



Ember's Accuracy

When compared to hemoglobin values measured using invasive methods, the accuracy of Ember is 1 g/dl at one standard deviation. This means that 68% of the hemoglobin values measured on the Ember device should fall within +/- 1 g/dl of invasive methods used to measure hemoglobin.

Based on an internal study, the trend accuracy of Ember, defined as its ability to detect changes in hemoglobin values when compared against an invasive method, was shown to be 0.7 g/dl at one standard deviation.

Ember's Precision

Precision is defined as the closeness of two or more measurements to one another. This is sometimes referred to as repeatability. Based on an internal study, the precision (or repeatability) of Ember was shown to be 0.4 g/dl at one standard deviation.

What are factors that can impact Ember's accuracy and precision?

- Improper sensor placement on the finger
- Inconsistent measurement technique
- Interference from outside light sources

Ember Technology is proven and already used around the world

The Ember non-invasive hemoglobin tracking system is based on existing technology that is trusted and used in hospitals around the world including here in the United States. The technology platform licensed by Cercacor Laboratories to Masimo Corporation for use in medical devices is referred to as Masimo rainbow SET (Signal Extraction Technology). This technology has been developed and utilized in both a spot-checking (one measurement at a time) and a continuous format.

To search for what others have found when evaluating the performance of non-invasive hemoglobin, search under (SpHb) spot-check measurements utilizing Masimo rainbow SET technology for medical use or refer to the studies.

Here are some studies:

1. Raikhel, M. (2012) Accuracy of noninvasive and invasive point-of-care total blood hemoglobin measurement in an outpatient setting. *Postgrad Med.*, 124(4), 250-155. <http://www.ncbi.nlm.nih.gov/pubmed/22913913>
2. Stoesz, M., Wood, L., Clark, W., Kwon, Y.M., Freiberg, A.A. (2014) Utility of noninvasive transcutaneous measurement of postoperative hemoglobin in total joint arthroplasty patients. *J. Arthroplasty*, 29(11), 2084-6. <http://www.ncbi.nlm.nih.gov/pubmed/25087726>
3. DeBarros, M., Shawhan, R., Bingham, J., Sokol, K., Izenberg, S., Martin, M. (2015) Assessing serum hemoglobin levels without venipuncture: accuracy and reliability of Pronto-7 noninvasive spot-check device. *Am. J. Surg*, 209(5), 844-55. <http://www.ncbi.nlm.nih.gov/pubmed/25869336>
4. Amano, K., Murakami, A. (2013) Use of Non-Invasive Total Hemoglobin Measurement as a Screening Tool for Anemia in Children. *Pediatr Int.*, 55(6), 803-5. <http://www.ncbi.nlm.nih.gov/pubmed/24330295>

For a complete list of studies:

PubMed Articles under SpHb (SpHb is the name used when our technology is licensed to hospitals).

<https://www.ncbi.nlm.nih.gov/pubmed/?term=SpHb>