

## Clinical Information

**Test:** This is a blood test for the Omega-3 Index, which measures the amount of omega-3 fatty acids eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) as a proportion of total red blood cell (RBC) membrane fatty acids<sup>1</sup>. Omega-3 fatty acids EPA and DHA are important nutrients that affect membrane properties, regulate gene expression, and serve as precursors to a multitude of oxygenated metabolites like prostaglandins. The test can be measured directly in red blood cells from blood collected in an EDTA tube or calculated from fatty acid analysis of a dried blood spot collected onto a filter paper treated with an antioxidant blend.

**Clinical Assessment:** Higher intake of omega-3 fatty acids EPA and DHA and an elevated Omega-3 Index (>8%) are associated with a reduction in risk for cardiovascular disease, sudden cardiac death, dementia, and all-cause mortality<sup>1-6</sup>. Consuming omega-3-rich fish, such as salmon, sardines, trout, and herring, or omega-3 containing supplements, like fish oil, algal oil, or krill oil, are a major contributor to omega-3 status in the body<sup>7</sup>. In regions with high seafood intake, like Japan and Mediterranean countries, rates of cardiovascular disease are lower partially due to the high omega-3 intake and status.<sup>8,9</sup> In most Western countries, the average Omega-3 Index is 4-5%. Vegans, athletes and young people tend to have lower Omega-3 Index levels.

**Treatment** The Omega-3 Index is raised by consuming more omega-3 fats either through supplementation or in the diet. Consuming high omega-3 containing fish three

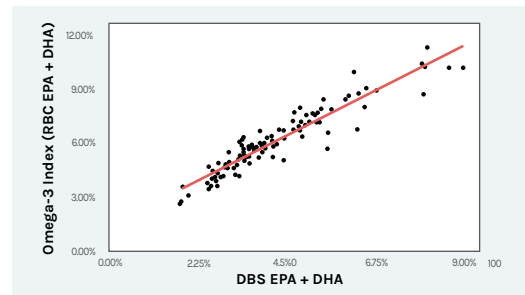


or more times per week can increase Omega-3 Index levels<sup>7</sup> but may not be enough on its own to reach the optimal 8-12% range, especially in someone with a very low Omega-3 Index. Fish oil supplements may be required for many individuals who do not consume fatty fish or who do not consume enough fatty fish to reach optimal levels. When looking at supplements, consider the total dose of EPA and DHA, not the "fish oil" dose listed. It is recommended to use triglyceride form omega-3s as opposed to ethyl-ester as the triglyceride form is more biologically similar to the omega-3s found in food and are more bioavailable than ethyl-ester. Patients should be encouraged to take their supplement with a meal that contains some fat, as this aids in digestion and absorption of the fish oil. Patients should also be encouraged to take their fish oil consistently as frequently skipping doses or stopping supplements for extended periods of time can lead to decreased Omega-3 Index levels.

**Target Range** Optimal levels of the Omega-3 Index (8% to 12%) are associated with reduced risk for death, cardiovascular disease, cellular aging, smaller brain volume and diminished cognitive function. It is possible to have an Omega-3 Index over 12% either from taking supplements or from dietary intakes and while this is not known to be harmful it also does not appear to confer any additional disease reduction benefit.

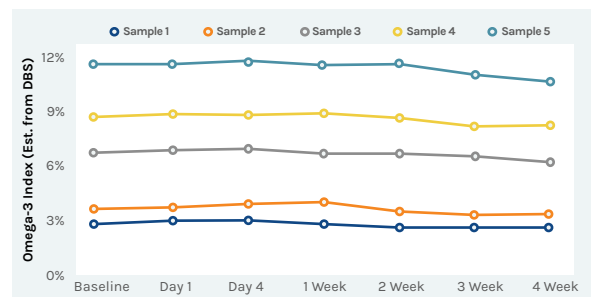
**Accuracy:** Whole blood EDTA samples (n=100) were used to compare red blood cell (RBC) and dried blood spot (DBS) methods. A 50 uL spot of whole blood was spotted onto a collection card. After drying, two 3.2 mm punches of the DBS were processed with our DBS fatty acid method. The same blood sample was then centrifuged, and the RBC portion was analyzed per our RBC fatty acid method. An equation to estimate the RBC EPA+DHA, i.e. the Omega-3 Index, from DBS EPA+DHA was calculated (R<sup>2</sup>=0.88, r= 0.94, Fig 1).

Figure 1. RBC versus DBS Omega-3 Index levels.



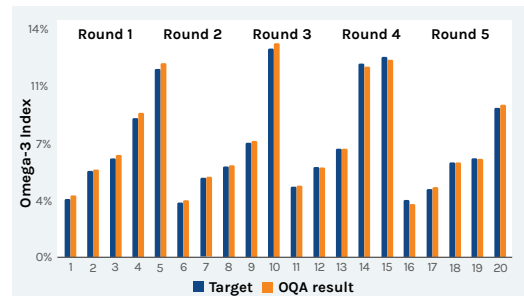
**Stability:** Omega-3 Index is stable (within 15% of baseline) on the DBS card for at least 21 days at room temperature (Fig 2).

Figure 2. Stability of estimated Omega-3 Index levels analyzed from dried blood spots over 28 days at room temperature.



**Validity:** OmegaQuant conducts its own proficiency testing with several labs globally to ensure the validity and consistency of the method. The average of 20 validation samples over 4 quarterly testing cycles were: Target, 6.99% vs. OmegaQuant, 7.08%. There was 0% average bias. The dried blood spot Omega-3 Index method developed by OmegaQuant is valid (Fig. 3).

Figure 3. Dried blood spot Omega-3 Index proficiency results.



**Repeatability:** Three quality control samples are processed with each batch of samples for acceptance (n>1500 batches; Table 1). A coefficient of variability (%CV) of less than 15% is acceptable and the OmegaQuant average CV for the Omega-3 Index is 5%.

Table 1. Repeatability of OmegaQuant’s dried blood spot Omega-3 Index method.

Control	Omega-3 Index	%CV
Low Control	2.97%	3.37%
Mid Control	6.17%	6.92%
High Control	9.82%	5.06%

## References

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