

## What is hemoglobin and why is it important?

Oxygen is the most essential element required to sustain human life. If an adequate supply of oxygen is not circulated throughout the body to vital organs and tissues, brain damage, organ failure and death can result. Hemoglobin (Hb), the iron-containing respiratory protein in red blood cells, is responsible for transporting oxygen from the lungs to the rest of the body. Measured in grams per deciliter (g/dL), hemoglobin levels indicate the blood's ability to carry oxygen and iron. Too little iron interferes with vital functions and leads to morbidity and mortality.

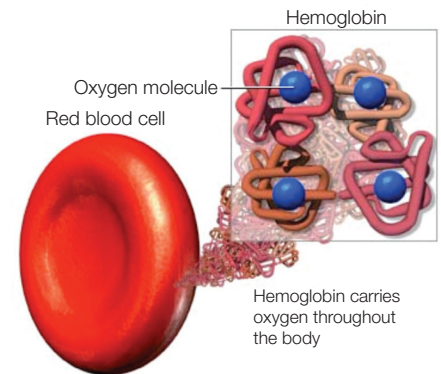
Normal hemoglobin levels differ between males and females, ranging from:

- 12-16 g/dL for women and
- 13-18 g/dL for men

A low hemoglobin level is called anemia, which can indicate a variety of serious medical conditions that may require immediate treatment.

### The Global Burden of Anemia<sup>1</sup>

- More than 2 billion people worldwide are anemic.
- Iron Deficiency Anemia (IDA) accounts for at least half of all anemia cases worldwide.
  - Causes almost 1 million deaths a year.
  - Recognized as a top-ten contributing factor to the global burden of disease.
  - Results in lost cognitive function and lost productivity—costing \$50 billion annually in gross domestic product (GDP) losses worldwide.



### Types and Causes

- Anemia can be chronic (consistently low hemoglobin levels) or acute (suddenly lower hemoglobin levels), resulting from:
  - Dietary iron deficiency, known as Iron Deficiency Anemia (IDA)
  - Blood loss (from internal or external bleeding) due to surgery or trauma
  - Anemia of chronic disease due to:
    - chronic infection, such as malaria
    - malignancy, such as cancer
  - Renal (kidney) failure
  - Drugs administered, such as in cancer therapy

### Signs and Symptoms

Anemia often goes undetected as symptoms can be small and vague. Most commonly-reported symptoms, include: weakness or fatigue, general malaise (feeling unwell), poor concentration, pallor (pale skin, mucosal linings and nail beds), pica (consumption of ice, hair, paper, etc.) shortness of breath on exertion, palpitations and sweatiness.

### Testing

- More than 400 million hemoglobin lab tests—to detect common blood disorders like anemia—are performed in the U.S. each year, making it the most common clinically-ordered blood test.
- For the first time, a new, breakthrough technology (Masimo noninvasive and continuous total hemoglobin monitoring technology – SpHb™) facilitates hemoglobin testing without a painful needle stick and invasive blood draw—making it safer, faster, and easier than ever to measure a patient's hemoglobin blood levels on the spot, in just seconds.

### Treatments

- Blood transfusion—the process of introducing blood or blood-based products into a patient's bloodstream—is used to replace blood lost during surgery or after traumatic events.
  - A low or falling Hb level is the primary method clinicians use to identify acute anemia due to blood loss and the need for a blood transfusion.
  - A stable Hb also helps clinicians determine when blood is not necessary and may, in fact, be harmful.
- Iron deficiency anemia (IDA) can be easily and successfully treated with iron supplements.

<sup>1</sup>The World Health Organization (WHO) <http://siteresources.worldbank.org/INTPHAAG/Resources/anemiaAAG.pdf>.