In 1990, Health and Welfare Canada established Recommended Nutrient Intakes (RNI values) for all Canadians. The recommended minimal intake for omega-3 fatty acid in the form of ALA was set at 0.5% of total energy. This translates into recommended intakes for ALA of 0.5 gm/day (as example) of 1.2-1.4 grams for children aged 10-12 years (male and female respectively) and 1.1-1.5 gm/day for 25-49 year old adults (female and male, respectively). These Canadian recommendations have more recently been applied and slightly modified by the Food and Nutrition Board in the United States (2002). They established recommended Adequate Intakes (AI values) for ALA, as indicated in Table 1. The term AI refers to the recommended average daily intake level based on observed or experimentally determined approximations or estimates of nutrient intake via a group (or groups) of apparently healthy people that are assumed to be adequate - used when an RDA (recommended dietary allowance) cannot be determined. Current mean estimates of ALA (omega-3) in a North American adult population have been reported to range from approximately 1.3-2.5 gm/day with approximately 40-50% reaching the aforementioned target levels for ALA (omega-3). It is noteworthy, unlike the 1990 recommendations from Canada, that the U.S. recommendations allow for up to 10% of the Adequate Intakes for ALA (omega-3) to be in the form of the longer-chain derivatives as DHA plus EPA. However, no obligatory intakes of DHA and/or EPA were established in these recommendations.

Table 1: Recommended Adequate Intakes (AI) for Omega-3 Fatty Acids (Food and Nutrition Board, USA, 2002)

<table>
<thead>
<tr>
<th>Life Stages</th>
<th>Males (g/day)</th>
<th>Females (g/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-6 mos</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Infants

7-12 mos

0.5

Children

1-3 yrs

0.7

0.7

Children
<table>
<thead>
<tr>
<th>Age Group</th>
<th>DHA/EPA (g/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-8 yrs</td>
<td>0.9</td>
</tr>
<tr>
<td>9-13 yrs</td>
<td>1.2</td>
</tr>
<tr>
<td>14-18 yrs</td>
<td>1.6</td>
</tr>
</tbody>
</table>

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Children
Adults

19 yrs and older

1.6

Pregnancy

All ages

1.4

Breastfeeding

All ages
The Workshop on the Essentiality of and Recommended Dietary Intakes (RDIs) for Omega-6 and Omega-3 Fatty Acids was held at the National Institutes of Health (NIH) in Bethesda, Maryland, U.S.A. from April 7-9, 1999. The workshop participants consisted of leading investigators in the field of essential fatty acid research as it relates to infant nutrition and overall health including cardiovascular disease. Based on the peer-reviewed science published in numerous medical and nutritional journals available, specific recommendations on the percentage of polyunsaturated fatty acids in infant formula and breast milk was provided. Based on studies showing higher levels of mental development (neuronal functioning) in infants consuming infant formula containing DHA when compared to a corresponding formula lacking DHA, a recommendation was made that 0.35 % by weight of the total fat (fatty acids) should be present as DHA. The level of DHA in the breast milk of North American women and that from many other countries is significantly below the target level of 0.35%. For example, the average level of DHA in Canadian breast milk is 0.14% with a range from trace to 0.53%. The low level of DHA in breast milk is due to the very low intakes of DHA during lactation (approximately 80 mg/day) in North America.

The workshop also recommended that the daily target for minimal DHA intakes during pregnancy, including the last trimester wherein DHA is very actively deposited in the brain membrane phospholipids, should be 300 mg DHA/day. However, the current estimated daily intake of DHA amongst pregnant women in North America is approximately 80 mg/day or only one quarter the targeted intake recommended at the 1999 workshop at the NIH. The workshop also determined that an intake of 300 mg/day during lactation would provide for DHA levels in breast milk attaining the target levels of 0.35% of total breast milk fat as DHA for the infant.

Based on the NIH Workshop recommendations that DHA should represent at least 0.1 % of total daily energy for adults (consuming a diet consisting of 2000 kcal/day), the corresponding minimal Adequate Intake for young children (aged 3 years old) would be approximately 150 mg/day based on their lower energy intakes. A direct assessment of DHA intakes in such children has indicated very low intakes - averaging 19 mg DHA/day. Figure 1 depicts the actual and target intakes of DHA indicating a wide nutrition gap (between actual and target intakes) such that the gap amounts to approximately 220 mg/day during pregnancy/lactation (in North America) and approximately 130 mg DHA/day for young children. In view of concerns regarding environmental contaminants in fish where intake in adults averages one fish serving every 7-10 days in North America, functional foods containing DHA will be come increasingly
important as a source of DHA to fill the 'nutrition gap'.

**Figure 1**: Actual versus target intakes for DHA

The American Heart Association has recommended two fatty fish servings per week for people who are healthy individuals without cardiovascular disease. The DHA plus EPA (combined) equivalency of such fish consumption is approximately 250-300 mg/day. The NIH Workshop recommended a daily intake of 650 mg of DHA plus EPA for normal healthy individuals (for overall health and cardiovascular care) with DHA and EPA representing at least one third of the 650 milligram amount. Finally, the American Heart Association in its official Dietary Guidelines (2000) recommended that the daily intake of DHA plus EPA in individuals with coronary heart disease should target 900 mg/day since this amount has shown to be beneficial in affecting coronary heart disease mortality rates in patients with coronary disease. Current DHA plus EPA (combined) daily intakes range from 130-150 mg/day; these actual intakes are well below any one of the three targeted intakes. **Figure 2** summarizes the nutrition gap between actual and targeted intakes for cardiovascular care in those who are free of cardiovascular disease or in patients with preexisting disease. It is apparent that the 'nutrition gap' for cardiovascular care ranges from 150-750 mg DHA/EPA (combined) per day.
The Australia government, in conjunction with the New Zealand health authorities, has published nutrient reference values including recommended dietary omega-3 fatty acid intakes. The extensive publication provides information, with references and rationale, on recommended intakes for most nutrients, vitamins, minerals, fats, carbohydrates, protein and water. The full document, along with an executive summary and appendix, can be found at [http://www.nhmrc.gov.au/publications/synopses/n35syn.htm](http://www.nhmrc.gov.au/publications/synopses/n35syn.htm).

We have reprinted their recommended dietary intakes for fats and omega-3 fatty acids here. For the rationale behind these recommendations, please see the full publication. The AI (acceptable intake) values are expected to protect against essential fatty acid deficiency whereas the higher SDT (suggested dietary target) values for men and women are for reducing chronic disease risk.

### AI Recommendations by Life Stages and Gender

**Infants**

<table>
<thead>
<tr>
<th></th>
<th>0 - 6 months</th>
<th>Total fat</th>
</tr>
</thead>
<tbody>
<tr>
<td>n-6 polyunsaturated fats</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n-3 polyunsaturated fats</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>7 - 12 months</th>
<th>Total fat</th>
</tr>
</thead>
<tbody>
<tr>
<td>n-6 polyunsaturated fats</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n-3 polyunsaturated fats</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Children, Adolescents & Adults

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Boys and Girls</th>
<th>Linoleic acid</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3 yr</td>
<td>5 g/day</td>
<td></td>
</tr>
<tr>
<td>4-8 yr</td>
<td>8 g/day</td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9-13 yr</td>
<td>10 g/day</td>
<td></td>
</tr>
<tr>
<td>14-18 yr</td>
<td>12 g/day</td>
<td></td>
</tr>
<tr>
<td>Girls</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9-13 yr</td>
<td>8 g/day</td>
<td></td>
</tr>
<tr>
<td>14-18 yr</td>
<td>8 g/day</td>
<td></td>
</tr>
<tr>
<td>Adults 19+ yr</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age Group</td>
<td>Linoleic Acid (g/day)</td>
<td>Alpha-Linolenic Acid (g/day)</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td><strong>Men</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 g/day</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Women</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 g/day</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pregnancy</strong></td>
<td>Linoleic acid</td>
<td></td>
</tr>
<tr>
<td>14 - 18 yr</td>
<td>10 g/day</td>
<td></td>
</tr>
<tr>
<td>19 - 50 yr</td>
<td>10 g/day</td>
<td></td>
</tr>
<tr>
<td><strong>Lactation</strong></td>
<td>Linoleic acid</td>
<td></td>
</tr>
<tr>
<td>14 - 18 yr</td>
<td>12 g/day</td>
<td></td>
</tr>
<tr>
<td>19 - 50 yr</td>
<td>12 g/day</td>
<td></td>
</tr>
</tbody>
</table>

**Upper Level of Intake - Total Fat and Fatty Acid**

Linoleic Acid

No UL was set because there is no known level at which adverse effects may occur.
<table>
<thead>
<tr>
<th>Alpha-Linolenic Acid</th>
<th>No UL was set because there is no known level at which adverse effects may occur. The longer chain DHA, EPA, and DPA fatty acids derived from ALA are more biologically potent than ALA itself.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC n-3 fatty acids (DHA, EPA, DPA)</td>
<td></td>
</tr>
<tr>
<td>Infants 0 - 12 months</td>
<td>Not possible to establish.</td>
</tr>
<tr>
<td>Children, Adolescents, Adults</td>
<td>3,000 mg/day</td>
</tr>
</tbody>
</table>

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