# DIAGNOSING CHILDHOOD ASTHMA

*Understanding the professional guidelines*

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# Contents




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# Introduction

## Who is this document for and what is it about?

This document explains the recommendations in the European Respiratory Society (ERS) clinical guidelines for the diagnosis of asthma in children between the ages of 5 and 16 years. It is aimed at parents or carers of children with asthma, or young people with asthma. This document is relevant for all children with suspected asthma, including those who have had a previous diagnosis of asthma and those who are currently taking, or have previously taken, medicine to treat asthma.

## What are clinical practice guidelines?

Clinical guidelines are produced after a scientific process used to gather and evaluate the latest evidence in the field. Guidelines also consider the opinions of leading experts and the priorities of patients and carers who have experience of a condition. Clinical guidelines are aimed at healthcare professionals. They use them as a 'best practice' document in how to diagnose, manage and treat specific conditions.

## What does this document include?

This document summarises the key points from the clinical guidelines. It explains them in a way that is more easily understood by people who do not work in a medical field. It will cover what asthma is and how it is diagnosed. By providing this information in an accessible way, this document aims to help parents/carers and young people with asthma understand more about the diagnosis process and feel informed when making decisions about care.

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## What is childhood asthma?

Asthma is a disease that includes the symptoms of wheeze, cough and breathing difficulty. These symptoms are triggered by issues in the airways that cause breathing issues:

- Airway obstruction – when the airways are blocked from swelling or extra mucus
- Airway inflammation – when the airways are irritated causing swelling and therefore narrowing
- Bronchial hyper-responsiveness – when the airways are overly sensitive and easily react to an irritant such as smoke or cold air or physical exercise. When they react, they get smaller, making breathing difficult.

Asthma can vary between each person and often not all of the above symptoms happen in each person. Symptoms can also come and go over time.

Childhood asthma refers to asthma that affects children between the ages of 5 and 16 years. Asthma is more difficult to diagnose before the age of 5 years as it is hard for children of this age to perform the tests needed to diagnose the condition. Some young children are still treated for asthma-like symptoms, such as wheeze, and a diagnosis will follow once they are older. Children over the age of 16 will be classed as an adult and follow the guidance given for diagnosing adult asthma.

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## How should childhood asthma be diagnosed?

There are many methods doctors can use to diagnose asthma. This guideline recommends the most effective methods based on a review of the latest evidence and discussion between experts.

### Symptoms

A doctor should ask about any symptoms a child has been experiencing and what triggers them. These could include wheeze, cough or breathing difficulties that could come and go over a long period of time. A diary of asthma-like symptoms can be a useful record for a doctor to understand a child's condition. However, these symptoms on their own should not be used to diagnose asthma. Further tests are required to confirm or rule out asthma.

### 3 key tests

The guideline recommends three tests that should be performed to confirm the presence of asthma. No single test result should be used on its own to confirm or rule out asthma. Instead, two test results that suggest asthma should be used to confirm the diagnosis.

#### Spirometry

A spirometry test involves blowing into a device called a spirometer. During the test, a person is asked to breathe out as much air as they can, as hard as they can. The spirometer then measures how much air can be blown out in total and how

much air is blown out in the first second of the test. Both these measurements are compared against a chart to look at what is normal for that person based on their sex and age. More information on understanding the results from a spirometry test can be found on the ELF website: https://europeanlung.org/en/information-hub/factsheets/testing-your-lungs-spirometry/

The guidelines recommend that spirometry tests are used to confirm whether asthma is present alongside the two tests described below. It is worth noting that not all children are able to perform the test accurately if they cannot blow into the device properly. This could generate an inaccurate result. For this reason, the guidelines recommend that even if the results suggest the lungs are working normally, this should not exclude asthma on its own. If the result is normal, but asthma is still suspected from looking at a child's symptoms, then results from the two tests below should also be considered.

## Bronchodilator reversibility (BDR) testing

If the spirometry test suggests a child has asthma, BDR testing should be the next step to confirm the diagnosis. BDR testing involves taking a small amount of asthma medicine, known as reliever medicine, to help open up the airways. Reliever medicine is used for quick relief when symptoms appear. It works by relaxing the airways to make breathing easier.

This is usually breathed in through a plastic container known as a spacer, which is often easier for children to use than inhaling the medicine directly.

After the medicine is taken, a spirometry test is performed again to see if there is a change in the airways. If a child is able to breathe better this time, showing the medication has helped prevent the airways narrowing, then it is likely they have asthma.

If both spirometry and the BDR test show that asthma is present, then this can confirm a diagnosis of asthma.

## Fractional exhaled nitric oxide (FeNO) testing

FeNO testing involves breathing into a machine that measures the amount of nitric oxide that is breathed out. A high level of nitric acid oxide suggests there is swelling (inflammation) in the lungs.

Some young children may struggle to breathe out properly for this test. It is also worth noting that inflammation that is not linked to asthma can also occur in the airways. This can happen when the child has hay fever for example. For these reasons, the guidelines recommend that the results of this test should not be used on their own to confirm a diagnosis. Instead, the results should be used alongside the two tests above and an understanding of a child's symptoms, to confirm a diagnosis of asthma.

## Will any other tests be used?

The guidelines recommend the three tests above as the best tests to diagnose asthma. There are many other tests available that have been previously used to diagnose asthma. The below provides a summary of what the guidelines concluded for each of these tests.

### Trial of asthma medicine

If a child is showing symptoms of asthma, they are often given an inhaler containing preventer asthma medicine. This medicine works over time to help reduce swelling in the airways. After taking the medicine for a short time, doctors will look at whether there has been any improvement in symptoms.

The guidelines do not recommend using a trial of asthma medicine to confirm or rule out asthma as there is not enough evidence to suggest it can give an accurate diagnosis.

This is a widely used test in many countries, particularly for younger children who may struggle to carry out the three key tests properly. The guidelines therefore suggest that the trial of medicine could be useful for situations where the three key tests could not confirm or rule out asthma. In this case, after the trial of medicine, the three key tests should be taken again 4-8 weeks later to look at whether there has been any improvement. The diagnosis should therefore be based not only on whether symptoms have improved, but also on changes in how well the lungs are working, shown by the test results.

## Peak expiratory flow rate (PEFR) – peak flow testing

Known as a peak flow test, this measurement looks at how fast a person can breathe out. The test uses a small hand-held device and can be done at a doctor's surgery or at home. Sometimes, healthcare professionals will ask children to keep a diary of their peak flow measurements at home over a period of a few weeks.

The guidelines suggest that this is not as accurate as spirometry, BDR and FeNO testing outlined above. In some healthcare settings where the three key tests are not widely available, then a peak flow diary could be used as a substitute. The measurements should ideally be taken over a 2-week period using an electronic peak flow meter.

## Challenge tests

### *Direct bronchial challenge tests*

These tests are carried out in hospitals and look at how sensitive a child's airways are. The test involves breathing in different substances through a hand-held device. The substances irritate the airways causing them to become gradually narrower. People with asthma will be affected by the substances much sooner than a person with healthy lungs. Although this test may sound scary, it is carried out in very controlled conditions with an asthma specialist on hand to monitor and treat any symptoms that are triggered. After the test, reliever medication is given to open up the airways again.

The test can be time consuming and potentially stressful for a child and their parent or carer. The guidelines therefore

recommend that it is only offered if it has not been possible to diagnose asthma from the three key tests listed above and a child's symptoms have not gone away. The results should also be considered alongside other test results and symptoms to build up a picture of a child's condition before asthma can be confirmed or ruled out.

### *Indirect challenge tests*

These tests work in a similar way to the direct challenge tests, by creating a situation where the airways swell, or become inflamed. Indirect challenge tests involve exposure to things that can trigger inflammation, such as exercise. The tests are carried out in specialist settings where a child does a small amount of exercise before taking a spirometry test. It is again carried out in very controlled conditions, with healthcare professionals monitoring and treating any symptoms that occur.

The guidelines recommend using a treadmill or a bicycle for an indirect challenge test for children who have asthma symptoms that are linked to exercise. This test should only be carried out if it has not been possible to diagnose asthma from the three key tests. The results should also be considered alongside other test results and symptoms to build up a picture of a child's condition before asthma can be confirmed or ruled out.

### *Allergy tests*

Allergies are common among children and even more so in children with asthma. Different inhaled particles, or allergens, in the air can trigger asthma symptoms. These include house dust

mites, animal fur, pollen and mould. Skin prick tests and blood tests are used to check whether a child is allergic to these different allergens.

A skin prick test involves dropping a small amount of liquid onto a child's arm that contains a substance that they may be allergic to. The skin is then gently pricked. If the child is allergic to the substance, a red, itchy bump would appear within a short space of time.

Blood tests can measure for specific antibodies produced by the immune system in response to an allergen.

The guidelines recommend that these tests are not used to diagnose asthma. The evidence suggests that they are not accurate enough. Some children who have allergies separate to asthma could be falsely diagnosed as having asthma. Other children with asthma separate to allergies could be missed. Guidelines suggest that these tests can be useful in managing asthma and understand symptoms and triggers, once a separate diagnosis has been given.

## Summary

There are many tests available to diagnose asthma and use of these tests varies across the world. The European Respiratory Society Guidelines recommend using two results from three key tests (spirometry, BDR testing and FeNO testing) to confirm or rule out whether a child has asthma. If the results of these tests are not certain, a number of other options are available to further investigate any persistent symptoms a child has.

"Getting an accurate diagnosis is so important. As a parent, you want to have answers so that you can move forward and help manage and improve any symptoms your child is feeling. Although there seems like a lot of tests that a child may need to get an asthma diagnosis, it is more reassuring for me to have test results in addition to a healthcare professional's diagnosis based on family history and symptoms alone. By having the diagnosis backed up by test results, you are able to have more trust that the plan you put in place to manage that condition, is the right one for your child."

***Kerri Jones, a parent of a child with asthma***

## Further reading

These guidelines were produced by the European Respiratory Society and the European Lung Foundation. You can find out more about these organisations and access the full professional guidelines using the links below:

### Full clinical guideline - published in April 2021.

https://www.ers-education.org/guidelines/all-ers-guidelines/

### Further resources for patients and carers:

Testing your lungs: spirometry (factsheet) https://europeanlung.org/en/information-hub/factsheets/testing-your-lungs-spirometry/

Childhood asthma (lung conditions section) https://europeanlung.org/en/information-hub/lung-conditions/childhood-asthma/

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## About ERS

The European Respiratory Society (ERS) is an international organisation that brings together physicians, healthcare professionals, scientists and other experts working in respiratory medicine. It is one of the leading medical organisations in the respiratory field, with a growing membership representing over 140 countries. The ERS mission is to promote lung health in order to alleviate suffering from disease and drive standards for respiratory medicine globally. Science, education and advocacy are at the core of everything it does. ERS is involved in promoting scientific research and providing access to high-quality educational resources. It also plays a key role in advocacy – raising awareness of lung disease amongst the public and politicians. www.ersnet.org

## About ELF

The European Lung Foundation (ELF) was founded by ERS to bring together patients and the public with professionals. ELF produces public versions of ERS guidelines to summarise the recommendations made to healthcare professionals in Europe, in a simple format for all to understand. These documents do not contain detailed information on each condition and should be used in conjunction with other patient information and discussions with your doctor. More information on lung conditions can be found on the ELF website: www.europeanlung.org

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