The Blood Project

UNDERSTANDING POLYCYTHEMIA

A brief guide for patients with elevated hemoglobin or hematocrit

Polycythemia means that the **hemoglobin** or **hematocrit** is higher than usual. These values are the modern way doctors assess **red blood cell mass** in the body. A mild elevation is often caused by reversible or harmless conditions, and many people with slightly high numbers feel completely well. This information sheet explains what polycythemia means, why it happens, how it is evaluated, and what to expect.

What are hemoglobin and hematocrit?

Hemoglobin and hematocrit are the two main markers used today to define polycythemia.

- **Hemoglobin (Hb)** is the concentration of the **oxygen-carrying protein** in red blood cells.
- **Hematocrit (Hct)** is the **percentage of your blood made up of red cells**.

These tests reflect **red cell mass**, which is the true basis for defining polycythemia. Although red cell mass can be measured directly, it is no longer used in routine practice.

Why not use the red blood cell count?

The red blood cell (RBC) count can be misleading. It may be high even when hemoglobin and hematocrit are normal, for example, in:

- thalassemia trait
- iron deficiency with very small red cells

This pattern is called **erythrocytosis**, and it does **not** mean polycythemia.
For diagnosing polycythemia, **hemoglobin and hematocrit are what matter**.

What is polycythemia?

Polycythemia means **the hemoglobin or hematocrit is above the laboratory's normal range**.
It is a **laboratory finding**, not a diagnosis by itself.
Most people with mild elevations do **not** have a bone marrow disease.
Common patterns your report may show:

- values marked in red
- comments such as "polycythemia" or "erythrocytosis"
- normal platelets and white blood cells (very typical in benign causes)

Relative vs. true (absolute) polycythemia

Relative polycythemia (very common)
Hemoglobin or hematocrit appears high because the plasma (fluid) part of the blood is low.
Examples:

- dehydration
- diuretics
- vomiting
- sweating
- acute stress

Red cell mass is normal, and values often improve with hydration.

True (absolute) polycythemia
The body is truly making **too many red blood cells**. This may occur because of:

- low oxygen levels
- hormone or medication effects
- kidney-related signaling changes
- rare bone marrow conditions such as polycythemia vera

Common causes of true polycythemia

Oxygen-related causes (very common)
Anything that lowers oxygen can signal the kidneys to make more red blood cells:
Examples include:

- sleep apnea
- chronic lung disease (COPD)
- obesity-related nighttime low oxygen
- living at high altitude
- certain heart or lung conditions

Hormones, medications, and metabolic factors
Examples include:

- testosterone therapy
- anabolic steroids
- certain supplements or hormonal regimens

Kidney-related causes
The kidneys make erythropoietin (EPO), a hormone that stimulates red cell production.
Examples include:

- kidney cysts or polycystic kidney disease
- renal artery narrowing
- kidney or liver tumors that produce EPO (rare)

Rare bone marrow causes (polycythemia vera)
Polycythemia vera (PV) is an uncommon condition in which the bone marrow makes red blood cells without an external trigger.
Clues that suggest PV include:

- higher platelets or white cells
- itching after warm showers
- redness or burning in the hands or feet
- enlarged spleen
- a positive JAK2 mutation

Most people with high hemoglobin or hematocrit do **not** have PV.
Inherited or genetic causes
Uncommon lifelong patterns involving:

- high-oxygen-affinity hemoglobins
- changes in the body's oxygen-sensing pathways

Does it cause symptoms?

Most people with polycythemia have **no symptoms**, especially when the cause is common and reversible (dehydration, sleep apnea, smoking, altitude, medications).
When symptoms occur in secondary or relative polycythemia, they usually come from the underlying condition, not from the elevated hemoglobin itself.
Examples:

- sleep apnea → daytime fatigue

- smoking → cough
- dehydration → dizziness

Symptoms more typical of polycythemia vera may include:

- itching after warm showers
- headaches or lightheadedness
- flushed feeling
- visual changes
- tingling, burning, or redness in hands or feet
- fullness in the left upper abdomen (enlarged spleen)

Bottom line: Symptoms depend on the **cause**, not on the number.

Is it dangerous?

Polycythemia is usually **not dangerous** when caused by common or reversible conditions.

When it is generally safe

Secondary or relative polycythemia:

- has **very low risk** of blood clots
- rarely causes symptoms
- usually reflects a correctable process (sleep apnea, smoking, altitude, dehydration)

When it can be dangerous

Risk increases mainly when the cause is **polycythemia vera (PV)**.

PV can:

- increase the risk of blood clots
- enlarge the spleen
- cause itching, redness, headaches, or vision changes
- continue rising without physiologic trigger

Polycythemia vera is **usually associated with a JAK2 mutation** and is diagnosed using blood tests and, in some cases, bone marrow evaluation.

Rare exceptions

Seek urgent evaluation for severe headache, vision changes, chest pain, shortness of breath, or symptoms of a blood clot

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How is it evaluated?

Your doctor may check:

- **repeat CBC**
  to confirm the finding and assess trends
- **oxygen level or sleep apnea testing**
  to check for low-oxygen states
- **kidney function tests and erythropoietin (EPO) level**
  to assess kidney-related causes
- **iron studies**
  iron status can affect interpretation
- review of **smoking or nicotine use**
- **JAK2 mutation testing**
  when appropriate to evaluate for polycythemia vera

Testing depends on your symptoms, history, and how elevated the values are.

What is the treatment?

Treatment depends entirely on the cause:

- sleep apnea → treat apnea
- smoking → quitting lowers red cell levels
- dehydration → hydrate
- hormones or medications → adjust therapy
- kidney-related causes → treat the underlying condition

Treatments for polycythemia vera

Only people with PV may need:

- phlebotomy (blood removal)
- low-dose aspirin
- cytoreductive therapy (medications that lower blood counts)

These treatments are **not used** for common or reversible causes.

When should I contact my doctor?

Let your doctor know if you have:

- new headaches, dizziness, or vision changes
- unusual bleeding or bruising
- chest pain or shortness of breath
- symptoms of sleep apnea
- rising hemoglobin or hematocrit on repeat testing

Seek urgent care for severe shortness of breath, chest pain, or neurologic (stroke-like) symptoms

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What is the usual plan going forward?

Most people need:

- periodic CBCs
- evaluation for reversible causes
- monitoring of oxygen levels or sleep studies (when appropriate)
- lifestyle guidance (hydration, smoking cessation, sleep evaluation)

Once the cause is identified, **most people do very well**.

Key points to remember

- **polycythemia means high hemoglobin or hematocrit**, not just a high RBC count.
- **most causes are common and reversible**, such as dehydration, sleep apnea, smoking, or hormones.
- **relative polycythemia** (low plasma volume) is common and improves with hydration.
- **polycythemia vera is rare** and diagnosed with specific testing.
- **your doctor will determine the cause**, and most people need monitoring, not treatment.