



Blood tests for heart and stroke conditions

Blood tests for stroke and heart conditions

If you have heart problems, if you have stroke symptoms, or if a heart attack is suspected, you may have some or all of the following tests:

- Troponin levels
- B-type natriuretic peptide (BNP) levels
- Urea and electrolytes

Troponin levels

Troponins are proteins in your heart that are involved in contracting the muscles when it beats. When the heart muscle is damaged, troponins may be released into your blood.

A positive blood test for troponins can suggest that you have **damage to your heart.**

A positive troponin test will usually be followed up with additional tests, like an ECG or scan of your chest, to see whether there are functional problems with your heart.

High troponin levels are often associated with a heart attack.

B-type natriuretic peptide (BNP) level

BNP is a hormone released by your heart to regulate your blood volume (and therefore blood pressure). When your heart is working particularly hard, it produces more BNP.

A high BNP level (more than 400 pg/mL) is associated with heart failure and heart disease.

If your BNP is **less than 100 pg/mL** then you are very unlikely to have heart failure.

If your BNP level is between **100-400 pg/mL**, you may need **follow-up tests**.



Electrolyte blood panels

Electrolyte panel

Electrolytes are chemicals that conduct electrical impulses in your body. This is important for a lot of things, including your nervous system. Measuring electrolytes can also help to show your blood's pH, and how much water is in the blood.

An electrolyte panel typically measures four chemicals in your blood serum (the liquid part of your blood):

1. **Chloride** (Cl)
2. **Potassium** (K)
3. **Sodium** (Na)
4. **Bicarbonate** (HCO₃)

Your electrolyte panel may also include a measure called the **anion gap**, which can highlight general problems with your electrolytes.

Serum chloride (Cl)

Chloride is a key electrolyte in the body. It usually increases or decreases in proportion to sodium (Na) since the two easily combine to make salt (NaCl). However, sometimes chloride may be out of proportion to sodium when your blood is too acidic or too alkaline.

- High chloride levels can be caused by dehydration, or by certain breathing problems.
- Low chloride levels can be caused by chronic lung disease like emphysema, or by vomiting or diarrhoea over a long time.

Your chloride value should usually be between 95–108 mmol/L

Serum sodium (Na)

Sodium is a key electrolyte in the body. It usually increases or decreases in proportion to chloride (Cl) since the two easily combine to make salt (NaCl).

High sodium levels are usually caused by dehydration.

Low chloride levels can be caused by several things:

- Losing salt through vomiting, diarrhoea, or sweating
- Too much water in the body, which can indicate kidney or heart problems
- Taking diuretics, which you may have been given to lower your blood pressure

Your sodium level should usually be between **133–146 mmol/L**

Serum potassium (K)

Most of the potassium in your body is actually in your cells, and the amount in your blood is very tightly controlled.

Abnormal blood potassium levels can affect nerves and muscles throughout the body. This may cause heart problems and other issues.

High serum potassium is connected to kidney disease and diabetes. It can also be caused by certain medications, such as ACE inhibitors or painkillers like ibuprofen.

Low serum potassium is caused by losing potassium through vomiting, diarrhoea, or urine. It is often associated with taking diuretics.

Your serum potassium should usually be between **3.5–5.3 mmol/L**

Serum bicarbonate (HCO)

Bicarbonate is a form of carbon dioxide which is stored in the blood. The level of bicarbonate can give your doctor an idea of how acidic or alkaline your blood is.

Where your bicarbonate levels are abnormal, it usually means that your blood is having trouble maintaining its pH.

Low bicarbonate can be caused by: kidney disease, chronic diarrhoea, metabolic problems, or hormonal problems.

High bicarbonate can be caused by: respiratory problems like COPD and other lung diseases, severe vomiting, or metabolic problems.

Your bicarbonate level should usually be between **22–29 mmol/L**

Anion gap (AG)

The anion gap is a calculated number which compares the number of positively-charged electrolytes (cations) against the number of negatively-charged electrolytes (anions).

Usually, this is calculated using the formula:

$$\text{Sodium} - (\text{Chloride} + \text{bicarbonate}) = \text{Anion gap}$$

If the anion gap is higher than expected, there are more anions in the blood than expected. You may need further tests to discover what is in the blood to cause this imbalance.

Because different labs use different formulae to calculate the anion gap, the normal range may vary depending on which laboratory did the test.



Blood coagulation tests

Coagulation tests

Coagulation is the ability of your blood to clot.

You may be given a coagulation panel if you are undergoing surgery, if you are taking blood thinners such as warfarin, or to see if you are at high risk of a blood clot.

These tests measure three things:

- **Prothrombin (PT) time**
- **International normalisation ratio (INR)**
- **Partial thromboplastin time (PTT)**

Prothrombin time (PT)

Prothrombin time is the time it takes for your blood to form a clot.

Your prothrombin time may be longer if you are taking anticoagulants (“blood thinners”).

If you are not taking anticoagulants and still have a long prothrombin time, you may need additional tests to find the cause.

The healthy range for prothrombin time will depend on which laboratory runs the test and what method they use, but it is generally around **12-13 seconds**.

International normalisation ratio (INR)

The international normalisation ratio (INR) is a more specific version of the **prothrombin time**. INR specifically measures the activity of warfarin and vitamin K in clotting your blood.

INR will usually be used to monitor how well anticoagulant medication is working.

For most people, the target INR is between **2.0 and 3.0**.

However, if you are at a high risk of clots, this may rise to **3.0 to 4.0**.

A higher INR means that you are **less likely** for your blood to clot, but **more likely** to bleed too much when cut or injured.

Partial thromboplastin time (PTT)

PTT, also called **aPTT** (Activated Partial Thromboplastin Time) or **KCCT** (Kaolin Cephalin Clotting Time), is another measure of how long your blood takes to form clots.

Your blood clotting is controlled by a range of coagulation factors (which are given numbers in Roman numerals, such as Factor I or Factor VII). Your PTT will show if any of these are low or missing.

The PTT workup is extremely complicated and will vary depending on the laboratory which performs the tests and the doctor who requests them. Your doctor will explain the results if asked.

Comparing PT and PTT

Sometimes, if you have a problem with your blood clotting, your prothrombin and partial thromboplastin times will be compared to help find the cause.

These results can suggest causes for your symptoms.(see table)

PT RESULT	PTT RESULT	POSSIBLE CONDITIONS:
High	Normal	Liver disease Low vitamin K Low/damaged factor VII
Normal	High	Low/damaged factor VIII, IX, XI or XII von Willebrand disease Lupus anticoagulant
High	High	Low/damaged factor I, II, V or X Liver disease Disseminated intravascular coagulation (DIC)
Normal	Normal	Low platelet function Thrombocytopenia (low platelet count) Low factor XIII Weak collagen



Inflammatory markers

Blood tests for inflammation

Inflammation tests

If your doctor suspects your problem may be caused by inflammation (swelling), they may ask for special tests to measure inflammation in your body.

Inflammation can be caused by an infection, an injury, or certain autoimmune conditions.

The most common tests for inflammation are:

- **C-reactive protein (CRP) test**
- **Erythrocyte sedimentation rate (ESR) test**
- **Plasma viscosity tests**

C-reactive protein (CRP)

C-reactive protein is a protein made by the liver. It is released into the blood within a few hours of an injury, infection, or other inflammation.

A CRP level higher than **10 mg/L** suggests you have a clinically important amount of inflammation.

This can be a result of:

- infection or injury
- heart attack
- recent surgery
- a flare-up of chronic inflammatory disease

Comments on CHSS Tailored Talks (TTs)

If you have any comments/changes/suggestions on CHSS Tailored Talks please contact:

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