CONDITION

# Hyperventilation

Hyperventilation is breathing more deeply or quickly than your body needs, causing carbon dioxide levels to fall.

**WHAT IT IS**
Excess breathing that lowers carbon dioxide

**BODY SYSTEM**
Lungs and nervous system

**MAIN SYMPTOMS**
Breathlessness, dizziness, tingling, chest tightness

**WHAT CAUSES IT**
Stress, pain, illness, medication, or high altitude

**HOW IT IS DIAGNOSED**
Clinical assessment and tests to exclude dangerous causes

**MAIN TREATMENT**
Breathing coaching and treatment of the cause

**CAN IT BE CURED?**
Sometimes - stops when the trigger is treated

**IS IT AN EMERGENCY?**
Sometimes - chest pain, fainting, blue lips, or severe breathlessness

**LONG-TERM OUTLOOK**
Usually good when triggers are identified and managed

## Overview

Hyperventilation means breathing more deeply or quickly than your body needs at that moment. This removes too much carbon dioxide from the blood.

Carbon dioxide is a waste gas, but your body still needs a balanced amount of it. A sudden drop can temporarily change blood acidity and narrow blood vessels supplying the brain. This may cause dizziness, tingling, muscle tightening, or a feeling that you cannot get enough air.

An episode can happen during anxiety or a panic attack. However, hyperventilation is not always caused by anxiety. Pain, fever, lung disease, heart problems, medication effects, and several other medical conditions can also change breathing.

Some people have repeated episodes without another medical cause being found. This is

sometimes called hyperventilation syndrome , which is one form of dysfunctional breathing. It is diagnosed only after other reasonable causes have been considered.

A brief episode is often reversible once breathing returns to normal. New or severe rapid breathing still needs careful assessment because it can resemble, or result from, a more serious condition.

## Symptoms

Hyperventilation may be obvious, with fast or deep breaths. In some people, the change is subtle and feels more like repeated sighing, frequent yawning, or an inability to take a satisfying breath.

Common symptoms include:

The symptoms can create a cycle. Feeling short of breath may cause fear, which can make breathing faster or deeper and further lower carbon dioxide.

These symptoms are not specific to hyperventilation. Asthma, heart rhythm problems, blood clots in the lungs, low blood sugar, and other conditions can cause similar experiences.

- Breathlessness or "air hunger"
- Dizziness, light-headedness, or feeling faint
- Tingling or numbness around the mouth, hands, or feet
- Chest tightness, discomfort, or a racing heartbeat
- Shaking, sweating, dry mouth, or feeling frightened
- Muscle cramps or tightening of the hands and feet
- Trouble concentrating or feeling detached from your surroundings

## Causes and risk factors

Hyperventilation is a breathing response, not one single disease. Sometimes it is an understandable reaction to emotional or physical stress.

Possible triggers include anxiety, panic, intense distress, severe pain, fever, exercise, and being at high altitude. Stimulants such as large amounts of caffeine may contribute in some people, especially when they also increase anxiety or palpitations.

Medical causes include asthma attacks, pneumonia and other lung infections, blood clots in the lungs, heart problems, severe infection, and uncontrolled diabetes causing a buildup of acids

called ketoacids. Brain injury or illness can sometimes affect breathing control.

Certain medicines or substances can cause rapid breathing. One example is salicylate poisoning, which can occur with an aspirin overdose. Never stop a prescribed medicine because you suspect it is affecting your breathing; seek medical advice instead.

Pregnancy normally causes some increase in ventilation because of hormonal changes. New, uncomfortable, or severe breathlessness during pregnancy should not automatically be attributed to this normal change.

Repeated anxiety-related episodes may become more likely if you start closely monitoring every breath or avoiding activities that once triggered symptoms. Asthma and hyperventilation can also occur together, making it important not to assume that every episode has the same cause.

## Diagnosis

There is no single test that proves all cases of hyperventilation. Assessment begins with what happened before the symptoms, how suddenly they started, and whether you have pain, fever, wheezing, medication exposure, or existing heart or lung conditions.

A healthcare professional may check your breathing rate, temperature, pulse, blood pressure, and blood oxygen level. They may listen to your heart and lungs and look for signs that point to another cause.

Blood oxygen is often normal during anxiety-related hyperventilation. A normal reading is reassuring in some situations, but it does not rule out every heart or lung problem.

When needed, tests may include:

The tests chosen depend on your symptoms and medical history. Hyperventilation syndrome is generally considered after important physical causes have been excluded rather than being confirmed by one result.

- An electrocardiogram, or ECG, to examine the heart's electrical activity
- Blood tests for infection, anemia, glucose, electrolytes, or other problems
- A chest X-ray or other imaging
- Blood gas testing to measure oxygen, carbon dioxide, and blood acidity
- Capnography, which measures carbon dioxide in exhaled breath

## Treatment and management

Treatment depends on why you are hyperventilating. A lung infection, asthma attack, blood clot, metabolic problem, medication effect, or heart condition requires treatment directed at that cause.

For a medically assessed episode linked to stress or dysfunctional breathing, the aim is to reduce overbreathing. A quiet environment, physical support, and calm reassurance may help. Breathing is usually encouraged to become gentler and slower rather than taking repeated large breaths.

Breathing retraining may teach you to relax your shoulders and upper chest, use less effort, and notice when frequent sighing or deep inhalation begins. A respiratory physiotherapist or another trained professional may help if episodes keep returning. Evidence for specific breathing programs is limited, so improvement may take practice and the approach may need adjusting.

Do not breathe into a paper bag. Rebreathing exhaled air can reduce oxygen and may be dangerous if the symptoms are actually caused by a heart or lung emergency.

If anxiety or panic is contributing, treatment may include cognitive behavioural therapy, often called CBT. It helps you understand the link between thoughts, physical sensations, and behaviour. It may also reduce fear of normal body sensations.

Medicines are not a standard treatment for hyperventilation itself. A clinician may sometimes recommend treatment for an underlying anxiety disorder or another identified condition. Oxygen is used when oxygen levels are low or another illness requires it; it is not routinely needed when oxygen levels are normal.

## Complications

Most short episodes settle without lasting physical harm. Symptoms such as tingling, cramping, and dizziness usually improve as carbon dioxide returns toward its normal level.

Fainting can lead to a fall or injury. Severe muscle tightening can be painful and frightening, although it is usually temporary.

Repeated episodes can disrupt sleep, work, exercise, travel, and social activities. Fear of another episode may lead you to avoid places or activities, which can reinforce anxiety and breathing changes.

The most important risk is assuming that new rapid breathing is "just anxiety" when it is being caused by another illness.

## Prevention

Not every episode can be prevented. Hyperventilation caused by a sudden infection, injury, high altitude, or an unexpected medical problem may occur without warning.

If episodes recur, learning your usual triggers and early symptoms may help. Breathing retraining, stress management, adequate sleep, and treatment of an underlying anxiety, heart, or lung condition may reduce episodes.

Follow the management plan for conditions such as asthma. If caffeine, nicotine, or another stimulant like methylphenidate or lisdexamfetamine seems to trigger palpitations and overbreathing, discussing ways to reduce it may be useful.

Avoid repeatedly checking or forcing your breathing. Trying to take the "perfect" deep breath can sometimes keep the overbreathing cycle going.

## Living with it and what to expect

An isolated episode may improve within minutes after the trigger passes and breathing settles. Tiredness, muscle soreness, or worry about what happened can last longer.

When hyperventilation is linked to panic or dysfunctional breathing, symptoms may come and go over months or years. Stress, illness, poor sleep, or unfamiliar body sensations may bring them back. This pattern does not mean that your lungs are steadily deteriorating.

Many people learn to recognise the early signs and respond before symptoms become intense. Progress is not always steady. A recurrence after a symptom-free period does not mean that previous treatment or breathing practice has failed.

Your longer-term outlook is influenced by the cause. Episodes related to a treatable trigger may stop once that trigger is managed. If a heart, lung, neurological, or metabolic condition is responsible, the course follows that underlying condition.

Routine follow-up is appropriate if episodes keep returning, interfere with daily life, wake you from sleep, or lead you to avoid exercise or public places. Follow-up can also help confirm that an existing diagnosis still explains your symptoms.

## When to get medical help

Call emergency services for rapid or difficult breathing accompanied by:

Seek prompt medical assessment for a first severe episode, new breathlessness during

pregnancy, breathing trouble after surgery or prolonged immobility, or symptoms accompanied by fever, wheezing, leg swelling, or an irregular heartbeat.

Arrange routine care if episodes recur, the cause is uncertain, or breathing symptoms are affecting sleep, work, exercise, or emotional well-being. A previous history of panic does not mean every new breathing problem is caused by panic.

- Blue or grey lips, face, or skin
- Severe chest pain, pressure, or heaviness
- Fainting, marked confusion, or difficulty waking
- New weakness on one side, facial drooping, or trouble speaking
- Coughing up blood
- Severe breathlessness that is worsening or prevents speaking
- A suspected overdose, poisoning, or serious allergic reaction

## Common questions

Can anxiety really make me hyperventilate?

Yes. Anxiety can activate the body's threat response and change breathing before you consciously feel afraid. The physical symptoms caused by low carbon dioxide may then increase anxiety, creating a cycle. Anxiety is only one possible cause, so new or unusual symptoms still deserve assessment.

Does hyperventilation mean my oxygen is too low?

Usually not. During uncomplicated hyperventilation, oxygen may be normal or high while carbon dioxide is low. However, serious lung or heart problems can cause both breathlessness and abnormal breathing. How you feel alone cannot reliably show your oxygen level or identify the cause.

How can I stop an episode?

If serious causes have already been excluded, reducing breathing effort may help. Try to remain supported and still, relax your shoulders, and allow breaths to become quieter and gentler. Avoid repeated gasping or forceful deep breaths. Seek urgent help if symptoms are severe, different from usual, or not settling.

Should I breathe into a paper bag?

No. This older method is not recommended because it can lower oxygen. That is especially dangerous when a heart problem, asthma attack, blood clot, or another medical condition has

been mistaken for anxiety-related hyperventilation.

Can hyperventilation damage my brain or lungs?

A short, uncomplicated episode does not usually cause permanent brain or lung damage. Low carbon dioxide temporarily reduces blood flow to the brain, which helps explain dizziness and tingling. The greater concern is injury from fainting or missing an underlying medical cause.

Is hyperventilation the same as a panic attack?

No. Hyperventilation can occur during a panic attack, but the terms are not interchangeable. Panic attacks include sudden intense fear or discomfort with physical symptoms. Hyperventilation can also result from pain, fever, lung disease, metabolic illness, medication effects, or other causes.

## Sources

- MedlinePlus Medical Encyclopedia: Hyperventilation , US National Library of Medicine
- MSD Manual Professional Edition: Hyperventilation Syndrome , Merck & Co.
- Boulding R, Stacey R, Niven R, Fowler SJ. Dysfunctional breathing: a review of the literature and proposal for classification , European Respiratory Review , 2016
- Jones M, Harvey A, Marston L, O'Connell NE. Breathing exercises for dysfunctional breathing/hyperventilation syndrome in adults , Cochrane Database of Systematic Reviews, 2013
- Gardner WN. The pathophysiology of hyperventilation disorders , Chest , 1996