



[Home](#) → [Medical Encyclopedia](#) → Comprehensive metabolic panel

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Comprehensive metabolic panel

A comprehensive metabolic panel is a group of blood tests. They provide an overall picture of your body's chemical balance and metabolism. Metabolism refers to all the physical and chemical processes in the body that use energy.

How the Test is Performed

A blood sample is needed.

How to Prepare for the Test

You should not eat or drink for at least 8 hours before the test.

How the Test will Feel

When the needle is inserted to draw blood, some people feel moderate pain. Others feel only a prick or stinging. Afterward, there may be some throbbing or a slight bruise. This soon goes away.

Why the Test is Performed

This test gives your health care provider information about:

- How your kidneys and liver are working
- Blood sugar and calcium levels
- Sodium, potassium, and chloride levels (called electrolytes)
- Protein levels

Your provider may order this test to check you for side effects of medicines or for diabetes, liver disease, or kidney disease.

Normal Results

Normal values for the panel tests are:

- Albumin: 3.4 to 5.4 g/dL (34 to 54 g/L)
- Alkaline phosphatase: 20 to 130 U/L (0.33 to 2.17 µkat/L)
- ALT (alanine aminotransferase): 4 to 36 U/L (0.07 to 0.60 µkat/L)

- AST (aspartate aminotransferase): 8 to 33 U/L (0.13 to 0.55 µkat/L)
- BUN (blood urea nitrogen): 6 to 20 mg/dL (2.14 to 7.14 mmol/L)
- Calcium: 8.5 to 10.2 mg/dL (2.13 to 2.55 mmol/L)
- Chloride: 96 to 106 mEq/L (96 to 106 mmol/L)
- CO₂ (carbon dioxide): 23 to 29 mEq/L (23 to 29 mmol/L)
- Creatinine: 0.6 to 1.3 mg/dL (53 to 114.9 µmol/L)
- Glucose: 70 to 100 mg/dL (3.9 to 5.6 mmol/L)
- Potassium: 3.7 to 5.2 mEq/L (3.70 to 5.20 mmol/L)
- Sodium: 135 to 145 mEq/L (135 to 145 mmol/L)
- Total bilirubin: 0.1 to 1.2 mg/dL (2 to 21 µmol/L)
- Total protein: 6.0 to 8.3 g/dL (60 to 83 g/L)

Normal values for creatinine can vary with age.

Normal value ranges for all tests may vary slightly among different labs. Some labs use different measurements or may test different specimens. Talk to your provider about the meaning of your specific test results.

What Abnormal Results Mean

Abnormal results can be due to a variety of different medical conditions. These may include kidney disease, liver disease, breathing problems, and diabetes or diabetes complications.

Risks

There is little risk involved with having your blood taken. Veins and arteries vary in size from one person to another and from one side of the body to the other. Taking blood from some people may be more difficult than from others.

Other risks associated with having blood drawn are slight but may include:

- Excessive bleeding
- Fainting or feeling lightheaded
- Multiple punctures to locate veins
- Hematoma (blood accumulating under the skin)
- Infection (a slight risk any time the skin is broken)

Alternative Names

Metabolic panel - comprehensive; CMP

References

McPherson RA, Pincus MR. Disease/organ panels. In: McPherson RA, Pincus MR, eds. *Henry's Clinical Diagnosis and Management by Laboratory Methods*. 24th ed. Philadelphia, PA: Elsevier; 2022:chap 7.

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