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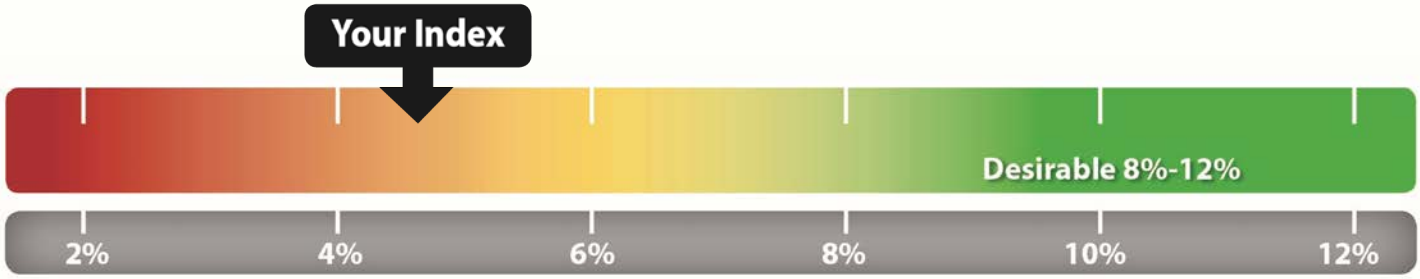
OMEGA-3 INDEX REPORT

NAME: Sally Sample
DOB: 01/01/0000
ID: SAMPLE

COLLECTION DATE: 08/21/2020
RESULT DATE: 08/25/2020
PROVIDER:
ACCOUNT: Complimentary

Your Index 4.64%

Reference Range*: 2.90% - 12.90%



* Reference Ranges encompass about 99% of US adults. Visit our FAQ section for more information on ranges.

An Omega-3 Index in the range of 8-12% is one indicator of better overall health. As a part of an overall healthy lifestyle, an Omega-3 Index in the 8-12% range may help to maintain heart, brain, eye and joint health. The best way to increase your Omega-3 Index is to eat more omega-3 fatty acids, specifically EPA and DHA. These are found primarily in fish, especially "oily" fish such as those near the top in the accompanying table. They can also be obtained from dietary supplements (fish, krill, cod liver and algal oils).

The 2015-2020 Dietary Guidelines for Americans states, "For the general population, consumption of about 8 ounces per week of a variety of seafood, which provide an average consumption of 250* mg per day of EPA and DHA, is associated with reduced cardiac deaths among individuals with and without pre-existing cardiovascular disease."

The advice from the American Academy of Nutrition and Dietetics is, "Based on recent literature, increasing consumption of polyunsaturated fatty acids with a particular focus on increasing omega-3 intake (i.e., striving to consume two or more servings of fatty fish per week to provide at least 500* mg EPA and DHA per day…) is desirable."

The FDA has determined that the consumption of up to 3000 mg/day of EPA and DHA is generally recognized as safe.

The amount of EPA+DHA you would need to eat in order to raise your Omega-3 Index into the desirable range cannot be predicted with certainty. Many factors – your age, sex, weight, diet, genetics, smoking habits, medications you may be taking, and other medical conditions – can all influence your body's response to EPA+DHA. However, research has shown that on average for most Americans, weekly consumption of 3 servings of non-fried fish plus taking a supplement should raise the Omega-3 Index into the desirable range.

It should be noted that, because they have a different chemical structure than EPA and DHA, the omega-3 fatty acid found in flax or chia seeds (alpha-linolenic acid, ALA) are distinct from EPA and DHA. We do not recommend any increase to ALA intake for the purpose of increasing Omega-3 Index.

After you increase your intake of EPA+DHA, your Omega-3 Index will begin to slowly go up within a few days, but will continue to change for 3-4 months. To know how your own body responds to an increased intake of EPA+DHA, we recommend that you re-measure your Omega-3 Index in 3-4 months. Once you reach the healthy range for Omega-3 Index, we recommend that you re-test every 6 months to make sure it is staying there.

*The difference between 250 and 500 mg/day recommendations is that the former would be provided by "8 oz of a variety of seafood" whereas the latter would be provided by the same number of servings of "fatty fish". Fatty fish contains about twice the amount of EPA and DHA as does seafood in general.

Lab Director: Brad Randall, MD. CLIA#: 43D1105229

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OMEGA RATIOS REPORT

NAME: Sally Sample
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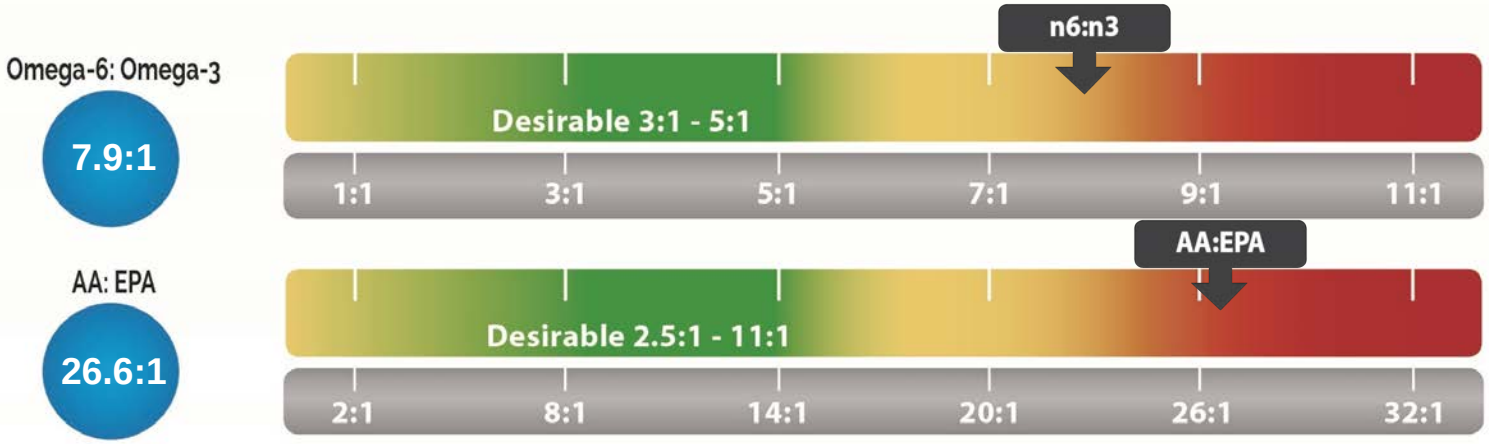

INFORMATION ABOUT THE OMEGA-6:OMEGA-3 AND THE AA:EPA RATIOS

Omega-6:Omega-3 ratio is calculated by dividing the sum of seven omega-6 fatty acids by the sum of four omega-3 fatty acids. The only two fatty acids included in the AA:EPA ratio are arachidonic acid (AA, 20:4n-6) and eicosapentaenoic acid (EPA, 20:5n-3).

The desirable range for the omega-6:omega-3 ratio is 3:1 to 5:1, and the desirable range for the AA:EPA ratio is 2.5:1 – 11:1.

These ranges were derived from thousands of individuals whose RBC samples were analyzed for the Omega-3 Index and for these two ratios. Because the Omega-3 Index is so strongly related to each of these ratios, the desirable ranges for these two ratios were calculated to correspond to the desirable range for the Omega-3 Index.

As described in the Omega-3 Index report, the best way to lower both the Omega-6:Omega-3 and the AA:EPA ratios is to consume more omega-3 fatty acids. As described below in the Omega-6 fatty acids section of this report, the latest scientific literature supports higher, not lower, intakes/levels of the principal omega-6 fatty acid, linoleic acid. Therefore, we do not recommend lowering your intake of linoleic acid as a strategy to lower these ratios. Raising your intake of EPA+DHA from seafoods and/or omega-3 supplements will, however, decrease both of these ratios (and raise your Omega-3 Index).

As described in the Omega-3 Index report, it will take 3-4 months for these ratios to reach their new levels.

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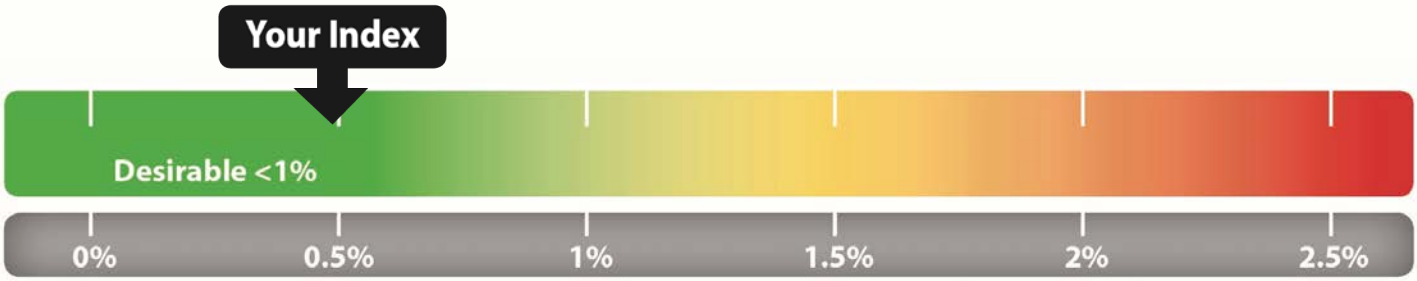
TRANS FAT INDEX REPORT

NAME: Sally Sample
DOB: 01/01/0000
ID: SAMPLE

COLLECTION DATE: 08/21/2020
RESULT DATE: 08/25/2020
PROVIDER:
ACCOUNT: Complimentary

Your Index 0.49%

Reference Range*: 0.30% - 2.42%



* Reference Ranges encompass about 99% of US adults. Visit our FAQ section for more info.

Trans fatty acids (commonly called *trans* fats) in our blood come only from the food we eat. Our body cannot make trans fats, like it can saturated and mono-unsaturated fats. The vast majority (80-90%) of trans fats we eat in America are industrially-produced trans fats*. These are produced by the "partial hydrogenation" of liquid vegetable oils, which is a chemical process that converts liquid oils into solid margarines and shortenings. Consumption of industrially-produced trans fats has been linked to poorer heart health and increased levels of "bad" cholesterol and decreased levels of "good" cholesterol. The Dietary Guidelines for Americans state that "trans fats can raise the risk of developing cardiovascular disease." Accordingly, the Guidelines recommend "keeping the intake of trans fat as low as possible by limiting foods containing partially hydrogenated oils." The US Food and Drug Administration (FDA) has taken several steps to remove as much industrial trans fats from the American diet as possible.

Unfortunately, it is virtually impossible to know for certain how much trans fat is in your diet. This is because varying amounts of trans fats are included in thousands of food products, and the amounts in any given food product can change over time depending on the prices of the fats used to produce the food and the success of food companies in finding other fats to replace trans fats. In general, the foods that provide the most trans fats in the American diet include cakes, cookies, pies, pastries, French fries, tortilla chips, crackers, popcorn, and stick margarines, as seen on the accompanying Trans Fat Table.

The Trans Fat Index is simply the amount of industrially-produced trans fats that are in your red blood cell membranes. Blood levels of trans fats reflect levels in the diet – the more you eat, the higher they are in the blood. Historically, Americans ate too much trans fat, but over the last several years the food industry has steadily removed trans fats from many products. In fact, since 2009, the average Trans Fat Index measured at OmegaQuant has decreased by half (from 1.7% to 0.8%). In other words, in 2017 more than half of the samples submitted to OmegaQuant have a Trans Fat Index of <1%.

Individuals who have been eating typical American diets for decades have relatively high levels of trans fatty acids stored in their fat tissue. The more they've eaten (and the more fat tissue they have), the larger the body's total burden of trans fats. When a person cuts down on trans fat intake, these fatty acids start to slowly "leak" out of the fat tissue and eventually get burned up, but the process is slow. Unfortunately, research on the question of "How slow?" has never been done, so nobody really knows. Consequently, the only way to track the loss of trans fats from your body is to periodically test your Trans Fat Index every 6 to 12 months.

*Trans fats are also produced by ruminant bacteria and are present in full-fat dairy products and beef, but blood levels of these types of trans fats are probably not linked to poor heart health. Nevertheless, the Trans Fat Index does include all the 18-carbon trans fats regardless of their dietary source. However, it does not contain the 16-carbon palmitelaidic acid which also comes from ruminant fats.

Lab Director: Brad Randall, MD. CLIA#: 43D1105229

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FULL FATTY ACID PROFILE REPORT

NAME: Sally Sample
DOB: 01/01/0000
ID: SAMPLE

COLLECTION DATE: 08/21/2020
RESULT DATE: 08/25/2020
PROVIDER:
ACCOUNT: Complimentary

Dried Blood Spot Fatty Acid Profile

Fatty Acid Group	Total	Percentile Rank	Reference Range*
Omega-3 Fatty Acids	4.43%	24th	2.92-13.29%
Omega 3 Index	4.64%	27th	2.90-12.90%
Alpha-Linolenic (18:3n3)	0.42%		
Eicosapentaenoic (EPA, 20:5n3)	0.36%		
Docosapentaenoic-n3 (22:5n3)	1.09%		
Docosahexaenoic (DHA, 22:6n3)	2.56%		
Omega-6 Fatty Acids	35.13%	24th	26.35-45.15%
Linoleic (18:2n6)	21.92%		
Gamma-Linolenic (18:3n6)	0.27%		
Eicosadienoic (20:2n6)	0.22%		
Dihomo-y-linolenic (20:3n6)	1.26%		
Arachidonic (AA, 20:4n6)	9.64%		
Docosatetraenoic (22:4n6)	1.48%		
Docosapentaenoic-n6 (22:5n6)	0.34%		
cis-Monounsaturated Fatty Acids	23.80%	80th	15.65-32.26%
Palmitoleic (16:1n7)	0.43%		
Oleic (18:1n9)	21.69%		
Eicosenoic (20:1n9)	0.31%		
Nervonic (24:1n9)	1.37%		
Saturated Fatty Acids	36.14%	95th	29.52-37.74%
Myristic (14:0)	1.12%		
Palmitic (16:0)	19.54%		
Stearic (18:0)	12.88%		
Arachidic (20:0)	0.31%		
Behenic (22:0)	0.90%		
Lignoceric (24:0)	1.39%		
Trans Fatty Acids	0.51%	5th	0.35-2.69%
Trans Palmitoleic (16:1n7t)	0.02%		
Trans Oleic (18:1t)	0.30%		
Trans Linoleic (18:2n6t)	0.19%		
Trans Fat Index	0.49%	5th	0.30-2.42%
Ratios			
AA:EPA	26.6:1	87th	1.4 – 52.6
Omega-6:Omega-3	7.9:1	68th	2.3 – 14.5

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Omega-3 Fatty Acids

The four omega-3 fatty acids reported here include the "plant" omega-3 (alpha-linolenic acid, ALA) and the three "fish" omega-3s (EPA, DHA and DPA n-3). ALA is one of the two essential fatty acids in the diet, meaning, like a vitamin, we cannot make it and have to get it from our diet. According to the Dietary Guidelines for Americans, an adequate intake of ALA is about 1.5 grams per day, which is about the average intake in the US today. ALA comes primarily from soybean oil (which is a component of many processed foods), but certain specialty foods/oils are particularly rich sources (chiaseed oil, flaxseed oil, black walnuts). With respect to the "fish" omega-3's, they are not technically essential fatty acids, but they may help to maintain heart, brain, eye and joint health. Recommendations for EPA+DHA intakes are given in the Omega-3 Index report. Although a desirable range for the Omega-3 Index has been set at 8%-12%, at present, there is not enough research to recommend a target blood levels for ALA (or DPA n3).

Omega-6 Fatty Acids

We measure levels of seven fatty acids in the omega-6 family, but on average 85% of the total amount comes from only two – linoleic and arachidonic acids. The former is (like ALA) an essential fatty acid and is the starting material for the synthesis of the other omega-6s, including arachidonic acid. The level of linoleic acid in your blood is generally influenced by the amount you eat over many months, whereas the level of arachidonic acid (and the other five omega-6 fatty acids) are primarily determined by your body's metabolism. In other words, there is little you can do from a dietary perspective to alter the levels of six of the seven omega-6 fatty acids. Making significant changes in linoleic acid blood levels via diet takes months to years. The Dietary Guidelines for Americans defines an adequate intake of linoleic acid as 11-14 grams per day for women and 14-16 grams per day for men. There has been considerable controversy regarding whether omega-6 fatty acids, linoleic acid in particular, are "good" or "bad" for our health. Some researchers link higher inflammation in the body, which is a part of many chronic disease processes, to higher intake of omega-6 fatty acids because arachidonic acid is the starting material for the production of some "pro-inflammatory" molecules. Others (including Dr. Harris and most nutrition science organizations around the world) disagree, noting that in most studies, higher amounts of linoleic acid in the diet or in the blood are associated with better overall heart and metabolic health. In fact, linoleic acid levels between about 25% and 28% are associated with better health than lower levels. Despite this evidence, there continues to be a controversy in this area. Nevertheless, OmegaQuant agrees with the recommendation of the American Heart Association that between 5% and 10% of calories be consumed as linoleic acid (current US intakes average about 6% of calories). Clearly, further research is needed in this area.

cis-Monounsaturated Fatty Acids

There are four fatty acids in this class in the OmegaQuant Complete Report, but 95% of "monos" are from one fatty acid, oleic acid. Oleic acid is in many vegetable oils, especially olive oil, so it is a part of virtually everyone's diet and also is made by our body (not an essential fatty acid). Although found in relatively high amounts in the blood of people on a Mediterranean Diet (due to the large intake of olive oil), the relationship between blood oleic acid levels and health is somewhat controversial. We cannot provide a strong, research-based recommendation for a desirable blood oleic acid range or corresponding dietary advice to change levels. Because oleic acid levels come from both what you eat and what your body makes, it's very hard to change blood levels. At present, oleic acid levels are provided in the report for the sake of completeness, not to guide recommendations for dietary changes.

The other fatty acid in this family that merits comment is palmitoleic acid. It is normally present at around 1% of total fatty acids in your blood, but it is being recognized as a marker of excess carbohydrates in the diet. Foods rich in simple carbohydrates are sugar, flour, high-fructose corn syrup, etc. Too much of these kinds of carbohydrates causes the body to actually make fatty acids, which is why palmitoleic acid levels go up in this setting. Again, the research in this field is immature and does not allow for firm target values to be set, but levels below about 0.6% are probably better than higher levels. (Note: if you are taking a palmitoleic acid supplement, the relationship between carbohydrate intake and blood levels of this fatty acid become complex and hard to interpret.)

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Saturated Fatty Acids

There are six saturated fatty acids in the OmegaQuant Complete Report. Foods rich in saturated fatty acids are usually solids at room temperatures, which includes foods like butter, shortening, and lard. (Oils rich in unsaturated fatty acids, like vegetable or fish oils, are liquids). As with the other classes described above, the vast majority of saturated fatty acids are from two fatty acids: palmitic and stearic acid. Together they make up ~98% of the saturated fatty acids in the blood, with palmitic making up 2/3rds of the total. Stearic acid does not appear to have any important health implications, but higher levels of palmitic may. Lower levels of palmitic acid in the blood seem to be linked with better overall health. So, keeping palmitic acid levels below "average" (i.e., less than about 21%,) would probably be wise although firm evidence for this has yet to be produced. Again, palmitic acid is both consumed and made by the body, especially when carbohydrate intake is high, so it is difficult to make dietary change recommendations based just on blood levels. Lowering both saturated fat and simple carbohydrate intake (which is generally recommended as a part of a healthy diet), should result in lower palmitic acid blood levels.

Trans Fatty Acids

Refer to your Trans Fat Index report for information relating to these fatty acids.

Ratios

Refer to your Omega Ratios report for information relating to these ratios.

a. Reference Ranges encompass about 99% of US adults. Visit our FAQ section for more information.
b. Desirable Ranges are only set for the fatty acids where the research has shown health benefits which has been able to be repeated in multiple studies.

Lab Director: Brad Randall, MD. CLIA#: 43D1105229

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Content of EPA+DHA (in mg) in Commonly Consumed Types of Fish and in Fish Oil Supplements (per 3 oz or 85 g serving SIZE)

Fish and Seafood	EPA	DHA	EPA+DHA
Atlantic Salmon (farmed)	587	1238	1825
Pacific Herring	1056	751	1807
Atlantic Herring	773	939	1712
Atlantic Salmon (wild)	349	1215	1564
Bluefin Tuna	309	970	1279
Pink Salmon (wild)	456	638	1094
Coho Salmon (farmed)	347	740	1087
Mackerel (canned)	369	677	1046
Sockeye Salmon (wild)	451	595	1046
Chum Salmon (canned)	402	597	999
Rainbow Trout (farmed)	284	697	981
Coho Salmon (wild)	341	559	900
Sardines (canned)	402	433	835
Albacore (or white) Tuna (canned)	198	535	733
Shark (raw)	267	444	711
Swordfish	117	579	696
Sea Bass	175	473	648
Pollock	77	383	460
Flat Fish (Flounder/Sole)	207	219	426
Blue Crab	207	196	403
Halibut	77	318	395
Oysters (farmed)	195	179	374
King Crab	251	100	351
King Mackeral	148	193	341
Walleye	93	245	338
Dungeness Crab	239	96	335
Scallops	141	169	310
Skipjack Tuna	77	201	278
Mixed Shrimp	145	122	267
Clams	117	124	241
Yellowfin Tuna	40	197	237
Light Chunk Tuna	40	190	230
Catfish (wild)	85	116	201
Catfish (farmed)	42	109	151
Cod	3	131	134
Mahi-Mahi (dolphin fish)	22	96	118
Tilapia	4	111	115
Orange Roughy	5	21	26
Dietary Supplements – Amount (mg) per 1,000 mg capsule or per teaspoon			
Standard Fish Oil Capsules	180	120	300
Fish Oil Concentrates (many varieties)	100-400	100-400	300-700
Cod Liver Oil (teaspoon)	300	500	800
Krill Oil	100-300	50-150	150-450
Algal Oil	50-150	100-300	150-450

Table adapted from Harris et al. Current Atherosclerosis Reports 2008;10:503-509. Values based on USDA Nutrient Data Lab values and are for fish cooked with dry heat unless otherwise noted.

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Content of Trans Fat (in grams) in Commonly Consumed Foods (serving size varies)

Food	Amount	Trans Fat (g)
Margarine, stick	1 Tbsp (15g)	2.1
Biscuits (from refrigerated dough)	1 biscuit	2.0
Cinnamon rolls with Icing (from refrigerated dough)	1 roll	1.9
Mashed potatoes, dehydrated with milk and margarine	1 cup	1.5
Frosting, coconut	1 serving (38 g)	1.4
Muffins, almond poppyseed (from box)	1 muffin (41 g)	1.1
Iced Oatmeal cookies	1 cookie (28 g)	1.0
Margarine, tub	1 Tbsp (15g)	0.8
Chocolate chip cookie dough, refrigerated	1 cookie (33 g)	0.8
Crème-filled snack sponge cakes	1 cake (28 g)	0.5
Butter, salted	1 Tbsp (14 g)	0.5
Chicken strips, fried	1 strip	0.4
Refrigerated bread dough	1 serving (52 g)	0.3
Frozen cheese pizza, rising crust (baked)	1 slice (1/4 pie)	0.3
Bacon, egg and cheese croissant, fast food	1 sandwich	0.3
American cheese	1 slice (28 g)	0.3
Candy, licorice cherry bites	18 pieces	0.2
Saltine Crackers	5 crackers	0.2
Crispy chicken sandwich, fast food	1 sandwich	0.2
Cheese puffs	1 package (35 g)	0.2
Chex Mix	1 package (49 g)	0.2
Cornbread (from mix)	1 muffin	0.1
Garlic bread, frozen	1 slice	0.1
Tortilla chips, ranch-flavor	~8 chips (28 g)	0.1
Chocolate chip cookies, commercial	1 cookie	0.1
French toast sticks, refrigerated	2 pieces	0.1
Chocolate frosting (butter)	2 Tbsp	0.1

USDA SR26, Accessed from http://ndb.nal.usda.gov on February 1, 2014. Due to the constantly changing trans fat levels in the food supply, these values are meant to serve only as a guide. Checking the Nutrient Facts Panel on the food product will have the most accurate information regarding trans fat levels.