TEST

ESR

An ESR blood test measures how quickly red blood cells settle, which may suggest inflammation

WHAT IT MEASURES
How quickly red blood cells settle in one hour

SAMPLE
Blood

FASTING NEEDED?
No

HOW LONG IT TAKES
Usually less than five minutes

RESULTS IN
Often same day, but laboratory turnaround times differ

USED FOR
Supporting diagnosis and monitoring inflammation

MAIN LIMITATION
Many non-inflammatory factors can change the result

Overview

ESR stands for erythrocyte sedimentation rate. Erythrocytes are red blood cells, and sedimentation means settling.

The test measures how far your red blood cells fall through a tube of blood in one hour. Results are usually reported in millimetres per hour, written as mm/hr.

Inflammation can increase certain proteins in your blood. These proteins make red blood cells stick together in groups, causing them to settle more quickly. A faster rate may therefore suggest inflammation.

ESR is a non-specific test. This means it can show that inflammation may be present, but it cannot identify the cause or location. An elevated result does not by itself diagnose an infection, autoimmune condition, or cancer.

ESR is often considered alongside your symptoms, examination, medical history, and other tests. C-reactive protein, or CRP, is another blood test for inflammation and is sometimes ordered with or instead of ESR.

Why the test is ordered

An ESR may help investigate symptoms that could be related to inflammation. These can include persistent fever, unexplained joint pain, muscle stiffness, headaches, or weight loss.

It may be used when assessing conditions such as:

The test can also help monitor a known inflammatory condition. A falling ESR may support other evidence that inflammation is improving. A rising result may lead to a review, but it does not automatically mean that treatment has failed or a condition has worsened.

ESR is generally not useful as a stand-alone screening test in someone without relevant symptoms. Too many unrelated factors can produce an abnormal result.

- Polymyalgia rheumatica, which causes pain and stiffness around the shoulders and hips
- Giant cell arteritis, an inflammation of arteries usually affecting the head
- Inflammatory arthritis and some autoimmune conditions
- Certain long-lasting infections

Who should have the test

You may have an ESR if your symptoms, examination, or other test results suggest an inflammatory process. It may also be checked at intervals when a diagnosed condition is being monitored.

Not everyone with possible inflammation needs this test. CRP may be more useful when a rapid change needs to be detected because it usually rises and falls more quickly than ESR.

Children can have an ESR, but their results need age-appropriate interpretation. Pregnancy, older age, sex, blood disorders, kidney function, and medicines can also influence how a result is assessed.

How to prepare

No fasting is required for an ESR. You can usually eat, drink water, and take your regular medicines before the blood draw.

Do not stop a medicine unless the health professional responsible for it has told you to. Some medicines can affect inflammation or the ESR result, so bring an up-to-date list of prescriptions, over-the-counter medicines, and supplements.

If other blood tests are being collected at the same appointment, their preparation rules may be different. For example, another test might require fasting even though ESR does not.

Tell the person arranging the test if you are pregnant, recently had a blood transfusion, or have a known blood or kidney condition. These details can help with interpretation.

What happens during the test

A healthcare professional places a band around your upper arm and cleans a small area of skin. A needle is inserted into a vein, usually at the inside of your elbow, and blood is collected into a tube containing a substance that prevents clotting.

The blood is sent to a laboratory. In the standard Westergren method, it is placed in a tall, narrow tube. The laboratory measures how far the red blood cells settle after one hour.

The blood draw itself usually takes less than five minutes. The laboratory measurement takes longer, and results are often available later that day or within a few days.

Understanding your results

Your report will show an ESR value in mm/hr and usually provide the laboratory's reference range. There is no single appropriate range for everyone. Ranges and interpretation vary by laboratory, age, sex, pregnancy status, medicines, and clinical context.

A higher-than-expected ESR means the red blood cells settled more quickly. This can occur with inflammation, but also with anaemia, pregnancy, kidney disease, ageing, and changes in blood proteins.

Very high results may make significant inflammation more likely, but they still do not identify its cause. Further assessment is needed before any conclusion can be reached.

A result within the laboratory range does not completely rule out inflammatory disease. Some conditions cause little change in ESR, especially early on. Medicines that reduce inflammation may also lower it.

A low ESR is usually not concerning by itself. It can occur when there are many red blood cells or when their size or shape prevents them from settling normally.

Trends can sometimes be more useful than one measurement. For monitoring, results are best compared with previous tests, symptoms, and other markers rather than interpreted alone.

What affects the results

ESR is especially sensitive to factors that change red blood cells or blood proteins. The result can be misleading even when the laboratory has performed the test correctly.

Important influences include:

Collection and handling matter too. A tilted or vibrating tube, incorrect blood-to-anticoagulant like warfarin or apixaban ratio, clotted sample, temperature changes, or a long delay before testing can produce an unreliable result. Laboratories use quality controls to reduce these problems and may request another sample if the specimen is unsuitable.

- Anaemia: A low red blood cell concentration, including from iron deficiency, can raise ESR without a matching increase in inflammation
- Red blood cell size or shape: Larger cells may settle faster, while sickle-shaped cells, spherocytes, or marked microcytosis may settle more slowly
- Altered red cell production or breakdown: Conditions affecting red cell turnover can change the result
- Recent blood transfusion: Donor cells can temporarily alter the number and characteristics of circulating red blood cells
- Pregnancy: ESR commonly rises during pregnancy and needs pregnancy-specific interpretation
- Age and sex: ESR tends to be higher in older adults, and laboratory ranges may differ by sex
- Kidney disease: Chronic kidney problems can raise ESR through anaemia and changes in blood proteins
- Medicines: Corticosteroids and other anti-inflammatory treatments may lower ESR by reducing inflammation; hormone-containing medicines may also influence it
- Blood protein changes: High levels of fibrinogen or immunoglobulins can speed settling, including when inflammation is not the cause

Accuracy and limitations

ESR does not have one fixed rate for correctly detecting inflammation. Its performance changes with the condition, its stage, the person being tested, and the threshold used by the laboratory.

The test can miss inflammation. A normal ESR may occur early in an illness, with limited

inflammation, or when medicines have reduced the inflammatory response.

It can also suggest inflammation when active inflammatory disease is not present. Anaemia, pregnancy, ageing, kidney disease, and abnormal blood proteins are common reasons for this type of misleading elevation.

ESR also changes slowly. It may remain elevated after symptoms and other signs have improved. CRP often responds more quickly to new inflammation and to recovery, and it is less affected by red blood cell characteristics.

Neither ESR nor CRP identifies a diagnosis. Depending on the concern, a blood count, CRP, cultures, antibody tests, imaging, or a tissue sample may provide more useful information.

Risks and complications

The risks are those of a routine blood draw. You may have brief discomfort, a small bruise, or feel light-headed; serious complications are uncommon.

What happens next

A result within the expected range may need no action if your symptoms and other findings are reassuring. If the result is unexpected, it may be repeated or compared with CRP, a full blood count, kidney tests, or other targeted investigations.

An abnormal ESR usually leads to routine follow-up rather than emergency treatment. The result should be interpreted with the reason it was ordered and any changes since earlier tests.

Seek urgent medical assessment for a new severe headache with scalp tenderness, jaw pain while chewing, or changes in vision, particularly if giant cell arteritis is being considered. Sudden loss of vision, stroke-like symptoms, severe breathing difficulty, or chest pain require emergency care regardless of the ESR result.

Common questions

Can I drink coffee before an ESR test?

Yes. Coffee does not usually interfere with ESR, and fasting is not required. Follow different instructions if other tests are being collected at the same time.

Does the time of day matter?

Usually not. ESR may show small biological changes over the day, but testing is not normally

restricted to a particular time. For repeated monitoring, using similar testing conditions can make trends easier to compare.

Can I exercise beforehand?

Ordinary activity is fine. If your ESR is being followed closely, it may be sensible to avoid unusually strenuous exercise immediately beforehand because intense activity can temporarily affect blood volume and inflammatory markers.

Should I take my medicines before the test?

Usually, yes. Do not stop prescribed medicines for an ESR unless instructed. Make sure the health professional interpreting the result knows about corticosteroids like prednisone or hydrocortisone , anti-inflammatory medicines, hormones, and recent changes in treatment.

Why are my ESR and CRP results different?

They measure different responses. CRP changes relatively quickly, while ESR can rise and fall more slowly and is more affected by anaemia, pregnancy, age, kidney disease, and red blood cell characteristics.

Do I need another ESR if mine is high?

Not always. The next step depends on why the test was ordered, how high it is relative to your laboratory's range, your symptoms, and other results. A repeat ESR or a different test may be more informative than acting on one value.

Sources

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