# U.S. Population Intake of Omega-3 Fatty Acids

The major source of omega-3 fatty acids is dietary intake of fish, fish oil, vegetable oils (principally canola and soybean), some nuts such as walnuts, and, dietary supplements. Two population-based surveys, the third National Health and Nutrition Examination (NHANES III) 1988-94, and the Continuing Survey of Food Intakes by Individuals 1994-98 (CSFII), are the main sources of dietary intake data for the U.S. population. NHANES III collected information on the U.S. population aged =2 months. Mexican Americans and non-Hispanic African-Americans, children =5 years old, and adults = 60 years old were over-sampled to produce more precise estimates for these population groups. There were no imputations for missing 24-hour dietary recall data. A total of 29,105 participants had complete and reliable dietary recall.

The CSFII 1994-96, popularly known as the "What We Eat in America" survey, addressed the requirements of the National Nutrition Monitoring and Related Research Act of 1990 (Public Law 101-445) for continuous monitoring of the dietary status of the American population. The CSFII 1994-96 utilized an improved data-collection method for 24-hour recall known as the multiple-pass approach. Given the large variation in intake from day-to-day, multiple 24-hour recalls are considered to be best suited for most nutrition monitoring and will produce stable estimates of mean nutrient intake from groups of individuals.[9] In 1998, the Supplemental Children's Survey, a survey of food and nutrient intake by children under the age of 10 years, was conducted as a supplement to the CSFII 1994-96. The CSFII 1994-96, 1998 surveyed 20,607 people of all ages with over-sampling of low-income population (<130% of the poverty threshold). Dietary intake data from individuals of all ages were collected over 2 nonconsecutive days via two 1-day dietary recalls.

Table 1 reports the NHANES III survey mean intake ± the standard error of the mean (SEM), in addition to the median and range for each omega-3 fatty acid. Distributions of EPA, DPA, and DHA were very skewed; therefore, the means and standard errors of the means should be used and interpreted with caution. Table 2 reports the CSFII survey mean and median intakes for each omega-3 fatty acid, along with SEMs, as reported in the Dietary Reference Intakes from the Institute of Medicine.[2]

**Table 1: Estimates of the mean±standard error of the mean (SEM) intake of linoleic acid (LA), alpha-linolenic acid (ALA), eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA) in the US population, based on analyses of a single 24-hour dietary recall of NHANES III data**

| | Grams/day | | % Kcal/day | |
|---|---|---|---|---|
| | **Mean±SEM** | **Median (range)[1]** | **Mean±SEM** | **Median (range)[1]** |
| **LA** (18:2 n-6) | 14.1±0.2 | 9.9 (0 - 168) | 5.79±0.05 | 5.30 (0 - 39.4) |
| **ALA** (18:3 n-3) | 1.33±0.02 | 0.90 (0 - 17) | 0.55±0.004 | 0.48 (0 - 4.98) |
| **EPA** (20:5 n-3) | 0.04±0.003 | 0.00 (0 - 4.1) | 0.02±0.001 | 0.00 (0 - 0.61) |
| **DHA** (22:6 n-3) | 0.07±0.004 | 0.00 (0 - 7.8) | 0.03±0.002 | 0.00 (0 - 2.86) |

[1]The distributions are not adjusted for the over-sampling of Mexican-Americans, non-Hispanic African-Americans, children =5 years old, and adults = 60 years old in the NHANES III dataset.

**Table 2: Mean, range, median, and standard error of the mean (SEM) of usual daily intakes of linoleic acid (LA), total omega-3 fatty acids (n-3 FA), alpha-linolenic acid (ALA), eicosapentaenoic acid (EPA), docosapentaenoic acid (DPA) and docosahexaenoic acid (DHA) in the US population, based on CSFII data (1994-1996, 1998)**

| | Grams/day | |
|---|---|---|
| | **Mean±SEM** | **Median±SEM** |
| **LA (18:2 n-6)** | 13.0±0.1 | 12.0±0.1 |
| **Total n-3 FA** | 1.40±0.01 | 1.30±0.01 |
| **ALA (18:3 n-3)** | 1.30±0.01 | 1.21±0.01 |
| **EPA (20:5 n-3)** | 0.028 | 0.004 |
| **DPA (22:5 n-3)** | 0.013 | 0.005 |
| **DHA (22:6 n-3)** | 0.057±0.018 | 0.046±0.013 |

# Dietary Sources of Omega-3 Fatty Acids

Omega-3 fatty acids can be found in many different sources of food, including fish, shellfish, some nuts, and various plant oils. Selected from the USDA website, Table 3 lists the amount of omega-3 fatty acids in some commonly consumed fish, shellfish, nuts, and edible oils, selected from the USDA website.[10]

**Table 3: The omega-3 fatty acid content, in grams per 100 g food serving, of a representative sample of commonly consumed fish, shellfish, fish oils, nuts and seeds, and plant oils that contain at least 5 g omega-3 fatty acids per 100 g**

| Food item | EPA | DHA | ALA | Food item | EPA | DHA | ALA |
|---|---|---|---|---|---|---|---|
| **Fish (Raw [a])** | | | | **Fish, continued** | | | |
| Anchovy, European | 0.6 | 0.9 | - | Tuna, Fresh, Yellowfin | trace | 0.2 | trace |
| Bass, Freshwater, Mixed Sp. | 0.2 | 0.4 | 0.1 | Tuna, Light, Canned in Oil [e] | trace | 0.1 | trace |
| Bass, Striped | 0.2 | 0.6 | trace | Tuna, Light, Canned in Water [e] | trace | 0.2 | trace |
| Bluefish | 0.2 | 0.5 | - | Tuna, White, Canned in Oil [e] | trace | 0.2 | 0.2 |
| Carp | 0.2 | 0.1 | 0.3 | Tuna, White, Canned in Water [e] | 0.2 | 0.6 | trace |
| Catfish, Channel | trace | 0.2 | 0.1 | Whitefish, Mixed Sp. | 0.3 | 0.9 | 0.2 |
| Cod, Atlantic | trace | 0.1 | trace | Whitefish, Mixed Sp., Smoked | trace | 0.2 | - |
| Cod, Pacific | trace | 0.1 | trace | Wolffish, Atlantic | 0.4 | 0.3 | trace |
| Eel, Mixed Sp. | trace | trace | 0.4 | | | | |
| Flounder & Sole Sp. | trace | 0.1 | trace | | | | |
| Grouper, Mixed Sp. | trace | 0.2 | trace | **Shellfish (Raw)** | | | |
| Haddock | trace | 0.1 | trace | Abalone, Mixed Sp. | trace | - | - |
| Halibut, Atlantic and Pacific | trace | 0.3 | trace | Clam, Mixed Sp. | trace | trace | trace |
| Halibut, Greenland | 0.5 | 0.4 | trace | Crab, Blue | 0.2 | 0.2 | - |
| Herring, Atlantic | 0.7 | 0.9 | 0.1 | Crayfish, Mixed Sp., Farmed | trace | 0.1 | trace |
| Herring, Pacific | 1.0 | 0.7 | trace | Lobster, Northern | - | - | - |
| Mackerel, Atlantic | 0.9 | 1.4 | 0.2 | Mussel, Blue | 0.2 | 0.3 | trace |
| Mackerel, Pacific and Jack | 0.6 | 0.9 | trace | Oyster, Eastern, Farmed | 0.2 | 0.2 | trace |
| Mullet, Striped | 0.2 | 0.1 | trace | Oyster, Eastern, Wild | 0.3 | 0.3 | trace |
| Ocean Perch, Atlantic | trace | 0.2 | trace | Oyster, Pacific | 0.4 | 0.3 | trace |
| Pike, Northern | trace | trace | trace | Scallop, Mixed Sp. | trace | 0.1 | - |
| Pike, Walleye | trace | 0.2 | trace | Shrimp, Mixed Sp. | 0.3 | 0.2 | trace |
| Pollock, Atlantic | trace | 0.4 | - | Squid, Mixed Sp. | 0.1 | 0.3 | trace |
| Pompano, Florida | 0.2 | 0.4 | - | | | | |
| Roughy, Orange | trace | - | trace | | | | |
| Salmon, Atlantic, Farmed | 0.6 | 1.3 | trace | **Fish Oils** | | | |
| Salmon, Atlantic, Wild | 0.3 | 1.1 | 0.3 | Cod Liver Oil | 6.9 | 11.0 | 0.9 |
| Salmon, Chinook | 1.0 | 0.9 | trace | Herring Oil | 6.3 | 4.2 | 0.8 |
| Salmon, Chinook, Smoked [b] | 0.2 | 0.3 | - | Menhaden Oil | 13.2 | 8.6 | 1.5 |
| Salmon, Chum | 0.2 | 0.4 | trace | Salmon Oil | 13.0 | 18.2 | 1.1 |
| Salmon, Coho, Farmed | 0.4 | 0.8 | trace | Sardine Oil | 10.1 | 10.7 | 1.3 |
| Salmon, Coho, Wild | 0.4 | 0.7 | 0.2 | | | | |
| Salmon, Pink | 0.4 | 0.6 | trace | | | | |
| Salmon, Pink, Canned [c] | 0.9 | 0.8 | trace | **Nuts and Seeds** | | | |
| Salmon, Sockeye | 0.6 | 0.7 | trace | Butternuts, Dried | - | - | 8.7 |
| Sardine, Atlantic, Canned in Oil [d] | 0.5 | 0.5 | 0.5 | Flaxseed | | | 18.1 |
| Seabass, Mixed Sp. | 0.2 | 0.4 | - | Walnuts, English | - | - | 9.1 |
| Seatrout, Mixed Sp. | 0.2 | 0.2 | trace | | | | |
| Shad, American | 1.1 | 1.3 | 0.2 | | | | |
| Shark, Mixed Sp. | 0.3 | 0.5 | trace | **Plant Oils** | | | |
| Snapper, Mixed Sp. | trace | 0.3 | trace | Canola (Rapeseed) | - | - | 9.3 |
| Swordfish | 0.1 | 0.5 | 0.2 | Flaxseed Oil | - | - | 53.3 |
| Trout, Mixed Sp. | 0.2 | 0.5 | 0.2 | Soybean Lecithin Oil | - | - | 5.1 |
| Trout, Rainbow, Farmed | 0.3 | 0.7 | trace | Soybean Oil | - | - | 6.8 |
| Trout, Rainbow, Wild | 0.2 | 0.4 | 0.1 | Walnut Oil | - | - | 10.4 |
| Tuna, Fresh, Bluefin | 0.3 | 0.9 | - | Wheatgerm Oil | - | - | 6.9 |
| Tuna, Fresh, Skipjack | trace | 0.2 | - | | | | |

Trace = <0.1; - = 0 or no data; Sp. = species; [a]Except as indicated; [b]Lox.; [c]Solids with bone and liquid; [d]Drained solids with bone; [e]Drained solids.