomach area, called ascites.
- Swelling in the legs.
- Weight loss.
- Confusion, drowsiness and slurred speech, called hepatic encephalopathy.
- Spiderlike blood vessels on the skin, called spider angiomas.

Acute hepatitis C infection doesn't always become chronic. Some people clear the infection from their bodies after the acute phase. This is called spontaneous viral clearance. Antiviral therapy also helps clear acute hepatitis C.

Causes

Hepatitis C infection is caused by the hepatitis C virus (HCV). The infection spreads when blood that has the virus enters the bloodstream of a person who isn't affected.

Around the world, hepatitis C infection exists in several forms, called genotypes. There are seven genotypes and 67 subtypes. The most common hepatitis C genotype in the United States is type 1.

Chronic hepatitis C follows the same course no matter what the genotype of the infecting virus. But treatment can vary depending on viral genotype. However, newer antiviral drugs can treat many genotypes.

Prevention

The following might protect from hepatitis C infection:

- **Stop using illegal drugs.** If you use illegal drugs, seek help.
- **Be careful about body piercing and tattooing.** For piercing or tattooing, look for a shop that's known to be clean. Ask questions about how the equipment is cleaned. Make sure the employees use sterile needles. If employees won't answer questions, look for another shop.
- **Practice safer sex.** Don't have sex without protection with any partner whose health status you don't know. Don't have sex with more than one partner. The risk of couples who only have sex with each other getting hepatitis C through sex is low.

Treatment

Antiviral medicines

Antiviral medicines treat hepatitis C. They're used to clear the virus from the body. The goal of treatment is to have no hepatitis C virus found in the body for at least 12 weeks after treatment ends.

Some newer antiviral medicines, called direct-acting, have better outcomes, fewer side effects and shorter treatment times. Treatment can be as short as eight weeks. The choice of medicines and length of treatment depend on the hepatitis C genotype, whether the liver is damaged, other medical conditions and earlier treatments.

Throughout treatment, the care team watches the treatment for response to the medicines and side effects. Treatment with direct-acting antiviral medicines usually lasts 12 weeks.

Due to the pace of research, treatments are changing quickly. So it's best to discuss treatment choices with a specialist.

Liver transplantation

Having a liver transplant might be an option for serious liver damage from chronic hepatitis C infection. During a liver transplant, a surgeon removes the damaged liver and replaces it with a healthy liver. Most transplanted livers come from dead donors. A small number come from living donors who donate a part of their livers.

In most cases, a liver transplant alone doesn't cure hepatitis C. The infection is likely to return. This means more treatment with antiviral medicines to prevent damage to the new liver. Several studies have shown that newer antiviral medicines cure hepatitis C after a transplant. Sometimes, the newer antivirals can cure hepatitis C before a liver transplant.

Vaccinations

There's no vaccine for hepatitis C. But a health care provider will likely recommend vaccines against the hepatitis A and B viruses. These are viruses that also can cause liver damage and make hepatitis C worse.

Lifestyle and home remedies

Certain lifestyle changes can help manage hepatitis C. These measures can help keep you healthy longer and protect the health of others:

- **Stop drinking alcohol.** Alcohol speeds liver disease.
- **Don't use medicines that might cause liver damage.** Review all medicines you take with your health care provider. You might need to not take certain medicines.
- **Keep others from coming in contact with your blood.** Cover wounds you have. Don't share razors or toothbrushes. Don't donate blood, body organs or semen. Tell health care workers that you have the virus.
  Tell your partner about your infection before you have sex. Always use condoms during intercourse.

Malaria

Symptoms

Signs and symptoms of malaria may include:

- Fever
- Chills
- General feeling of discomfort
- Headache
- Nausea and vomiting
- Diarrhea
- Abdominal pain

- Muscle or joint pain
- Fatigue
- Rapid breathing
- Rapid heart rate
- Cough

Some people who have malaria experience cycles of malaria "attacks." An attack usually starts with shivering and chills, followed by a high fever, followed by sweating and a return to normal temperature.
Malaria signs and symptoms typically begin within a few weeks after being bitten by an infected mosquito. However, some types of malaria parasites can lie dormant in your body for up to a year.

When to see a doctor

Talk to your doctor if you experience a fever while living in or after traveling to a high-risk malaria region. If you have severe symptoms, seek emergency medical attention.

Causes

Malaria is caused by a single-celled parasite of the genus plasmodium. The parasite is transmitted to humans most commonly through mosquito bites.

Malaria transmission cycle

Malaria spreads when a mosquito becomes infected with the disease after biting an infected person, and the infected mosquito then bites a noninfected person. The malaria parasites enter that person's bloodstream and travel to the liver. When the parasites mature, they leave the liver and infect red blood cells.

- **Uninfected mosquito.** A mosquito becomes infected by feeding on a person who has malaria.
- **Transmission of parasite.** If this mosquito bites you in the future, it can transmit malaria parasites to you.
- **In the liver.** Once the parasites enter your body, they travel to your liver — where some types can lie dormant for as long as a year.
- **Into the bloodstream.** When the parasites mature, they leave the liver and infect your red blood cells. This is when people typically develop malaria symptoms.
- **On to the next person.** If an uninfected mosquito bites you at this point in the cycle, it will become infected with your malaria parasites and can spread them to the other people it bites.

Other modes of transmission

Because the parasites that cause malaria affect red blood cells, people can also catch malaria from exposure to infected blood, including:

- From mother to unborn child
- Through blood transfusions
- By sharing needles used to inject drugs

Prevention

If you live in or are traveling to an area where malaria is common, take steps to avoid mosquito bites. Mosquitoes are most active between dusk and dawn. To protect yourself from mosquito bites, you should:

- **Cover your skin.** Wear pants and long-sleeved shirts. Tuck in your shirt, and tuck pant legs into socks.
- **Apply insect repellent to skin.** Use an insect repellent registered with the Environmental Protection Agency on any exposed skin. These include repellents that contain DEET, picaridin, IR3535, oil of lemon eucalyptus (OLE), para-menthane-3,8-diol (PMD) or 2-undecanone. Do not use a spray directly on your face. Do not use products with oil of lemon eucalyptus (OLE) or p-Menthane-3,8-diol (PMD) on children under age 3.
- **Apply repellent to clothing.** Sprays containing permethrin are safe to apply to clothing.
- **Sleep under a net.** Bed nets, particularly those treated with insecticides, such as permethrin, help prevent mosquito bites while you are sleeping.

Preventive medicine

If you'll be traveling to a location where malaria is common, talk to your doctor a few months ahead of time about whether you should take drugs before, during and after your trip to help protect you from malaria parasites.
In general, the drugs taken to prevent malaria are the same drugs used to treat the disease. What drug you take depends on where and how long you are traveling and your own health.

Vaccine

The World Health Organization has recommended a malaria vaccine for use in children who live in countries with high numbers of malaria cases.
Researchers are continuing to develop and study malaria vaccines to prevent infection.

Treatment

Malaria is treated with prescription drugs to kill the parasite. The types of drugs and the length of treatment will vary, depending on:

- Which type of malaria parasite you have
- The severity of your symptoms
- Your age
- Whether you're pregnant

Medications

The most common antimalarial drugs include:

- **Chloroquine phosphate.** Chloroquine is the preferred treatment for any parasite that is sensitive to the drug. But in many parts of the world, parasites are resistant to chloroquine, and the drug is no longer an effective treatment.
- **Artemisinin-based combination therapies (ACTs).** artemisinin-based combination therapy (ACT) is a combination of two or more drugs that work against the malaria parasite in different ways. This is usually the preferred treatment for chloroquine-resistant malaria. Examples include artemether-lumefantrine (Coartem) and artesunate-mefloquine.

Other common antimalarial drugs include:

- Atovaquone-proguanil (Malarone)
- Quinine sulfate (Qualaquin) with doxycycline (Oracea, Vibramycin, others)
- Primaquine phosphate

Food Poisoning

Symptoms

Symptoms vary depending on what is causing the illness. They may begin within a few hours or a few weeks depending on the cause.

Common symptoms are:

- Upset stomach.
- Vomiting.
- Diarrhea.
- Diarrhea with bloody stools.
- Stomach pain and cramps.
- Fever.
- Headache.

Less often food poisoning affects the nervous system and can cause severe disease. Symptoms may include:

- Blurred or double vision.
- Headache.
- Loss of movement in limbs.
- Problems with swallowing.
- Tingling or numbness of skin.
- Weakness.

- Changes in sound of the voice.

When to see a doctor

Infants and children

Vomiting and diarrhea can quickly cause low levels of body fluids, also called dehydration, in infants and children. This can cause serious illness in infants.

Call your child's health care provider if your child's symptoms include vomiting and diarrhea and any of the following:

- Unusual changes in behavior or thinking.
- Excessive thirst.
- Little or no urination.
- Weakness.
- Dizziness.
- Diarrhea that lasts more than a day.
- Vomiting often.
- Stools that have blood or pus.
- Stools that are black or tarry.
- Severe pain in the stomach or rectum.
- Any fever in children under 2 years of age.
- Fever of 102 degrees Fahrenheit (38.9 degrees Celsius) or higher in older children.
- History of other medical problems.

Adults

Adults should see a health care provider or get emergency care if the following occur:

- Nervous system symptoms, such as blurry vision, muscle weakness and tingling of skin.
- Changes in thinking or behavior.
- Fever of 103 degrees Fahrenheit (39.4 degrees Celsius).
- Vomiting often.
- Diarrhea that lasts more than three days.
- Symptoms of dehydration — excessive thirst, dry mouth, little or no urination, severe weakness, dizziness, or lightheadedness.

Causes

Many germs or harmful things, called contaminants, can cause foodborne illnesses. Food or drink that carries a contaminant is called "contaminated." Food can be contaminated with any of the following:

- Bacteria.
- Viruses.
- Parasites that can live in the intestines.
- Poisons, also called toxins.
- Bacteria that carry or make toxins.
- Molds that make toxins.

How food becomes contaminated

Food can be contaminated at any point from the farm or fishery to the table. The problem can begin during growing, harvesting or catching, processing, storing, shipping, or preparing.

Food can be contaminated any place it's handled, including the home, because of:

- **Poor handwashing.** Feces that remains on the hands after using the toilet can contaminate food. Other contaminants can be transferred from hands during food preparation or food serving.
- **Not disinfecting cooking or eating areas.** Unwashed knives, cutting boards or other kitchen tools can spread contaminants.
- **Improper storage.** Food left out for too long at room temperature can become contaminated. Food stored in the refrigerator for too long can spoil. Also, food stored in a refrigerator or freezer that is too warm can spoil.

Common causes

The following table shows common causes of foodborne illnesses, the time from exposure to the beginning of symptoms and common sources of contamination.

Disease cause	Timing of symptoms	Common sources
Bacillus cereus (bacterium)	30 minutes to 15 hours.	Foods such as rice, leftovers, sauces, soups, meats and others that have sat out at room temperature too long.
Campylobacter (bacterium)	2 to 5 days.	Raw or undercooked poultry, shellfish, unpasteurized milk, and contaminated water.
Clostridium botulinum (bacterium)	18 to 36 hours. Infants: 3 to 30 days.	For infants, honey or pacifiers dipped in honey. Home-preserved foods including canned foods, fermented fish, fermented beans and alcohol. Commercial canned foods and oils infused with herbs.
Clostridium perfringens (bacterium)	6 to 24 hours.	Meats, poultry, stews and gravies. Commonly, food that is not kept hot enough when served to a large group. Food left out at room temperature too long.
Escherichia coli, commonly called E. coli (bacterium)	Usually, 3 to 4 days. Possibly, 1 to 10 days.	Raw or undercooked meat, unpasteurized milk or juice, soft cheeses from unpasteurized milk, and fresh fruits and vegetables. Contaminated water. Feces of people with E. coli.

Giardia lamblia (parasite)	1 to 2 weeks.	Food and water contaminated with feces that carry the parasite. Food handlers who are carriers of the parasite.
Hepatitis A (virus)	15 to 50 days.	Raw and undercooked shellfish, fresh fruits and vegetables, and other uncooked food. Food and water contaminated with human feces. Food handlers who have hepatitis A.
Listeria (bacterium)	9 to 48 hours for digestive disease. 1 to 4 weeks for body-wide disease.	Hot dogs, luncheon meats, unpasteurized milk, soft cheeses from unpasteurized milk, refrigerated smoked fish, refrigerated pates or meat spreads, and fresh fruits and vegetables.
Norovirus (virus)	12 to 48 hours.	Shellfish and fresh fruits and vegetables. Ready-to-eat foods, such as salads and sandwiches, touched by food handlers with the virus. Food or water contaminated with vomit or feces of a person with the virus.
Rotavirus (virus)	18 to 36 hours.	Food, water or objects, such as faucet handles or utensils, contaminated with the virus.
Salmonella (bacterium)	6 hours to 6 days.	Most often poultry, eggs and dairy products. Other foods such as fresh fruits and vegetables, meat, poultry, nuts, nut products, and spices.
Shellfish poisoning (toxin)	Usually 30 to 60 minutes, up to 24 hours.	Shellfish, including cooked shellfish, from coastal seawater contaminated with toxins.
Shigella (bacterium)	Usually, 1 to 2 days. Up to 7 days.	Contact with a person who is sick. Food or water contaminated with human feces. Often ready-to-eat food handled by a food worker with shigella.

Staphylococcus aureus (bacterium)	30 minutes to 8 hours.	Meat, egg salad, potato salad or cream-filled pastries that have been left out too long or not refrigerated. Foods handled by a person with the bacteria, which is often found on skin.
Vibrio (bacterium)	2 to 48 hours.	Raw or undercooked fish or shellfish, especially oysters. Water contaminated with sewage. Rice, millet, fresh fruits and vegetables.

Other sources

Bacteria that cause foodborne illnesses can also be found in swimming pools, lakes, ponds, rivers and seawater. Also, some bacteria, such as E. coli, may be spread by exposure to animals carrying the disease.

Prevention

To prevent food poisoning at home:

- **Handwashing.** Wash your hands with soap and water for at least 20 seconds. Do this after using the toilet, before eating, and before and after handling food.
- **Wash fruits and vegetables.** Rinse fruits and vegetables under running water before eating, peeling or preparing.
- **Wash kitchen utensils thoroughly.** Wash cutting boards, knives and other utensils with soapy water after contact with raw meats or unwashed fruits and vegetables.
- **Don't eat raw or undercooked meat or fish.** Use a meat thermometer to make sure meat is cooked enough. Cook whole meats and fish to at least 145 F (63 C) and let rest for at least three minutes. Cook ground meat to at least 160 F (71 C). Cook whole and ground poultry to at least 165 F (74 C).
- **Refrigerate or freeze leftovers.** Put leftovers in covered containers in the refrigerator right after your meal. Leftovers can be kept for 3 to 4 days in the refrigerator. If you don't think you'll eat them within four days, freeze them right away.
- **Cook leftovers safely.** You can safely thaw frozen food three ways. You can microwave it. You can move it to the refrigerator to thaw overnight. Or you can put the frozen food in a leakproof container and put it in cold water on the counter. Reheat leftovers until the internal temperature reaches 165 degrees Fahrenheit (74 degrees Celsius).
- **Throw it out when in doubt.** If you aren't sure if a food has been prepared, served or stored safely, discard it. Even if it looks and smells fine, it may not be safe to eat.
- **Throw out moldy food.** Throw out any baked foods with mold. Throw out moldy soft fruits and vegetables, such as tomatoes, berries or peaches. And throw away any nuts or nut products with mold. You can trim away mold from firm foods with low moisture, such as carrots, bell peppers and hard cheeses. Cut away at least 1 inch (2.5 centimeters) around the moldy part of the food.
- **Clean your refrigerator.** Clean the inside of the refrigerator every few months. Make a cleaning solution of 1 tablespoon (15 milliliters) of baking soda and 1 quart (0.9 liters) of water. Clean visible mold in the refrigerator or on the door seals. Use a solution of 1 tablespoon (15 milliliters) of bleach in 1 quart (0.9 liters) of water.

Safety for at-risk people

Food poisoning is especially serious during pregnancies and for young children, older adults and people with weakened immune systems. These illnesses may be life-threatening. These individuals should avoid the following foods:

- Raw or undercooked meat, poultry, fish, and shellfish.
- Raw or undercooked eggs or foods that may contain them, such as cookie dough and homemade ice cream.

- Raw sprouts, such as alfalfa, bean, clover and radish sprouts.
- Unpasteurized juices and ciders.
- Unpasteurized milk and milk products.
- Soft cheeses, such as feta, brie and Camembert; blue-veined cheese; and unpasteurized cheese.
- Refrigerated pates and meat spreads.
- Uncooked hot dogs, luncheon meats and deli meats.

Treatment

Treatment for food poisoning depends on how severe your symptoms are and what caused the illness. In most cases, drug treatment isn't necessary.

Treatment may include the following:

- **Fluid replacement.** Fluids and electrolytes, maintain the balance of fluids in your body. Electrolytes include minerals such as sodium, potassium and calcium. After vomiting or diarrhea, it's important to replace fluids to prevent dehydration. Severe dehydration may require going to the hospital. You may need fluids and electrolytes delivered directly into the bloodstream.
- **Antibiotics.** If the illness is caused by bacteria, you may be prescribed an antibiotic. Antibiotics are generally for people with severe disease or with a higher risk of complications.
- **Antiparasitics.** Drugs that target parasites, called antiparasitics, are usually prescribed for parasitic infections.
- **Probiotics.** Your care provider may recommend probiotics. These are treatments that replace healthy bacteria in the digestive system.

Drugs for diarrhea or upset stomach

Adults who have diarrhea that isn't bloody and who have no fever may take loperamide (Imodium A-D) to treat diarrhea. They also may take bismuth subsalicylate (Pepto-Bismol, Kaopectate, others) to treat an upset stomach. These nonprescription drugs are not recommended for children.

Lifestyle and home remedies

For most people, symptoms improve without treatment within 48 hours. To help keep yourself more comfortable and prevent dehydration while you recover, try the following:

- **Let your stomach settle.** Eat after your stomach is settled and you are hungry again.
- **Replace fluids.** Replace fluids with water, sports drinks, juice with added water or broths. Children or people at risk for serious illness should drink rehydration fluids (Pedialyte, Enfalyte, others). Talk to your doctor before giving rehydration fluids to infants.
- **Ease back into eating.** Gradually begin to eat bland, low-fat, easy-to-digest foods, such as soda crackers, toast, gelatin, bananas and rice. Stop eating if you feel sick to your stomach again.

- **Avoid certain foods and substances until you're feeling better.** These include dairy products, caffeine, alcohol, nicotine, and fatty or highly seasoned foods.
- **Rest.** Rest to recover from illness and dehydration.

Heart Diseases

Symptoms

Heart disease symptoms depend on the type of heart disease.

Symptoms of heart disease in the blood vessels

Coronary artery disease is a common heart condition that affects the major blood vessels that supply the heart muscle. A buildup of fats, cholesterol and other substances in and on the artery walls usually causes coronary artery disease. This buildup is called plaque. The buildup of plaque in the arteries is called atherosclerosis (ath-ur-o-skluh-ROE-sis). Atherosclerosis reduces blood flow to the heart and other parts of the body. It can lead to a heart attack, chest pain or a stroke.

Symptoms of coronary artery disease can include:

- Chest pain, chest tightness, chest pressure and chest discomfort, called angina.
- Shortness of breath.
- Pain in the neck, jaw, throat, upper belly or back.
- Pain, numbness, weakness or coldness in the legs or arms if the blood vessels in those body areas are narrowed.

You might not be diagnosed with coronary artery disease until you have a heart attack, angina, a stroke or heart failure. It's important to watch for heart symptoms. Talk with your healthcare team about any concerns. Heart disease can sometimes be found early with regular health checkups.

What is coronary artery disease? A Mayo Clinic cardiologist explains.
Stephen Kopecky, M.D., talks about the risk factors, symptoms and treatment of coronary artery disease (CAD). Learn how lifestyle changes can lower your risk.

Heart disease symptoms caused by irregular heartbeats, called arrhythmias

The heart may beat too quickly, too slowly or irregularly. Heart arrhythmia symptoms can include:

- Chest pain or discomfort.
- Dizziness.
- Fainting or almost fainting.
- Fluttering in the chest.
- Lightheadedness.
- Racing heartbeat.
- Shortness of breath.
- Slow heartbeat.

Heart disease symptoms caused by congenital heart defects

A congenital heart defect is a heart condition present at birth. Serious congenital heart defects usually are noticed soon after birth. Congenital heart defect symptoms in children could include:

- Blue or gray skin. Depending on skin color, these changes may be easier or harder to see.
- Swelling in the legs, belly area or areas around the eyes.
- In an infant, shortness of breath during feedings, leading to poor weight gain.

Some congenital heart defects may not be found until later in childhood or during adulthood. Symptoms may include:

- Getting very short of breath during exercise or activity.
- Easily tiring during exercise or activity.
- Swelling of the hands, ankles or feet.

Heart disease symptoms caused by diseased heart muscle, called cardiomyopathy

In the beginning, cardiomyopathy may not cause noticeable symptoms. As the condition gets worse, symptoms may include:

- Dizziness, lightheadedness and fainting.
- Fatigue.
- Feeling short of breath during activity or at rest.
- Feeling short of breath at night when trying to sleep, or waking up short of breath.
- Rapid, pounding or fluttering heartbeats.
- Swollen legs, ankles or feet.

Heart disease symptoms caused by heart valve disease

The heart has four valves. The valves open and close to move blood through the heart. Many things can damage the heart valves. If a heart valve is narrowed, it's called stenosis. If a heart valve lets blood flow backward, it's called regurgitation.

Symptoms of heart valve disease depend on which valve isn't working right. Symptoms may include:

- Chest pain.
- Fainting or almost fainting.
- Fatigue.
- Irregular heartbeats.
- Shortness of breath.
- Swollen feet or ankles.

When to see a doctor

Get emergency medical help if you have these heart disease symptoms:

- Chest pain.
- Shortness of breath.
- Fainting.

Always call 911 or your local emergency number if you think you might be having a heart attack.

If you think you may have symptoms of heart disease, make an appointment for a health checkup.

Heart disease is easier to treat when found early.

Causes

Heart disease causes depend on the specific type of heart disease. There are many different types of heart disease.

How the heart works

Chambers and valves of the heart

To understand the causes of heart disease, it may help to understand how the heart works.

- The heart has four chambers. The two upper chambers are called the atria. The two lower chambers are called the ventricles.
- The right side of the heart moves blood to the lungs through blood vessels called the pulmonary arteries.
- In the lungs, blood gets oxygen. The oxygen-rich blood goes to the left side of the heart through the pulmonary veins.
- The left side of the heart then pumps the blood through the body's main artery, called the aorta. The blood then goes to the rest of the body.

Heart valves

Four valves in the heart keep blood flowing in the right direction. These valves are:

- Aortic valve.
- Mitral valve.
- Pulmonary valve.
- Tricuspid valve.

Each valve has flaps, called leaflets or cusps. The flaps open and close once during each heartbeat. If a valve flap doesn't open or close properly, less blood moves out of the heart to the rest of the body.

Heartbeats

The heart's electrical system keeps the heart beating. The heart's electrical signals start in a group of cells at the top of the heart called the sinus node. They pass through a pathway between the upper and lower heart chambers called the atrioventricular (AV) node. The movement of the signals causes the heart to squeeze and pump blood.

Causes of coronary artery disease

Development of atherosclerosis

A buildup of fatty substances in the arteries, called atherosclerosis, is the most common cause of coronary artery disease. Risk factors include an unhealthy diet, lack of exercise, obesity, and smoking. Healthy-lifestyle choices can help lower the risk of atherosclerosis.

Causes of irregular heartbeats, called arrhythmias

Common causes of arrhythmias or conditions that can lead to them include:

- Heart muscle disease, called cardiomyopathy.
- Coronary artery disease.
- Diabetes.
- Illegal drugs such as cocaine.
- Emotional stress.
- Too much alcohol or caffeine.
- Heart conditions present at birth, called congenital heart defects.
- High blood pressure.
- Smoking.
- Heart valve disease.
- Some medicines, herbs and supplements.

Causes of congenital heart defects

A congenital heart defect happens while a baby is growing in the womb. Healthcare professionals aren't sure exactly what causes most congenital heart defects. But gene changes, some medical conditions, some medicines, and environmental or lifestyle factors may play a role.

Causes of heart muscle disease, called cardiomyopathy

The cause of cardiomyopathy depends on the type. There are three types:

- **Dilated cardiomyopathy.** This is the most common type of cardiomyopathy. The cause is often unknown. It may be passed down through families, which means it's inherited.
- **Hypertrophic cardiomyopathy.** This type is usually passed down through families.
- **Restrictive cardiomyopathy.** This type of cardiomyopathy can happen for no known reason. Sometimes a buildup of protein called amyloid causes it. Other causes include connective tissue disorders.

Causes of heart valve disease

Many things can cause a damaged or diseased heart valve. Some people are born with heart valve disease. If this happens, it's called congenital heart valve disease.

Other causes of heart valve disease can include:

- Rheumatic fever.
- Infection in the lining of the heart valves, called infectious endocarditis.
- Connective tissue disorders.

Prevention

The same lifestyle changes used to manage heart disease also may help prevent it. Try these heart-healthy tips:

- Don't smoke.
- Eat a diet that's low in salt and saturated fat.
- Exercise at least 30 minutes a day on most days of the week.
- Maintain a healthy weight.
- Reduce and manage stress.
- Control high blood pressure, high cholesterol and diabetes.
- Get good sleep. Adults should aim for 7 to 9 hours daily.

Rabies

Treatment

Heart disease treatment depends on the cause and type of heart damage. Treatment for heart disease may include:

- Lifestyle changes such as eating a diet low in salt and saturated fat, getting more exercise, and not smoking.
- Medicines.
- A heart procedure.
- Heart surgery.

Medications

You may need medicines to control heart disease symptoms and prevent complications. The type of medicine used depends on the type of heart disease.

Surgery or other procedures

Some people with heart disease may need a heart procedure or surgery. The type of treatment depends on the type of heart disease and how much damage has happened to the heart.

Lifestyle and home remedies

Lifestyle changes are an important part of heart disease treatment and prevention. The following changes are recommended to improve heart health:

- **Don't smoke.** Smoking is a major risk factor for heart disease. If you smoke and can't quit, talk with your healthcare team about programs or treatments that can help.
- **Eat healthy foods.** Eat plenty of fruits, vegetables and whole grains. Limit sugar, salt and saturated fats.
- **Control blood pressure.** Uncontrolled high blood pressure increases the risk of serious health conditions. Get your blood pressure checked at least every two years if you're 18 or older. If you have risk factors for heart disease or are over age 40, you may

need more-frequent checks. Ask your healthcare professional what blood pressure reading is best for you.
- **Get a cholesterol test.** Get a cholesterol test when you're in your 20s and then at least every 4 to 6 years. You may need to start testing earlier if high cholesterol is in your family history. You may need cholesterol checks more often if your test results aren't in a desirable range or you have risk factors for heart disease.
- **Manage diabetes.** If you have diabetes, controlling your blood sugar can help reduce the risk of heart disease.
- **Exercise.** Staying active keeps the heart healthy. Exercise at least 30 minutes a day on most days of the week. Talk with your healthcare team about the amount and type of exercise that's best for you.
- **Keep a healthy weight.** Being overweight increases the risk of heart disease. Ask your healthcare professional what weight is best for you.
- **Manage stress.** Find ways to help reduce emotional stress. Some tips are to get more exercise, practice mindfulness and connect with others in support groups.
- **Practice good hygiene.** Regularly wash your hands and brush and floss your teeth to keep yourself healthy.
- **Get good sleep.** Poor sleep may increase the risk of heart disease and other long-term health conditions. Adults should try to get 7 to 9 hours of sleep daily. Kids often need more. Go to bed and wake at the same time every day, including on weekends. If you have trouble sleeping, talk with your healthcare professional about strategies that might help.

Stroke

Symptoms

If you or someone you're with may be having a stroke, pay attention to the time the symptoms began. Some treatments are most effective when given soon after a stroke begins.

Symptoms of stroke include:

- **Trouble speaking and understanding what others are saying.** A person having a stroke may be confused, slur words or may not be able to understand speech.
- **Numbness, weakness or paralysis in the face, arm or leg.** This often affects just one side of the body. The person can try to raise both arms over the head. If one arm begins to fall, it may be a sign of a stroke. Also, one side of the mouth may droop when trying to smile.
- **Problems seeing in one or both eyes.** The person may suddenly have blurred or blackened vision in one or both eyes. Or the person may see double.
- **Headache.** A sudden, severe headache may be a symptom of a stroke. Vomiting, dizziness and a change in consciousness may occur with the headache.
- **Trouble walking.** Someone having a stroke may stumble or lose balance or coordination.

When to see a doctor

Seek immediate medical attention if you notice any symptoms of a stroke, even if they seem to come and go or they disappear completely. Think "FAST" and do the following:

- **Face.** Ask the person to smile. Does one side of the face droop?

- **Arms.** Ask the person to raise both arms. Does one arm drift downward? Or is one arm unable to rise?
- **Speech.** Ask the person to repeat a simple phrase. Is the person's speech slurred or different from usual?
- **Time.** If you see any of these signs, call 911 or emergency medical help right away.

Call 911 or your local emergency number immediately. Don't wait to see if symptoms stop. Every minute counts. The longer a stroke goes untreated, the greater the potential for brain damage and disability.

If you're with someone you suspect is having a stroke, watch the person carefully while waiting for emergency assistance

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Causes

There are two main causes of stroke. An ischemic stroke is caused by a blocked artery in the brain. A hemorrhagic stroke is caused by leaking or bursting of a blood vessel in the brain. Some people may have only a temporary disruption of blood flow to the brain, known as a transient ischemic attack (TIA). A TIA doesn't cause lasting symptoms.

Ischemic stroke

This is the most common type of stroke. It happens when the brain's blood vessels become narrowed or blocked. This causes reduced blood flow, known as ischemia. Blocked or narrowed blood vessels can be caused by fatty deposits that build up in blood vessels. Or they can be caused by blood clots or other debris that travel through the bloodstream, most often from the heart. An ischemic stroke occurs when fatty deposits, blood clots or other debris become lodged in the blood vessels in the brain.

Some early research shows that COVID-19 infection may increase the risk of ischemic stroke, but more study is needed.

Hemorrhagic stroke

Hemorrhagic stroke occurs when a blood vessel in the brain leaks or ruptures. Bleeding inside the brain, known as a brain hemorrhage, can result from many conditions that affect the blood vessels. Factors related to hemorrhagic stroke include:

- High blood pressure that's not under control.
- Overtreatment with blood thinners, also known as anticoagulants.
- Bulges at weak spots in the blood vessel walls, known as aneurysms.
- Head trauma, such as from a car accident.
- Protein deposits in blood vessel walls that lead to weakness in the vessel wall. This is known as cerebral amyloid angiopathy.
- Ischemic stroke that leads to a brain hemorrhage.

A less common cause of bleeding in the brain is the rupture of an arteriovenous malformation (AVM). An AVM is an irregular tangle of thin-walled blood vessels.

Transient ischemic attack

A transient ischemic attack (TIA) is a temporary period of symptoms similar to those of a stroke. But a TIA doesn't cause permanent damage. A TIA is caused by a temporary decrease in blood supply to part of the brain. The decrease may last as little as five minutes. A transient ischemic attack is sometimes known as a ministroke.

A TIA occurs when a blood clot or fatty deposit reduces or blocks blood flow to part of the nervous system.

Seek emergency care even if you think you've had a TIA. It's not possible to tell if you're having a stroke or TIA based only on the symptoms. If you've had a TIA, it means you may have a partially blocked or narrowed artery leading to the brain. Having a TIA increases your risk of having a stroke later.

Prevention

You can take steps to prevent a stroke. It's important to know your stroke risk factors and follow the advice of your healthcare professional about healthy lifestyle strategies. If you've had a stroke, these measures might help prevent another stroke. If you have had a transient ischemic attack (TIA), these steps can help lower your risk of a stroke. The follow-up care you receive in the hospital and afterward also may play a role.

Many stroke prevention strategies are the same as strategies to prevent heart disease. In general, healthy lifestyle recommendations include:

- **Control high blood pressure, known as hypertension.** This is one of the most important things you can do to reduce your stroke risk. If you've had a stroke, lowering your blood pressure can help prevent a TIA or stroke in the future. Healthy lifestyle changes and medicines often are used to treat high blood pressure.
- **Lower the amount of cholesterol and saturated fat in your diet.** Eating less cholesterol and fat, especially saturated fats and trans fats, may reduce buildup in the arteries. If you can't control your cholesterol through dietary changes alone, you may need a cholesterol-lowering medicine.
- **Quit tobacco use.** Smoking raises the risk of stroke for smokers and nonsmokers exposed to secondhand smoke. Quitting lowers your risk of stroke.
- **Manage diabetes.** Diet, exercise and losing weight can help you keep your blood sugar in a healthy range. If lifestyle factors aren't enough to control blood sugar, you may be prescribed diabetes medicine.
- **Maintain a healthy weight.** Being overweight contributes to other stroke risk factors, such as high blood pressure, cardiovascular disease and diabetes.
- **Eat a diet rich in fruits and vegetables.** Eating five or more servings of fruits or vegetables every day may reduce the risk of stroke. The Mediterranean diet, which emphasizes olive oil, fruit, nuts, vegetables and whole grains, may be helpful.
- **Exercise regularly.** Aerobic exercise reduces the risk of stroke in many ways. Exercise can lower blood pressure, increase the levels of good cholesterol, and improve the overall health of the blood vessels and heart. It also helps you lose weight, control diabetes and reduce stress. Gradually work up to at least 30 minutes of moderate physical activity on most or all days of the week. The American Heart association recommends getting 150 minutes of moderate-intensity aerobic activity or 75 minutes of vigorous aerobic activity a week. Moderate intensity activities can include walking, jogging, swimming and bicycling.
- **Drink alcohol in moderation, if at all.** Drinking large amounts of alcohol increases the risk of high blood pressure, ischemic strokes and hemorrhagic strokes. Alcohol also may interact with other medicines you're taking. However, drinking small to moderate amounts of alcohol may help prevent ischemic stroke and decrease the blood's clotting

tendency. A small to moderate amount is about one drink a day. Talk to your healthcare professional about what's appropriate for you.
- **Treat obstructive sleep apnea (OSA).** OSA is a sleep disorder that causes you to stop breathing for short periods several times during sleep. Your healthcare professional may recommend a sleep study if you have symptoms of OSA. Treatment includes a device that delivers positive airway pressure through a mask to keep the airway open while you sleep.
- **Don't use illicit drugs.** Certain illicit drugs such as cocaine and methamphetamine are established risk factors for a TIA or a stroke.

Preventive medicines

If you have had an ischemic stroke, you may need medicines to help lower your risk of having another stroke. If you have had a TIA, medicines can lower your risk of having a stroke in the future. These medicines may include:

- **Anti-platelet drugs.** Platelets are cells in the blood that form clots. Anti-platelet medicines make these cells less sticky and less likely to clot. The most commonly used anti-platelet medicine is aspirin. Your healthcare professional can recommend the right dose of aspirin for you.
  If you've had a TIA or minor stroke, you may take both an aspirin and an anti-platelet medicine such as clopidogrel (Plavix). These medicines may be prescribed for a period of time to reduce the risk of another stroke. If you can't take aspirin, you may be prescribed clopidogrel alone. Ticagrelor (Brilinta) is another anti-platelet medicine that can be used for stroke prevention.
- **Blooding-thinning medicines, known as anticoagulants.** These medicines reduce blood clotting. Heparin is a fast-acting anticoagulant that may be used short-term in the hospital.
  Slower acting warfarin (Jantoven) may be used over a longer term. Warfarin is a powerful blood-thinning medicine, so you need to take it exactly as directed and watch for side effects. You also need regular blood tests to monitor warfarin's effects.
  Several newer blood-thinning medicines are available to prevent strokes in people who have a high risk. These medicines include dabigatran (Pradaxa), rivaroxaban (Xarelto), apixaban (Eliquis) and edoxaban (Savaysa). They work faster than warfarin and usually don't require regular blood tests or monitoring by your healthcare professional. These medicines also are associated with a lower risk of bleeding complications compared to warfarin.

Treatment

Emergency treatment depends on whether you're having an ischemic or hemorrhagic stroke. During an ischemic stroke, blood vessels in the brain are blocked or narrowed. During a hemorrhagic stroke, there's bleeding into the brain.

Ischemic stroke

To treat an ischemic stroke, blood flow must quickly be restored to the brain. This may be done with:

- **Emergency IV medicine.** An IV medicine that can break up a clot has to be given within 4.5 hours from when symptoms began. The sooner the medicine is given, the

better. Quick treatment improves your chances of survival and may reduce complications.

An IV injection of recombinant tissue plasminogen activator (TPA) is the gold standard treatment for ischemic stroke. The two types of TPA are alteplase (Activase) and tenecteplase (TNKase). An injection of TPA is usually given through a vein in the arm within the first three hours. Sometimes, TPA can be given up to 4.5 hours after stroke symptoms started.

This medicine restores blood flow by dissolving the blood clot causing the stroke. By quickly removing the cause of the stroke, it may help people recover more fully from a stroke. Your healthcare professional considers certain risks, such as potential bleeding in the brain, to determine whether TPA is appropriate for you.

- **Emergency endovascular procedures.** Healthcare professionals sometimes treat ischemic strokes directly inside the blocked blood vessel. Endovascular therapy has been shown to improve outcomes and reduce long-term disability after ischemic stroke. These procedures must be performed as soon as possible:
    - **Medicines delivered directly to the brain.** During this procedure, a long, thin tube called a catheter is inserted through an artery in the groin. The catheter is moved through the arteries to the brain to deliver TPA directly where the stroke is happening. The time window for this treatment is somewhat longer than for injected TPA but is still limited.
    - **Removing the clot with a stent retriever.** A device attached to a catheter can directly remove the clot from the blocked blood vessel in the brain. This procedure is especially helpful for people with large clots that can't be completely dissolved with TPA. This procedure often is performed in combination with injected TPA.

The time window when these procedures can be considered has been expanding due to newer imaging technology. Perfusion imaging tests done with CT or MRI help determine if that someone may benefit from endovascular therapy.

Other procedures

Your healthcare professional may recommend a procedure to open up an artery that is narrowed by plaque. This type of procedure is done to lower your risk of having another stroke or transient ischemic attack. Options vary, but include:

- **Carotid endarterectomy.** Carotid arteries are the blood vessels that run along each side of the neck, supplying the brain with blood. This surgery removes the plaque blocking a carotid artery and may reduce the risk of ischemic stroke. A carotid endarterectomy also involves risks, especially for people with heart disease or other medical conditions.
- **Angioplasty and stents.** In an angioplasty, a surgeon threads a catheter to the carotid arteries through an artery in the groin. A balloon is then inflated to expand the narrowed artery. Then a stent can be inserted to support the opened artery.

Hemorrhagic stroke

Emergency treatment of hemorrhagic stroke focuses on controlling the bleeding and reducing pressure in the brain caused by excess fluid.

Emergency measures

If you take blood-thinning medicines to prevent blood clots, you may be given treatment to counteract the blood thinners' effects. These treatments include medicines or a transfusion of blood products. Medicines also can lower the pressure in your brain, lower blood pressure, prevent spasms of the blood vessels and prevent seizures.

Surgery

If the area of bleeding is large, you may need surgery to remove the blood and relieve pressure on your brain. Surgery also may be used to repair blood vessel damage associated with hemorrhagic strokes.

Your healthcare professional may recommend one of these procedures if an aneurysm, arteriovenous malformation (AVM) or other blood vessel condition caused the stroke.

- **Surgical clipping.** A surgeon places a tiny clamp at the base of an aneurysm to stop blood flow to it. An aneurysm is a bulge at a weak spot in a blood vessel. The clamp can keep the aneurysm from bursting. Or the clamp can keep an aneurysm that has recently burst from bleeding again.
- **Coiling, also known as endovascular embolization.** A catheter is inserted into an artery in the groin and guided to the brain. Using the catheter, a surgeon places tiny coils into the aneurysm to fill it. This blocks blood flow into the aneurysm and causes blood to clot.
- **Surgical removal of a tangle of thin-walled blood vessels, known as an AVM.** Surgeons may remove a smaller AVM if it's in an area of the brain that's easy to access. This removes the risk of rupture and lowers the risk of hemorrhagic stroke. However, it's not always possible to remove an AVM if it's deep within the brain or if it's large. It also may not be possible to remove if the procedure would impact brain function.
- **Stereotactic radiosurgery.** This procedure uses multiple beams of highly focused radiation to repair blood vessel malformations. Stereotactic radiosurgery is an advanced treatment that's not as invasive as other procedures.

Diabetes

Symptoms

Diabetes symptoms depend on how high your blood sugar is. Some people, especially if they have prediabetes, gestational diabetes or type 2 diabetes, may not have symptoms. In type 1 diabetes, symptoms tend to come on quickly and be more severe.

Some of the symptoms of type 1 diabetes and type 2 diabetes are:

- Feeling more thirsty than usual.
- Urinating often.
- Losing weight without trying.
- Presence of ketones in the urine. Ketones are a byproduct of the breakdown of muscle and fat that happens when there's not enough available insulin.
- Feeling tired and weak.
- Feeling irritable or having other mood changes.
- Having blurry vision.
- Having slow-healing sores.
- Getting a lot of infections, such as gum, skin and vaginal infections.

Type 1 diabetes can start at any age. But it often starts during childhood or teen years. Type 2 diabetes, the more common type, can develop at any age. Type 2 diabetes is more common in people older than 40. But type 2 diabetes in children is increasing.

When to see a doctor

- **If you think you or your child may have diabetes.** If you notice any possible diabetes symptoms, contact your health care provider. The earlier the condition is diagnosed, the sooner treatment can begin.
- **If you've already been diagnosed with diabetes.** After you receive your diagnosis, you'll need close medical follow-up until your blood sugar levels stabilize.

Causes

To understand diabetes, it's important to understand how the body normally uses glucose.

How insulin works

Insulin is a hormone that comes from a gland behind and below the stomach (pancreas).

- The pancreas releases insulin into the bloodstream.
- The insulin circulates, letting sugar enter the cells.
- Insulin lowers the amount of sugar in the bloodstream.
- As the blood sugar level drops, so does the secretion of insulin from the pancreas.

The role of glucose

Glucose — a sugar — is a source of energy for the cells that make up muscles and other tissues.

- Glucose comes from two major sources: food and the liver.
- Sugar is absorbed into the bloodstream, where it enters cells with the help of insulin.
- The liver stores and makes glucose.
- When glucose levels are low, such as when you haven't eaten in a while, the liver breaks down stored glycogen into glucose. This keeps your glucose level within a typical range.

The exact cause of most types of diabetes is unknown. In all cases, sugar builds up in the bloodstream. This is because the pancreas doesn't produce enough insulin. Both type 1 and type 2 diabetes may be caused by a combination of genetic or environmental factors. It is unclear what those factors may be.

Prevention

Type 1 diabetes can't be prevented. But the healthy lifestyle choices that help treat prediabetes, type 2 diabetes and gestational diabetes can also help prevent them:

- **Eat healthy foods.** Choose foods lower in fat and calories and higher in fiber. Focus on fruits, vegetables and whole grains. Eat a variety to keep from feeling bored.

- **Get more physical activity.** Try to get about 30 minutes of moderate aerobic activity on most days of the week. Or aim to get at least 150 minutes of moderate aerobic activity a week. For example, take a brisk daily walk. If you can't fit in a long workout, break it up into smaller sessions throughout the day.
- **Lose excess pounds.** If you're overweight, losing even 7% of your body weight can lower the risk of diabetes. For example, if you weigh 200 pounds (90.7 kilograms), losing 14 pounds (6.4 kilograms) can lower the risk of diabetes.
  But don't try to lose weight during pregnancy. Talk to your provider about how much weight is healthy for you to gain during pregnancy.
  To keep your weight in a healthy range, work on long-term changes to your eating and exercise habits. Remember the benefits of losing weight, such as a healthier heart, more energy and higher self-esteem.

Sometimes drugs are an option. Oral diabetes drugs such as metformin (Glumetza, Fortamet, others) may lower the risk of type 2 diabetes. But healthy lifestyle choices are important. If you have prediabetes, have your blood sugar checked at least once a year to make sure you haven't developed type 2 diabetes.

Treatment

Depending on what type of diabetes you have, blood sugar monitoring, insulin and oral drugs may be part of your treatment. Eating a healthy diet, staying at a healthy weight and getting regular physical activity also are important parts of managing diabetes.

Treatments for all types of diabetes

An important part of managing diabetes — as well as your overall health — is keeping a healthy weight through a healthy diet and exercise plan:

- **Healthy eating.** Your diabetes diet is simply a healthy-eating plan that will help you control your blood sugar. You'll need to focus your diet on more fruits, vegetables, lean proteins and whole grains. These are foods that are high in nutrition and fiber and low in fat and calories. You'll also cut down on saturated fats, refined carbohydrates and sweets. In fact, it's the best eating plan for the entire family. Sugary foods are OK once in a while. They must be counted as part of your meal plan.
  Understanding what and how much to eat can be a challenge. A registered dietitian can help you create a meal plan that fits your health goals, food preferences and lifestyle. This will likely include carbohydrate counting, especially if you have type 1 diabetes or use insulin as part of your treatment.
- **Physical activity.** Everyone needs regular aerobic activity. This includes people who have diabetes. Physical activity lowers your blood sugar level by moving sugar into your cells, where it's used for energy. Physical activity also makes your body more sensitive to insulin. That means your body needs less insulin to transport sugar to your cells.
  Get your provider's OK to exercise. Then choose activities you enjoy, such as walking, swimming or biking. What's most important is making physical activity part of your daily routine.
  Aim for at least 30 minutes or more of moderate physical activity most days of the week, or at least 150 minutes of moderate physical activity a week. Bouts of activity can be a few minutes during the day. If you haven't been active for a while, start slowly and build up slowly. Also avoid sitting for too long. Try to get up and move if you've been sitting for more than 30 minutes.

Treatments for type 1 and type 2 diabetes

Treatment for type 1 diabetes involves insulin injections or the use of an insulin pump, frequent blood sugar checks, and carbohydrate counting. For some people with type 1 diabetes, pancreas transplant or islet cell transplant may be an option.

Treatment of type 2 diabetes mostly involves lifestyle changes, monitoring of your blood sugar, along with oral diabetes drugs, insulin or both.

Monitoring your blood sugar

Depending on your treatment plan, you may check and record your blood sugar as many as four times a day or more often if you're taking insulin. Careful blood sugar testing is the only way to make sure that your blood sugar level remains within your target range. People with type 2 diabetes who aren't taking insulin generally check their blood sugar much less often.

People who receive insulin therapy also may choose to monitor their blood sugar levels with a continuous glucose monitor. Although this technology hasn't yet completely replaced the glucose meter, it can lower the number of fingersticks necessary to check blood sugar and provide important information about trends in blood sugar levels.

Even with careful management, blood sugar levels can sometimes change unpredictably. With help from your diabetes treatment team, you'll learn how your blood sugar level changes in response to food, physical activity, medications, illness, alcohol and stress. For women, you'll learn how your blood sugar level changes in response to changes in hormone levels.

Besides daily blood sugar monitoring, your provider will likely recommend regular A1C testing to measure your average blood sugar level for the past 2 to 3 months.

Compared with repeated daily blood sugar tests, A1C testing shows better how well your diabetes treatment plan is working overall. A higher A1C level may signal the need for a change in your oral drugs, insulin regimen or meal plan.

Your target A1C goal may vary depending on your age and various other factors, such as other medical conditions you may have or your ability to feel when your blood sugar is low. However, for most people with diabetes, the American Diabetes Association recommends an A1C of below 7%. Ask your provider what your A1C target is.

Insulin

People with type 1 diabetes must use insulin to manage blood sugar to survive. Many people with type 2 diabetes or gestational diabetes also need insulin therapy.

Many types of insulin are available, including short-acting (regular insulin), rapid-acting insulin, long-acting insulin and intermediate options. Depending on your needs, your provider may prescribe a mixture of insulin types to use during the day and night.

Insulin can't be taken orally to lower blood sugar because stomach enzymes interfere with insulin's action. Insulin is often injected using a fine needle and syringe or an insulin pen — a device that looks like a large ink pen.

An insulin pump also may be an option. The pump is a device about the size of a small cellphone worn on the outside of your body. A tube connects the reservoir of insulin to a tube (catheter) that's inserted under the skin of your abdomen.

A continuous glucose monitor, on the left, is a device that measures blood sugar every few minutes using a sensor inserted under the skin. An insulin pump, attached to the pocket, is a device that's worn outside of the body with a tube that connects the reservoir of insulin to a catheter inserted under the skin of the abdomen. Insulin pumps are programmed to deliver specific amounts of insulin continuously and with food.

A tubeless pump that works wirelessly is also now available. You program an insulin pump to dispense specific amounts of insulin. It can be adjusted to give out more or less insulin depending on meals, activity level and blood sugar level.

A closed loop system is a device implanted in the body that links a continuous glucose monitor to an insulin pump. The monitor checks blood sugar levels regularly. The device automatically delivers the right amount of insulin when the monitor shows that it's needed.

The Food and Drug Administration has approved several hybrid closed loop systems for type 1 diabetes. They are called "hybrid" because these systems require some input from the user. For example, you may have to tell the device how many carbohydrates are eaten, or confirm blood sugar levels from time to time.

A closed loop system that doesn't need any user input isn't available yet. But more of these systems currently are in clinical trials.

Oral or other drugs

Sometimes your provider may prescribe other oral or injected drugs as well. Some diabetes drugs help your pancreas to release more insulin. Others prevent the production and release of glucose from your liver, which means you need less insulin to move sugar into your cells.

Still others block the action of stomach or intestinal enzymes that break down carbohydrates, slowing their absorption, or make your tissues more sensitive to insulin. Metformin (Glumetza, Fortamet, others) is generally the first drug prescribed for type 2 diabetes.

Another class of medication called SGLT2 inhibitors may be used. They work by preventing the kidneys from reabsorbing filtered sugar into the blood. Instead, the sugar is eliminated in the urine.

Transplantation

In some people who have type 1 diabetes, a pancreas transplant may be an option. Islet transplants are being studied as well. With a successful pancreas transplant, you would no longer need insulin therapy.

But transplants aren't always successful. And these procedures pose serious risks. You need a lifetime of immune-suppressing drugs to prevent organ rejection. These drugs can have serious side effects. Because of this, transplants are usually reserved for people whose diabetes can't be controlled or those who also need a kidney transplant.

Bariatric surgery

Some people with type 2 diabetes who are obese and have a body mass index higher than 35 may be helped by some types of bariatric surgery. People who've had gastric bypass have seen major improvements in their blood sugar levels. But this procedure's long-term risks and benefits for type 2 diabetes aren't yet known.

Treatment for gestational diabetes

Controlling your blood sugar level is essential to keeping your baby healthy. It can also keep you from having complications during delivery. In addition to having a healthy diet and exercising regularly, your treatment plan for gestational diabetes may include monitoring your blood sugar. In some cases, you may also use insulin or oral drugs.

Your provider will monitor your blood sugar level during labor. If your blood sugar rises, your baby may release high levels of insulin. This can lead to low blood sugar right after birth.

Treatment for prediabetes

Treatment for prediabetes usually involves healthy lifestyle choices. These habits can help bring your blood sugar level back to normal. Or it could keep it from rising toward the levels seen in type 2 diabetes. Keeping a healthy weight through exercise and healthy eating can help. Exercising at least 150 minutes a week and losing about 7% of your body weight may prevent or delay type 2 diabetes.

Drugs — such as metformin, statins and high blood pressure medications — may be an option for some people with prediabetes and other conditions such as heart disease.

Signs of trouble in any type of diabetes

Many factors can affect your blood sugar. Problems may sometimes come up that need care right away.

High blood sugar

High blood sugar (hyperglycemia in diabetes) can occur for many reasons, including eating too much, being sick or not taking enough glucose-lowering medication. Check your blood sugar level as directed by your provider. And watch for symptoms of high blood sugar, including:

- Urinating often
- Feeling thirstier than usual
- Blurred vision
- Tiredness (fatigue)
- Headache
- Irritability

If you have hyperglycemia, you'll need to adjust your meal plan, drugs or both.

Increased ketones in your urine

Diabetic ketoacidosis is a serious complication of diabetes. If your cells are starved for energy, your body may begin to break down fat. This makes toxic acids known as ketones, which can build up in the blood. Watch for the following symptoms:

- Nausea
- Vomiting
- Stomach (abdominal) pain
- A sweet, fruity smell on your breath
- Shortness of breath
- Dry mouth
- Weakness
- Confusion
- Coma

You can check your urine for excess ketones with a ketones test kit that you can get without a prescription. If you have excess ketones in your urine, talk with your provider right away or seek emergency care. This condition is more common in people with type 1 diabetes.

Hyperglycemic hyperosmolar nonketotic syndrome

Hyperosmolar syndrome is caused by very high blood sugar that turns blood thick and syrupy.

Symptoms of this life-threatening condition include:

- A blood sugar reading over 600 mg/dL (33.3 mmol/L)
- Dry mouth
- Extreme thirst
- Fever
- Drowsiness
- Confusion
- Vision loss
- Hallucinations

This condition is seen in people with type 2 diabetes. It often happens after an illness. Call your provider or seek medical care right away if you have symptoms of this condition.

Low blood sugar (hypoglycemia)

If your blood sugar level drops below your target range, it's known as low blood sugar (diabetic hypoglycemia). If you're taking drugs that lower your blood sugar, including insulin, your blood sugar level can drop for many reasons. These include skipping a meal and getting more physical activity than normal. Low blood sugar also occurs if you take too much insulin or too much of a glucose-lowering medication that causes the pancreas to hold insulin.

Check your blood sugar level regularly and watch for symptoms of low blood sugar, including:

- Sweating
- Shakiness
- Weakness
- Hunger
- Dizziness
- Headache
- Blurred vision
- Heart palpitations
- Irritability
- Slurred speech
- Drowsiness
- Confusion
- Fainting
- Seizures

Low blood sugar is best treated with carbohydrates that your body can absorb quickly, such as fruit juice or glucose tablets.

Lifestyle and home remedies

Diabetes is a serious disease. Following your diabetes treatment plan takes total commitment. Careful management of diabetes can lower your risk of serious or life-threatening complications.

- **Commit to managing your diabetes.** Learn all you can about diabetes. Build a relationship with a diabetes educator. Ask your diabetes treatment team for help when you need it.
- **Choose healthy foods and stay at a healthy weight.** If you're overweight, losing just 7% of your body weight can make a difference in your blood sugar control if you have prediabetes or type 2 diabetes. A healthy diet is one with plenty of fruits, vegetables, lean proteins, whole grains and legumes. And limit how much food with saturated fat you eat.
- **Make physical activity part of your daily routine.** Regular physical activity can help prevent prediabetes and type 2 diabetes. It can also help those who already have diabetes to maintain better blood sugar control. A minimum of 30 minutes of moderate physical activity — such as brisk walking — most days of the week is recommended. Aim for at least 150 minutes of moderate aerobic physical activity a week.
  Getting regular aerobic exercise along with getting at least two days a week of strength training exercises can help control blood sugar more effectively than does either type of exercise alone. Aerobic exercises can include walking, biking or dancing. Resistance training can include weight training and body weight exercises.
  Also try to spend less time sitting still. Try to get up and move around for a few minutes at least every 30 minutes or so when you're awake.

Lifestyle recommendations for type 1 and type 2 diabetes

Also, if you have type 1 or type 2 diabetes:

- **Identify yourself.** Wear a tag or bracelet that says you have diabetes. Keep a glucagon kit nearby in case of a low blood sugar emergency. Make sure your friends and loved ones know how to use it.
- **Schedule a yearly physical and regular eye exams.** Your regular diabetes checkups aren't meant to replace yearly physicals or routine eye exams. During the physical, your provider will look for any diabetes-related complications and screen for other medical problems. Your eye care specialist will check for signs of eye damage, including retinal damage (retinopathy), cataracts and glaucoma.
- **Keep your vaccinations up to date.** High blood sugar can weaken your immune system. Get a flu shot every year. Your provider may recommend the pneumonia and COVID-19 vaccines, as well.

The Centers for Disease Control and Prevention (CDC) also currently recommends hepatitis B vaccination if you haven't previously had it and you're an adult ages 19 to 59 with type 1 or type 2 diabetes.
The most recent CDC guidelines suggest vaccination as soon as possible after diagnosis with type 1 or type 2 diabetes. If you are age 60 or older, have been diagnosed with diabetes, and haven't previously received the vaccine, talk to your provider about whether it's right for you.

- **Pay attention to your feet.** Wash your feet daily in lukewarm water. Dry them gently, especially between the toes. Moisturize with lotion, but not between the toes. Check your feet every day for blisters, cuts, sores, redness or swelling. Talk to your provider if you have a sore or other foot problem that doesn't heal quickly on its own.
- **Control your blood pressure and cholesterol.** Eating healthy foods and exercising regularly can help control high blood pressure and cholesterol. Drugs may be needed, too.
- **Take care of your teeth.** Diabetes may leave you prone to more-serious gum infections. Brush and floss your teeth at least twice a day. And if you have type 1 or type 2 diabetes, schedule regular dental exams. Talk to your dentist right away if your gums bleed or look red or swollen.
- **If you smoke or use other types of tobacco, ask your provider to help you quit.** Smoking increases your risk of many diabetes complications. Smokers who have diabetes are more likely to die of cardiovascular disease than are nonsmokers who have diabetes. Talk to your provider about ways to stop smoking or to stop using other types of tobacco.
- **If you drink alcohol, do so responsibly.** Alcohol can cause either high or low blood sugar. This depends on how much you drink and if you eat at the same time. If you choose to drink, do so only in moderation — one drink a day for women and up to two drinks a day for men — and always with food.
  Remember to include the carbohydrates from any alcohol you drink in your daily carbohydrate count. And check your blood sugar levels before going to bed.
- **Take stress seriously.** The hormones your body may make in response to long-term stress may prevent insulin from working properly. This will raise your blood sugar and stress you even more. Set limits for yourself and prioritize your tasks. Learn relaxation techniques. And get plenty of sleep.

Alternative medicine

Many substances have been shown to improve the body's ability to process insulin in some studies. Other studies fail to find any benefit for blood sugar control or in lowering A1C levels. Because of the conflicting findings, there aren't any alternative therapies that are currently recommended to help everyone to manage blood sugar.

If you decide to try any type of alternative therapy, don't stop taking the drugs that your provider has prescribed. Be sure to discuss the use of any of these therapies with your provider. Make sure that they won't cause bad reactions or interact with your current therapy.

Also, no treatments — alternative or conventional — can cure diabetes. If you're using insulin therapy for diabetes, never stop using insulin unless directed to do so by your provider.

Cancer

Symptoms

Signs and symptoms caused by cancer will vary depending on what part of the body is affected.

Some general signs and symptoms associated with, but not specific to, cancer, include:

- Fatigue

- Lump or area of thickening that can be felt under the skin
- Weight changes, including unintended loss or gain
- Skin changes, such as yellowing, darkening or redness of the skin, sores that won't heal, or changes to existing moles
- Changes in bowel or bladder habits
- Persistent cough or trouble breathing
- Difficulty swallowing
- Hoarseness
- Persistent indigestion or discomfort after eating
- Persistent, unexplained muscle or joint pain
- Persistent, unexplained fevers or night sweats
- Unexplained bleeding or bruising

When to see a doctor

Make an appointment with your doctor if you have any persistent signs or symptoms that concern you.

If you don't have any signs or symptoms, but are worried about your risk of cancer, discuss your concerns with your doctor. Ask about which cancer screening tests and procedures are appropriate for you.

Causes

Cancer is caused by changes (mutations) to the DNA within cells. The DNA inside a cell is packaged into a large number of individual genes, each of which contains a set of instructions telling the cell what functions to perform, as well as how to grow and divide. Errors in the instructions can cause the cell to stop its normal function and may allow a cell to become cancerous.

What do gene mutations do?

A gene mutation can instruct a healthy cell to:

- **Allow rapid growth.** A gene mutation can tell a cell to grow and divide more rapidly. This creates many new cells that all have that same mutation.
- **Fail to stop uncontrolled cell growth.** Normal cells know when to stop growing so that you have just the right number of each type of cell. Cancer cells lose the controls (tumor suppressor genes) that tell them when to stop growing. A mutation in a tumor suppressor gene allows cancer cells to continue growing and accumulating.
- **Make mistakes when repairing DNA errors.** DNA repair genes look for errors in a cell's DNA and make corrections. A mutation in a DNA repair gene may mean that other errors aren't corrected, leading cells to become cancerous.

These mutations are the most common ones found in cancer. But many other gene mutations can contribute to causing cancer.

What causes gene mutations?

Gene mutations can occur for several reasons, for instance:

- **Gene mutations you're born with.** You may be born with a genetic mutation that you inherited from your parents. This type of mutation accounts for a small percentage of cancers.

- **Gene mutations that occur after birth.** Most gene mutations occur after you're born and aren't inherited. A number of forces can cause gene mutations, such as smoking, radiation, viruses, cancer-causing chemicals (carcinogens), obesity, hormones, chronic inflammation and a lack of exercise.

Gene mutations occur frequently during normal cell growth. However, cells contain a mechanism that recognizes when a mistake occurs and repairs the mistake. Occasionally, a mistake is missed. This could cause a cell to become cancerous.

How do gene mutations interact with each other?

The gene mutations you're born with and those that you acquire throughout your life work together to cause cancer.

For instance, if you've inherited a genetic mutation that predisposes you to cancer, that doesn't mean you're certain to get cancer. Instead, you may need one or more other gene mutations to cause cancer. Your inherited gene mutation could make you more likely than other people to develop cancer when exposed to a certain cancer-causing substance.

It's not clear just how many mutations must accumulate for cancer to form. It's likely that this varies among cancer types.

Prevention

Doctors have identified several ways to reduce your risk of cancer, such as:

- **Stop smoking.** If you smoke, quit. If you don't smoke, don't start. Smoking is linked to several types of cancer — not just lung cancer. Stopping now will reduce your risk of cancer in the future.
- **Avoid excessive sun exposure.** Harmful ultraviolet (UV) rays from the sun can increase your risk of skin cancer. Limit your sun exposure by staying in the shade, wearing protective clothing or applying sunscreen.
- **Eat a healthy diet.** Choose a diet rich in fruits and vegetables. Select whole grains and lean proteins. Limit your intake of processed meats.
- **Exercise most days of the week.** Regular exercise is linked to a lower risk of cancer. Aim for at least 30 minutes of exercise most days of the week. If you haven't been exercising regularly, start out slowly and work your way up to 30 minutes or longer.
- **Maintain a healthy weight.** Being overweight or obese may increase your risk of cancer. Work to achieve and maintain a healthy weight through a combination of a healthy diet and regular exercise.
- **Drink alcohol in moderation, if you choose to drink.** If you choose to drink alcohol, do so in moderation. For healthy adults, that means up to one drink a day for women and up to two drinks a day for men.
- **Schedule cancer screening exams.** Talk to your doctor about what types of cancer screening exams are best for you based on your risk factors.
- **Ask your doctor about immunizations.** Certain viruses increase your risk of cancer. Immunizations may help prevent those viruses, including hepatitis B, which increases the risk of liver cancer, and human papillomavirus (HPV), which increases the risk of cervical cancer and other cancers. Ask your doctor whether immunization against these viruses is appropriate for you.

Goals of cancer treatment

Cancer treatments have different objectives, such as:

- **Cure.** The goal of treatment is to achieve a cure for your cancer, allowing you to live a normal life span. This may or may not be possible, depending on your specific situation.
- **Primary treatment.** The goal of a primary treatment is to completely remove the cancer from your body or kill the cancer cells.
  Any cancer treatment can be used as a primary treatment, but the most common primary cancer treatment for the most common cancers is surgery. If your cancer is particularly sensitive to radiation therapy or chemotherapy, you may receive one of those therapies as your primary treatment.
- **Adjuvant treatment.** The goal of adjuvant therapy is to kill any cancer cells that may remain after primary treatment in order to reduce the chance that the cancer will recur.
  Any cancer treatment can be used as an adjuvant therapy. Common adjuvant therapies include chemotherapy, radiation therapy and hormone therapy.
- **Palliative treatment.** Palliative treatments may help relieve side effects of treatment or signs and symptoms caused by cancer itself. Surgery, radiation, chemotherapy and hormone therapy can all be used to relieve symptoms and control the spread of cancer when a cure isn't possible. Medications may relieve symptoms such as pain and shortness of breath.
  Palliative treatment can be used at the same time as other treatments intended to cure your cancer.

Cancer treatments

Doctors have many tools when it comes to treating cancer. Cancer treatment options include:

- **Surgery.** The goal of surgery is to remove the cancer or as much of the cancer as possible.
- **Chemotherapy.** Chemotherapy uses drugs to kill cancer cells.
- **Radiation therapy.** Radiation therapy uses high-powered energy beams, such as X-rays and protons, to kill cancer cells. Radiation treatment can come from a machine outside your body (external beam radiation), or it can be placed inside your body (brachytherapy).
- **Bone marrow transplant.** Bone marrow transplant is also known as a stem cell transplant. Your bone marrow is the material inside your bones that makes blood cells. A bone marrow transplant can use your own cells or cells from a donor.
  A bone marrow transplant allows your doctor to use higher doses of chemotherapy to treat your cancer. It may also be used to replace diseased bone marrow.
- **Immunotherapy.** Immunotherapy, also known as biological therapy, uses your body's immune system to fight cancer. Cancer can survive unchecked in your body because your immune system doesn't recognize it as an intruder. Immunotherapy can help your immune system "see" the cancer and attack it.
- **Hormone therapy.** Some types of cancer are fueled by your body's hormones. Examples include breast cancer and prostate cancer. Removing those hormones from the body or blocking their effects may cause the cancer cells to stop growing.
- **Targeted drug therapy.** Targeted drug treatment focuses on specific abnormalities within cancer cells that allow them to survive.
- **Clinical trials.** Clinical trials are studies to investigate new ways of treating cancer. Thousands of cancer clinical trials are underway.

Other treatments may be available to you, depending on your type of cancer.

Alternative medicine

No alternative cancer treatments have been proved to cure cancer. But alternative medicine options may help you cope with side effects of cancer and cancer treatment, such as fatigue, nausea and pain.

Talk with your doctor about which alternative medicine options may offer some benefit. Your doctor can also discuss whether these therapies are safe for you or whether they may interfere with your cancer treatment.

Some alternative medicine options found to be helpful for people with cancer include:

- Acupuncture
- Hypnosis
- Massage
- Meditation
- Relaxation techniques
- Yoga

High Cholesterol

Symptoms

High cholesterol has no symptoms. A blood test is the only way to detect if you have it.

When to see a doctor

According to the National Heart, Lung, and Blood Institute (NHLBI), a person's first cholesterol screening should occur between the ages of 9 and 11, and then be repeated every five years after that.

The NHLBI recommends that cholesterol screenings occur every one to two years for men ages 45 to 65 and for women ages 55 to 65. People over 65 should receive cholesterol tests annually.

If your test results aren't within desirable ranges, your doctor might recommend more-frequent measurements. Your doctor might also suggest more-frequent tests if you have a family history of high cholesterol, heart disease or other risk factors, such as diabetes or high blood pressure.

Causes

Cholesterol is carried through your blood, attached to proteins. This combination of proteins and cholesterol is called a lipoprotein. There are different types of cholesterol, based on what the lipoprotein carries. They are:

- **Low-density lipoprotein (LDL).** LDL, the "bad" cholesterol, transports cholesterol particles throughout your body. LDL cholesterol builds up in the walls of your arteries, making them hard and narrow.
- **High-density lipoprotein (HDL).** HDL, the "good" cholesterol, picks up excess cholesterol and takes it back to your liver.

A lipid profile also typically measures triglycerides, a type of fat in the blood. Having a high triglyceride level also can increase your risk of heart disease.

Factors you can control — such as inactivity, obesity and an unhealthy diet — contribute to harmful cholesterol and triglyceride levels. Factors beyond your control might play a role, too. For example,

your genetic makeup might make it more difficult for your body to remove LDL cholesterol from your blood or break it down in the liver.

Medical conditions that can cause unhealthy cholesterol levels include:

- Chronic kidney disease
- Diabetes
- HIV/AIDS
- Hypothyroidism
- Lupus

Cholesterol levels can also be worsened by some types of medications you may be taking for other health problems, such as:

- Acne
- Cancer
- High blood pressure
- HIV/AIDS
- Irregular heart rhythms
- Organ transplants

Prevention

The same heart-healthy lifestyle changes that can lower your cholesterol can help prevent you from having high cholesterol in the first place. To help prevent high cholesterol, you can:

- Eat a low-salt diet that emphasizes fruits, vegetables and whole grains
- Limit the amount of animal fats and use good fats in moderation
- Lose extra pounds and maintain a healthy weight
- Quit smoking
- Exercise on most days of the week for at least 30 minutes
- Drink alcohol in moderation, if at all
- Manage stress

Children and cholesterol testing

For most children, the National Heart, Lung, and Blood Institute recommends one cholesterol screening test between the ages of 9 and 11, and then be repeated every five years after that.

If your child has a family history of early-onset heart disease or a personal history of obesity or diabetes, your doctor might recommend earlier or more-frequent cholesterol testing.

Treatment

Lifestyle changes such as exercising and eating a healthy diet are the first line of defense against high cholesterol. But, if you've made these important lifestyle changes and your cholesterol levels remain high, your doctor might recommend medication.

The choice of medication or combination of medications depends on various factors, including your personal risk factors, your age, your health and possible drug side effects. Common choices include:

- **Statins.** Statins block a substance your liver needs to make cholesterol. This causes your liver to remove cholesterol from your blood. Choices include atorvastatin (Lipitor), fluvastatin (Lescol), lovastatin (Altoprev), pitavastatin (Livalo), pravastatin (Pravachol), rosuvastatin (Crestor) and simvastatin (Zocor).
- **Cholesterol absorption inhibitors.** Your small intestine absorbs the cholesterol from your diet and releases it into your bloodstream. The drug ezetimibe (Zetia) helps reduce blood cholesterol by limiting the absorption of dietary cholesterol. Ezetimibe can be used with a statin drug.
- **Bempedoic acid.** This newer drug works in much the same way as statins but is less likely to cause muscle pain. Adding bempedoic acid (Nexletol) to a maximum statin dosage can help lower LDL significantly. A combination pill containing both bempedoic acid and ezetimibe (Nexlizet) also is available.
- **Bile-acid-binding resins.** Your liver uses cholesterol to make bile acids, a substance needed for digestion. The medications cholestyramine (Prevalite), colesevelam (Welchol) and colestipol (Colestid) lower cholesterol indirectly by binding to bile acids. This prompts your liver to use excess cholesterol to make more bile acids, which reduces the level of cholesterol in your blood.
- **PCSK9 inhibitors.** These drugs can help the liver absorb more LDL cholesterol, which lowers the amount of cholesterol circulating in your blood. Alirocumab (Praluent) and evolocumab (Repatha) might be used for people who have a genetic condition that causes very high levels of LDL or in people with a history of coronary disease who have intolerance to statins or other cholesterol medications. They are injected under the skin every few weeks and are expensive.

Medications for high triglycerides

If you also have high triglycerides, your doctor might prescribe:

- **Fibrates.** The medications fenofibrate (Tricor, Fenoglide, others) and gemfibrozil (Lopid) reduce your liver's production of very-low-density lipoprotein (VLDL) cholesterol and speed the removal of triglycerides from your blood. VLDL cholesterol contains mostly triglycerides. Using fibrates with a statin can increase the risk of statin side effects.
- **Niacin.** Niacin limits your liver's ability to produce LDL and VLDL cholesterol. But niacin doesn't provide additional benefits over statins. Niacin has also been linked to liver damage and strokes, so most doctors now recommend it only for people who can't take statins.
- **Omega-3 fatty acid supplements.** Omega-3 fatty acid supplements can help lower your triglycerides. They are available by prescription or over-the-counter. If you choose to take over-the-counter supplements, get your doctor's OK. Omega-3 fatty acid supplements could affect other medications you're taking.

Tolerance varies

Tolerance of medications varies from person to person. The common side effects of statins are muscle pains and muscle damage, reversible memory loss and confusion, and elevated blood sugar. If you decide to take cholesterol medication, your doctor might recommend liver function tests to monitor the medication's effect on your liver.

Children and cholesterol treatment

Diet and exercise are the best initial treatment for children age 2 and older who have high cholesterol or who are obese. Children age 10 and older who have extremely high cholesterol levels might be prescribed cholesterol-lowering drugs, such as statins.

Lifestyle and home remedies

Lifestyle changes are essential to improve your cholesterol levels.

- **Lose extra pounds.** Losing weight can help lower cholesterol.
- **Eat a heart-healthy diet.** Focus on plant-based foods, including fruits, vegetables and whole grains. Limit saturated fats and trans fats. Monounsaturated fat, found in olive and canola oils, is a healthier option. Avocados, nuts and oily fish are other sources of healthy fat.
- **Exercise regularly.** With your doctor's OK, work up to at least 30 minutes of moderate intensity exercise five times a week.
- **Don't smoke.** If you smoke, find a way to quit.

Arthritis

Types

Ankylosing spondylitis
Gout
Juvenile idiopathic arthritis

Symptoms

The most common signs and symptoms of arthritis involve the joints. Depending on the type of arthritis, signs and symptoms may include:

- Pain
- Stiffness
- Swelling
- Redness
- Decreased range of motion

Causes

The two main types of arthritis — osteoarthritis and rheumatoid arthritis — damage joints in different ways.

Osteoarthritis

The most common type of arthritis, osteoarthritis involves wear-and-tear damage to a joint's cartilage — the hard, slick coating on the ends of bones where they form a joint. Cartilage cushions the ends of the bones and allows nearly frictionless joint motion, but enough damage can result in bone grinding directly on bone, which causes pain and restricted movement. This wear and tear can occur over many years, or it can be hastened by a joint injury or infection.

Osteoarthritis also causes changes in the bones and deterioration of the connective tissues that attach muscle to bone and hold the joint together. If cartilage in a joint is severely damaged, the joint lining may become inflamed and swollen.

Rheumatoid arthritis

In rheumatoid arthritis, the body's immune system attacks the lining of the joint capsule, a tough membrane that encloses all the joint parts. This lining (synovial membrane) becomes inflamed and swollen. The disease process can eventually destroy cartilage and bone within the joint.

Treatment

Arthritis treatment focuses on relieving symptoms and improving joint function. You may need to try several different treatments, or combinations of treatments, before you determine what works best for you.

Medications

The medications used to treat arthritis vary depending on the type of arthritis. Commonly used arthritis medications include:

- **NSAIDs.** Nonsteroidal anti-inflammatory drugs (NSAIDs) can relieve pain and reduce inflammation. Examples include ibuprofen (Advil, Motrin IB, others) and naproxen sodium (Aleve). Stronger NSAIDs can cause stomach irritation and may increase your risk of heart attack or stroke. NSAIDs are also available as creams or gels, which can be rubbed on joints.
- **Counterirritants.** Some varieties of creams and ointments contain menthol or capsaicin, the ingredient that makes hot peppers spicy. Rubbing these preparations on the skin over your aching joint may interfere with the transmission of pain signals from the joint itself.
- **Steroids.** Corticosteroid medications, such as prednisone, reduce inflammation and pain and slow joint damage. Corticosteroids may be given as a pill or as an injection into the painful joint. Side effects may include thinning of bones, weight gain and diabetes.
- **Disease-modifying antirheumatic drugs (DMARDs).** These drugs can slow the progression of rheumatoid arthritis and save the joints and other tissues from permanent damage. In addition to conventional DMARDs, there are also biologic agents and targeted synthetic DMARDs. Side effects vary but most DMARDs increase your risk of infections.

Therapy

Physical therapy can be helpful for some types of arthritis. Exercises can improve range of motion and strengthen the muscles surrounding joints. In some cases, splints or braces may be warranted.

Surgery

If conservative measures don't help, doctors may suggest surgery, such as:

- **Joint repair.** In some instances, joint surfaces can be smoothed or realigned to reduce pain and improve function. These types of procedures can often be performed arthroscopically — through small incisions over the joint.
- **Joint replacement.** This procedure removes the damaged joint and replaces it with an artificial one. Joints most commonly replaced are hips and knees.
- **Joint fusion.** This procedure is more often used for smaller joints, such as those in the wrist, ankle and fingers. It removes the ends of the two bones in the joint and then locks those ends together until they heal into one rigid unit.

Lifestyle and home remedies

In many cases, arthritis symptoms can be reduced with the following measures:

- **Weight loss.** Excess weight puts extra stress on weight-bearing joints. Losing weight may increase your mobility and limit future joint injury.
- **Exercise.** Regular exercise can help keep joints flexible. Swimming and water aerobics may be good choices because the buoyancy of the water reduces stress on weight-bearing joints.
- **Heat and cold.** Heating pads or ice packs may help relieve arthritis pain.
- **Assistive devices.** Using canes, shoe inserts, walkers, raised toilet seats, and other assistive devices can help protect joints and improve your ability to perform daily tasks.

Alternative medicine

Many people use alternative remedies for arthritis, but there is little reliable evidence to support the use of many of these products. The most promising alternative remedies for arthritis include:

- **Acupuncture.** This therapy uses fine needles inserted at specific points on the skin to reduce many types of pain, including that caused by some types of arthritis.
- **Glucosamine.** Although study results have been mixed, some studies have found that glucosamine works no better than placebo. However, glucosamine and the placebo both relieved osteoarthritis pain better than taking nothing, particularly in people who have moderate to severe pain from knee osteoarthritis.
- **Chondroitin.** Chondroitin may provide modest pain relief from osteoarthritis, although study results are mixed.
- **Fish oil.** Some preliminary studies have found that fish oil supplements may reduce the symptoms of some types of arthritis. Fish oil can interfere with medications, so check with your doctor first.
- **Yoga and tai chi.** The slow, stretching movements associated with yoga and tai chi may help improve joint flexibility and range of motion.
- **Massage.** Light stroking and kneading of muscles may increase blood flow and warm affected joints, temporarily relieving pain. Make sure your massage therapist knows which joints are affected by arthritis.

Asthma

Symptoms

Asthma symptoms vary from person to person. You may have infrequent asthma attacks, have symptoms only at certain times — such as when exercising — or have symptoms all the time.

Asthma signs and symptoms include:

- Shortness of breath
- Chest tightness or pain
- Wheezing when exhaling, which is a common sign of asthma in children
- Trouble sleeping caused by shortness of breath, coughing or wheezing
- Coughing or wheezing attacks that are worsened by a respiratory virus, such as a cold or the flu

Signs that your asthma is probably worsening include:

- Asthma signs and symptoms that are more frequent and bothersome
- Increasing difficulty breathing, as measured with a device used to check how well your lungs are working (peak flow meter)
- The need to use a quick-relief inhaler more often

For some people, asthma signs and symptoms flare up in certain situations:

- **Exercise-induced asthma,** which may be worse when the air is cold and dry
- **Occupational asthma,** triggered by workplace irritants such as chemical fumes, gases or dust

- **Allergy-induced asthma,** triggered by airborne substances, such as pollen, mold spores, cockroach waste, or particles of skin and dried saliva shed by pets (pet dander)

When to see a doctor

Seek emergency treatment

Severe asthma attacks can be life-threatening. Work with your doctor to determine what to do when your signs and symptoms worsen — and when you need emergency treatment. Signs of an asthma emergency include:

- Rapid worsening of shortness of breath or wheezing
- No improvement even after using a quick-relief inhaler
- Shortness of breath when you are doing minimal physical activity

Contact your doctor

See your doctor:

- **If you think you have asthma.** If you have frequent coughing or wheezing that lasts more than a few days or any other signs or symptoms of asthma, see your doctor. Treating asthma early may prevent long-term lung damage and help keep the condition from getting worse over time.
- **To monitor your asthma after diagnosis.** If you know you have asthma, work with your doctor to keep it under control. Good long-term control helps you feel better from day to day and can prevent a life-threatening asthma attack.
- **If your asthma symptoms get worse.** Contact your doctor right away if your medication doesn't seem to ease your symptoms or if you need to use your quick-relief inhaler more often.
  Don't take more medication than prescribed without consulting your doctor first. Overusing asthma medication can cause side effects and may make your asthma worse.
- **To review your treatment.** Asthma often changes over time. Meet with your doctor regularly to discuss your symptoms and make any needed treatment adjustments.

Causes

It isn't clear why some people get asthma and others don't, but it's probably due to a combination of environmental and inherited (genetic) factors.

Asthma triggers

Exposure to various irritants and substances that trigger allergies (allergens) can trigger signs and symptoms of asthma. Asthma triggers are different from person to person and can include:

- Airborne allergens, such as pollen, dust mites, mold spores, pet dander or particles of cockroach waste
- Respiratory infections, such as the common cold
- Physical activity
- Cold air
- Air pollutants and irritants, such as smoke
- Certain medications, including beta blockers, aspirin, and nonsteroidal anti-inflammatory drugs, such as ibuprofen (Advil, Motrin IB, others) and naproxen sodium (Aleve)
- Strong emotions and stress
- Sulfites and preservatives added to some types of foods and beverages, including shrimp, dried fruit, processed potatoes, beer and wine

- Gastroesophageal reflux disease (GERD), a condition in which stomach acids back up into your throat

Prevention

While there's no way to prevent asthma, you and your doctor can design a step-by-step plan for living with your condition and preventing asthma attacks.

- **Follow your asthma action plan.** With your doctor and health care team, write a detailed plan for taking medications and managing an asthma attack. Then be sure to follow your plan. Asthma is an ongoing condition that needs regular monitoring and treatment. Taking control of your treatment can make you feel more in control of your life.
- **Get vaccinated for influenza and pneumonia.** Staying current with vaccinations can prevent flu and pneumonia from triggering asthma flare-ups.
- **Identify and avoid asthma triggers.** A number of outdoor allergens and irritants — ranging from pollen and mold to cold air and air pollution — can trigger asthma attacks. Find out what causes or worsens your asthma, and take steps to avoid those triggers.
- **Monitor your breathing.** You may learn to recognize warning signs of an impending attack, such as slight coughing, wheezing or shortness of breath.
  But because your lung function may decrease before you notice any signs or symptoms, regularly measure and record your peak airflow with a home peak flow meter. A peak flow meter measures how hard you can breathe out. Your doctor can show you how to monitor your peak flow at home.
- **Identify and treat attacks early.** If you act quickly, you're less likely to have a severe attack. You also won't need as much medication to control your symptoms.
  When your peak flow measurements decrease and alert you to an oncoming attack, take your medication as instructed. Also, immediately stop any activity that may have triggered the attack. If your symptoms don't improve, get medical help as directed in your action plan.
- **Take your medication as prescribed.** Don't change your medications without first talking to your doctor, even if your asthma seems to be improving. It's a good idea to bring your medications with you to each doctor visit. Your doctor can make sure you're using your medications correctly and taking the right dose.
- **Pay attention to increasing quick-relief inhaler use.** If you find yourself relying on your quick-relief inhaler, such as albuterol, your asthma isn't under control. See your doctor about adjusting your treatment.

How asthma is classified

To classify your asthma severity, your doctor will consider how often you have signs and symptoms and how severe they are. Your doctor will also consider the results of your physical exam and diagnostic tests.

Determining your asthma severity helps your doctor choose the best treatment. Asthma severity often changes over time, requiring treatment adjustments.

Asthma is classified into four general categories:

Asthma classification	Signs and symptoms
Mild intermittent	Mild symptoms up to two days a week and up to two nights a month

Mild persistent	Symptoms more than twice a week, but no more than once in a single day
Moderate persistent	Symptoms once a day and more than one night a week
Severe persistent	Symptoms throughout the day on most days and frequently at night

Treatment

Prevention and long-term control are key to stopping asthma attacks before they start. Treatment usually involves learning to recognize your triggers, taking steps to avoid triggers and tracking your breathing to make sure your medications are keeping symptoms under control. In case of an asthma flare-up, you may need to use a quick-relief inhaler.

Medications

The right medications for you depend on a number of things — your age, symptoms, asthma triggers and what works best to keep your asthma under control.

Preventive, long-term control medications reduce the swelling (inflammation) in your airways that leads to symptoms. Quick-relief inhalers (bronchodilators) quickly open swollen airways that are limiting breathing. In some cases, allergy medications are necessary.

Long-term asthma control medications, generally taken daily, are the cornerstone of asthma treatment. These medications keep asthma under control on a day-to-day basis and make it less likely you'll have an asthma attack. Types of long-term control medications include:

- **Inhaled corticosteroids.** These medications include fluticasone propionate (Flovent HFA, Flovent Diskus, Xhance), budesonide (Pulmicort Flexhaler, Pulmicort Respules, Rhinocort), ciclesonide (Alvesco), beclomethasone (Qvar Redihaler), mometasone (Asmanex HFA, Asmanex Twisthaler) and fluticasone furoate (Arnuity Ellipta).
  You may need to use these medications for several days to weeks before they reach their maximum benefit. Unlike oral corticosteroids, inhaled corticosteroids have a relatively low risk of serious side effects.
- **Leukotriene modifiers.** These oral medications — including montelukast (Singulair), zafirlukast (Accolate) and zileuton (Zyflo) — help relieve asthma symptoms.
  Montelukast has been linked to psychological reactions, such as agitation, aggression, hallucinations, depression and suicidal thinking. Seek medical advice right away if you experience any of these reactions.
- **Combination inhalers.** These medications — such as fluticasone-salmeterol (Advair HFA, Airduo Digihaler, others), budesonide-formoterol (Symbicort), formoterol-mometasone (Dulera) and fluticasone furoate-vilanterol (Breo Ellipta) — contain a long-acting beta agonist along with a corticosteroid.
- **Theophylline.** Theophylline (Theo-24, Elixophyllin, Theochron) is a daily pill that helps keep the airways open by relaxing the muscles around the airways. It's not used as often as other asthma medications and requires regular blood tests.

Quick-relief (rescue) medications are used as needed for rapid, short-term symptom relief during an asthma attack. They may also be used before exercise if your doctor recommends it. Types of quick-relief medications include:

- **Short-acting beta agonists.** These inhaled, quick-relief bronchodilators act within minutes to rapidly ease symptoms during an asthma attack. They include albuterol (ProAir HFA, Ventolin HFA, others) and levalbuterol (Xopenex, Xopenex HFA).
  Short-acting beta agonists can be taken using a portable, hand-held inhaler or a nebulizer, a machine that converts asthma medications to a fine mist. They're inhaled through a face mask or mouthpiece.
- **Anticholinergic agents.** Like other bronchodilators, ipratropium (Atrovent HFA) and tiotropium (Spiriva, Spiriva Respimat) act quickly to immediately relax your airways, making it easier to breathe. They're mostly used for emphysema and chronic bronchitis, but can be used to treat asthma.
- **Oral and intravenous corticosteroids.** These medications — which include prednisone (Prednisone Intensol, Rayos) and methylprednisolone (Medrol, Depo-Medrol, Solu-Medrol) — relieve airway inflammation caused by severe asthma. They can cause serious side effects when used long term, so these drugs are used only on a short-term basis to treat severe asthma symptoms.

If you have an asthma flare-up, a quick-relief inhaler can ease your symptoms right away. But you shouldn't need to use your quick-relief inhaler very often if your long-term control medications are working properly.

Keep a record of how many puffs you use each week. If you need to use your quick-relief inhaler more often than your doctor recommends, see your doctor. You probably need to adjust your long-term control medication.

Allergy medications may help if your asthma is triggered or worsened by allergies. These include:

- **Allergy shots (immunotherapy).** Over time, allergy shots gradually reduce your immune system reaction to specific allergens. You generally receive shots once a week for a few months, then once a month for a period of three to five years.
- **Biologics.** These medications — which include omalizumab (Xolair), mepolizumab (Nucala), dupilumab (Dupixent), reslizumab (Cinqair) and benralizumab (Fasenra) — are specifically for people who have severe asthma.

Bronchial thermoplasty

This treatment is used for severe asthma that doesn't improve with inhaled corticosteroids or other long-term asthma medications. It isn't widely available nor right for everyone.

During bronchial thermoplasty, your doctor heats the insides of the airways in the lungs with an electrode. The heat reduces the smooth muscle inside the airways. This limits the ability of the airways to tighten, making breathing easier and possibly reducing asthma attacks. The therapy is generally done over three outpatient visits.

Treat by severity for better control: A stepwise approach

Your treatment should be flexible and based on changes in your symptoms. Your doctor should ask about your symptoms at each visit. Based on your signs and symptoms, your doctor can adjust your treatment accordingly.

For example, if your asthma is well controlled, your doctor may prescribe less medication. If your asthma isn't well controlled or is getting worse, your doctor may increase your medication and recommend more-frequent visits.

Asthma action plan

Work with your doctor to create an asthma action plan that outlines in writing when to take certain medications or when to increase or decrease the dose of your medications based on your symptoms. Also include a list of your triggers and the steps you need to take to avoid them.

Your doctor may also recommend tracking your asthma symptoms or using a peak flow meter on a regular basis to monitor how well your treatment is controlling your asthma.

Lifestyle and home remedies

Although many people with asthma rely on medications to prevent and relieve symptoms, you can do several things on your own to maintain your health and lessen the possibility of asthma attacks.

Avoid your triggers

Taking steps to reduce your exposure to asthma triggers is a key part of asthma control. To reduce your exposure, you should:

- **Use your air conditioner.** Air conditioning reduces the amount of airborne pollen from trees, grasses and weeds that finds its way indoors. Air conditioning also lowers indoor humidity and can reduce your exposure to dust mites. If you don't have air conditioning, try to keep your windows closed during pollen season.
- **Decontaminate your decor.** Minimize dust that may worsen nighttime symptoms by replacing certain items in your bedroom. For example, encase pillows, mattresses and box springs in dustproof covers. Avoid using down-filled pillows and blankets. Throughout the house, remove carpeting and install hardwood or linoleum flooring. Use washable curtains and blinds.
- **Maintain optimal humidity.** If you live in a damp climate, talk to your doctor about using a dehumidifier.
- **Prevent mold spores.** Clean damp areas in the bathroom, kitchen and around the house to keep mold spores from developing. Get rid of moldy leaves or damp firewood in the yard.
- **Reduce pet dander.** If you're allergic to dander, avoid pets with fur or feathers. Having pets regularly bathed or groomed may also reduce the amount of dander in your surroundings.
- **Clean regularly.** Clean your home at least once a week. If you're likely to stir up dust, wear a mask or have someone else do the cleaning. Wash your bedding regularly.
- **Cover your nose and mouth if it's cold out.** If your asthma is worsened by cold or dry air, wearing a face mask can help.

Stay healthy

Taking care of yourself can help keep your symptoms under control, including:

- **Get regular exercise.** Having asthma doesn't mean you have to be less active. Treatment can prevent asthma attacks and control symptoms during activity.
  Regular exercise can strengthen your heart and lungs, which helps relieve asthma symptoms. If you exercise in cold temperatures, wear a face mask to warm the air you breathe.
- **Maintain a healthy weight.** Being overweight can worsen asthma symptoms, and it puts you at higher risk of other health problems.
- **Control heartburn and gastroesophageal reflux disease (GERD).** It's possible that the acid reflux that causes heartburn may damage lung airways and worsen asthma symptoms. If you have frequent or constant heartburn, talk to your doctor about treatment options. You may need treatment for GERD before your asthma symptoms improve.

Alternative medicine

Certain alternative treatments may help with asthma symptoms. However, keep in mind that these treatments are not a replacement for medical treatment, especially if you have severe asthma. Talk to your doctor before taking any herbs or supplements, as some may interact with the medications you take.

In most cases, more research is needed to see how well alternative remedies work and to measure the extent of possible side effects. Alternative asthma treatments include:

- **Breathing exercises.** These exercises may reduce the amount of medication you need to keep your asthma symptoms under control.
- **Herbal and natural remedies.** A few herbal and natural remedies that may help

- improve asthma symptoms include black seed, caffeine, choline and pycnogenol.

Kidney Disease

Symptoms

Signs and symptoms of chronic kidney disease develop over time if kidney damage progresses slowly. Loss of kidney function can cause a buildup of fluid or body waste or electrolyte problems. Depending on how severe it is, loss of kidney function can cause:

- Nausea
- Vomiting
- Loss of appetite
- Fatigue and weakness
- Sleep problems
- Urinating more or less
- Decreased mental sharpness
- Muscle cramps
- Swelling of feet and ankles
- Dry, itchy skin
- High blood pressure (hypertension) that's difficult to control
- Shortness of breath, if fluid builds up in the lungs
- Chest pain, if fluid builds up around the lining of the heart

Signs and symptoms of kidney disease are often nonspecific. This means they can also be caused by other illnesses. Because your kidneys are able to make up for lost function, you might not develop signs and symptoms until irreversible damage has occurred.

When to see a doctor

Make an appointment with your doctor if you have signs or symptoms of kidney disease. Early detection might help prevent kidney disease from progressing to kidney failure.

If you have a medical condition that increases your risk of kidney disease, your doctor may monitor your blood pressure and kidney function with urine and blood tests during office visits. Ask your doctor whether these tests are necessary for you.

Causes

Chronic kidney disease occurs when a disease or condition impairs kidney function, causing kidney damage to worsen over several months or years.

Diseases and conditions that cause chronic kidney disease include:

- Type 1 or type 2 diabetes
- High blood pressure
- Glomerulonephritis (gloe-mer-u-low-nuh-FRY-tis), an inflammation of the kidney's filtering units (glomeruli)
- Interstitial nephritis (in-tur-STISH-ul nuh-FRY-tis), an inflammation of the kidney's tubules and surrounding structures
- Polycystic kidney disease or other inherited kidney diseases
- Prolonged obstruction of the urinary tract, from conditions such as enlarged prostate, kidney stones and some cancers

- Vesicoureteral (ves-ih-koe-yoo-REE-tur-ul) reflux, a condition that causes urine to back up into your kidneys
- Recurrent kidney infection, also called pyelonephritis (pie-uh-low-nuh-FRY-tis)

Prevention

To reduce your risk of developing kidney disease:

- **Follow instructions on over-the-counter medications.** When using nonprescription pain relievers, such as aspirin, ibuprofen (Advil, Motrin IB, others) and acetaminophen (Tylenol, others), follow the instructions on the package. Taking too many pain relievers for a long time could lead to kidney damage.
- **Maintain a healthy weight.** If you're at a healthy weight, maintain it by being physically active most days of the week. If you need to lose weight, talk with your doctor about strategies for healthy weight loss.
- **Don't smoke.** Cigarette smoking can damage your kidneys and make existing kidney damage worse. If you're a smoker, talk to your doctor about strategies for quitting. Support groups, counseling and medications can all help you to stop.
- **Manage your medical conditions with your doctor's help.** If you have diseases or conditions that increase your risk of kidney disease, work with your doctor to control them. Ask your doctor about tests to look for signs of kidney damage.

Treatment

Depending on the cause, some types of kidney disease can be treated. Often, though, chronic kidney disease has no cure.

Treatment usually consists of measures to help control signs and symptoms, reduce complications, and slow progression of the disease. If your kidneys become severely damaged, you might need treatment for end-stage kidney disease.

Treating the cause

Your doctor will work to slow or control the cause of your kidney disease. Treatment options vary depending on the cause. But kidney damage can continue to worsen even when an underlying condition, such as diabetes mellitus or high blood pressure, has been controlled.

Treating complications

Kidney disease complications can be controlled to make you more comfortable. Treatments might include:

- **High blood pressure medications.** People with kidney disease can have worsening high blood pressure. Your doctor might recommend medications to lower your blood pressure — commonly angiotensin-converting enzyme (ACE) inhibitors or angiotensin II receptor blockers — and to preserve kidney function.
  High blood pressure medications can initially decrease kidney function and change electrolyte levels, so you might need frequent blood tests to monitor your condition. Your doctor may also recommend a water pill (diuretic) and a low-salt diet.

- **Medications to relieve swelling.** People with chronic kidney disease often retain fluids. This can lead to swelling in the legs as well as high blood pressure. Medications called diuretics can help maintain the balance of fluids in your body.
- **Medications to treat anemia.** Supplements of the hormone erythropoietin (uh-rith-roe-POI-uh-tin), sometimes with added iron, help produce more red blood cells. This might relieve fatigue and weakness associated with anemia.
- **Medications to lower cholesterol levels.** Your doctor might recommend medications called statins to lower your cholesterol. People with chronic kidney disease often have high levels of bad cholesterol, which can increase the risk of heart disease.
- **Medications to protect your bones.** Calcium and vitamin D supplements can help prevent weak bones and lower your risk of fracture. You might also take medication known as a phosphate binder to lower the amount of phosphate in your blood and protect your blood vessels from damage by calcium deposits (calcification).
- **A lower protein diet to minimize waste products in your blood.** As your body processes protein from foods, it creates waste products that your kidneys must filter from your blood. To reduce the amount of work your kidneys must do, your doctor might recommend eating less protein. A registered dietitian can suggest ways to lower your protein intake while still eating a healthy diet.

Your doctor might recommend regular follow-up testing to see whether your kidney disease remains stable or progresses.

Treatment for end-stage kidney disease

If your kidneys can't keep up with waste and fluid clearance on their own and you develop complete or near-complete kidney failure, you have end-stage kidney disease. At that point, you need dialysis or a kidney transplant.

- **Dialysis.** Dialysis artificially removes waste products and extra fluid from your blood when your kidneys can no longer do this. In hemodialysis, a machine filters waste and excess fluids from your blood.
  In peritoneal dialysis, a thin tube inserted into your abdomen fills your abdominal cavity with a dialysis solution that absorbs waste and excess fluids. After a time, the dialysis solution drains from your body, carrying the waste with it.
- **Kidney transplant.** A kidney transplant involves surgically placing a healthy kidney from a donor into your body. Transplanted kidneys can come from deceased or living donors.
  After a transplant, you'll need to take medications for the rest of your life to keep your body from rejecting the new organ. You don't need to be on dialysis to have a kidney transplant.

For some who choose not to have dialysis or a kidney transplant, a third option is to treat your kidney failure with conservative measures. Conservative measures likely will include symptom management, advance care planning and care to keep you comfortable (palliative care).

Lifestyle and home remedies

As part of your treatment for chronic kidney disease, your doctor might recommend a special diet to help support your kidneys and limit the work they must do. Ask your doctor for a referral to a registered dietitian who can analyze your diet and suggest ways to make your diet easier on your kidneys.

Depending on your situation, kidney function and overall health, dietary recommendations might include the following:

- **Avoid products with added salt.** Lower the amount of sodium you eat each day by avoiding products with added salt, including many convenience foods, such as frozen dinners, canned soups and fast foods. Other foods with added salt include salty snack foods, canned vegetables, and processed meats and cheeses.
- **Choose lower potassium foods.** High-potassium foods include bananas, oranges, potatoes, spinach and tomatoes. Examples of low-potassium foods include apples, cabbage, carrots, green beans, grapes and strawberries. Be aware that many salt substitutes contain potassium, so you generally should avoid them if you have kidney failure.
- **Limit the amount of protein you eat.** Your registered dietitian will estimate how many grams of protein you need each day and make recommendations based on that amount. High-protein foods include lean meats, eggs, milk, cheese and beans. Low-protein foods include vegetables, fruits, breads and cereals.

Liver Disease

Symptoms

Liver disease doesn't always cause symptoms that can be seen or felt. If there are symptoms of liver disease, they may include:

- Yellowing of the skin and the whites of the eyes, called jaundice. Yellowing of the skin might be harder to see on Black or brown skin.
- Belly pain and swelling.
- Swelling in the legs and ankles.
- Itchy skin.
- Dark urine.
- Pale stool.
- Constant tiredness.
- Nausea or vomiting.
- Loss of appetite.
- Bruising easily.

When to see a doctor

Make an appointment with your healthcare professional if you have any lasting symptoms that worry you. Seek medical help right away if you have belly pain that is so bad that you can't stay still.

Causes

Liver disease has many causes.

Infection

Parasites and viruses can infect the liver, causing swelling and irritation, called inflammation. Inflammation keeps the liver from working as it should. The viruses that cause liver damage can be spread through blood or semen, bad food or water, or close contact with a person who is infected.

The most common types of liver infection are hepatitis viruses, including:

- Hepatitis A.
- Hepatitis B.
- Hepatitis C.

Immune system condition

Diseases in which the immune system attacks certain parts of the body are called autoimmune diseases. Autoimmune liver diseases include:

- Autoimmune hepatitis.
- Primary biliary cholangitis.
- Primary sclerosing cholangitis.

Genetics

A changed gene from one or both parents can cause substances to build up in the liver. This can cause liver damage. Genetic liver diseases include:

- Hemochromatosis.
- Wilson's disease.
- Alpha-1 antitrypsin deficiency.

Cancer and other growths

Examples include:

- Liver cancer.
- Bile duct cancer.
- Liver adenoma.

Other

Other common causes of liver disease include:

- Long-term alcohol use.
- Fat that builds up in the liver, called nonalcoholic fatty liver disease or metabolic-associated steatotic liver disease.
- Certain prescription or other medicines.
- Certain herbal mixes.
- Being in contact often with toxic chemicals.

Prevention

To prevent liver disease:

- **If you choose to drink alcohol, do so in moderation.** For healthy adults, that means up to one drink a day for women and up to two drinks a day for men.
- **Avoid risky behavior.** Use a condom during sex. If you get tattoos or body piercings, pick a shop that's clean and safe. Seek help if you shoot illicit drugs. Don't share needles to shoot drugs.

- **Get vaccinated.** If you're at increased risk of getting hepatitis, talk with your healthcare professional about getting the hepatitis A and hepatitis B vaccines. This also is true if you've been infected with any form of the hepatitis virus.
- **Be careful when taking medicines.** Take prescription and other medicines only when needed. Take only as much as directed. Don't mix medicines and alcohol. Talk with your healthcare provider before mixing herbal supplements or prescription or other medicines.
- **Stay away from other people's blood and body fluids.** Hepatitis viruses can be spread by accidental needle sticks or poor cleanup of blood or body fluids.
- **Keep your food safe.** Wash your hands well before eating or making foods. If traveling in a resource-poor country, use bottled water to drink, wash your hands and brush your teeth.
- **Take care with aerosol sprays.** Make sure to use these products in an open area. Wear a mask when spraying insecticides, fungicides, paint and other toxic chemicals. Always follow the maker's instructions.
- **Protect your skin.** When using insecticides and other toxic chemicals, wear gloves, long sleeves, a hat and a mask so that chemicals don't get on your skin.
- **Maintain a healthy weight.** Obesity can cause nonalcoholic fatty liver disease, now called metabolic-associated steatotic liver disease.

Treatment

Treatment for liver disease depends on the diagnosis. Some liver problems can be treated with lifestyle changes. These might include losing weight or not drinking alcohol. These changes often are part of a medical program that includes watching liver function.

Other liver problems may be treated with medicines or surgery.

Liver disease that causes liver failure may need a liver transplant.

Lifestyle and home remedies

Changing some lifestyle habits often can help improve liver health. If you've been diagnosed with liver disease, your healthcare professional might suggest that you:

- Drink little alcohol, if any.
- Eat a healthy diet. Eat fruits, vegetables and whole grains. Don't eat foods with a lot of sugar or fructose.
- Limit the fat you eat. Eat healthier fats, such as those in fish, olive oil and walnuts. Limit red meat.
- Try to stay at a healthy weight. Lose weight slowly if you're overweight.

Alternative medicine

No alternative medicine therapies have been proved to treat liver disease. Some studies show possible benefits. But more research is needed.

Some dietary and herbal supplements can harm the liver. More than 1,000 medicines and herbal products have been linked to liver damage. They include:

- Vitamin A.

- Ma-huang.
- Germander.
- Valerian.
- Mistletoe.
- Skullcap.
- Chaparral.
- Comfrey.
- Kava.
- Pennyroyal oil.

To protect your liver, it's important to talk with your healthcare professional about the risks before you take any alternative medicines.

Migraine

Symptoms

Migraines, which affect children and teenagers as well as adults, can progress through four stages: prodrome, aura, attack and post-drome. Not everyone who has migraines goes through all stages.

Prodrome

One or two days before a migraine, you might notice subtle changes that warn of an upcoming migraine, including:

- Constipation.
- Mood changes, from depression to euphoria.
- Food cravings.
- Neck stiffness.
- Increased urination.
- Fluid retention.
- Frequent yawning.

Aura

For some people, an aura might occur before or during migraines. Auras are reversible symptoms of the nervous system. They're usually visual but can also include other disturbances. Each symptom usually begins gradually, builds up over several minutes and can last up to 60 minutes.

Examples of migraine auras include:

- Visual phenomena, such as seeing various shapes, bright spots or flashes of light.
- Vision loss.
- Pins and needles sensations in an arm or leg.
- Weakness or numbness in the face or one side of the body.
- Difficulty speaking.

Attack

A migraine usually lasts from 4 to 72 hours if untreated. How often migraines occur varies from person to person. Migraines might occur rarely or strike several times a month.

During a migraine, you might have:

- Pain usually on one side of your head, but often on both sides.
- Pain that throbs or pulses.
- Sensitivity to light, sound, and sometimes smell and touch.
- Nausea and vomiting.

Post-drome

After a migraine attack, you might feel drained, confused and washed out for up to a day. Some people report feeling elated. Sudden head movement might bring on the pain again briefly.

When to see a doctor

Migraines are often undiagnosed and untreated. If you regularly have signs and symptoms of migraine, keep a record of your attacks and how you treated them. Then make an appointment with your health care provider to discuss your headaches.

Even if you have a history of headaches, see your health care provider if the pattern changes or your headaches suddenly feel different.

See your health care provider immediately or go to the emergency room if you have any of the following signs and symptoms, which could indicate a more serious medical problem:

- An abrupt, severe headache like a thunderclap.
- Headache with fever, stiff neck, confusion, seizures, double vision, numbness or weakness in any part of the body, which could be a sign of a stroke.
- Headache after a head injury.
- A chronic headache that is worse after coughing, exertion, straining or a sudden movement.
- New headache pain after age 50.

Causes

Though migraine causes aren't fully understood, genetics and environmental factors appear to play a role.

Changes in the brainstem and its interactions with the trigeminal nerve, a major pain pathway, might be involved. So might imbalances in brain chemicals — including serotonin, which helps regulate pain in your nervous system.

Researchers are studying the role of serotonin in migraines. Other neurotransmitters play a role in the pain of migraine, including calcitonin gene-related peptide (CGRP).

Migraine triggers

There are a number of migraine triggers, including:

- **Hormonal changes in women.** Fluctuations in estrogen, such as before or during menstrual periods, pregnancy and menopause, seem to trigger headaches in many women.

Hormonal medications, such as oral contraceptives, also can worsen migraines. Some women, however, find that their migraines occur less often when taking these medications.

- **Drinks.** These include alcohol, especially wine, and too much caffeine, such as coffee.
- **Stress.** Stress at work or home can cause migraines.
- **Sensory stimuli.** Bright or flashing lights can induce migraines, as can loud sounds. Strong smells — such as perfume, paint thinner, secondhand smoke and others — trigger migraines in some people.
- **Sleep changes.** Missing sleep or getting too much sleep can trigger migraines in some people.
- **Physical strain.** Intense physical exertion, including sexual activity, might provoke migraines.
- **Weather changes.** A change of weather or barometric pressure can prompt a migraine.
- **Medications.** Oral contraceptives and vasodilators, such as nitroglycerin, can aggravate migraines.
- **Foods.** Aged cheeses and salty and processed foods might trigger migraines. So might skipping meals.
- **Food additives.** These include the sweetener aspartame and the preservative monosodium glutamate (MSG), found in many foods.

Treatment

Migraine treatment is aimed at stopping symptoms and preventing future attacks.

Many medications have been designed to treat migraines. Medications used to combat migraines fall into two broad categories:

- **Pain-relieving medications.** Also known as acute or abortive treatment, these types of drugs are taken during migraine attacks and are designed to stop symptoms.
- **Preventive medications.** These types of drugs are taken regularly, often daily, to reduce the severity or frequency of migraines.

Your treatment choices depend on the frequency and severity of your headaches, whether you have nausea and vomiting with your headaches, how disabling your headaches are, and other medical conditions you have.

Medications for relief

Medications used to relieve migraine pain work best when taken at the first sign of an oncoming migraine — as soon as symptoms of a migraine begin. Medications that can be used to treat it include:

- **Pain relievers.** These over-the-counter or prescription pain relievers include aspirin or ibuprofen (Advil, Motrin IB, others). When taken too long, these might cause medication-overuse headaches, and possibly ulcers and bleeding in the gastrointestinal tract.
  Migraine relief medications that combine caffeine, aspirin and acetaminophen (Excedrin Migraine) may be helpful, but usually only against mild migraine pain.
- **Triptans.** Prescription drugs such as sumatriptan (Imitrex, Tosymra) and rizatriptan (Maxalt, Maxalt-MLT) are used to treat migraine because they block pain pathways in the brain. Taken as

pills, shots or nasal sprays, they can relieve many symptoms of migraine. They might not be safe for those at risk of a stroke or heart attack.

- **Dihydroergotamine (Migranal, Trudhesa).** Available as a nasal spray or injection, this drug is most effective when taken shortly after the start of migraine symptoms for migraines that tend to last longer than 24 hours. Side effects can include worsening of migraine-related vomiting and nausea.
  People with coronary artery disease, high blood pressure, or kidney or liver disease should avoid dihydroergotamine.
- **Lasmiditan (Reyvow).** This newer oral tablet is approved for the treatment of migraine with or without aura. In drug trials, lasmiditan significantly improved headache pain. Lasmiditan can have a sedative effect and cause dizziness, so people taking it are advised not to drive or operate machinery for at least eight hours.
- **Oral calcitonin gene-related peptides antagonists, known as gepants.** Ubrogepant (Ubrelvy) and rimegepant (Nurtec ODT) are oral gepants approved for the treatment of migraine in adults. In drug trials, medicines from this class were more effective than placebo at relieving pain two hours after taking them. They also were effective at treating migraine symptoms such as nausea and sensitivity to light and sound. Common side effects include dry mouth, nausea and too much sleepiness. Ubrogepant and rimegepant should not be taken with strong CYP3A4 inhibitor medicines such as some medicines used to treat cancer.
- **Intranasal zavegepant (Zavzpret).** The Food and Drug Administration recently approved this nasal spray to treat migraines. Zavegepant is a gepant and the only migraine medicine that comes as a nasal spray. It brings migraine pain relief within 15 minutes to 2 hours after taking a single dose. The medicine continues working for up to 48 hours. It also can improve other symptoms related to migraine, such as nausea and sensitivity to light and sound.
  Common side effects of zavegepant include a change in sense of taste, nasal discomfort and throat irritation.
- **Opioid medications.** For people who can't take other migraine medications, narcotic opioid medications might help. Because they can be highly addictive, these are usually used only if no other treatments are effective.
- **Anti-nausea drugs.** These can help if your migraine with aura is accompanied by nausea and vomiting. Anti-nausea drugs include chlorpromazine, metoclopramide (Gimoti, Reglan) or prochlorperazine (Compro, Compazine). These are usually taken with pain medications.

Some of these medications are not safe to take during pregnancy. If you're pregnant or trying to get pregnant, don't use any of these medications without first talking with your health care provider.

Preventive medications

Medications can help prevent frequent migraines. Your health care provider might recommend preventive medications if you have frequent, long-lasting or severe headaches that don't respond well to treatment.

Preventive medication is aimed at reducing how often you get a migraine, how severe the attacks are and how long they last. Options include:

- **Blood pressure-lowering medications.** These include beta blockers such as propranolol (Inderal, InnoPran), Hemangeol) and metoprolol (Lopressor). Calcium channel blockers such as verapamil (Verelan, Calan) can be helpful in preventing migraines with aura.
- **Antidepressants.** A tricyclic antidepressant, amitriptyline, can prevent migraines. Because of the side effects of amitriptyline, such as sleepiness, other antidepressants might be prescribed instead.
- **Anti-seizure drugs.** Valproate and topiramate (Topamax, Qudexy, others) might help if you have less frequent migraines, but can cause side effects such as dizziness, weight changes, nausea and more. These medications are not recommended for pregnant women or women trying to get pregnant.

- **Botox injections.** Injections of onabotulinumtoxinA (Botox) about every 12 weeks help prevent migraines in some adults.
- **Calcitonin gene-related peptides (CGRP) monoclonal antibodies.** Erenumab-aooe (Aimovig), fremanezumab-vfrm (Ajovy), galcanezumab-gnlm (Emgality), and eptinezumab-jjmr (Vyepti) are newer medicines approved by the Food and Drug Administration to treat migraines. They're given monthly or quarterly by injection. The most common side effect is a reaction at the injection site.
- **Atogepant (Qulipta).** This medicine is a gepant that helps prevent migraines. It's a tablet taken by mouth daily. Potential side effects of the medicine may include nausea, constipation and fatigue.
- **Rimegepant (Nurtec ODT).** This medicine is unique in that it's a gepant that helps prevent migraines in addition to treating migraines as needed.

Ask your health care provider if these medications are right for you. Some of these medications are not safe to take during pregnancy. If you're pregnant or trying to get pregnant, don't use any of these medications without first talking with your provider.

Lifestyle and home remedies

When symptoms of migraine start, try heading to a quiet, darkened room. Close your eyes and rest or take a nap. Place a cool cloth or ice pack wrapped in a towel or cloth on your forehead and drink lots of water.

These practices might also soothe migraine pain:

- **Try relaxation techniques.** Biofeedback and other forms of relaxation training teach you ways to deal with stressful situations, which might help reduce the number of migraines you have.
- **Develop a sleeping and eating routine.** Don't sleep too much or too little. Set and follow a consistent sleep and wake schedule daily. Try to eat meals at the same time every day.
- **Drink plenty of fluids.** Staying hydrated, particularly with water, might help.
- **Keep a headache diary.** Recording your symptoms in a headache diary will help you learn more about what triggers your migraines and what treatment is most effective. It will also help your health care provider diagnose your condition and track your progress in between visits.
- **Exercise regularly.** Regular aerobic exercise reduces tension and can help prevent a migraine. If your care provider agrees, choose aerobic activity you enjoy, such as walking, swimming and cycling. Warm up slowly, however, because sudden, intense exercise can cause headaches.
  Regular exercise can also help you lose weight or maintain a healthy body weight, and obesity is thought to be a factor in migraines.

Alternative medicine

Nontraditional therapies might help with chronic migraine pain.

- **Acupuncture.** Clinical trials have found that acupuncture may be helpful for headache pain. In this treatment, a practitioner inserts many thin, disposable needles into several areas of your skin at defined points.

- **Biofeedback.** Biofeedback appears to be effective in relieving migraine pain. This relaxation technique uses special equipment to teach you how to monitor and control certain physical responses related to stress, such as muscle tension.
- **Cognitive behavioral therapy.** Cognitive behavioral therapy may benefit some people with migraines. This type of psychotherapy teaches you how behaviors and thoughts affect how you perceive pain.
- **Meditation and yoga.** Meditation may relieve stress, which is a known trigger of migraines. Done on a regular basis, yoga may reduce the frequency and duration of migraines.
- **Herbs, vitamins and minerals.** There is some evidence that the herbs feverfew and butterbur might prevent migraines or reduce their severity, though study results are mixed. Butterbur isn't recommended because of safety concerns.
  A high dose of riboflavin (vitamin B-2) may reduce the frequency and severity of headaches. Coenzyme Q10 supplements might decrease the frequency of migraines, but larger studies are needed.
  Magnesium supplements have been used to treat migraines, but with mixed results.

Ask your health care provider if these treatments are right for you. If you're pregnant, don't use any of these treatments without first talking with your provider.

Back Pain

Symptoms

Back pain can range from a muscle ache to a shooting, burning or stabbing feeling. Also, the pain can radiate down a leg. Bending, twisting, lifting, standing or walking can make pain worse.

When to see a doctor

Most back pain improves over time with home treatment and self-care, often within a few weeks. Contact your healthcare professional for back pain that:

- Lasts longer than a few weeks.
- Is severe and doesn't improve with rest.
- Spreads down one or both legs, especially if it goes below the knee.
- Causes weakness, numbness, or tingling in one or both legs.
- Is paired with unexplained weight loss.

In some people, back pain can signal a serious medical problem. This is rare, but seek immediate care for back pain that:

- Causes new bowel or bladder problems.
- Is accompanied by a fever.
- Follows a fall, blow to the back or other injury.

Causes

Back pain often develops without a cause that shows up in a test or an imaging study. Conditions commonly linked to back pain include:

- **Muscle or ligament strain.** Repeated heavy lifting or a sudden awkward movement can strain back muscles and spinal ligaments. For people in poor physical condition, constant strain on the back can cause painful muscle spasms.

- **Bulging or ruptured disks.** Disks act as cushions between the bones in the spine. The soft material inside a disk can bulge or rupture and press on a nerve. However, a bulging or ruptured disk might not cause back pain. Disk disease is often found on spine X-rays, CT scans or MRIs done for another reason.
- **Arthritis.** Osteoarthritis can affect the lower back. In some cases, arthritis in the spine can lead to a narrowing of the space around the spinal cord, a condition called spinal stenosis.
- **Osteoporosis.** The spine's vertebrae can develop painful breaks if the bones become porous and brittle.
- **Ankylosing spondylitis, also called axial spondyloarthritis.** This inflammatory disease can cause some of the bones in the spine to fuse. This makes the spine less flexible.

Prevention

Improving one's physical condition and learning and practicing how to use the body might help prevent back pain.

To keep the back healthy and strong:

- **Exercise.** Regular low-impact aerobic activities can increase strength and endurance in the back and allow the muscles to work better. Walking, bicycling and swimming are good choices because they don't strain or jolt the back. Talk with your healthcare team about which activities to try.
- **Build muscle strength and flexibility.** Abdominal and back muscle exercises, which strengthen the body's core, help condition these muscles so that they work together to support the back.
- **Maintain a healthy weight.** Being overweight strains back muscles.
- **Quit smoking.** Smoking increases the risk of low back pain. The risk rises with the number of cigarettes smoked each day, so quitting can help reduce this risk.

Avoid movements that twist or strain the back. To use the body properly:

- **Stand smart.** Don't slouch. Maintain a neutral pelvic position. When standing for long periods, place one foot on a low footstool to take some of the load off the lower back. Alternate feet. Good posture can reduce the stress on back muscles.
- **Sit smart.** Choose a seat with good lower back support, armrests and a swivel base. Placing a pillow or rolled towel in the small of the back can maintain its typical curve. Keep knees and hips level. Change position frequently, at least every half hour.
- **Lift smart.** Avoid heavy lifting, if possible. If you must lift something heavy, let your legs do the work. Keep your back straight, bend only at the knees, and don't twist. Hold the load close to your body. Find a lifting partner if the object is heavy or awkward.

Buyer beware

Because back pain is common, many products promise prevention or relief. But there's no good evidence that special shoes, shoe inserts, back supports or specially designed furniture can help.

In addition, there doesn't appear to be one type of mattress that's best for people with back pain. It's probably a matter of what feels most comfortable to each person.

Treatment

Most back pain gets better within a month using home treatment, especially for people younger than age 60. However, for many, the pain lasts several months.

Pain relievers and the use of heat might be all that's needed. Bed rest isn't recommended.

Continue your activities as much as you can with back pain. Try light activity, such as walking. Stop activity that increases pain, but don't avoid activity out of fear of pain. If home treatments aren't working after several weeks, your healthcare professional might recommend stronger medicines or other therapies.

Medicines

Medicines depend on the type of back pain. They might include:

- **Pain relievers.** Nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen (Advil, Motrin IB, others) or naproxen sodium (Aleve), might help. Take these medicines only as directed. Overuse can cause serious side effects. If pain relievers you can buy without a prescription don't help, your healthcare professional might suggest prescription NSAIDs.
- **Muscle relaxants.** If mild to moderate back pain doesn't improve with pain relievers, a muscle relaxant might help. Muscle relaxants can cause dizziness and sleepiness.
- **Topical pain relievers.** These products, including creams, salves, ointments and patches, deliver pain-relieving substances through the skin.
- **Narcotics.** Medicines containing opioids, such as oxycodone or hydrocodone, may be used for a short time with close medical supervision.
- **Antidepressants.** Some types of antidepressants, particularly duloxetine (Cymbalta) and tricyclic antidepressants such as amitriptyline, have been shown to relieve chronic back pain.

Physical therapy

A physical therapist can teach exercises to increase flexibility, strengthen back and abdominal muscles, and improve posture. Regular use of these techniques can help keep pain from returning. Physical therapists also teach how to modify movements during an episode of back pain to avoid flaring pain symptoms while staying active.

Surgical and other procedures

Procedures used to treat back pain may include:

- **Cortisone shots, also called injections.** If other measures don't relieve pain that radiates down the leg, an injection of cortisone plus a numbing medicine might help. A cortisone injection into the space around the spinal cord helps decrease inflammation around the nerve roots, but the pain relief often lasts only a month or two.
- **Radiofrequency ablation.** In this procedure, a fine needle is inserted through the skin near the area causing the pain. Radio waves are passed through the needle to damage the nearby nerves. Damaging the nerves interferes with pain signals to the brain.
- **Implanted nerve stimulators.** Devices implanted under the skin can deliver electrical impulses to certain nerves to block pain signals.
- **Surgery.** Surgery to create more space within the spine is sometimes helpful for people who have increasing muscle weakness or back pain that goes down a leg. These problems can be related to herniated disks or other conditions that narrow the spaces where nerves pass through the spine.

Alternative medicine

A number of alternative treatments might ease back pain. Always discuss the benefits and risks with your healthcare professional before starting a new alternative therapy. Alternative treatments may include:

- **Acupuncture.** A practitioner of acupuncture inserts thin sterilized needles into the skin at specific points on the body. A growing body of scientific evidence indicates that acupuncture can be helpful in treating back pain.
- **Chiropractic care.** A chiropractor manipulates the spine to ease pain.
- **Massage.** For back pain caused by tense or overworked muscles, massage might help.
- **Transcutaneous electrical nerve stimulation, also known as TENS.** A battery-powered device placed on the skin delivers electrical impulses to the painful area. Studies have shown mixed results on whether TENS works to treat back pain.
- **Yoga.** There are several types of yoga, a broad discipline that involves practicing specific postures or poses, breathing exercises, and relaxation techniques. Yoga can stretch and strengthen muscles and improve posture. People with back pain might need to adjust some poses if they make symptoms worse.

Arthritis

Symptoms

The most common signs and symptoms of arthritis involve the joints. Depending on the type of arthritis, signs and symptoms may include:

- Pain
- Stiffness
- Swelling
- Redness
- Decreased range of motion

Causes

The two main types of arthritis — osteoarthritis and rheumatoid arthritis — damage joints in different ways.

Osteoarthritis

The most common type of arthritis, osteoarthritis involves wear-and-tear damage to a joint's cartilage — the hard, slick coating on the ends of bones where they form a joint. Cartilage cushions the ends of the bones and allows nearly frictionless joint motion, but enough damage can result in bone grinding directly on bone, which causes pain and restricted movement. This wear and tear can occur over many years, or it can be hastened by a joint injury or infection.

Osteoarthritis also causes changes in the bones and deterioration of the connective tissues that attach muscle to bone and hold the joint together. If cartilage in a joint is severely damaged, the joint lining may become inflamed and swollen.

Rheumatoid arthritis

In rheumatoid arthritis, the body's immune system attacks the lining of the joint capsule, a tough membrane that encloses all the joint parts. This lining (synovial membrane) becomes inflamed and swollen. The disease process can eventually destroy cartilage and bone within the joint.

Treatment

Arthritis treatment focuses on relieving symptoms and improving joint function. You may need to try several different treatments, or combinations of treatments, before you determine what works best for you.

Medications

The medications used to treat arthritis vary depending on the type of arthritis. Commonly used arthritis medications include:

- **NSAIDs.** Nonsteroidal anti-inflammatory drugs (NSAIDs) can relieve pain and reduce inflammation. Examples include ibuprofen (Advil, Motrin IB, others) and naproxen sodium (Aleve). Stronger NSAIDs can cause stomach irritation and may increase your risk of heart attack or stroke. NSAIDs are also available as creams or gels, which can be rubbed on joints.
- **Counterirritants.** Some varieties of creams and ointments contain menthol or capsaicin, the ingredient that makes hot peppers spicy. Rubbing these preparations on the skin over your aching joint may interfere with the transmission of pain signals from the joint itself.
- **Steroids.** Corticosteroid medications, such as prednisone, reduce inflammation and pain and slow joint damage. Corticosteroids may be given as a pill or as an injection into the painful joint. Side effects may include thinning of bones, weight gain and diabetes.
- **Disease-modifying antirheumatic drugs (DMARDs).** These drugs can slow the progression of rheumatoid arthritis and save the joints and other tissues from permanent damage. In addition to conventional DMARDs, there are also biologic agents and targeted synthetic DMARDs. Side effects vary but most DMARDs increase your risk of infections.

Therapy

Physical therapy can be helpful for some types of arthritis. Exercises can improve range of motion and strengthen the muscles surrounding joints. In some cases, splints or braces may be warranted.

Surgery

If conservative measures don't help, doctors may suggest surgery, such as:

- **Joint repair.** In some instances, joint surfaces can be smoothed or realigned to reduce pain and improve function. These types of procedures can often be performed arthroscopically — through small incisions over the joint.
- **Joint replacement.** This procedure removes the damaged joint and replaces it with an artificial one. Joints most commonly replaced are hips and knees.
- **Joint fusion.** This procedure is more often used for smaller joints, such as those in the wrist, ankle and fingers. It removes the ends of the two bones in the joint and then locks those ends together until they heal into one rigid unit.

Lifestyle and home remedies

In many cases, arthritis symptoms can be reduced with the following measures:

- **Weight loss.** Excess weight puts extra stress on weight-bearing joints. Losing weight may increase your mobility and limit future joint injury.
- **Exercise.** Regular exercise can help keep joints flexible. Swimming and water aerobics may be good choices because the buoyancy of the water reduces stress on weight-bearing joints.
- **Heat and cold.** Heating pads or ice packs may help relieve arthritis pain.
- **Assistive devices.** Using canes, shoe inserts, walkers, raised toilet seats, and other assistive devices can help protect joints and improve your ability to perform daily tasks.

Alternative medicine

Many people use alternative remedies for arthritis, but there is little reliable evidence to support the use of many of these products. The most promising alternative remedies for arthritis include:

- **Acupuncture.** This therapy uses fine needles inserted at specific points on the skin to reduce many types of pain, including that caused by some types of arthritis.
- **Glucosamine.** Although study results have been mixed, some studies have found that glucosamine works no better than placebo. However, glucosamine and the placebo both relieved osteoarthritis pain better than taking nothing, particularly in people who have moderate to severe pain from knee osteoarthritis.
- **Chondroitin.** Chondroitin may provide modest pain relief from osteoarthritis, although study results are mixed.
- **Fish oil.** Some preliminary studies have found that fish oil supplements may reduce the symptoms of some types of arthritis. Fish oil can interfere with medications, so check with your doctor first.
- **Yoga and tai chi.** The slow, stretching movements associated with yoga and tai chi may help improve joint flexibility and range of motion.
- **Massage.** Light stroking and kneading of muscles may increase blood flow and warm affected joints, temporarily relieving pain. Make sure your massage therapist knows which joints are affected by arthritis.

ACNE

Symptoms

Acne signs vary depending on the severity of your condition:

- Whiteheads (closed plugged pores)
- Blackheads (open plugged pores)
- Small red, tender bumps (papules)
- Pimples (pustules), which are papules with pus at their tips
- Large, solid, painful lumps under the skin (nodules)
- Painful, pus-filled lumps under the skin (cystic lesions)

Acne usually appears on the face, forehead, chest, upper back and shoulders.

When to see a doctor

If self-care remedies don't clear your acne, see your primary care doctor. He or she can prescribe stronger medications. If acne persists or is severe, you may want to seek medical treatment from a doctor who specializes in the skin (dermatologist or pediatric dermatologist).

For many women, acne can persist for decades, with flares common a week before menstruation. This type of acne tends to clear up without treatment in women who use contraceptives.

In older adults, a sudden onset of severe acne may signal an underlying disease requiring medical attention.

The Food and Drug Administration (FDA) warns that some popular nonprescription acne lotions, cleansers and other skin products can cause a serious reaction. This type of reaction is quite rare, so don't confuse it with any redness, irritation or itchiness that occurs in areas where you've applied medications or products.

Seek emergency medical help if after using a skin product you experience:

- Faintness
- Difficulty breathing
- Swelling of the eyes, face, lips or tongue
- Tightness of the throat

Causes

Four main factors cause acne:

- Excess oil (sebum) production
- Hair follicles clogged by oil and dead skin cells
- Bacteria
- Inflammation

Acne typically appears on your face, forehead, chest, upper back and shoulders because these areas of skin have the most oil (sebaceous) glands. Hair follicles are connected to oil glands.

The follicle wall may bulge and produce a whitehead. Or the plug may be open to the surface and darken, causing a blackhead. A blackhead may look like dirt stuck in pores. But actually the pore is congested with bacteria and oil, which turns brown when it's exposed to the air.

Pimples are raised red spots with a white center that develop when blocked hair follicles become inflamed or infected with bacteria. Blockages and inflammation deep inside hair follicles produce cystlike lumps beneath the surface of your skin. Other pores in your skin, which are the openings of the sweat glands, aren't usually involved in acne.

Certain things may trigger or worsen acne:

- **Hormonal changes.** Androgens are hormones that increase in boys and girls during puberty and cause the sebaceous glands to enlarge and make more sebum. Hormone changes during midlife, particularly in women, can lead to breakouts too.
- **Certain medications.** Examples include drugs containing corticosteroids, testosterone or lithium.
- **Diet.** Studies indicate that consuming certain foods — including carbohydrate-rich foods, such as bread, bagels and chips — may worsen acne. Further study is needed to examine whether people with acne would benefit from following specific dietary restrictions.
- **Stress.** Stress doesn't cause acne, but if you have acne already, stress may make it worse.

Acne myths

These factors have little effect on acne:

- **Chocolate and greasy foods.** Eating chocolate or greasy food has little to no effect on acne.
- **Hygiene.** Acne isn't caused by dirty skin. In fact, scrubbing the skin too hard or cleansing with harsh soaps or chemicals irritates the skin and can make acne worse.
- **Cosmetics.** Cosmetics don't necessarily worsen acne, especially if you use oil-free makeup that doesn't clog pores (noncomedogenics) and remove makeup regularly. Nonoily cosmetics don't interfere with the effectiveness of acne drugs.

Treatment

If you've tried over-the-counter (nonprescription) acne products for several weeks and they haven't helped, ask your doctor about prescription-strength medications. A dermatologist can help you:

- Control your acne
- Avoid scarring or other damage to your skin
- Make scars less noticeable

Acne medications work by reducing oil production and swelling or by treating bacterial infection. With most prescription acne drugs, you may not see results for four to eight weeks. It can take many months or years for your acne to clear up completely.

The treatment regimen your doctor recommends depends on your age, the type and severity of your acne, and what you are willing to commit to. For example, you may need to wash and apply medications to the affected skin twice a day for several weeks. Topical medications and drugs you take by mouth (oral medication) are often used in combination. Treatment options for pregnant women are limited due to the risk of side effects.

Talk with your doctor about the risks and benefits of medications and other treatments you are considering. And make follow-up appointments with your doctor every three to six months until your skin improves.

Topical medications

The most common topical prescription medications for acne are:

- **Retinoids and retinoid-like drugs.** Drugs that contain retinoic acids or tretinoin are often useful for moderate acne. These come as creams, gels and lotions. Examples include tretinoin (Avita, Retin-A, others), adapalene (Differin) and tazarotene (Tazorac, Avage, others). You apply this medication in the evening, beginning with three times a week, then daily as your skin becomes used to it. It prevents plugging of hair follicles. Do not apply tretinoin at the same time as benzoyl peroxide.
  Topical retinoids increase your skin's sun sensitivity. They can also cause dry skin and redness, especially in people with brown or Black skin. Adapalene may be tolerated best.
- **Antibiotics.** These work by killing excess skin bacteria and reducing redness and inflammation. For the first few months of treatment, you may use both a retinoid and an antibiotic, with the antibiotic applied in the morning and the retinoid in the evening. The antibiotics are often combined with benzoyl peroxide to reduce the likelihood of developing antibiotic resistance. Examples include clindamycin with benzoyl peroxide (Benzaclin, Duac, others) and erythromycin with benzoyl peroxide (Benzamycin). Topical antibiotics alone aren't recommended.
- **Azelaic acid and salicylic acid.** Azelaic acid is a naturally occurring acid produced by a yeast. It has antibacterial properties. A 20% azelaic acid cream or gel seems to be as effective as many conventional acne treatments when used twice a day. Prescription azelaic acid (Azelex, Finacea) is an option during pregnancy and while breast-feeding. It can also be used to manage discoloration that occurs with some types of acne. Side effects include skin redness and minor

skin irritation.
Salicylic acid may help prevent plugged hair follicles and is available as both wash-off and leave-on products. Studies showing its effectiveness are limited. Side effects include skin discoloration and minor skin irritation.

- **Dapsone.** Dapsone (Aczone) 5% gel twice daily is recommended for inflammatory acne, especially in women with acne. Side effects include redness and dryness.

Evidence is not strong in support of using zinc, sulfur, nicotinamide, resorcinol, sulfacetamide sodium or aluminum chloride in topical treatments for acne.

Oral medications

- **Antibiotics.** For moderate to severe acne, you may need oral antibiotics to reduce bacteria. Usually the first choice for treating acne is a tetracycline (minocycline, doxycycline) or a macrolide (erythromycin, azithromycin). A macrolide might be an option for people who can't take tetracyclines, including pregnant women and children under 8 years old.
  Oral antibiotics should be used for the shortest time possible to prevent antibiotic resistance. And they should be combined with other drugs, such as benzoyl peroxide, to reduce the risk of developing antibiotic resistance.
  Severe side effects from the use of antibiotics to treat acne are uncommon. These drugs do increase your skin's sun sensitivity.
- **Combined oral contraceptives.** Four combined oral contraceptives are approved by the FDA for acne therapy in women who also wish to use them for contraception. They are products that combine progestin and estrogen (Ortho Tri-Cyclen 21, Yaz, others). You may not see the benefit of this treatment for a few months, so using other acne medications with it for the first few weeks may help.
  Common side effects of combined oral contraceptives are weight gain, breast tenderness and nausea. These drugs are also associated with increased risk of cardiovascular problems, breast cancer and cervical cancer.
- **Anti-androgen agents.** The drug spironolactone (Aldactone) may be considered for women and adolescent girls if oral antibiotics aren't helping. It works by blocking the effect of androgen hormones on the oil-producing glands. Possible side effects include breast tenderness and painful periods.
- **Isotretinoin.** Isotretinoin (Amnesteem, Claravis, others) is a derivative of vitamin A. It may be prescribed for people whose moderate or severe acne hasn't responded to other treatments. Potential side effects of oral isotretinoin include inflammatory bowel disease, depression and severe birth defects. All people receiving isotretinoin must participate in an FDA-approved risk management program. And they'll need to see their doctors regularly to monitor for side effects.

Therapies

For some people, the following therapies might be helpful, either alone or in combination with medications.

- **Light therapy.** A variety of light-based therapies have been tried with some success. Most will require multiple visits to your doctor's office. Further study is needed to determine the ideal method, light source and dose.
- **Chemical peel.** This procedure uses repeated applications of a chemical solution, such as salicylic acid, glycolic acid or retinoic acid. This treatment is for mild acne. It might improve the appearance of the skin, though the change is not long lasting and repeat treatments are usually needed.
- **Drainage and extraction.** Your doctor may use special tools to gently remove whiteheads and blackheads (comedos) or cysts that haven't cleared up with topical medications. This technique temporarily improves the appearance of your skin, but it might also cause scarring.
- **Steroid injection.** Nodular and cystic lesions can be treated by injecting a steroid drug into them. This therapy has resulted in rapid improvement and decreased pain. Side effects may include skin thinning and discoloration in the treated area.

Treating children

Most studies of acne drugs have involved people 12 years of age or older. Increasingly, younger children are getting acne as well. The FDA has expanded the number of topical products approved for use in children. And guidelines from the American Academy of Dermatology indicate that topical benzoyl peroxide, adapalene and tretinoin in preadolescent children are effective and don't cause increased risk of side effects.

If your child has acne, consider consulting a pediatric dermatologist. Ask about drugs to avoid in children, appropriate doses, drug interactions, side effects, and how treatment may affect a child's growth and development.

Kidney Stones

Symptoms

A kidney stone usually will not cause symptoms until it moves around within the kidney or passes into one of the ureters. The ureters are the tubes that connect the kidneys and bladder.

If a kidney stone becomes lodged in the ureters, it may block the flow of urine and cause the kidney to swell and the ureter to spasm, which can be very painful. At that point, you may experience these symptoms:

- Severe, sharp pain in the side and back, below the ribs
- Pain that radiates to the lower abdomen and groin
- Pain that comes in waves and fluctuates in intensity
- Pain or burning sensation while urinating

Other signs and symptoms may include:

- Pink, red or brown urine
- Cloudy or foul-smelling urine
- A persistent need to urinate, urinating more often than usual or urinating in small amounts
- Nausea and vomiting
- Fever and chills if an infection is present

Pain caused by a kidney stone may change — for instance, shifting to a different location or increasing in intensity — as the stone moves through your urinary tract.

When to see a doctor

Make an appointment with your doctor if you have any signs and symptoms that worry you.

Seek immediate medical attention if you experience:

- Pain so severe that you can't sit still or find a comfortable position
- Pain accompanied by nausea and vomiting
- Pain accompanied by fever and chills
- Blood in your urine
- Difficulty passing urine

Causes

Kidney stones often have no definite, single cause, although several factors may increase your risk.

Kidney stones form when your urine contains more crystal-forming substances — such as calcium, oxalate and uric acid — than the fluid in your urine can dilute. At the same time, your urine may lack substances that prevent crystals from sticking together, creating an ideal environment for kidney stones to form.

Types of kidney stones

Knowing the type of kidney stone you have helps determine its cause, and may give clues on how to reduce your risk of getting more kidney stones. If possible, try to save your kidney stone if you pass one so that you can bring it to your doctor for analysis.

Types of kidney stones include:

- **Calcium stones.** Most kidney stones are calcium stones, usually in the form of calcium oxalate. Oxalate is a substance made daily by your liver or absorbed from your diet. Certain fruits and vegetables, as well as nuts and chocolate, have high oxalate content.
  Dietary factors, high doses of vitamin D, intestinal bypass surgery and several metabolic disorders can increase the concentration of calcium or oxalate in urine.
  Calcium stones may also occur in the form of calcium phosphate. This type of stone is more common in metabolic conditions, such as renal tubular acidosis. It may also be associated with certain medications used to treat migraines or seizures, such as topiramate (Topamax, Trokendi XR, Qudexy XR).
- **Struvite stones.** Struvite stones form in response to a urinary tract infection. These stones can grow quickly and become quite large, sometimes with few symptoms or little warning.
- **Uric acid stones.** Uric acid stones can form in people who lose too much fluid because of chronic diarrhea or malabsorption, those who eat a high-protein diet, and those with diabetes or metabolic syndrome. Certain genetic factors also may increase your risk of uric acid stones.
- **Cystine stones.** These stones form in people with a hereditary disorder called cystinuria that causes the kidneys to excrete too much of a specific amino acid

Treatment

Treatment for kidney stones varies, depending on the type of stone and the cause.

Small stones with minimal symptoms

Most small kidney stones won't require invasive treatment. You may be able to pass a small stone by:

- **Drinking water.** Drinking as much as 2 to 3 quarts (1.8 to 3.6 liters) a day will keep your urine dilute and may prevent stones from forming. Unless your doctor tells you otherwise, drink enough fluid — ideally mostly water — to produce clear or nearly clear urine.
- **Pain relievers.** Passing a small stone can cause some discomfort. To relieve mild pain, your doctor may recommend pain relievers such as ibuprofen (Advil, Motrin IB, others) or naproxen sodium (Aleve).
- **Medical therapy.** Your doctor may give you a medication to help pass your kidney stone. This type of medication, known as an alpha blocker, relaxes the muscles in your ureter, helping you

pass the kidney stone more quickly and with less pain. Examples of alpha blockers include tamsulosin (Flomax) and the drug combination dutasteride and tamsulosin (Jalyn).

Large stones and those that cause symptoms

Kidney stones that are too large to pass on their own or cause bleeding, kidney damage or ongoing urinary tract infections may require more-extensive treatment. Procedures may include:

- **Using sound waves to break up stones.** For certain kidney stones — depending on size and location — your doctor may recommend a procedure called extracorporeal shock wave lithotripsy (ESWL).
  ESWL uses sound waves to create strong vibrations (shock waves) that break the stones into tiny pieces that can be passed in your urine. The procedure lasts about 45 to 60 minutes and can cause moderate pain, so you may be under sedation or light anesthesia to make you comfortable.
  ESWL can cause blood in the urine, bruising on the back or abdomen, bleeding around the kidney and other adjacent organs, and discomfort as the stone fragments pass through the urinary tract.
- **Surgery to remove very large stones in the kidney.** A procedure called percutaneous nephrolithotomy (nef-row-lih-THOT-uh-me) involves surgically removing a kidney stone using small telescopes and instruments inserted through a small incision in your back.
  You will receive general anesthesia during the surgery and be in the hospital for one to two days while you recover. Your doctor may recommend this surgery if ESWL is unsuccessful.
- **Using a scope to remove stones.** To remove a smaller stone in your ureter or kidney, your doctor may pass a thin lighted tube (ureteroscope) equipped with a camera through your urethra and bladder to your ureter. Once the stone is located, special tools can snare the stone or break it into pieces that will pass in your urine. Your doctor may then place a small tube (stent) in the ureter to relieve swelling and promote healing. You may need general or local anesthesia during this procedure.
- **Parathyroid gland surgery.** Some calcium phosphate stones are caused by overactive parathyroid glands, which are located on the four corners of your thyroid gland, just below your Adam's apple. When these glands produce too much parathyroid hormone (hyperparathyroidism), your calcium levels can become too high and kidney stones may form as a result.
  Hyperparathyroidism sometimes occurs when a small, benign tumor forms in one of your parathyroid glands or you develop another condition that leads these glands to produce more parathyroid hormone. Removing the growth from the gland stops the formation of kidney stones. Or your doctor may recommend treatment of the condition that's causing your parathyroid gland to overproduce the hormone.

Prevention

Prevention of kidney stones may include a combination of lifestyle changes and medications.

Lifestyle changes

You may reduce your risk of kidney stones if you:

- **Drink water throughout the day.** For people with a history of kidney stones, doctors usually recommend drinking enough fluids to pass about 2.1 quarts (2 liters) of urine a day. Your doctor may ask that you measure your urine output to make sure that you're drinking enough water.
  If you live in a hot, dry climate or you exercise frequently, you may need to drink even more water to produce enough urine. If your urine is light and clear, you're likely drinking enough water.
- **Eat fewer oxalate-rich foods.** If you tend to form calcium oxalate stones, your doctor may recommend restricting foods rich in oxalates. These include rhubarb, beets, okra, spinach, Swiss chard, sweet potatoes, nuts, tea, chocolate, black pepper and soy products.
- **Choose a diet low in salt and animal protein.** Reduce the amount of salt you eat and choose nonanimal protein sources, such as legumes. Consider using a salt substitute, such as Mrs. Dash.
- **Continue eating calcium-rich foods, but use caution with calcium supplements.** Calcium in food doesn't have an effect on your risk of kidney stones. Continue eating calcium-rich foods unless your doctor advises otherwise.
  Ask your doctor before taking calcium supplements, as these have been linked to increased risk of kidney stones. You may reduce the risk by taking supplements with meals. Diets low in calcium can increase kidney stone formation in some people.
  Ask your doctor for a referral to a dietitian who can help you develop an eating plan that reduces your risk of kidney stones.

Medications

Medications can control the amount of minerals and salts in the urine and may be helpful in people who form certain kinds of stones. The type of medication your doctor prescribes will depend on the kind of kidney stones you have. Here are some examples:

- **Calcium stones.** To help prevent calcium stones from forming, your doctor may prescribe a thiazide diuretic or a phosphate-containing preparation.
- **Uric acid stones.** Your doctor may prescribe allopurinol (Zyloprim, Aloprim) to reduce uric acid levels in your blood and urine and a medicine to keep your urine alkaline. In some cases, allopurinol and an alkalizing agent may dissolve the uric acid stones.
- **Struvite stones.** To prevent struvite stones, your doctor may recommend strategies to keep your urine free of bacteria that cause infection, including drinking fluids to maintain good urine flow and frequent voiding. In rare cases long-term use of antibiotics in small or intermittent doses may help achieve this goal. For instance, your doctor may recommend an antibiotic before and for a while after surgery to treat your kidney stones.
- **Cystine stones.** Along with suggesting a diet lower in salt and protein, your doctor may recommend that you drink more fluids so that you produce a lot more urine,. If that alone doesn't help, your doctor may also prescribe a medication that increases the solubility of cystine in your urine.

Lung Cancer

Symptoms

Lung cancer typically doesn't cause symptoms early on. Symptoms of lung cancer usually happen when the disease is advanced.

Signs and symptoms of lung cancer that happen in and around the lungs may include:

- A new cough that doesn't go away.
- Chest pain.
- Coughing up blood, even a small amount.
- Hoarseness.
- Shortness of breath.
- Wheezing.

Signs and symptoms that happen when lung cancer spreads to other parts of the body may include:

- Bone pain.
- Headache.
- Losing weight without trying.
- Loss of appetite.
- Swelling in the face or neck.

When to see a doctor

Make an appointment with your doctor or other healthcare professional if you have any symptoms that worry you.

If you smoke and haven't been able to quit, make an appointment. Your healthcare professional can recommend strategies for quitting smoking. These may include counseling, medicines and nicotine replacement products.

Causes

Lung cancer happens when cells in the lungs develop changes in their DNA. A cell's DNA holds the instructions that tell a cell what to do. In healthy cells, the DNA gives instructions to grow and multiply at a set rate. The instructions tell the cells to die at a set time. In cancer cells, the DNA changes give different instructions. The changes tell the cancer cells to make many more cells quickly. Cancer cells can keep living when healthy cells would die. This causes too many cells.

The cancer cells might form a mass called a tumor. The tumor can grow to invade and destroy healthy body tissue. In time, cancer cells can break away and spread to other parts of the body. When cancer spreads, it's called metastatic cancer.

Smoking causes most lung cancers. It can cause lung cancer in both people who smoke and in people exposed to secondhand smoke. But lung cancer also happens in people who never smoked or been exposed to secondhand smoke. In these people, there may be no clear cause of lung cancer.

How smoking causes lung cancer

Researchers believe smoking causes lung cancer by damaging the cells that line the lungs. Cigarette smoke is full of cancer-causing substances, called carcinogens. When you inhale cigarette smoke, the carcinogens cause changes in the lung tissue almost immediately.

At first your body may be able to repair this damage. But with each repeated exposure, healthy cells that line your lungs become more damaged. Over time, the damage causes cells to change and eventually cancer may develop.

Types of lung cancer

Lung cancer is divided into two major types based on the appearance of the cells under a microscope. Your healthcare professional makes treatment decisions based on which major type of lung cancer you have.

The two general types of lung cancer include:

- **Small cell lung cancer.** Small cell lung cancer usually only happens in people who have smoked heavily for years. Small cell lung cancer is less common than non-small cell lung cancer.
- **Non-small cell lung cancer.** Non-small cell lung cancer is a category that includes several types of lung cancers. Non-small cell lung cancers include squamous cell carcinoma, adenocarcinoma and large cell carcinoma.

Prevention

There's no sure way to prevent lung cancer, but you can reduce your risk if you:

Don't smoke

If you've never smoked, don't start. Talk to your children about not smoking so that they can understand how to avoid this major risk factor for lung cancer. Begin conversations about the dangers of smoking with your children early so that they know how to react to peer pressure.

Stop smoking

Stop smoking now. Quitting reduces your risk of lung cancer, even if you've smoked for years. Talk to your healthcare team about strategies and aids that can help you quit. Options include nicotine replacement products, medicines and support groups.

Avoid secondhand smoke

If you live or work with a person who smokes, urge them to quit. At the very least, ask them to smoke outside. Avoid areas where people smoke, such as bars. Seek out smoke-free options.

Test your home for radon

Have the radon levels in your home checked, especially if you live in an area where radon is known to be a problem. High radon levels can be fixed to make your home safer. Radon test kits are often sold at hardware stores and can be purchased online. For more information on radon testing, contact your local department of public health.

Avoid carcinogens at work

Take precautions to protect yourself from exposure to toxic chemicals at work. Follow your employer's precautions. For instance, if you're given a face mask for protection, always wear it. Ask your healthcare professional what more you can do to protect yourself at work. Your risk of lung damage from workplace carcinogens increases if you smoke.

Eat a diet full of fruits and vegetables

Choose a healthy diet with a variety of fruits and vegetables. Food sources of vitamins and nutrients are best. Avoid taking large doses of vitamins in pill form, as they may be harmful. For instance, researchers hoping to reduce the risk of lung cancer in people who smoked heavily gave them beta carotene supplements. Results showed the supplements increased the risk of cancer in people who smoke.

Exercise most days of the week

If you don't exercise regularly, start out slowly. Try to exercise most days of the week.

Treatment

Treatment for lung cancer usually begins with surgery to remove the cancer. If the cancer is very large or has spread to other parts of the body, surgery may not be possible. Treatment might start with medicine and radiation instead. Your healthcare team considers many factors when creating a treatment plan. These factors may include your overall health, the type and stage of your cancer, and your preferences.

Some people with lung cancer choose not to have treatment. For instance, you may feel that the side effects of treatment will outweigh the potential benefits. When that's the case, your healthcare professional may suggest comfort care to treat only the symptoms the cancer is causing.

Surgery

During surgery, your surgeon works to remove the lung cancer and some healthy tissue around it. Procedures to remove lung cancer include:

- **Wedge resection** to remove a small section of lung that contains the cancer along with a margin of healthy tissue.

- **Segmental resection** to remove a larger portion of lung, but not an entire lobe.
- **Lobectomy** to remove the entire lobe of one lung.
- **Pneumonectomy** to remove an entire lung.

If you have surgery, your surgeon also may remove lymph nodes from your chest to test them for cancer.

Surgery may be an option if your cancer is only in the lungs. If you have a larger lung cancer, chemotherapy or radiation therapy may be used before surgery to shrink the cancer. Chemotherapy or radiation therapy also may be used after surgery if there's a risk that cancer cells were left behind or that your cancer may come back.

Radiation therapy

Radiation therapy treats cancer with powerful energy beams. The energy can come from X-rays, protons or other sources. During radiation therapy, you lie on a table while a machine moves around you. The machine directs radiation to precise points on your body.

For lung cancer that has spread within the chest, radiation may be used before surgery or after surgery. It's often combined with chemotherapy treatments. If surgery isn't an option, combined chemotherapy and radiation therapy may be your first treatment.

For lung cancers that have spread to other areas of the body, radiation therapy may help relieve symptoms.

Chemotherapy

Chemotherapy treats cancer with strong medicines. Many chemotherapy medicines exist. Most are given through a vein. Some come in pill form. A combination of medicines usually is given in a series of treatments over a period of weeks or months. Breaks in between are used to help you recover.

Chemotherapy is often used after surgery to kill any cancer cells that may remain. It can be used alone or combined with radiation therapy. Chemotherapy also may be used before surgery to shrink cancers and make them easier to remove.

In people with lung cancer that has spread, chemotherapy can be used to relieve pain and other symptoms.

Stereotactic body radiotherapy

Stereotactic body radiotherapy is an intense radiation treatment. This treatment aims beams of radiation from many angles at the cancer. Stereotactic body radiotherapy treatment is typically completed in one or a few treatments. Sometimes this treatment is called stereotactic radiosurgery.

Stereotactic body radiotherapy may be an option for people with small lung cancers who can't have surgery. It also may be used to treat lung cancer that spreads to other parts of the body, including the brain.

Targeted therapy

Targeted therapy for cancer is a treatment that uses medicines that attack specific chemicals in the cancer cells. By blocking these chemicals, targeted treatments can cause cancer cells to die. For lung cancer, targeted therapy may be used for people with cancer that spreads or comes back after treatment.

Some targeted therapies only work in people whose cancer cells have certain DNA changes. Your cancer cells may be tested in a lab to see if these medicines might help you.

Immunotherapy

Immunotherapy for cancer is a treatment with medicine that helps the body's immune system to kill cancer cells. The immune system fights off diseases by attacking germs and other cells that shouldn't be in the body. Cancer cells survive by hiding from the immune system. Immunotherapy helps the immune system cells find and kill the cancer cells.

For lung cancer, immunotherapy might be used after surgery to kill any cancer cells that remain. When surgery isn't an option, immunotherapy might help control the cancer.

Palliative care

Palliative care is a special type of healthcare that helps you feel better when you have a serious illness. If you have cancer, palliative care can help relieve pain and other symptoms. A healthcare team that may include doctors, nurses and other specially trained health professionals provides palliative care. The care team's goal is to improve quality of life for you and your family.

Palliative care specialists work with you, your family and your care team. They provide an extra layer of support while you have cancer treatment. You can have palliative care at the same time you're getting strong cancer treatments, such as surgery, chemotherapy or radiation therapy.

The use of palliative care with other proper treatments can help people with cancer feel better and live longer.

Lifestyle and home remedies

Many people with lung cancer experience shortness of breath. Treatments such as supplemental oxygen and medicines are available to help you feel more comfortable. However, they aren't always enough.

To cope with shortness of breath, it may help to:

Try to relax

Feeling short of breath can be scary. But fear and anxiety only make it harder to breathe. When you begin to feel short of breath, choose an activity that helps you relax. Listen to music, imagine your favorite vacation spot, meditate or say a prayer.

Find a comfortable position

It may help to lean forward when you feel short of breath.

Focus on your breath

When you feel short of breath, focus your mind on your breathing. Instead of trying to fill your lungs with air, concentrate on moving the muscles that control your breathing. Try breathing through pursed lips and pacing your breaths with your activity.

Save your energy for what's important

If you're short of breath, you may become tired easily. Prioritize your tasks for the day so that you can save your energy for what needs to be done.

Tell your healthcare professional if you experience shortness of breath or if your symptoms worsen. There are many other treatments available to relieve shortness of breath.

Alternative medicine

Complementary and alternative lung cancer treatments can't cure your cancer. But complementary and alternative treatments can often be combined with your healthcare team's care to help relieve symptoms.

The American College of Chest Physicians suggests people with lung cancer may find comfort in:

Acupuncture

During an acupuncture session, a trained practitioner inserts small needles into precise points on your body. Acupuncture may relieve pain and ease cancer treatment side effects, such as nausea and vomiting.

Hypnosis

Hypnosis is typically done by a therapist who leads you through relaxation exercises. The therapist may ask you to think pleasing and positive thoughts. Hypnosis may reduce anxiety, nausea and pain in people with cancer.

Massage

During massages, massage therapists use their hands to apply pressure to your skin and muscles. Massage can help relieve anxiety and pain in people with cancer. Some massage therapists are specially trained to work with people who have cancer.

Meditation

Meditation is a time of quiet reflection in which you focus on something. It may be an idea, image or sound. Meditation may reduce stress and improve quality of life in people with cancer.

Yoga

Yoga combines gentle stretching movements with deep breathing and meditation. Yoga may help people with cancer sleep better.

Liver Cancer

Symptoms

Most people don't have signs and symptoms in the early stages of primary liver cancer. When signs and symptoms do appear, they may include:

- Losing weight without trying
- Loss of appetite
- Upper abdominal pain
- Nausea and vomiting
- General weakness and fatigue
- Abdominal swelling
- Yellow discoloration of your skin and the whites of your eyes (jaundice)
- White, chalky stools

When to see a doctor

Make an appointment with your doctor if you experience any signs or symptoms that worry you.

Causes

Liver cancer happens when liver cells develop changes (mutations) in their DNA. A cell's DNA is the material that provides instructions for every chemical process in your body. DNA mutations cause changes in these instructions. One result is that cells may begin to grow out of control and eventually form a tumor — a mass of cancerous cells.

Sometimes the cause of liver cancer is known, such as with chronic hepatitis infections. But sometimes liver cancer happens in people with no underlying diseases and it's not clear what causes it.

Prevention

Reduce your risk of cirrhosis

Cirrhosis is scarring of the liver, and it increases the risk of liver cancer. You can reduce your risk of cirrhosis if you:

- **Drink alcohol in moderation, if at all.** If you choose to drink alcohol, limit the amount you drink. For women, this means no more than one drink a day. For men, this means no more than two drinks a day.
- **Maintain a healthy weight.** If your current weight is healthy, work to maintain it by choosing a healthy diet and exercising most days of the week. If you need to lose weight, reduce the number of calories you eat each day and increase the amount of exercise you do. Aim to lose weight slowly — 1 or 2 pounds (0.5 to 1 kilograms) each week.

Get vaccinated against hepatitis B

You can reduce your risk of hepatitis B by receiving the hepatitis B vaccine. The vaccine can be given to almost anyone, including infants, older adults and those with compromised immune systems.

Take measures to prevent hepatitis C

No vaccine for hepatitis C exists, but you can reduce your risk of infection.

- **Know the health status of any sexual partner.** Don't engage in unprotected sex unless you're certain your partner isn't infected with HBV, HCV or any other sexually transmitted infection. If you don't know the health status of your partner, use a condom every time you have sexual intercourse.
- **Don't use intravenous (IV) drugs, but if you do, use a clean needle.** Reduce your risk of HCV by not injecting illegal drugs. But if that isn't an option for you, make sure any needle you use is sterile, and don't share it. Contaminated drug paraphernalia is a common cause of hepatitis C infection. Take advantage of needle-exchange programs in your community and consider seeking help for your drug use.
- **Seek safe, clean shops when getting a piercing or tattoo.** Needles that may not be properly sterilized can spread the hepatitis C virus. Before getting a piercing or tattoo, check out the shops in your area and ask staff members about their safety practices. If employees at a shop refuse to

answer your questions or don't take your questions seriously, take that as a sign that the facility isn't right for you.

Seek treatment for hepatitis B or C infection

Treatments are available for hepatitis B and hepatitis C infections. Research shows that treatment can reduce the risk of liver cancer.

Ask your doctor about liver cancer screening

For the general population, screening for liver cancer hasn't been proved to reduce the risk of dying of liver cancer, and it isn't generally recommended. People with conditions that increase the risk of liver cancer might consider screening, such as people who have:

- Hepatitis B infection
- Hepatitis C infection
- Liver cirrhosis

Discuss the pros and cons of screening with your doctor. Together you can decide whether screening is right for you based on your risk. Screening typically involves a blood test and an abdominal ultrasound exam every six months.

Treatment

Treatments for primary liver cancer depend on the extent (stage) of the disease as well as your age, overall health and personal preferences.

Surgery

Operations used to treat liver cancer include:

- **Surgery to remove the tumor.** In certain situations, your doctor may recommend an operation to remove the liver cancer and a small portion of healthy liver tissue that surrounds it if your tumor is small and your liver function is good.
  Whether this is an option for you also depends on the location of your cancer within the liver, how well your liver functions and your overall health.
- **Liver transplant surgery.** During liver transplant surgery, your diseased liver is removed and replaced with a healthy liver from a donor. Liver transplant surgery is only an option for a small percentage of people with early-stage liver cancer.

Localized treatments

Localized treatments for liver cancer are those that are administered directly to the cancer cells or the area surrounding the cancer cells. Localized treatment options for liver cancer include:

- **Heating cancer cells.** Radiofrequency ablation uses electric current to heat and destroy cancer cells. Using an imaging test as a guide, such as ultrasound, the doctor inserts one or more thin needles into small incisions in your abdomen. When the needles reach the tumor, they're heated with an electric current, destroying the cancer cells. Other procedures to heat the cancer cells might use microwaves or lasers.
- **Freezing cancer cells.** Cryoablation uses extreme cold to destroy cancer cells. During the procedure, your doctor places an instrument (cryoprobe) containing liquid nitrogen directly onto liver tumors. Ultrasound images are used to guide the cryoprobe and monitor the freezing of the cells.

- **Injecting alcohol into the tumor.** During alcohol injection, pure alcohol is injected directly into tumors, either through the skin or during an operation. Alcohol causes the tumor cells to die.
- **Injecting chemotherapy drugs into the liver.** Chemoembolization is a type of chemotherapy treatment that supplies strong anti-cancer drugs directly to the liver.
- **Placing beads filled with radiation in the liver.** Tiny spheres that contain radiation may be placed directly in the liver where they can deliver radiation directly to the tumor.

Radiation therapy

This treatment uses high-powered energy from sources such as X-rays and protons to destroy cancer cells and shrink tumors. Doctors carefully direct the energy to the liver, while sparing the surrounding healthy tissue.

Radiation therapy might be an option if other treatments aren't possible or if they haven't helped. For advanced liver cancer, radiation therapy might help control symptoms.

During external beam radiation therapy treatment, you lie on a table and a machine directs the energy beams at a precise point on your body.

A specialized type of radiation therapy, called stereotactic body radiotherapy, involves focusing many beams of radiation simultaneously at one point in your body.

Targeted drug therapy

Targeted drug treatments focus on specific abnormalities present within cancer cells. By blocking these abnormalities, targeted drug treatments can cause cancer cells to die.

Many targeted drugs are available for treating advanced liver cancer.

Some targeted therapies only work in people whose cancer cells have certain genetic mutations. Your cancer cells may be tested in a laboratory to see if these drugs might help you.

Immunotherapy

Immunotherapy uses your immune system to fight cancer. Your body's disease-fighting immune system may not attack your cancer because the cancer cells produce proteins that blind the immune system cells. Immunotherapy works by interfering with that process.

Immunotherapy treatments are generally reserved for people with advanced liver cancer.

Chemotherapy

Chemotherapy uses drugs to kill rapidly growing cells, including cancer cells. Chemotherapy can be administered through a vein in your arm, in pill form or both.

Chemotherapy is sometimes used to treat advanced liver cancer.

Supportive (palliative) care

Palliative care is specialized medical care that focuses on providing relief from pain and other symptoms of a serious illness. Palliative care specialists work with you, your family and your other doctors to provide an extra layer of support that complements your ongoing care. Palliative care can be used while undergoing other aggressive treatments, such as surgery, chemotherapy or radiation therapy.

When palliative care is used along with all of the other appropriate treatments, people with cancer may feel better and live longer.

Palliative care is provided by a team of doctors, nurses and other specially trained professionals. Palliative care teams aim to improve the quality of life for people with cancer and their families. This form of care is offered alongside curative or other treatments you may be receiving.

Typhoid fever

Symptoms

Symptoms are likely to start slowly, often showing up 1 to 3 weeks after exposure to the bacteria.

Early illness

Early symptoms include:

- Fever that starts low and increases throughout the day, possibly reaching as high as 104 degrees Fahrenheit (40 degrees Celsius).
- Chills.
- Headache.
- Weakness and fatigue.
- Muscle aches.
- Stomach pain.
- Diarrhea or constipation.
- Rash.

People also may have a cough, loss of appetite and sweating.

Later illness

A few weeks after symptoms start, the illness can cause problems in the intestines. People may have:

- Stomach pain.
- Very swollen stomach.
- An infection caused by gut bacteria spreading throughout the body, called sepsis.

In very serious cases, people may:

- Become confused.
- Not be able to pay attention to anything around them.
- Not be able to react to the world around them.

These are life-threatening complications.
In some people, symptoms may return up to a few weeks after the fever has gone away.

When to see a doctor

See a health care provider right away if you think you might have typhoid fever.
If you get sick while traveling in a foreign country, know who to call for a list of providers. For some that might be the closest embassy or consulate.
If you have symptoms after you return home, consider seeing a provider who focuses on international travel medicine or infectious diseases. This might help get typhoid fever diagnosed and treated more quickly.

Causes

A bacteria strain called Salmonella enterica serotype typhi causes typhoid fever. Other strains of salmonella bacteria cause a similar disease called paratyphoid fever.
People pick up the bacteria most often in places where outbreaks are common. The bacteria passes out of the body in the stool and urine of people who are carrying the bacteria. Without careful hand-washing after going to the bathroom, the bacteria can move from the hands to objects or other people.
The bacteria also can spread from a person who carries the bacteria. It can spread on food that isn't cooked, such as raw fruits without a peel. In places where water isn't treated to kill germs, you can pick up the bacteria from that source. This includes drinking water, using ice made from untreated water, or by drinking unpasteurized milk or juice.

Typhoid carriers

Even after antibiotic treatment, a small number of people who recover from typhoid fever still have the bacteria living in their bodies. These people are known as chronic carriers. They no longer have symptoms of the disease. But they still shed the bacteria in their stools and spread it.

Prevention

People can get a vaccination against typhoid fever. This is an option if you live where typhoid fever is common. It is also an option if you plan to travel to a place where the risk is high.
Where typhoid fever is common, access to treated water helps avoid contact with the Salmonella enterica serotype typhi bacteria. Management of human waste also helps people avoid the bacteria. And careful hand-washing for people who prepare and serve food is also important.

Vaccines

Two vaccines are available in the United States for people age 2 and older.

- One is given as a single shot at least one week before travel.
- One is given orally in four capsules, with one capsule to be taken every other day.

The effectiveness of these vaccines wears off over time. So repeat immunization is needed.
Because the vaccine won't provide complete protection, follow these guidelines when traveling to high-risk areas:

- **Wash your hands.** Frequent hand-washing in hot, soapy water is the best way to control infection. Wash before eating or preparing food and after using the toilet. Carry an alcohol-based hand sanitizer for times when soap and water aren't available.
- **Avoid using untreated water.** Contaminated drinking water is a problem in areas where typhoid fever is common. For that reason, drink only bottled water or canned or bottled carbonated beverages, wine and beer. Carbonated bottled water is safer than noncarbonated bottled water. Ask for drinks without ice. Use bottled water to brush your teeth, and try not to swallow water in the shower.
- **Avoid raw fruits and vegetables.** Because raw produce may have been washed in contaminated water, avoid fruits and vegetables that you can't peel, especially lettuce. To be safe, you may want to avoid raw foods.
- **Choose hot foods.** Avoid food that's stored or served at room temperature. Freshly made, steaming hot foods may be less risky than uncooked foods.
- **Know where the health care providers are.** Find out about medical care in the areas you'll visit. Carry a list of the names, addresses and phone numbers of health care providers.

Prevent infecting others

If you're recovering from typhoid fever, these measures can help keep others safe:

- **Take your antibiotics.** Follow your health care provider's instructions for taking your antibiotics and be sure to finish the entire prescription.
- **Wash your hands often.** This is the single most important thing you can do to keep from spreading the infection to others. Use hot, soapy water and scrub thoroughly for at least 30 seconds, especially before eating and after using the toilet.
- **Avoid handling food.** Avoid preparing food for others until your health care provider says you're no longer contagious. If you work with food, you may need to take a test to show you aren't shedding typhoid bacteria. If you work in health care, you also may need to show you aren't shedding the bacteria.

Treatment

Antibiotic therapy is the only effective treatment for typhoid fever.

Commonly prescribed antibiotics

The medicine you get to treat typhoid fever may depend on where you picked up the bacteria. Strains picked up in different places respond better or worse to certain antibiotics. These medicines may be used alone or together. Antibiotics that may be given for typhoid fever are:

- **Fluoroquinolones.** These antibiotics, including ciprofloxacin (Cipro), may be a first choice. They stop bacteria from copying themselves. But some strains of bacteria can live through treatment. These bacteria are called antibiotic resistant.
- **Cephalosporins.** This group of antibiotics keeps bacteria from building cell walls. One kind, ceftriaxone, is used if there is antibiotic resistance.
- **Macrolides.** This group of antibiotics keeps bacteria from making proteins. One kind called azithromycin (Zithromax) can be used if there is antibiotic resistance.
- **Carbapenems.** These antibiotics also prevent bacteria from building cell walls. But they focus on a different stage of that process than the cephalosporins. Antibiotics in this category may be used with severe disease that doesn't respond to other antibiotics.

Other treatments

Other treatments include:

- **Drinking fluids.** This helps prevent the dehydration caused by a long fever and diarrhea. If you're very dehydrated, you may need to receive fluids through a vein.
- **Surgery.** If the intestines are damaged, you may need surgery to repair them.

Jaundice

Symptoms

Yellowing of the skin and the whites of the eyes — the main sign of infant jaundice — usually appears between the second and fourth day after birth.
To check for infant jaundice, press gently on your baby's forehead or nose. If the skin looks yellow where you pressed, it's likely your baby has mild jaundice. If your baby doesn't have jaundice, the skin color should simply look slightly lighter than its normal color for a moment.
Examine your baby in good lighting conditions, preferably in natural daylight.

When to see a doctor

Most hospitals have a policy of examining babies for jaundice before discharge. The American Academy of Pediatrics recommends that newborns be examined for jaundice during routine medical checks and at least every eight to 12 hours while in the hospital.
Your baby should be examined for jaundice between the third and seventh day after birth, when bilirubin levels usually peak. If your baby is discharged earlier than 72 hours after birth, make a follow-up appointment to look for jaundice within two days of discharge.
The following signs or symptoms may indicate severe jaundice or complications from excess bilirubin. Call your doctor if:

- Your baby's skin becomes more yellow
- The skin on your baby's the abdomen, arms or legs looks yellow
- The whites of your baby's eyes look yellow
- Your baby seems listless or sick or is difficult to awaken
- Your baby isn't gaining weight or is feeding poorly
- Your baby makes high-pitched cries
- Your baby develops any other signs or symptoms that concern you

Causes

Excess bilirubin (hyperbilirubinemia) is the main cause of jaundice. Bilirubin, which is responsible for the yellow color of jaundice, is a normal part of the pigment released from the breakdown of "used" red blood cells.
Newborns produce more bilirubin than adults do because of greater production and faster breakdown of red blood cells in the first few days of life. Normally, the liver filters bilirubin from the bloodstream and releases it into the intestinal tract. A newborn's immature liver often can't remove bilirubin quickly enough, causing an excess of bilirubin. Jaundice due to these normal newborn conditions is called physiologic jaundice, and it typically appears on the second or third day of life.

Other causes

An underlying disorder may cause infant jaundice. In these cases, jaundice often appears much earlier or much later than does the more common form of infant jaundice. Diseases or conditions that can cause jaundice include:

- Internal bleeding (hemorrhage)
- An infection in your baby's blood (sepsis)
- Other viral or bacterial infections
- An incompatibility between the mother's blood and the baby's blood
- A liver malfunction
- Biliary atresia, a condition in which the baby's bile ducts are blocked or scarred
- An enzyme deficiency
- An abnormality of your baby's red blood cells that causes them to break down rapidly

Prevention

The best preventive of infant jaundice is adequate feeding. Breast-fed infants should have eight to 12 feedings a day for the first several days of life. Formula-fed infants usually should have 1 to 2 ounces (about 30 to 60 milliliters) of formula every two to three hours for the first week.

Treatment

Mild infant jaundice often disappears on its own within two or three weeks. For moderate or severe jaundice, your baby may need to stay longer in the newborn nursery or be readmitted to the hospital.
Treatments to lower the level of bilirubin in your baby's blood may include:

- **Enhanced nutrition.** To prevent weight loss, your doctor may recommend more-frequent feeding or supplementation to ensure that your baby receives adequate nutrition.
- **Light therapy (phototherapy).** Your baby may be placed under a special lamp that emits light in the blue-green spectrum. The light changes the shape and structure of bilirubin molecules in such a way that they can be excreted in both the urine and stool. During treatment, your baby will wear only a diaper and protective eye patches. Light therapy may be supplemented with the use of a light-emitting pad or mattress.
- **Intravenous immunoglobulin (IVIg).** Jaundice may be related to blood type differences between mother and baby. This condition results in the baby carrying antibodies from the mother that contribute to the rapid breakdown of the baby's red blood cells. Intravenous transfusion of an immunoglobulin — a blood protein that can reduce levels of antibodies — may decrease jaundice and lessen the need for an exchange transfusion, although results are not conclusive.
- **Exchange transfusion.** Rarely, when severe jaundice doesn't respond to other treatments, a baby may need an exchange transfusion of blood. This involves repeatedly withdrawing small amounts of blood and replacing it with donor blood, thereby diluting the bilirubin and maternal antibodies — a procedure that's performed in a newborn intensive care unit.

Self care

When infant jaundice isn't severe, your doctor may recommend changes in feeding habits that can lower levels of bilirubin. Talk to your doctor if you have any questions or concerns about how much or how often your baby is feeding or if you're having trouble breast-feeding. The following steps may lessen jaundice:

- **More-frequent feedings.** Feeding more frequently will provide your baby with more milk and cause more bowel movements, increasing the amount of bilirubin eliminated in your baby's stool. Breast-fed infants should have eight to 12 feedings a day for the first several days of life. Formula-fed infants usually should have 1 to 2 ounces (about 30 to 60 milliliters) of formula every two to three hours for the first week.
- **Supplemental feedings.** If your baby is having trouble breast-feeding, is losing weight, or is dehydrated, your doctor may suggest giving your baby formula or expressed milk to supplement breast-feeding. In some cases, your doctor may recommend using formula alone for a couple of days and then resuming breast-feeding. Ask your doctor what feeding options are right for your baby.

Dengue

Symptoms

Many people experience no signs or symptoms of a dengue infection.

When symptoms do occur, they may be mistaken for other illnesses — such as the flu — and usually begin four to 10 days after you are bitten by an infected mosquito.

Dengue fever causes a high fever — 104 F (40 C) — and any of the following signs and symptoms:

- Headache
- Muscle, bone or joint pain
- Nausea
- Vomiting
- Pain behind the eyes
- Swollen glands
- Rash

Most people recover within a week or so. In some cases, symptoms worsen and can become life-threatening. This is called severe dengue, dengue hemorrhagic fever or dengue shock syndrome.

Severe dengue happens when your blood vessels become damaged and leaky. And the number of clot-forming cells (platelets) in your bloodstream drops. This can lead to shock, internal bleeding, organ failure and even death.

Warning signs of severe dengue fever — which is a life-threatening emergency — can develop quickly. The warning signs usually begin the first day or two after your fever goes away, and may include:

- Severe stomach pain
- Persistent vomiting
- Bleeding from your gums or nose
- Blood in your urine, stools or vomit
- Bleeding under the skin, which might look like bruising
- Difficult or rapid breathing
- Fatigue
- Irritability or restlessness

When to see a doctor

Severe dengue fever is a life-threatening medical emergency. Seek immediate medical attention if you've recently visited an area in which dengue fever is known to occur, you have had a fever and you develop any of the warning signs. Warning signs include severe stomach pain, vomiting, difficulty breathing, or blood in your nose, gums, vomit or stools.

If you've been traveling recently and develop a fever and mild symptoms of dengue fever, call your doctor.

Causes

Dengue fever is caused by any one of four types of dengue viruses. You can't get dengue fever from being around an infected person. Instead, dengue fever is spread through mosquito bites.

The two types of mosquitoes that most often spread the dengue viruses are common both in and around human lodgings. When a mosquito bites a person infected with a dengue virus, the virus enters the mosquito. Then, when the infected mosquito bites another person, the virus enters that person's bloodstream and causes an infection.

After you've recovered from dengue fever, you have long-term immunity to the type of virus that infected you — but not to the other three dengue fever virus types. This means you can be infected again in the future by one of the other three virus types. Your risk of developing severe dengue fever increases if you get dengue fever a second, third or fourth time.

Prevention

Vaccine

Dengue fever vaccines may be available for people ages 6 to 60. Dengue vaccination is a series of two or three doses, depending on the vaccine you get, over the course of months. These vaccines are for use by people who live where the viruses that cause dengue are common, and who have already had dengue fever at least once.

The vaccines are not available in the continental United States. But in 2019, the U.S. Food and Drug Administration approved a dengue vaccine called Dengvaxia for people ages 9 to 16 who have had dengue fever in the past and who live in U.S. territories and freely associated states where dengue fever is common.

Prevent mosquito bites

The World Health Organization stresses that the vaccine is not an effective tool on its own to reduce dengue fever in areas where the illness is common. Preventing mosquito bites and controlling the mosquito population are still the main methods for preventing the spread of dengue fever.

If you live in or travel to an area where dengue fever is common, these tips may help reduce your risk of mosquito bites:

- **Stay in air-conditioned or well-screened housing.** The mosquitoes that carry the dengue viruses are most active from dawn to dusk, but they can also bite at night.
- **Wear protective clothing.** When you go into mosquito-infested areas, wear a long-sleeved shirt, long pants, socks and shoes.
- **Use mosquito repellent.** Permethrin can be applied to your clothing, shoes, camping gear and bed netting. You can also buy clothing made with permethrin already in it. For your skin, use a repellent containing at least a 10% concentration of DEET.
- **Reduce mosquito habitat.** The mosquitoes that carry the dengue virus typically live in and around houses, breeding in standing water that can collect in such things as used automobile tires. You can help lower mosquito populations by eliminating habitats where they lay their eggs. At least once a week, empty and clean containers that hold standing water, such as planting containers, animal dishes and flower vases. Keep standing water containers covered between cleanings.

Treatment

No specific treatment for dengue fever exists.

While recovering from dengue fever, drink plenty of fluids. Call your doctor right away if you have any of the following signs and symptoms of dehydration:

- Decreased urination
- Few or no tears
- Dry mouth or lips
- Lethargy or confusion
- Cold or clammy extremities

The over-the-counter (OTC) drug acetaminophen (Tylenol, others) can help reduce muscle pain and fever. But if you have dengue fever, you should avoid other OTC pain relievers, including aspirin, ibuprofen (Advil, Motrin IB, others) and naproxen sodium (Aleve). These pain relievers can increase the risk of dengue fever bleeding complications.

If you have severe dengue fever, you may need:

- Supportive care in a hospital
- Intravenous (IV) fluid and electrolyte replacement
- Blood pressure monitoring
- Transfusion to replace blood loss