

HumaMeter Hb^{Plus}

Lab in your palm for rapid hemoglobin testing

- > Fast and flexible operation
- > Patient-, user- and eco-friendly
- > Reliable, robust and cost-efficient

Hemoglobin Measurement

POC DX



Human

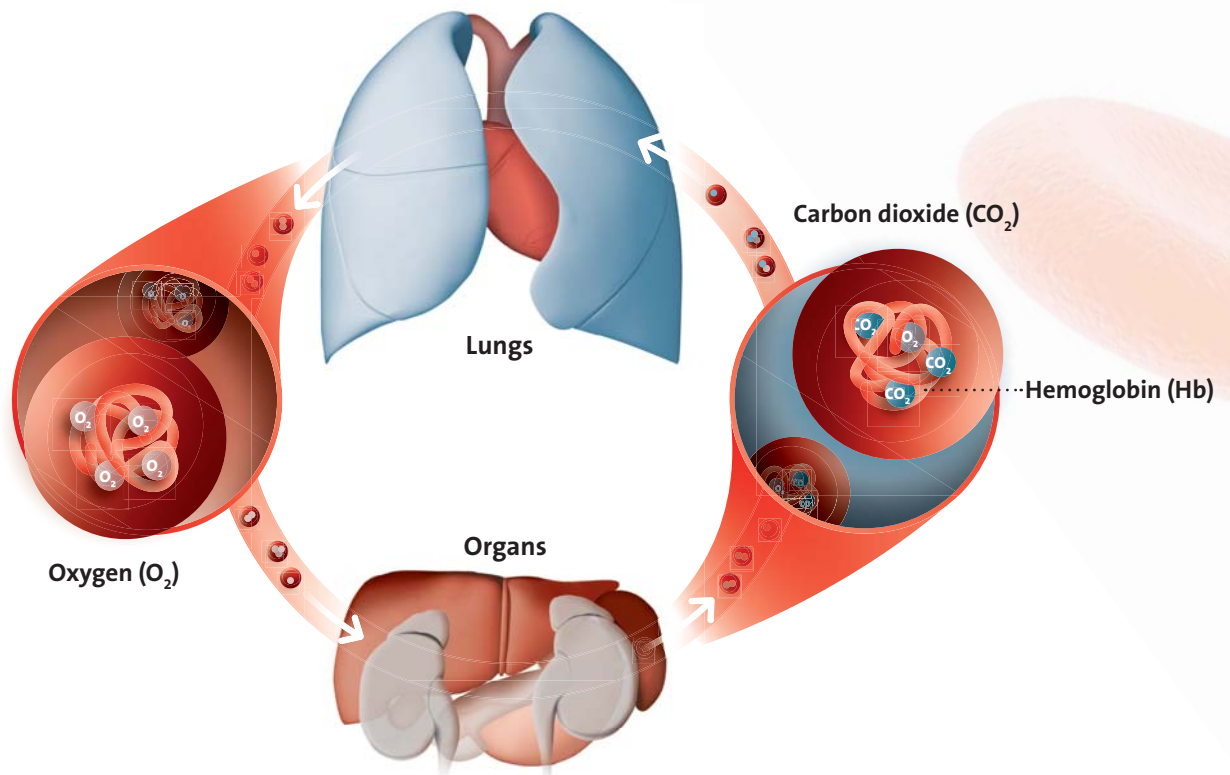
Diagnostics Worldwide

Anemia and Hemoglobin

Importance of hemoglobin determination

Clinical background

Anemia is a condition when blood does not contain sufficient functional erythrocytes or hemoglobin. The principal function of hemoglobin, the main protein component of the erythrocytes, is the transport of oxygen and carbon dioxide. Hemoglobin (Hb) transports oxygen from the lungs into the body. Hb also brings waste products such as carbon dioxide from the body to the lungs.



Anemia

Patients with anemia have not enough erythrocytes or hemoglobin. As a result, their body cells, tissues and organs will not receive enough vital oxygen. The related common symptoms of anemia are e.g. fatigue, weakness, dizziness, cold extremities or insomnia. Iron deficiency is one of the most common preventable causes of anemia next to nutritional deficiencies including lack of vitamins (e.g. vitamin A, vitamin B12, folate), chronic inflammation or parasitic infections.

Anemia prevalence: Who is affected?

Anemia is the most common blood disorder in most countries, it can affect up to one out of four people. Pregnant women and children younger than five years do have the highest prevalence, almost twice as high, besides humans with chronic diseases. ^{1,2}

Population group	Prevalence of anemia
Children < 5 years	47.4 %
Children 5 - 15 years	25.4 %
Non-pregnant women	30.2 %
Pregnant women	41.8 %
Men	12.7 %
Elderly	23.9 %
Total population	24.8 %

Table 1: Global anemia prevalence and number of individuals affected. ²
(Adapted version)

Malaria and anemia

Malaria parasites are transmitted into the blood by mosquito bites. These parasites invade the erythrocytes and cause their hemolysis at the end of the infection cycle. This reduces the number of erythrocytes and can lead to severe anemia. Anemia is a major driver of patient hospitalization, mortality and is seen as a critical factor influencing patient outcomes. Therefore, it is important to provide access to reliable anemia screening to easily identify patients at risk.³

Pregnancy and anemia

With an estimated global prevalence of over 40 %, anemia is the most common disorder in pregnancy. Blood loss associated with child delivery may worsen an existing anemia. Consequences of anemia include intrauterine fetal death, premature birth, low birth weight and other adverse neonatal outcomes. For the mother these are e.g. breathlessness, lethargy, infection or lactation failure.^{4,5}

Hb testing at the point of need

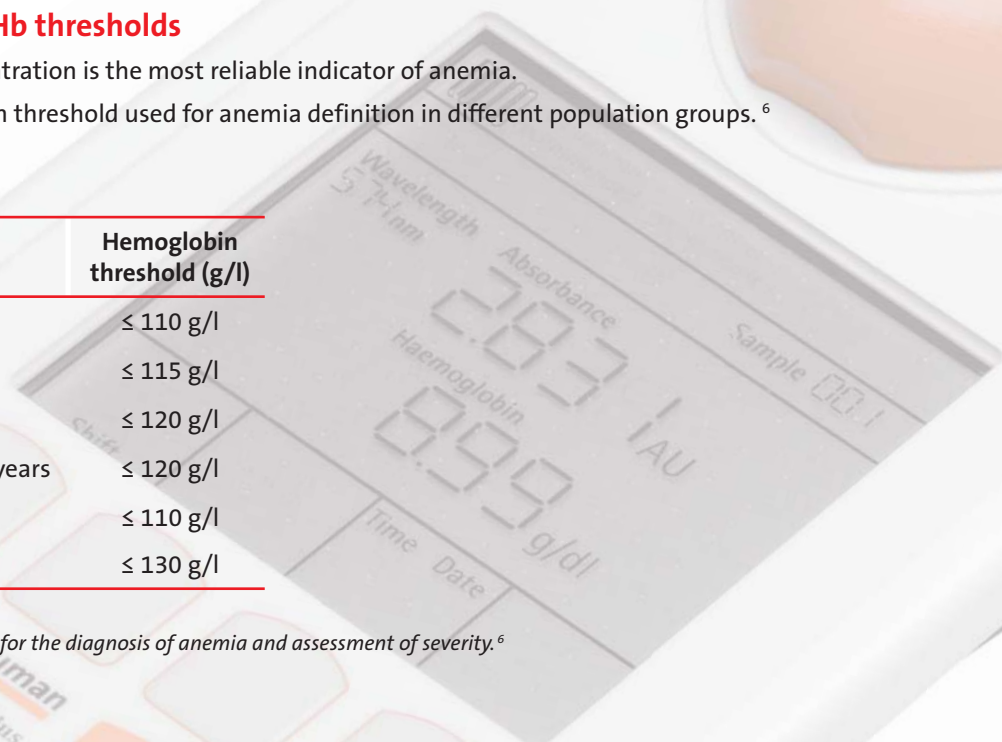
There are several methods to test hemoglobin. Point-of-care testing gaining ground because it provides immediate results. In addition, it enables testing and screening independent of a patient's access to complex clinical laboratory technology. Hemoglobin testing is probably the most performed point-of-care test in hematology.

Anemia: Definition by Hb thresholds

According to WHO, Hb concentration is the most reliable indicator of anemia. Table 2 shows the hemoglobin threshold used for anemia definition in different population groups.⁶

Age or gender group	Hemoglobin threshold (g/l)
Children < 5 years	≤ 110 g/l
Children 5 - 11 years	≤ 115 g/l
Children 12 - 15 years	≤ 120 g/l
Non-pregnant women > 15 years	≤ 120 g/l
Pregnant women	≤ 110 g/l
Men ≥ 15 years	≤ 130 g/l

Table 2: Hemoglobin concentrations for the diagnosis of anemia and assessment of severity.⁶



HumaMeter Hb^{Plus}

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The HumaMeter Hb^{Plus} system uses the AHD method (Alkaline Haematin Detergent), an internationally recognized reference method.⁷ The AHD process is free of toxic cyanide. In addition, it provides reliable results for blood samples with e.g. erythrocyte stroma, elevated leukocytes and/or thrombocytes, triglycerides or protein coagulations. The frequently used azide methemoglobin method as an example can overestimate Hb values under these conditions.

Fast and flexible operation

- > Lab quality results in less than 10 seconds
- > Samples: capillary, venous or arterial blood
- > Testing where needed: portable system, mains operation or with batteries



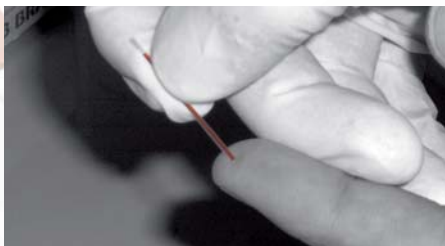
Patient-, user- and eco-friendly

- > Only 20 µl sample volume
- > Simple, intuitive operation
- > Factory-calibrated, ready-to-use
- > Unique cyanide-free AHD method

Reliable, robust and cost-efficient

- > Robust design with modern, extremely durable optics
- > Reagent and control shelf life up to 3 years
- > Reagent storage at up to 40°C

Reliable results in four simple steps



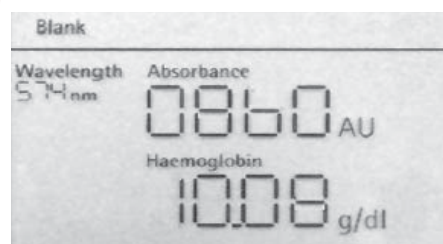
1 Blood collection, 20 µl capillary, venous or arterial blood



2 Addition of the sample into the cuvette and mixing with capillary or pipette



3 Insert the cuvette into the HumaMeter Hb^{Plus}



4 Results in 10 seconds

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Technical Data

Sample volume:	20 µl
Measuring range:	0.5 – 30 g/dl (5 – 300 g/l)
Wavelength:	574 nm-specific LED
Photodiode detector:	Recording range 200 – 1000 nm
Measuring principle:	Absorption
Memory:	Up to 1,000 results incl. date/time
Power:	Rechargeable batteries or power supply
Interface:	USB Port 1.1
Reagent Cuvettes:	Cuvettes prefilled with 3 ml
Method:	AHD (Alkaline Haematin Detergent)
Calibration:	Precalibrated
Quality control:	2-level control

HumaMeter Hb^{Plus}

Portable system for hemoglobin determination **REF 16070**

System Reagents

Reagent Hb – 100 prefilled cuvettes	REF 16070/1
Reagent Hb – 25 prefilled cuvettes	16070/25
Calibrator Set Hb 6 x 1.5 ml	16070/2
Control Set Hb (2 level) 2 x 1.5 ml	16070/3

Consumables

End-to-end capillaries 20 µl 100 pcs. **REF 16070/30**

AHD (Alkaline Haematin Detergent)

The only recognized Hb reference method

In contrast to most other methods and systems for the determination of Hb in blood, the AHD method does not contain any toxic cyanide. Moreover, what is known to only a few experts, in the AHD method all corpuscular parts and lipid components are solubilized, preventing contrary to all other methods, the overestimation of hemoglobin concentrations. Due to this, AHD is the only internationally recognized reference method for the determination of hemoglobin (DIN 58931).⁷

Your local distribution partner

1. WHO (2008) Worldwide prevalence of anaemia 1993–2005: WHO global database on anaemia.
2. WHO (2015) The global prevalence of anaemia in 2011. Geneva: World Health Organization 2015.
3. Chen I et al. (2016) "Asymptomatic" Malaria: A Chronic and Debilitating Infection That Should Be Treated. *PLoS Med* 2016, 13(1): e1001942.
4. Stevens GA et al. (2013) Global, regional, and national trends in haemoglobin concentration and prevalence of total and severe anaemia in children and pregnant and non-pregnant women for 1995-2011: a systematic analysis of population-representative data. *Lancet Glob Health* Jul, 2013, 1(1): e16-25.5.
5. Rahman MM et al. (2016) Maternal anemia and risk of adverse birth and health outcomes in low- and middle-income countries: systematic review and meta-analysis. *Am J Clin Nutr* 2016, 103:495–504
6. WHO (2011) Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity.
7. DIN 58931 (2010) Haematology - Determination of haemoglobin concentration in blood - Reference method.

