How Much Fish Oil?
By Evelyn Tribole, MS, RD

There are hundreds of studies on the various conditions in which fish oil may be helpful (from basic health to stress reduction). Yet, there is little consensus among the experts as to which omega-3 fatty acid (particularly, EPA and DHA) is providing the benefit let alone the effective dose. While it may seem that the scientists can't make up their minds, the problems usually lie with the study design. Here are a few reasons there are conflicting results on omega-3 studies:

- Failure to evaluate or account for the background diet: including the amounts of omega-3 and omega-6 fats eaten.
- Few direct comparisons of different sources, doses and ratios of fatty acids
- Failure to use biomarkers to assure compliance of supplement or diet.

The gold standard for research is the randomized double-blind design, in which neither researcher nor subject know who is getting the omega-3 or placebo. But some of these studies still suffer from design limitations described above. That said, the following charts list amounts of fish oil recommended for particular conditions. When there is not a clear dose, the range of effective doses used in studies is provided.

Unless otherwise stated, the doses on the charts to follow, are combined totals for EPA + DHA. One gram is equivalent to 1000 milligrams. Keep in mind that a one gram capsule of fish oil is not 100% EPA/DHA. Remember to always check with your physician before taking fish oil, especially in amounts exceeding 3000 milligrams (the level deemed Generally Recognized as Safe by the FDA).

Baseline Recommendations for Health

International guidelines were published in 2000, by a respected group of fatty-acid scientists, from a meeting organized by the International for the Study of Fatty Acids and Lipids (ISSFAL). You can meet these levels by eating an average of 10 ounces of fatty fish per week.

Age	**EPA + DHA (combined)** milligrams	**EPA minimum** milligrams	**DHA minimum** milligrams
2-3 years old	433	145	145
4-6 years old	600	200	200
7 years and over (including adults)	650	220	220
Pregnant or Breastfeeding	650	220	300

"Official" Recommendations by Scientific Organizations

These fish oil recommendations are issued by scientific organizations, based on expert review committees.

Condition	EPA + DHA	Organization	Source
Hypertriglyceridemia	2-4 g/day	Am. Heart Association	Kris-Etherton.Circulation. Circulation. 2002 Nov 19;106(21):2747-57.
Heart Disease	1g/day	Am. Heart Association	Kris-Etherton.Circulation. Circulation. 2002 Nov 19;106(21):2747-57.
Patients w/ Mood, Impulse-Control or Psychotic Disorders.	1 g/ day	Am. Psychiatric Assoc.	Freeman MP et al.Omega-3 fatty acids: evidence basis for treatment and future research in psychiatry.J Clin Psychiatry. 2006 Dec;67(12):1954-67.
Mood Disorders	1-9 g/day	Am. Psychiatric Assoc	Freeman MP et al. 2006 Dec;67(12):1954-67.

Conclusion of Meta-Analysis Scientific Review Papers

These health conditions treated by fish oil are the results of a systematic review process of several studies, which conclude with a specified dose. (Meta-analysis is a process in which studies are identified based on strict criteria and then evaluated for effectiveness).

Condition	Fish Oil Dose/day (EPA + DHA)	Comments	Source
Cancer	1.5 g	Reviewed 50 clinical trials, and of these17 studies met criteria for evaluation. Supplementation increased appetite, weight and quality of life. EPA is clearly beneficial alone or with DHA. But the role of DHA alone is not known.	Colomer et al. Systematic Review: N-3 fatty acids, cancer and cachexia: systematic review of the literature. *Br J Nutr* (2007):97:823-831.
Hypertension (high blood pressure)	3.7 g	Reviewed 124 trials and of these, 36 studies fulfilled scientific criteria (including randomized placebo-controlled design). There was a significant reduction in blood pressure, usually with a high dose. Notably, one of the studies used a small dose of 180 mg(EPA + DHA)/day, which effectively lowered blood pressure. A new study (not included above), found that 700mg of DHA lowered blood pressure in healthy adults.	Geleijnse J et al. Blood pressure response to fish oil supplementation: metaregression analysis of randomized trials. *J of Hypertension.* 2002;20(8): 1493-1499. Theobald H E, et al. Low-dose docosahexaenoic acid lowers diastolic blood pressure in middle-aged men and women. *J Nutr*. 2007;137(4):973-8.
Pain: joint pain from PMS, IBD, or rheumatoid arthritis.	≥2.7 g	Reviewed 24 studies, and of these 17 studies met scientific criteria, (randomized placebo-controlled trials). Supplementation reduced pain in patients with joint pain from inflammatory bowel disease, rheumatoid arthritis or dysmenorrhea, resulting in less pain meds (NSAID's) taken.	Goldberg RJ et al. A meta-analysis of the analgesic effects of omega-3 polyunsaturated fatty acid supplementation for inflammatory joint pain. *Pain*.2007;129(1):210-223. DOI:10.1016/j.pain.2007.01.020)

Conclusion of Meta-Analysis Scientific Review Papers (continued)			
Condition	**Fish Oil Dose/day (EPA + DHA)**	**Comments**	**Source**
Rheumatoid arthritis (RA)	2.7-6 g	There have been at least 14 published randomized controlled trials of fish oil in RA. Fish oil reduced RA symptoms in a dose dependent manner. Omega-3 supplementation with a diet low in Arachidonic Acid (potent omega-6) results in greater improvement.	Stamp LK et al. Diet and Rheumatoid Arthritis: A Review of the Literature. *Seminars in Arthritis and Rheumatism*. 2005;352: 77-94. Cleland , LG. Fish Oil: What the Prescriber Needs to Know . *Arthritis Research and Therapy*. 2006; 8:202.

Promising Scientific Studies

While more research is need for these health conditions ameliorated by fish oil, enough studies exist that it merited a scientific review process, yet there are not enough data/studies to recommend a specific dose.

Condition	Fish Oil Dose per day (EPA + DHA)	Comments	Source
Asthma	1.0 to 5.4 grams	While a scientific review of 26 studies found that no definitive conclusion can be drawn on the efficacy of omega-3s on asthma, there appears to be subgroups of asthmatics who benefit greatly from EPA + DHA supplementation. Of the studies showing benefit, the dose ranged from 1.0 to 5.4 grams.	Calder P. Recommendations for Therapeutics and Prevention: n–3 Polyunsaturated fatty acids, inflammation, and inflammatory diseases. *Am. J Clinical Nutr*. 2006; 83(6):S1505-1519S.
Bipolar Disorder	6.2 g EPA + 3.4 g DHA/day	Unstable bipolar patients were given placebo or fish oil, while they remained on their existing medication. This four-month double-blind study showed that the fish oil group improved on nearly every outcome measure, compared to the medication-only patients.	Stoll, AL. et al. Omega-3 Fatty Acids in Bipolar Disorder. *Archives of General Psychiatry,* 1999;56:407-412.
Crohn's Disease/Inflammatory Bowel Disease	2.7-5.6 grams	12 randomized placebo controlled studies showed a benefit, including longer remissions.	Calder P. Recommendations for Therapeutics and Prevention: n–3 Polyunsaturated fatty acids, inflammation, and inflammatory diseases. *Am. J Clinical Nutr. 2006*; 83(6):S1505-1519S.

Promising Scientific Studies (continued)

Condition	Fish Oil Dose per day (EPA + DHA)	Comments	Source
Critically Ill patients	Fish oil infusion ranged from 0.1 to 0.2 g/ kilogram body weight	A review of several studies concluded that omega-3 fats improves survival and accelerates recovery of patients, even in critical illness. In a recent study on 661 patients from 82 hospitals, fish oil improved survival, lowered infection, lowered use of antibiotics, and shortened hospital stays.	Koch, T and Heller, AR. Benefits of omega-3 fatty acids in parenteral nutrition. *Clinical Nutrition Supplements* (2005):1: 17-24. Heller AR. Omega-3 fatty acids improve the diagnosis-related clinical outcome. *Crit Care Med* 2006;34(4):972-979.
Depression	1-2 grams/day	Strongest evidence supports use of omega-3 for mood disorders. EPA given either alone or with DHA has been shown to be effective. But DHA alone has not shown a benefit.	Ross et al. Omega-3 fatty acids as treatments for mental illness: which disorder and which fatty acid? *Lipids in Health and Disease* (2007), 6:21 doi:10.1186/1476-511x-6-21 http://lipidworld.com/content/6/1/21
Exercise-Induced Asthma	5.2 grams	Fish oil improved lung function in a small double-blind cross-over study on 8 elite athletes. The same study design was repeated on 16 patients with mild to moderate exercise-induced asthma with striking results. The fish oil improved lung function to the point that patients no longer met the criteria for asthma, which resulted in a reduction of inhaler use by 31%.	Mickleborough TD et al. Protective Effect of Fish Oil Supplementation on Exercise-Induced Broncho- constriction in Asthma. *Chest*. 2006;129: 39-49
PMS (premenstrual syndrome)	1080 mg EPA + 720 mg DHA	A double-blind crossover study on 42 girls found that fish oil was effective in alleviating PMS.	Harel, Z. et al. Supplementation with omega-3 polyunsaturated fatty acids in the management of dysmenorrhea in adolescents. *Am J Obstetrics and Gynecology*, 1996;174:1335-1338.

Promising Scientific Studies (continued)			
Self-Harm	1.2 g EPA + 0.9 g EPA	A 12-week double-blind randomized trial found that fish oil group achieved substantial reductions in surrogate markers for suicidal behavior and improvements in well-being.	Hallahan B et al. Omega-3 fatty acid supplementation in patients with recurrent self-harm: Single-centre double-blind randomised controlled trial. Br J of Psychiatry 2007;190:118-122.
Stress (stress hormones, hostile and aggressive behaviors)	.32-1.5 g DHA	Serveral double-blind randomized studies in a variety of groups of people from pre-schoolers to substance abuse users, found a reduction in stress hormones in the blood and a reduction in stress-related behaviors including hostility and aggression. Surprisingly, there is yet to be a scientific critical of all stress studies to date.	*See studies by* • *Hamazaki K Nutrition 21(2005):705-10.* • *Itomura, M JNB(2005):163-71.* • *Takeuci T. BR 964(2003):136-43.*

Kids Studies

While this list is by no means complete, there are promising conditions in which children might benefit from supplementation.

Condition	Age (years)	Dose (EPA + DHA) milligrams	Comments	Source
Asthma	4-17	17-27 mg DHA/ kilogram body weight + 7-11.5 mg EPA/kg weight	School-age kids were given fish oil in a randomized double-blind study, resulting in decreased asthma symptoms and improved bronchial response.	Nagakura T et al. Dietary supplementation with fish oil rich in omega-3 polyunsat-urated fatty acids in children with bronchial asthma. *Eur Respir J.* 2000;16: 861-865.
Attention Deficit Hyperactivity Disorder	7-12	558 mg EPA + 174 mg DHA	A randomized double-blind supplementation study on 104 children, improved ADHD symptoms: inattention, hyperactivity, impulsivity and oppositional behavior. These benefits were replicated in the placebo group.	Sinn N et al. Effect of supplementation with polyunsaturated fatty acids and micronutrients on learning and behavior problems associated with child ADHD. *J Dev Behav Pediatr*.2007.28(2):82-91.

Kids Studies (continued)

Autism	5-17	540 mg EPA + 700 mg/DHA	6-week pilot randomized, double-blind, study on 13 children (aged 5 to 17 years) with autistic disorders. The results provide preliminary evidence that omega-3 fatty acids may be an effective treatment for children with autism.	Amminger GP et al. Omega-3 Fatty Acids Supplementation in Children with Autism: A Double-blind Randomized, Placebo-controlled Pilot Study. *Biol Psychiatry* 2007.61(4): 551-553
Bipolar	9-18	360 mg EPA + 1560 mg per DHA	Eighteen children and adolescents with Juvenile Bipolar Disorder received supplements containing 360 mg per day eicosapentaenoic acid (EPA) and 1560 mg per day docosahexaenoic acid (DHA) for 6 weeks in an open-label study. Clinician ratings of mania and depression were significantly lower and global functioning significantly higher after supplementation. Parent ratings of internalizing and externalizing behaviours were also significantly lower following supplementation.	
Blood Pressure	9 mos.	1 teaspoon fish oil	Healthy infants were randomly given fish oil daily for 3 months, resulting in lower blood pressure compared to the no fish oil group.	Damsgaard CT et al. Fish Oil Affects Blood Pressure and the Plasma Lipid Profile in Healthy Danish Infants *J. Nutr.* 2006;136: 94-99.
Crohn's/ Irritable Bowel Disease	5-16	400 mg EPA + 200 mg DHA	Omega-3s prevented relapse in a double-blind study on children with Crohn's disease.Notably, the fish oil group had fewer relapses by 61% at the end of one year. Whereas, 95% of the kids receiving just standard medications relapsed by the first month.	Romano, C et al. Usefulness of ω-3 fatty acid supplementation in addition to mesalazine in maintaining remission in pediatric Crohn's disease: A double-blind, randomized, placebo-controlled study. *World J Gastro.*2005; 11(45): 7118-7121.
Depression	6-12	400 mg EPA + 200 mg DHA	A 16-week controlled, double-blind study on 28 children showed significant improvement in symptoms of depression.	Nemets H et al. Omega-3 Treatment of Childhood Depression: A Controlled, Double-Blind Pilot Study.*Am J Psychiatry*. 2006; 163: 1098-1100.
Dyslexia	8-12	186 mg EPA + 480 mg DHA	A study on dyslexic children had significantly greater improvements in reading when supplemented with omega-3 fatty acids, compared to the unsupplemented group.	Richardson AJ et al. A randomized double-blind, placebo-controlled study of the effects of supplementation with highly unsaturated fatty acids on ADHD-related symptoms in children with specific learning difficulties. *Progress in NeuroPsycho-pharmacology & Biological*

				Psychiatry.2002; 26:233– 239.

Kids Studies (continued)

Condition	Age (years)	Dose (EPA + DHA) milligrams	Comments	Source
Listening and Comprehension	4	400 mg DHA	A randomized double-blind study 175 healthy preschool children found that DHA supplementation improved test scores on listening comprehension and vocabulary.	Ryan AS and Nelson EB. Assessing the Effect of docosahexaenoic acid on cognitive function in healthy preschool children:a randomized, placebo-controlled, double-blind study. *Clinical Pediatrics*. In press.
Reading: Developmental Coordination Disorder (DCP)	5-12	558 mg of EPA and 174 mg of DHA (+ 60 mg g-linoleic acid)	Double-blind study on 117 kids showed beneficial effects on behavior, reading, and spelling. Notably, these results were duplicated when the placebo group was given the supplement.	Richardson AJ et al. The Oxford-Durham Study: A Randomized, Controlled Trial of Dietary Supplementation With Fatty Acids in Children With Developmental Coordination Disorder. *Pediatrics*. 2005; 115:1360-1366

Resources

- Tribole, E. Ultimate Omega-3 Diet (2007) McGraw-Hill: NY, NY.
- Food and Behaviour Research Resources: http://www.fabresearch.org/103
- **Food for Thought: "Omega-3s" and the Brain** 60-minute talk show on the role of omega-3s on mental health
- GOED –Global Organization for EPA and DHA http://www.goedomega3.com/
- Omega-3 Learning Consortium at Purdue http://www.omega3learning.purdue.edu/