Composition of Foods
Raw, Processed, Prepared
USDA National Nutrient Database for Standard Reference, Release 22

September 2009

U.S. Department of Agriculture
Agricultural Research Service
Beltsville Human Nutrition Research Center
Nutrient Data Laboratory
10300 Baltimore Avenue
Building 005, Room 107, BARC-West
Beltsville, Maryland 20705

U.S. Department of Agriculture, Agricultural Research Service, USDA Nutrient Data Laboratory. 2009. USDA National Nutrient Database for Standard Reference, Release 22.

USDA Nutrient Data Laboratory website: http://www.ars.usda.gov/nutrientdata

Issued September 2009

Contents

Introduction

The USDA National Nutrient Database for Standard Reference (SR) is the major source of food composition data in the United States. It provides the foundation for most food composition databases in the public and private sectors. As information is updated, new versions of the database are released. This version, Release 22 (SR22), contains data on 7,538 food items and up to 143 food components. It replaces SR21 issued in September 2008.

Updated data have been published electronically on the USDA Nutrient Data Laboratory (NDL) website since 1992. SR22 includes composition data for all the food groups and nutrients published in the 21 volumes of "Agriculture Handbook 8" (U.S. Department of Agriculture 1976–92), and its four supplements (U.S. Department of Agriculture 1990–93), which superseded the 1963 edition (Watt and Merrill, 1963). SR22 supersedes all previous releases, including the printed versions, in the event of any differences.

In July 2001, when NDL converted to a new version of its Nutrient Databank System (NDBS), formats were changed and fields added to improve the descriptive information for food items and the statistical information about the nutrient values. While data in previous releases have been moved to the new NDBS, they may not have been updated through the complete system. Therefore, many of these new fields contain data only for those items that have been processed through the new NDBS and it will take a number of years before they are populated for most food items in the database.

Data have been compiled from published and unpublished sources. Published sources include the scientific literature. Unpublished data include those obtained from the food industry, other government agencies, and research conducted under contracts initiated by USDA's Agricultural Research Service (ARS). These analyses are currently conducted under the National Food and Nutrient Analysis Program (NFNAP), in cooperation with the National Cancer Institute and other offices and institutes of the National Institutes of Health (Haytowitz *et al*., 2008). Data from the food industry represents the nutrient content of a specific food or food product at the time the data is sent to NDL. The values may change due to reformulations or other processing changes by individual companies between the time that SR is released and the next update of this database. Values in the database may be based on the results of laboratory analyses or calculated by using appropriate algorithms, factors, or recipes, as indicated by the source code in the Nutrient Data file. Not every food item contains a complete nutrient profile.

Specific Changes for SR22

The major changes to the database since the last release are listed below.

- Added nutrient values for vitamin D in µg (Nutr. No. 328) for all foods used in the Food and Nutrient Database for Dietary Studies (FNDDS) (USDA 2008). The FNDDS supports What We Eat in America, the dietary intake interview component of the National Health and Nutrition Examination Survey. At the same time values for vitamin

D in IU (Nutr. No. 324) were expanded and updated such that all food items containing a value for Nutr. No. 328 have a corresponding value for Nutr. No. 324. When available, values for D_2 (Nutr. No. 325) and D_3 (Nutr. No. 326) were also added to the database. The abbreviated file (p. 32) has been modified to include values for Vitamin D, µg (Nutr. No. 328) and Vitamin D, IU (Nutr. No. 324). See the discussion of vitamin D (p. 15) for more information on this project.

- A new food group (36), Restaurant Foods, has been added to the database. These are foods sampled at various restaurants (not fast food, which are in food group 21) and are different from the home prepared items or prepared frozen entrees included in Food Group 22, Meals, Entrees, and Sidedishes Some food items, such as beverages and rice, though obtained at restaurants are included in their respective food groups. At this time Restaurant Foods contains profiles for 38 food items obtained from family-style restaurants, Latino restaurants, and Chinese restaurants.

- Two hundred and twenty-five new foods were added to the database using data generated by USDA through the NFNAP or submitted by the food industry. Among these are: muscadine grapes, gold kiwi, formulated bars, brand-name vegetable burgers, and energy drinks. A number of food items were added to the database in response to specific requests from the USDA-ARS Food Surveys Research Group (FSRG) to support future releases of the FNDDS. A complete list of the added food items can be found in the ADD_Food file (p. 35).

- Nutrient data were updated and expanded for
    - RTE breakfast cereals, cream of wheat, soy-based vegetarian products, onion powder, garlic powder, mustard seed, chilled orange juice, pumpkin and squash seed kernels (both dried and roasted), whole wheat flour, and rye flour.
    - Fatty acid profiles were updated for several highly consumed snack foods where reformulations to low- or no-*trans* oils have occurred.
    - Several vegetables and seafood items on FDA's list of the 20 most frequently consumed raw vegetables and seafood in the United States (CFR, Title 21, Pts. 101.42–101.45), not previously analyzed under NFNAP, were sampled, analyzed, and the corresponding nutrient profiles updated.
    - Proximates and fatty acid profiles for fast food fried chicken were updated to reflect the fast food companies' transition to oils to reduce the amount of *trans* fat in their products.
    - Nutrient profiles were also updated and expanded for a number of food items in response to specific requests from FSRG to support future releases of the FNDDS.

  A complete list of the updated nutrients can be found in the CHG_NUTR file (p. 35).

- Some margarines and spreads are available on the retail market with or without added vitamin D. New NDB items were created to represent the margarines/spreads with added vitamin D. Seven margarines/spreads were discontinued from SR22. Appropriate substitutions for those items, if needed, are:

Discontinued item	Substitution
04105	04614
04131	04617
04132	04610
04521	04610
04619	04620
42310	04128
42313	04614

- A study was conducted to determine the nutrient composition of boneless, skinless chicken breasts. Nationally representative samples of 2 types of chicken breast—enhanced [with water, salt, and sodium phosphate added] and non-enhanced/natural—were obtained from 12 locations nationwide. The samples were analyzed in raw form only. As a result of this study, data has been generated to update one existing SR item (Chicken, broilers or fryers, breast, meat only, raw) and one new item (Chicken, broilers or fryers, breast, meat only, raw, enhanced).

- A study was conducted to determine the mathematical relationship between the individual nutrients and fat content of raw ground pork using regression techniques. Ground pork samples were obtained from four US commercial packers. These samples were specially formulated by the packer to provide the following fat levels; low fat (2 – 6%), medium fat (14-17%) and high fat (26 - 30%). Samples from each fat level were prepared as raw products, pan-broiled patties, and pan-browned crumbles. Regression equations were then developed for each nutrient in the raw and each of the cooked products relative to fat level (Williams *et al.*, 2009). These equations were used to estimate the nutrient profile of ground pork for the specific fat levels (4%, 16% and 28%) reported in the SR.

- Some RTE cereals had been included in previous releases as both a brand name item that had a limited number of nutrients and as a generic NDB item that had the full complement of required nutrients for the food survey subset. The related generic items are now identified by the cereal brand name and the limited nutrient profile has been dropped.

- As part of the American Indian/Alaska Native database, data for 7 food items (ringed seal liver, stinging nettles, caribou, wocas (yellow pond lily) dried seeds and tubers, beaked hazelnuts, and piki bread) were added. These items are entered in food group 35, Ethnic Foods.

- As part of an ongoing effort to expand the number of Latino food items in the database, profiles for tostada shells, sweet breads, cakes, cookies, muffins, horchata, fried green and fried yellow plantains, and dulce de leche have been added. Each of these items are entered in the database in their respective food groups, i.e. horchata is in food group 14 (Beverages), while fried plantains are in food group 9 (Fruit and Fruit Juices).

Data Files

The data files for SR22 are available in ASCII format and as a Microsoft Access 2003 database. A description of each field in these files and the relationships between each begins on p. 23. The Access database contains all the SR22 files and relationships, with a few sample queries and reports. An abbreviated file (p. 32), with fewer nutrients (46) but all the food items is also included. A Microsoft Excel 2003 spreadsheet of this file is also provided. These database and spreadsheet files are generally compatible with later releases of the same software package or with other software packages released at the same time.

Database Reports

The data in SR22 are available as reports in two different presentations. The first presents items in SR22 as page images containing all the data for each food. These data are separated into files by food groups. The second presentation contains selected foods and nutrients in SR22. Those reports are sorted either alphabetically by food description or in descending order by nutrient content in terms of common household measures. The food items and weights in these reports are adapted from those in the "U.S. Department of Agriculture Home and Garden Bulletin 72, Nutritive Value of Foods" (Gebhardt and Thomas, 2002).

The Adobe Reader is needed to see these files. There is a link from the NDL website to Adobe''s website where it can be downloaded at no charge.

Database Content

The database consists of several sets of data: food descriptions, nutrients, weights and measures, footnotes, and sources of data. The sections below provide details about the information in each. More extensive details on many specific foods are available in the printed "Agriculture Handbook 8" sections (U.S. Department of Agriculture, 1976-92).

Food Descriptions

This file includes descriptive information about the food items. For more details on the Food Description file, see "Food Description File Formats" (p. 25). A full description (containing the name of the food with relevant characteristics, e.g., raw or cooked, enriched, color) and a short description (containing abbreviations) are provided. Abbreviations used in creating short descriptions are given in Appendix A. In creating the short description, the first word in the long description is not abbreviated. In addition, if the long description is 25 characters or less, the short description contains no abbreviations. Abbreviations used elsewhere are given in Appendix B. Brand names used in food descriptions are in upper case. Scientific names, common names, manufacturers' names, amounts of refuse, and refuse descriptions are provided where appropriate. The common name field includes alternative names for a product, e.g., soda or pop, for a carbonated beverage. In addition this field also includes Uniform Retail Meat Identity Standard (URMIS) identification numbers and USDA commodity codes as appropriate. The food group to which the food item belongs is also indicated. A code is also provided indicating if the item is used in the Food and Nutrient Database for Dietary Studies (FNDDS; USDA, ARS, 2008). The factors used to calculate protein from nitrogen are included, as well as those used to calculate kilocalories. There are no factors for items prepared using the recipe program of the NDBS or for items where the manufacturer calculates protein and kilocalories.

The refuse and refuse description fields contain amounts and descriptions of inedible material (for example, seeds, bone, and skin) for applicable foods. These amounts are expressed as a percentage of the total weight of the item as purchased, and they are used to compute the weight of the edible portion. Refuse data were obtained from USDA-sponsored contracts and U.S. Department of Agriculture Handbooks 102 (Matthews and Garrison, 1975) and 456 (Adams, 1975). To calculate "amount of nutrient in edible portion of 1 pound as purchased," use the following formula:

$$Y = V*4.536*[(100-R)/100]$$

where

Y = nutrient value per 1 pound as purchased,
V = nutrient value per 100 g (Nutr_Val in the Nutrient Data file), and
R = percent refuse (Refuse in the Food Description file).

For meat cuts containing bone and connective tissue, the amount of connective tissue is included in the value given for bone. Separable fat is not shown as refuse if the meat is described as separable lean and fat. Separable fat generally refers to seam fat and external trim fat. Separable lean refers to muscle tissue that can be readily separated from fat, bone, and connective tissue in the intact cut; it includes any fat striations (marbling) within the muscle. For boneless cuts, the refuse value applies to connective tissue or connective tissue plus separable fat. The percentage yield of cooked, edible meat from 1 pound of raw meat with refuse can be determined by using the following formula:

$$Y = (W_c/453.6)*100$$

where

Y = nutrient value per 1 pound as purchased, and
W_c = weight of cooked, edible meat.

Nutrients

The Nutrient Data file contains mean nutrient values per 100 g of the edible portion of food, along with fields to further describe the mean value. The following statistical attributes are provided to better describe the data:

- Nutrient value – the mean of the data values for a specific parameter. Nutrient values have been rounded to the number of decimal places for each nutrient as specified in the Nutrient Definition file (p. 28).
- Number of data points – the number of data points used to estimate the mean.
- Standard error – the standard error of the mean: a measure of variability of the mean value

as a function of the number of data points.

- Number of studies—the number of analytical studies used to generate the mean. A study is a discrete research project conducted or reported for a specific food. A study can be the analysis of one nutrient in one food, one nutrient in many foods, or many nutrients in many foods.
- Minimum value—the smallest observed value in the range of values.
- Maximum value—the largest observed value in the range of values.
- Degrees of freedom—the number of data values that are free to vary after certain restrictions are placed on the estimates; used in probability calculations.
- Lower- and upper-error bounds—represents a range of values within which the population mean is expected to fall, given a pre-specified confidence level. For SR22 and related releases, the confidence level is 95 percent.
- Statistical comments—gives additional details about certain assumptions made during statistical calculations. The definition of each comment is given after the description of the Nutrient Data file under “File Formats” (p. 26).

Other fields provide information on how the values were generated, as follows:

- Derivation code—gives more information about how a value was calculated or imputed. Procedures used to impute a nutrient value are described by Schakel et al. (1997).
- Reference NDB number—indicates the NDB number of the food item that was used to impute a nutrient value for another food. This field is only populated for items added or updated since SR14 for which an imputed value is provided.
- Added nutrient marker—a “Y” indicates that a mineral or vitamin was added for enrichment or fortification. This field is populated for ready-to-eat breakfast cereals and many brand-name hot cereals in food group 8. In future releases, this field will be populated for other food groups.
- Confidence code—indicates the relative quality of the data. This code is derived using the data quality criteria first described by Mangels et al. (1993). These criteria have been expanded and enhanced for the NDBS (Holden et al., 2002). This field is included as a placeholder for future releases.

For more details on the Nutrient Data file, see “Nutrient Data File Formats” (p. 26). Nutrient values indicate the total amount of the nutrient present in the edible portion of the food, including any nutrients added in processing. Table 1 gives an idea of the comprehensiveness of the database by listing for each nutrient the number of food items that contain data.

In general, levels of fortified nutrients are the values calculated by the manufacturer or by NDL, based on the Nutrition Labeling and Education Act (NLEA) label declaration of % Daily Value (DV) (CFR, Title 21, Pt. 101) (U.S. Food and Drug Administration–Department of Health and Human Services, 2004). Such values represent the minimum nutrient level expected in the product. If analytical values were used to estimate levels of added nutrients, a number is present in the sample count field for these nutrients.

Table 1.—Number of Foods in the Database (*n* = 7,538) Containing a Value for the Specified Nutrient

Nutr. No.	Nutrient	Number of foods	Nutr. No.	Nutrient	Number of foods
255	Water* †	7534	417	Folate, total* †	6442
208	Energy* †	7538	431	Folic acid* †	6121
203	Protein* †	7538	432	Food folate* †	6278
204	Total lipid (fat)* †	7538	435	Folate (DFE)* †	6115
205	Carbohydrate, by difference* †	7538	421	Choline, total * †	3735
207	Ash †	7533	454	Betaine	1502
291	Total dietary fiber* †	6812	418	Vitamin B_{12}* †	6533
269	Total sugars* †	5307	578	Vitamin B_{12}, Added*	3796
210	Sucrose	1118	320	Vitamin A (RAE)* †	6331
211	Glucose	1116	319	Retinol* †	6056
212	Fructose	1110	321	β-carotene* †	4324
213	Lactose	1094	322	α-carotene* †	4225
214	Maltose	1081	334	β-cryptoxanthin* †	4214
287	Galactose	953	318	Vitamin A (IU) †	7147
209	Starch	717	337	Lycopene* †	4184
301	Calcium* †	7397	338	Lutein+zeaxanthin* †	4159
303	Iron* †	7415	323	α-tocopherol (vitamin E)* †	4462
304	Magnesium* †	6771	573	Vitamin E, Added *	3684
305	Phosphorus* †	6867	341	β-tocopherol	1286
306	Potassium* †	7023	342	γ-tocopherol	1282
307	Sodium* †	7456	343	δ-tocopherol	1265
309	Zinc* †	6805	328	Vitamin D (D_2 + D_3), µg *†	4154
312	Copper*	6673	325	Vitamin D_2 (ergocalciferol)	33
315	Manganese†	5916	326	Vitamin D_3 (cholecalciferol)	906
317	Selenium* †	6094	324	Vitamin D, IU†	4154
313	Fluoride	557	430	Vitamin K* †	4126
401	Vitamin C, total ascorbic acid* †	7108	606	Total saturated fatty acids* †	7202
			607	4:0*	4522
404	Thiamin* †	6812	608	6:0*	4565
405	Riboflavin* †	6832	609	8:0*	4841
406	Niacin* †	6805	610	10:0*	5338
410	Pantothenic acid†	6025	611	12:0*	5632
415	Vitamin B_6* †	6616	696	13:0	246

*Indicates the 65 nutrients included in the USDA Food and Nutrient Database for Dietary Studies (FNDDS).

† Nutrients included in the Abbreviated file (p. 32).

Table 1.—Number of Foods in the Database (*n* = 7,538) Containing a Value for the Specified Nutrient—(continued)

Nutr. No.	Nutrient	Number of foods	Nutr. No.	Nutrient	Number of foods
612	14:0*	6026	851	18:3 n-3 *cis, cis, cis* (ALA)	741
652	15:0	1371	685	18:3 n-6 *cis, cis, cis*	724
613	16:0*	6244	856	18:3 i (other isomers)	36
653	17:0	1399	627	18:4*	4548
614	18:0*	6232	672	20:2 n-6 *cis,cis*	1156
615	20:0	1477	689	20:3 undifferentiated	1172
624	22:0	1383	852	20:3 n-3	193
654	24:0	838	853	20:3 n-6	201
645	Total monounsaturated fatty acids* †	6747	620	20:4 undifferentiated*	5350
			855	20:4 n-6	8
625	14:1	1396	629	20:5 n-3* (EPA)	4716
697	15:1	1071	857	21:5	99
626	16:1 undifferentiated*	5982	858	22:4	307
673	16:1 *cis*	263	631	22:5 n-3* (DPA)	4662
662	16:1 *trans*	202	621	22:6 n-3* (DHA)	4714
687	17:1	1096	605	Fatty acids, total *trans*	1534
617	18:1 undifferentiated*	6264	693	Fatty acids, total *trans*-monoenoic	523
674	18:1 *cis*	538			
663	18:1 *trans*	551	695	Fatty acids, total *trans*-polyenoic	460
628	20:1*	5331			
630	22:1 undifferentiated*	4746	601	Cholesterol* †	7217
676	22:1 *cis*	243	636	Phytosterols	529
664	22:1 *trans*	193	638	Stigmasterol	97
671	24:1 *cis*	467	639	Campesterol	97
646	Total polyunsaturated fatty acids* †	6753	641	β-sitosterol	97
			501	Tryptophan	4500
618	18:2 undifferentiated*	6280	502	Threonine	4543
675	18:2 n-6 *cis,cis*	505	503	Isoleucine	4545
666	18:2 i (other isomers)	66	504	Leucine	4545
669	18:2 *trans, trans*	221	505	Lysine	4558
665	18:2 *trans*, not further defined	201	506	Methionine	4556
			507	Cystine	4484
670	18:2 conjugated linoleic acid (CLAs)	229	508	Phenylalanine	4541
			509	Tyrosine	4510
619	18:3 undifferentiated*	6173	510	Valine	4545

*Indicates the 65 nutrients included in the USDA Food and Nutrient Database for Dietary Studies (FNDDS).

† Nutrients included in the Abbreviated file (p. 32).

Table 1.—Number of Foods in the Database (*n* = 7.538) Containing a Value for the Specified Nutrient—(continued)

Nutr. No.	Nutrient	Number of foods	Nutr. No.	Nutrient	Number of foods
511	Arginine	4530	517	Proline	4473
512	Histidine	4538	518	Serine	4486
513	Alanine	4484	521	Hydroxyproline	774
514	Aspartic acid	4487	221	Alcohol*	4408
515	Glutamic acid	4488	262	Caffeine*	4159
516	Glycine	4485	263	Theobromine*	4135

* Indicates the 65 nutrients included in the USDA Food and Nutrient Database for Dietary Studies (FNDDS).

† Nutrients included in the Abbreviated file (p. 32).

Nutrient Retention and Food Yield. When nutrient data for prepared or cooked products are unavailable or incomplete, nutrient values are calculated from comparable raw items or by recipe. When values are calculated in a recipe or from the raw item, appropriate nutrient retention (USDA, 2007) and food yield factors (Matthews and Garrison, 1975) are applied to reflect the effects of food preparation on food weights and nutrient content. To obtain the content of nutrient per 100 g of cooked food, the nutrient content per 100 g of raw food is multiplied by the nutrient retention factor and, where appropriate, adjustments are made for fat and moisture gains and losses.

Nutrient retention factors are based on data from USDA research contracts, research reported in the literature, and USDA publications. Most retention factors were calculated by the True Retention Method (%TR) (Murphy et al., 1975). This method, as shown below, accounts for the loss or gain of moisture and the loss of nutrients due to heat or other food preparation methods:

$$\%TR = (N_c{*}G_c) / (N_r{*}G_r) * 100$$

Where
- TR = true retention
- N_c = nutrient content per g of cooked food,
- G_c = g of cooked food,
- N_r = nutrient content per g of raw food, and
- G_r = g of food before cooking.

Proximates. The term proximate component refers to those macronutrients that include water (moisture), protein, total lipid (fat), total carbohydrate, and ash. To be included in the database, a nutrient profile must have values for the proximate components and at least one other nutrient.

Protein. The values for protein were calculated from the amount of total nitrogen (N) in the food, using the specific conversion factors recommended by Jones (1941) for most food items. The analytical methods used to determine the nitrogen content of foods are AOAC 968.06 (4.2.04) and 990.03 (combustion) and 991.20 (Kjeldahl) (AOAC, 2003). The specific factor applied to each food item is provided in the N_Factor field in the Food Description file. The general factor of 6.25 is used to calculate protein in items that do not have a specific factor. When the protein content of a multi-ingredient food (e.g., beef stew) is calculated using the recipe program of the NDBS the specific nitrogen to protein conversion factors are applied at the ingredient level. Therefore, the N-factor field will remain empty. When the manufacturer calculates protein the N-factor field will also be empty.

Protein values for chocolate, cocoa, coffee, mushrooms, and yeast were adjusted for nonprotein nitrogenous material (Merrill and Watt, 1973). The adjusted protein conversion factors used to calculate protein for these items are as follows:

chocolate and cocoa	4.74
coffee	5.3
mushrooms	4.38
yeast	5.7

When these items are used as ingredients, such as chocolate in chocolate milk or yeast in bread, only their protein nitrogen content was used to determine their contribution to the calculated protein and amino acid content of the food. Protein calculated from total nitrogen, which may contain nonprotein nitrogen, was used in determining carbohydrate by difference. This unadjusted protein value is not given in the Nutrient Data file for SR22; rather, it is given as a footnote in printed sections of "Agriculture Handbook 8."

For soybeans, nitrogen values were multiplied by a factor of 5.71 (Jones, 1941) to calculate protein. The soybean industry, however, uses 6.25 to calculate protein. The protein content of soy flours, soy meals, soy protein concentrates, and soy protein isolates is expressed both ways in the database. The item calculated using the 6.25 factor is identified as "crude protein basis."

<u>Total Lipid.</u> The total lipid (fat) content of most foods is determined by gravimetric methods, including extraction methods such as those that use ether or a mixed solvent system of chloroform and methanol, or by acid hydrolysis. Total lipid determined by extraction is reported as Nutrient No. 204. It is sometimes referred to as "crude fat" and includes the weight of all lipid components, including glycerol, soluble in the solvent system. Nutrient No. 204 may not be identical to the fat level declared on food labels under the NLEA, where fat is expressed as the amount of triglyceride that would produce the analytically determined amount of lipid fatty acids and does not include other lipid components not soluble in the solvent system. The term "NLEA fat" is commonly referred to as "total fatty acids expressed as triglycerides."

<u>Carbohydrate</u>. Carbohydrate, when present, is determined as the difference between 100 and the sum of the percentages of water, protein, total lipid (fat), ash, and, when present, alcohol. Total carbohydrate values include total dietary fiber. Carbohydrate in beer and wine is determined by methods 979.06 (27.1.21) and 985.10 (28.1.18) of AOAC International (AOAC 2003), respectively. Total dietary fiber content is determined by enzymatic-gravimetric methods 985.29 and 991.43 of the AOAC (2003). Total sugars is the term used for the sum of the individual monosaccharides (galactose, glucose, and fructose) and disaccharides (sucrose, lactose, and maltose). Analytical data for individual sugars are determined using AOAC methods (2003),

with either high-performance liquid chromatography (HPLC) or gas-liquid chromatography (GLC). When analytical data for total sugars are unavailable for items in the FNDDS, values are imputed or obtained from manufacturers and trade associations. Starch is analyzed using the AOAC method 966.11 (2003). Because the analyses of total dietary fiber, total sugars, and starch are performed separately and reflect the analytical variability inherent to the measurement process, the sum of these carbohydrate fractions may not equal the carbohydrate-by-difference value.

Food Energy. Food energy is expressed in kilocalories (kcal) and kilojoules (kJ). One kcal equals 4.184 kJ. The data represent physiologically available energy, which is the energy value remaining after digestive and urinary losses are deducted from gross energy. Energy values, with the exception of multi-ingredient processed foods, are based on the Atwater system for determining energy values. Derivation of the Atwater calorie factors is discussed in "Agriculture Handbook 74" (Merrill and Watt, 1973). For multi-ingredient processed foods, kilocalorie values (source codes 8 or 9; for more information on source codes, see p. 28) generally reflect industry practices (as permitted by NLEA) of calculating kilocalories as 4, 4, or 9 kilocalories per gram of protein, carbohydrate, and fat, respectively, or as 4, 4, or 9 kilocalories per gram of protein, carbohydrate minus insoluble fiber, and fat. The latter method is often used for high-fiber foods.

Calorie factors for protein, fat, and carbohydrates are included in the Food Description file. For foods containing alcohol, a factor of 6.93 is used to calculate kilocalories per gram of alcohol (Merrill and Watt, 1973). No calorie factors are given for items prepared using the recipe program of the NDBS. Instead, total kilocalories for these items equal the sums of the kilocalories contributed by each ingredient after adjustment for changes in yield, as appropriate. For multi-ingredient processed foods, if the kilocalories calculated by the manufacturer are reported, no calorie factors are given.

Calorie factors for fructose and sorbitol, not available in the Atwater system, are derived from the work of Livesay and Marinos (1988). Calorie factors for coffee and tea are estimated from those for seeds and vegetables, respectively.

Minerals. Minerals included in the database are calcium, iron, magnesium, phosphorus, potassium, sodium, zinc, copper, manganese, selenium, and fluoride. Levels of minerals for most foods are determined by methods of the AOAC (2003). Calcium, iron, magnesium, phosphorus, sodium, potassium, zinc, copper, and manganese are usually determined by atomic absorption (AOAC 985.35) and inductively coupled plasma emission spectrophotometry (AOAC 984.27).

Analytical data for selenium were published earlier by USDA (1992) and were determined by the modified selenium hydride and fluorometric methods. Selenium values for foods analyzed between 1998 and 2008 for NFNAP are determined by either the modified selenium hydride (AOAC 986.15) or stable isotope dilution gas chromatography-mass spectrometry (Reamer and Veillon, 1981) methods. The selenium content of plants, in particular cereal grains, is strongly influenced by the quantity of biologically available selenium in the soil in which the plants grow, that is, by their geographical origin (Kubota and Allaway, 1972). The values given are national averages and should be used with caution when levels of selenium in locally grown foods are of interest or concern.

Values for fluoride, previously released in the USDA National Fluoride Database of Selected Beverages and Foods, Release 2 (USDA, 2005), have been incorporated into SR22, but other analyzed values, including regional values, are not included in SR. Samples are analyzed using a fluoride ion-specific electrode, direct read method (VanWinkle, 1995) for clear liquids and a micro-diffusion method (VanWinkle, 1995) for other food samples. As with selenium, the values for fluoride are national averages and should be used with caution when levels of fluoride in locally produced foods and beverages are of interest or concern.

Vitamins. Vitamins included in the database are ascorbic acid (vitamin C), thiamin, riboflavin, niacin, pantothenic acid, vitamin B_6, vitamin B_{12}, folate, total choline and betaine, vitamin A, vitamin E (α-tocopherol), vitamin K (phylloquinone), and vitamin D.

Ascorbic acid. In the current database system, all data for ascorbic acid are listed under Nutrient No. 401, total ascorbic acid, determined by the fluorometric method (AOAC 967.22). Older values which have not been updated are primarily for reduced ascorbic acid and were determined by the dichloroindophenol method (AOAC 967.21)

Thiamin, Riboflavin, and Niacin. Thiamin is determined chemically by the fluorometric method (AOAC 942.23). Fluorometric (AOAC 970.65) or microbiological (AOAC 940.33) methods are used to measure riboflavin. Niacin is determined by microbiological methods (AOAC 944.13). The values for niacin are for preformed niacin only and do not include the niacin contributed by tryptophan, a niacin precursor. The term “niacin equivalent” applies to the potential niacin value; that is, to the sum of the preformed niacin and the amount that could be derived from tryptophan (the mean value of 60 mg tryptophan is considered equivalent to 1 mg niacin (IOM, 1998)). Although not included in SR, niacin equivalents can be estimated for those foods where amino acids are given:

$$\text{mg Niacin equivalents} = \text{mg niacin} + (\text{mg tryptophan} / 60)$$

Pantothenic acid, Vitamins B_6, and B_{12}. Pantothenic acid (AOAC 945.74 or 992.07), vitamin B_6 (AOAC 961.15), and vitamin B_{12} (AOAC 952.20) are determined by microbiological methods. Vitamin B_{12} is found intrinsically in foods of animal origin or those containing some ingredient of animal origin, e.g., cake that contains eggs or milk. For foods that contain only plant products, the value for vitamin B_{12} is assumed to be zero. Some reports contain values for vitamin B_{12} in certain fermented foods (soy sauce and miso). It is believed that this B_{12} is synthesized not by the microorganisms responsible for the fermentation of the food, but rather by other contaminating microorganisms. Therefore, one should not consider these foods to be a consistent source of vitamin B_{12} (Liem et al., 1977) and these values are not included in the database.

The Dietary Reference Intakes (DRI) report on vitamin B_{12} recommended that people older than 50 years meet their Recommended Dietary Allowances (RDA) mainly by consuming foods fortified with vitamin B_{12} or a vitamin B_{12}-containing supplement (IOM, 1998). Since vitamin B_{12} added as a fortificant may provide a significant source of the vitamin in the diet, a nutrient number (#578) for “added vitamin B_{12}” has been added to the database. In this release, there are about 260 foods fortified with vitamin B_{12}. The vast majority are breakfast cereals, infant formulas, and plant-based meat substitutes. For these foods, the value for total vitamin B_{12} is used for "added vitamin B_{12}." Only a few cereals containing a milk ingredient would contain any intrinsic vitamin B_{12}. Milk-based infant formulas should contain intrinsic vitamin B_{12}. However, infants are not the population of concern for intake of fortified vitamin B_{12}. Plant-based meat substitutes should not contain intrinsic vitamin B_{12}.

Folate. Values are reported for folic acid (Nutr. No. 431), food folate (Nutr. No. 432), and total folate reported in µg (Nutr. No. 417) and as dietary folate equivalents (DFEs) (Nutr. No. 435). These varied folate forms are included and defined as described in the DRI report on folate (IOM, 1998). RDAs for folate are expressed in DFEs, which take into account the greater bioavailability of synthetic folic acid compared with naturally occurring food folate.

To calculate DFEs for any single food, it is necessary to have separate values for naturally occurring food folate and added synthetic folic acid in that item.

$$\mu g \text{ DFE} = \mu g \text{ food folate} + (1.7 * \mu g \text{ folic acid})$$

Folate values for foods analyzed through NFNAP are generated using the trienzyme microbiological procedure (Martin et al., 1990). For a small number of foods, total folate was determined as 5-methyltetrahydrofolate; these are indicated in the footnotes. Microbiological methods measure µg total folate; for enriched foods, folic acid and food folate are not distinguished from each other. Therefore, to be able to calculate DFE, multi-ingredient enriched foods are analyzed by an additional microbiological procedure without enzymes to estimate the amount of added folic acid (Chun et al., 2006). Food folate is then calculated by difference.

The addition of folic acid to enriched cereal-grain products subject to standards of identity began in the United States on January 1, 1998 (CFR, Title 21, Pts. 136–137). These products include flour, cornmeal and grits, farina, rice, macaroni, noodles, bread, rolls, and buns. Folic acid may continue to be added (with some restrictions on amounts) to breakfast cereals, infant formulas, medical foods, food for special dietary use, and meal replacement products.

For unenriched foods, food folate would be equivalent to total folate since folic acid (pteroylmonoglutamic acid) occurs rarely in foods. Therefore, the same value with its number of data points and standard error, if present, is used for total folate and food folate. The folic acid value is assumed to be zero.

For enriched cereal-grain products with standards of identity (flour, cornmeal and grits, farina, rice, macaroni, noodles, bread, rolls, and buns), the folic acid value is calculated by subtracting the analytical folate value before fortification from the analytical value for the fortified product.

Enriched ready-to-eat (RTE) cereals have generally included folic acid fortification for over 25 years. Therefore, food folate values (before fortification) were not readily available for these products. Food folate was estimated by means of the NDBS formulation program for a variety of high-consumption cereals. Mean folate values were calculated for categories of RTE cereals based on grain content. Added folic acid was then calculated by subtracting estimated food folate from the total folate content. Generally, food folate values represent a small proportion of the total folate in the fortified products.

Choline. Beginning with SR19 (2006), total choline and betaine values from the USDA Database for the Choline Content of Common Foods (USDA, 2004) have been incorporated into SR. Values for the individual metabolites have not been added to SR, but are available in the USDA Database for the Choline Content of Common Foods.

For analysis, choline compounds are extracted, partitioned into organic and aqueous phases using methanol and chloroform, and analyzed directly by liquid chromatography-electrospray ionization-isotope dilution mass spectrometry (LC-ESI-IDMS) (Koc et al., 2002). Samples are analyzed for betaine and these choline-contributing compounds: free choline (Cho), glycerophosphocholine (GPC), phosphocholine (Pcho), phosphatidylcholine (Ptdcho), and sphingomyelin (SM).

Because there are metabolic pathways for the interconversion of Cho, GPC, Pcho, PtdCho, and SM (Zeisel et al., 1994), total choline content is calculated as the sum of these choline-contributing metabolites. Betaine values are not included in the calculation of total choline since the conversion of choline to betaine is irreversible (Zeisel et al., 2003).

Vitamin A. Beginning with SR15 (2002) values for vitamin A in µg of retinol activity equivalents (RAEs) and µg of retinol are reported. At the same time, values in µg of retinol equivalents (REs) were dropped from the database.

This change responded to new reference values for vitamin A in the DRI report issued by the Institute of Medicine of the National Academies (IOM, 2001). The report recommended changing the factors used for calculating vitamin A activity from the individual provitamin A carotenoids and introduced RAE as a new unit for expressing vitamin A activity. One µg RAE is equivalent to 1 µg of all-*trans*-retinol, 12 µg of all-*trans*-β-carotene, or 24 µg of other provitamin A carotenoids. The RAE conversion factors are based on studies showing that the conversion of provitamin A carotenoids to retinol was only half as great as previously thought.

Vitamin A is also reported in international units (IU), and will continue to be reported because it is still the unit used for nutrition labeling in the U.S. One IU is equivalent to 0.3 µg retinol, 0.6 µg β-carotene, or 1.2 µg other provitamin-A carotenoids (NAS/NRC, 1989) and thus over-estimates bioavailabilty.

Individual carotenoids (β-carotene, α-carotene, β-cryptoxanthin, lycopene, and lutein+zeaxanthin) are reported. The analytical data are from NFNAP, generated using HPLC methodology (AOAC 941.15) and from the scientific literature. Most analytical systems do not separate lutein and zeaxanthin, so these carotenoids are shown combined. These values supersede those in Holden et al., 1999. Vitamin A activity values in RAE and IU were calculated from the content of individual carotenoids (β-carotene, α-carotene, and β-cryptoxanthin) using the appropriate factors. For food items used in the FNDDS, carotenoid values are imputed if analytical data are not available. For many of these items data are only available for vitamin A in IU. The variability in carotenoid levels due to cultivar, season, growing area, etc., as well as rounding within the NDBS, increases the difficulty in matching the calculated vitamin A activity values from imputed individual carotenoids to the existing IU values. As a result, the vitamin A IU value agrees within ±15 IU of the value calculated from individual carotenoids.

When individual carotenoids are not reported for plant foods (i.e. fruits, vegetables, legumes, nuts, cereal grains, and spices and herbs), µg RAE are calculated by dividing the IU value by 20. In foods of animal origin, such as eggs, beef, pork, poultry, lamb, veal, game, and fish (except for some organ meats and dairy), all of the vitamin A activity is contributed by retinol. For these foods, where analytical data are not available, µg RAE and µg of retinol are calculated by dividing the IU value by 3.33.

In foods that contain both retinol and provitamin A carotenoids, the amount of each of these components must be known to calculate RAE. Previously, most of the vitamin A data in the database were received as IU. Therefore, the amounts of the provitamin A carotenoids and retinol were then estimated from the ingredients. Once the components had been estimated, µg RAE were calculated as (IU from carotenoids/20) + (IU from retinol/3.33). Micrograms of retinol were calculated as IU from retinol/3.33.

<u>Vitamin D</u> Due to considerable public health interest in vitamin D, a multi-year project was undertaken by NDL to expand and update the relatively small existing dataset of vitamin D values in SR. Much of the original data for vitamin D had been published earlier in USDA's Provisional Table (PT-108) (Weihrauch and Tamaki, 1991), with values for fortified foods updated as needed with data received from the food industry.

The availability of vitamin D data for foods permitting subsequent dietary intake assessment is expected be a useful tool in investigating dietary requirements of vitamin D in vulnerable groups, one of the specific research recommendations of the 2005 Dietary Guidelines Committee (DGAC. 2004). An Institute of Medicine Committee to Review Dietary Reference Intakes for Vitamin D and Calcium was convened in 2009 to assess current relevant data and revise, as appropriate, the DRIs for vitamin D and calcium (http://www.iom.edu/?id=61170).

Before foods could be analyzed for vitamin D for inclusion in SR22, analytical methodology had to be developed that could be used for a variety of food matrices (Byrdwell, 2008). Although a single method is not required for USDA-sponsored analyses, all participating laboratories must demonstrate that their analysis of quality control materials falls within an acceptable range of values. For vitamin D, all methods involved extraction with solvent(s), cleanup steps, and quantification by HPLC or by HPLC and LC/MS. In the absence of certified quality control materials for vitamin D, NDL, in collaboration with Virginia Tech, developed five matrix-specific materials, one of which was sent with every batch of foods to be analyzed. The materials were: vitamin D_3 fortified fluid milk, a vitamin D_3 fortified multigrain ready-to-eat cereal, orange juice fortified with calcium and vitamin D_3, pasteurized process cheese fortified with vitamin D_3, and canned red salmon, a natural source of D_3 (Phillips et al. 2008). Vitamin D may also be present as 25-hydroxycholecalciferol in some foods such as fish, meat, and poultry. At this point the analytical methodology used to determine this metabolite of vitamin D has not been sufficiently validated; when work on this validation is completed 25-hydroxycholecalciferol values will be provided in future releases of SR.

Once an improved method of analysis was developed (Byrdwell, 2008), and the labortories certified, a selection of foods, representing natural vitamin D sources and fortified sources, were chosen for sampling and analysis under the National Food and Nutrient Analysis Program (Haytowitz *et al*. 2008). Analyses have been completed for raw eggs and the following fortified products: fluid milk at 4 fat levels, reduced fat chocolate milk, fruit yogurt, and orange juice. Current analytical values for fish are based on limited analyses; additional samples are being analyzed and values will be updated in future SR releases. Vitamin D analyses have also been completed for selected cuts/pieces of chicken, pork, and beef.

Cholecalciferol (vitamin D_3; Nutr. No. 326) is the form naturally occurring in animal products and the form most commonly added to fortified foods. Ergocalciferol (vitamin D_2; Nutr. No. 325) is the form found in plants and is sometimes added to fortified foods, such as soy milk. In SR22, vitamin D (Nutr. No. 328) is defined as the sum of vitamin D_2 and vitamin D_3.

Vitamin D values in SR22 are being provided in both micrograms (µg) and International Units (IU) to support both the analytical unit (µg) and the unit (IU) that is currently used in nutrient labeling of foods in the U.S. The biological activity of vitamin D is given as 40 IU/µg. Where available, specific isomers of vitamin D are reported only in µg. Calculations for vitamin D in SR include:

Vitamin D, µg (Nutr. No. 328) = vitamin D_2, µg + vitamin D_3, µg
Vitamin D, IU (Nutr. No. 324) = vitamin D, µg x 40

Vitamin D values in µg (Nutr. No. 328) are provided for all items in SR22 used to create the FNDDS.

In some cases, it was possible to identify food groups for which the foods do not provide or only contain trace amounts of vitamin D. Values for those foods were set to zero. For example, except for mushrooms, plant foods are not expected to contain any appreciable levels of vitamin D. In order to provide vitamin D estimates for the rest of the foods provided to create the FNDDS, data for other foods have been taken from the scientific literature or from other food composition databases, calculated from industry-declared % DV fortification levels, determined by formulation/recipe techniques, or estimated by other USDA imputation methods.

Fluid milk available at the retail level is fortified. The dairy industry provided guidance that most dairy products used as ingredients in formulated (commercial multi-ingredient) food, are not likely to be fortified with vitamin D. Likewise, margarine used in commercial products is generally not vitamin D-fortified; a relatively low percentage of vitamin D-fortified margarines and spreads are available in the retail market. For ingredients that could be fortified at the retail level, but generally are not fortified at the food processing level, two related profiles are available in SR – one with added vitamin D and one without. When estimates were calculated for formulated foods, the unfortified profile was used. For home-prepared foods, such as pudding prepared with milk, the fortified ingredient(s) was selected for use in the recipe calculation of vitamin D. In the case of margarine, a market-share blend of fortified and unfortified product was used.

For some retail products, such as yogurt, there is considerable brand-to-brand difference in vitamin D fortification practices. One brand or line of products may be fortified with vitamin D, whereas another brand may not. Both types are included in the database. The market changes quickly and consumers concerned about vitamin D intake should always confirm vitamin D content by checking the product label.

<u>Vitamin E</u>. The DRI report (IOM, 2000) defines vitamin E as the naturally occurring form (*RRR*-α-tocopherol) and three synthetic forms of α-tocopherol. Since the release of SR16-1 (2003), NDL has reported vitamin E as mg of α-tocopherol (Nutr. No. 323) in accordance with the DRI report. Analytical values for tocopherols found in the database are determined by gas-liquid chromatography (GLC) or high-performance liquid chromatography (HPLC; Lee et al., 1999). Although β, γ, and δ-tocopherol do not contribute to vitamin E activity, they are included in the database when analytical data are available.

In the 2000 DRI report, a revised factor was recommended for calculation of the milligram amounts of α-tocopherol contributed by synthetic forms of vitamin E, since *all rac*-α-tocopherol contains 2*R*-stereoisomeric and 2*S*-stereoisomeric forms in equal amounts. Vitamin E activity is limited to the 2*R*-stereoisomeric forms of α-tocopherol to establish recommended intakes (IOM, 2000).

However, the unit for vitamin E required by the Nutrition Labeling and Education Act (NLEA) is IU and is based on the 1968 RDA definitions for vitamin E (CFR, Title 21, Pt. 101) (U.S. Food and Drug Administration–Department of Health and Human Services, 2004).

When NDL receives vitamin E data from the food industry expressed as IU, the values are converted to mg amounts based on the conversions of vitamin E in IU to mg as defined by the DRI report:

One mg of α-tocopherol = IU of the *all rac*-α-tocopherol compound × 0.45; and

One mg of α-tocopherol = IU of the *RRR*-α-tocopherol compound × 0.67.

The basis of the vitamin E tolerable upper intake level (UL), another important reference value defined in the DRI report, was established using all forms of supplemental α-tocopherol (IOM, 2000). Although the 2*S*-stereoisomers do not contribute to dietary requirements for vitamin E (IOM, 2000), they do contribute to the total intake relative to the UL. Nutrient number 573 is used to identify quantities of "added vitamin E." In this release, there are about 140 food items that have values for added vitamin E greater than 0. For the majority of these food items, the form added is *all rac*-α-tocopherol; these values should be multiplied by 2 to relate intakes of this form to the UL. Items that are fortified with *RRR*-α-tocopherol are identified by a footnote and the added vitamin E value can be used directly to estimate its contribution to the UL.

<u>Vitamin K</u>. Much of the data for vitamin K has been generated under NFNAP and supersedes the values in the USDA Provisional Table (PT-104) (Weihrauch and Chatra, 1994). Vitamin K is extracted with hexane, purified with solid phase extraction using silica columns, and quantitated using HPLC with chemical reduction and fluorescence detection. Losses are corrected using

vitamin $K_{1(25)}$ as the internal standard (Booth et al. 1994).

Lipid Components. Fatty acids are expressed as the actual quantity of fatty acid in g per 100 g of food and do not represent fatty acids as triglycerides. Historically, most fatty acid data were obtained as the percentage of fatty acid methyl esters and determined by GLC analyses (AOAC 996.06). These data were converted to g fatty acid per 100 g total lipid using lipid conversion factors and then to g fatty acid per 100 g edible portion of food using the total lipid content. Details of the derivation of lipid conversion factors were published by Weihrauch et al., 1977.

In the redesigned NDBS, fatty acid data may be imported in a variety of units and converted within the system. No conversions are required if data are received as g fatty acid per 100 g edible portion of food. Data received as fatty acid esters and as triglycerides are converted to fatty acids using Sheppard conversion factors. Sheppard conversion factors are based on the molecular weights of the specific fatty acid and its corresponding esters (butyl or methyl) and triglyceride (Sheppard, 1992). When fatty acid data are received as percentages of fatty acid methyl esters, methyl esters are converted to fatty acids using Sheppard conversion factors and then multiplied by total lipid (Nutrient No. 204) to give g fatty acid per 100 g edible portion of food. Occasionally, total lipid values are available from a variety of data sources, but individual fatty acids are available from fewer sources. In those cases, it may be necessary to normalize the individual fatty acids to the mean fat value of the food item. In the case of normalized fatty acids, the sum of the individual fatty acids will equal the mean fat value multiplied by the Weihrauch (1977) lipid conversion factor for that food item. No statistics of variability are reported for normalized fatty acids.

<u>Individual Fatty Acids</u>. The basic format for describing individual fatty acids is that the number before the colon indicates the number of carbon atoms in the fatty acid chain, and the number after the colon indicates the number of double bonds. For unsaturated fatty acids, additional nutrient numbers have been added to accommodate the reporting of many specific positional and geometric isomers. Of the specific isomers, there are two basic classifications considered: omega double bond position and *cis/trans* configuration of double bonds.

Omega-3 (n-3) and omega-6 (n-6) isomers are denoted in shorthand nomenclature as n-3 and n-6. The n- number indicates the position of the first double bond from the methyl end of the carbon chain. The letter *c* or *t* indicates whether the bond is *cis* or *trans*. For polyunsaturated fatty acids, *cis* and *trans* configurations at successive double bonds may be indicated. For example, linoleic acid is an 18 carbon omega-6 fatty acid with 2 double bonds, both in *cis* configuration. When data are isomer specific, linoleic acid is described as 18:2 n-6 *c,c*. Other isomers of 18:2, for which nutrient numbers have now been assigned, include 18:2 *c,t*; 18:2 *t,c*; 18:2 *t,t;* 18:2 *t* not further defined; and 18:2 *i.* 18:2 *i* is not a single isomer but includes isomers other than 18:2 n-6 *c,c* with peaks that cannot be easily differentiated in the particular food item. Systematic and common names for fatty acids are given in Table 2.

Table 2 is provided for the convenience of users in attaching common names or systematic names to fatty acids in this database. Though individual fatty acids are more specific than in past releases, it is not possible to include every possible geometric and positional isomer. Where specific isomers exist for a fatty acid, the common name of the most typical isomer is listed for the undifferentiated fatty acid and an asterisk (*) designates the specific isomer by that name. For example, the most typical isomer for 18:1 is oleic. Thus, the specific isomer by that name, 18:1 c, is designated in Table 2 as oleic.

Table 2.─Systematic and Common Names for Fatty Acids

Fatty acid	Systematic name	Common name of most typical isomer	Nutrient number
Saturated fatty acids			
4:0	butanoic	butyric	607
6:0	hexanoic	caproic	608
8:0	octanoic	caprylic	609
10:0	decanoic	capric	610
12:0	dodecanoic	lauric	611
13:0	tridecanoic		696
14:0	tetradecanoic	myristic	612
15:0	pentadecanoic		652
16:0	hexadecanoic	palmitic	613
17:0	heptadecanoic	margaric	653
18:0	octadecanoic	stearic	614
20:0	eicosanoic	arachidic	615
22:0	docosanoic	behenic	624
24:0	tetracosanoic	lignoceric	654
Monounsaturated fatty acids			
14:1	tetradecenoic	myristoleic	625
15:1	pentadecenoic		697
16:1 undifferentiated	hexadecenoic	palmitoleic	626
16:1 *cis*			673*
16:1 *trans*			662
17:1	heptadecenoic		687
18:1 undifferentiated	octadecenoic	oleic	617
18:1 *cis*			674*
18:1 *trans*			663
20:1	eicosenoic	gadoleic	628
22:1 undifferentiated	docosenoic	erucic	630
22:1 *cis*			676*
22:1 *trans*			664
24:1 *cis*	cis-tetracosenoic	nervonic	671
Polyunsaturated fatty acids			
18:2 undifferentiated	octadecadienoic	linoleic	618
18:2 *trans* not further defined			665
18:2 *i* (mixed isomers)			666

Table 2.─Systematic and Common Names for Fatty Acids─(continued)

Fatty acid	Systematic name	Common name of most typical isomer	Nutrient number
18:2 n-6 *cis, cis*			675*
18:2 *trans, trans*			669
18:2 conjugated linoleic acid (CLAs)			670
18:3 undifferentiated	octadecatrienoic	linolenic	619
18:3 n-3 *cis, cis, cis*		alpha-linolenic	851*
18:3 n-6 *cis, cis, cis*		gamma-linolenic	685
18:3 *trans* (other isomers)			856
18:4	octadecatetraenoic	parinaric	627
20:2 n-6 *cis, cis*	eicosadienoic		672
20:3 undifferentiated	eicosatrienoic		689
20:3 n-3			852
20:3 n-6			853
20:4 undifferentiated	eicosatetraenoic	arachidonic	620
20:4 n-6			855
20:5 n-3	eicosapentaenoic (EPA)	timnodonic	629
21:5			857
22:4			858
22:5 n-3	docosapentaenoic (DPA)	clupanodonic	631
22:6 n-3	docosahexaenoic (DHA)		621

* Designates the specific isomer associated with the common name; the typical isomer is listed for the undifferentiated fatty acid.

Fatty acid totals. Only a small portion of the fatty acid data received for release in SR22 contains specific positional and geometric isomers. Therefore, it has been necessary to maintain the usual nutrient numbers corresponding to fatty acids with no further differentiation other than carbon length and number of double bonds. To aid users of our data, specific isomers are always summed to provide a total value for the undifferentiated fatty acid. For example, mean values for the specific isomers of 18:2 are summed to provide a mean for 18:2 undifferentiated (Nutrient No. 618). Other fatty acid totals provided are (1) the sum of saturated, monounsaturated, and polyunsaturated fatty acids and (2) the sum of *trans*-monoenoic, the sum of *trans*-polyenoic, and the sum of all *trans* fatty acids.

Values for total saturated, monounsaturated, and polyunsaturated fatty acids may include individual fatty acids not reported; therefore, the sum of their values may exceed the sum of the individual fatty acids. In rare cases, the sum of the individual fatty acids may exceed the sum of the values given for the total saturated fatty acids (SFA), monounsaturated fatty acids (MUFA), and polyunsaturated fatty acids (PUFA). These differences are generally caused by rounding and should be relatively small.

For multi-ingredient processed brand-name foods, industry data are often available for fatty acid classes (SFA, MUFA, and PUFA) but are lacking for individual fatty acids. In these cases, individual fatty acids are calculated from the fatty acids of the individually listed ingredients and normalized to the total fat level. A best-fit approximation has been made to fatty acid classes, but unavoidably, calculated sums of individual fatty acid totals do not always match industry data for fatty acid classes. Zero values for individual fatty acids should be understood to mean that trace amounts may be present. When g fatty acids per 100 g of total lipid are converted to g fatty acids per 100 g of food, values of less than 0.0005 are rounded to 0.

Cholesterol. Cholesterol values are generated primarily by gas liquid chromatographic procedures (AOAC 994.10). It is assumed that cholesterol is present only in foods of animal origin and foods containing at least one ingredient of animal origin (for example, cake that contains eggs). For mixtures containing ingredients derived from animal products, the cholesterol value may be calculated from the value for those ingredients. For foods that contain only plant products, the value for cholesterol is assumed to be zero.

Plant sterols. Data on plant sterols (campesterol, stigmasterol, and β-sitosterol) are obtained by gas-chromatographic procedures (AOAC 967.18) and summed to calculate total phytosterols.

Amino Acids. Amino acid data for a class or species of food are aggregated to yield a set of values that serve as the pattern for calculating the amino acid profile of other similar foods. The amino acid values for the pattern are expressed on a per-gram-of-nitrogen basis. Amino acids are extracted in three groups—tryptophan, sulfur-containing amino acids (methionine and cystine), and all others. Tryptophan is determined by alkaline hydrolysis/HPLC (AOAC 988.15), methionine and cystine by performic oxidation/HPLC (AOAC 994.12) and all others by acid hydrolysis/HPLC (AOAC 982.30). The amino acid patterns and the total nitrogen content are used to calculate the levels of individual amino acids per 100 g of food, using the following formula:

$$AA_f = (AA_n * V_p)/N_f$$

Where:

AA_f = amino acid content per 100 g of food,
AA_n = amino acid content per g of nitrogen,
V_p = protein content of food, and
N_f = nitrogen factor.

For foods processed in the NDBS since SR14 (2001), the number of observations used in developing an amino acid pattern will be released only with the pattern. The amino acid profiles calculated from these patterns will show the number of data points to be zero. In the past, the number of data points appeared only for the food item for which the amino acid pattern was developed, not on other foods that used the same pattern. It referred to the number of observations used in developing the amino acid pattern for that food.

If amino acid values are presented for an item with more than one protein-containing ingredient, the values may be calculated on a per-gram-of-nitrogen basis from the amino acid patterns of the various protein-containing ingredients. Then the amino acid contents for an item on the 100-g basis are calculated as the sum of the amino acids in each protein-containing ingredient multiplied by total nitrogen in the item. The number of data points for these values is given as zero.

Weights and Measures

Information is provided on household measures for food items (for example, 1 cup, 1 tablespoon, 1 fruit, 1 leg). Weights are given for edible material without refuse, that is, the weight of an apple without the core or stem, or a chicken leg without the bone, and so forth. The Weight file contains the gram weights and measure descriptions for each food item. This file can be used to calculate nutrient values for food portions from the values provided per 100 g of food. The following formula is used to calculate the nutrient content per household measure:

$$N = (V*W)/100$$

Where:

N = nutrient value per household measure,
V = nutrient value per 100 g (Nutr_Val in the Nutrient Data file), and
W = g weight of portion (Gm_Wgt in the Weight file).

The Weight file can be used to produce reports showing the household measure and nutrient values calculated for that portion. The weights are derived from published sources, industry files, studies conducted by USDA (Adams, 1975; Fulton et al., 1977), and the weights and measures used in the FNDDS (2006). Though special efforts have been made to provide representative values, weights and measures obtained from different sources vary considerably for some foods. The format of this file is described on p. 30.

Footnotes

Footnotes are provided for a few items where information about food description, weights and measures, or nutrient values could not be accommodated in existing fields. For example, if citric acid is added to a juice drink, this is indicated in the footnote. The format of this file is described on p. 30.

Sources of Data

The Sources of Data file (previously called References) was first added with SR14 (2001). The name of the file and fields reflect the fact that not all sources are journals or published literature, but also include the results of unpublished data from USDA-sponsored research and from research sponsored by others either separately or in collaboration with USDA. It contains data sources for the nutrient values and links to an identification number on each nutrient record. Since some of the data in this release were carried forward from SR13 (1999), nutrient-specific source documentation is not electronically available. As new data for these foods are generated and as additional documentation is entered into the new NDBS, data source information will increase in future releases. The format of this file is described on p. 31.

A file, the Sources of Data Link file, is provided to allow users to establish a relationship between the Sources of Data file and the Nutrient Data file. This lets the user identify specific sources of data for each nutrient value. For example, the user can use these files to identify where NFNAP data is used in the database. The format of this file is described on p.31.

Explanation of File Formats

The data appear in two different organizational formats. One is a relational format of four principal and six support files making up the database. The relational format is complete and contains all food, nutrient, and related data. The other is a flat abbreviated file with all the food items, but fewer nutrients, and not all of the other related information. The abbreviated file does not include values for starch, individual sugars, fluoride, betaine, vitamin D_2 or D_3, added vitamin E, added vitamin B_{12}, alcohol, caffeine, theobromine, phytosterols, individual amino acids, or individual fatty acids. See p. 32 for more information on this file.

Relational Files

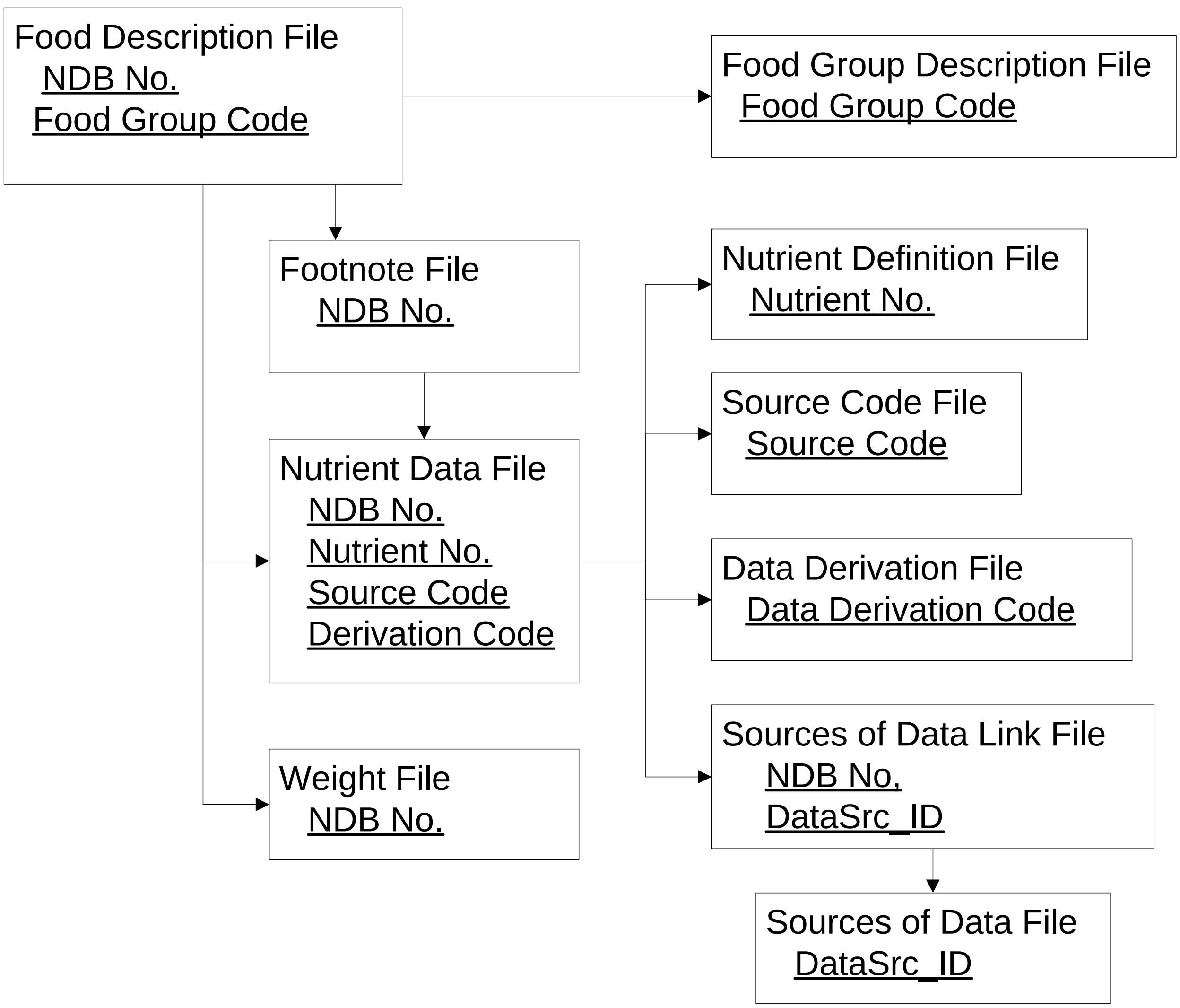
The four principal database files are the Food Description file, Nutrient Data file, Gram Weight file, and Footnote file. The six support files are the Nutrient Definition file, Food Group Description file, Source Code file, Data Derivation Code Description file, Sources of Data file, and Sources of Data Link file. Table 3 shows the number of records in each file. In a relational database, these files can be linked together in a variety of combinations to produce queries and generate reports. Figure 1 provides a diagram of the relationships between files and their key fields.

Table 3. – Number of Records in Principal and Support Files

File name	Table name	Number of records
Principal files		
Food Description	FOOD_DES	7.538
Nutrient Data	NUT_DATA	534,542
Weight	WEIGHT	13,209
Footnote	FOOTNOTE	356
Support files		
Food Group Description	FD_GROUP	25
Nutrient Definition	NUTR_DEF	143
Source Code	SRC_CD	10
Data Derivation Description	DERIV_CD	54
Sources of Data	DATA_SRC	529
Sources of Data Link	DATSRCLN	145,494

The relational files are provided in both ASCII format and a Microsoft Access 2003 database. Tables 4 through 13 describe the formats of these files. Information on the relationships that can be made among these files is also given. Fields that always contain data and fields that can be left blank or null are identified in the "blank" column; N indicates a field that is always filled; Y indicates a field that may be left blank (null) (Tables 4–13). An asterisk (*) indicates primary key(s) for the file. Though keys are not identified for the ASCII files, the file descriptions show where keys are used to sort and manage records within the NDBS. When importing these files into a database management system, if keys are to be identified for the files, it is important to use the keys listed here, particularly with the Nutrient Data file, which uses two.

Figure 1. Relationships among files in the USDA National Nutrient Database for Standard Reference *



* Underlined items denote key fields.

ASCII files are delimited. All fields are separated by carets (^) and text fields are surrounded by tildes (~). A double caret (^^) or two carets and two tildes (~~) appear when a field is null or blank. Format descriptions include the name of each field, its type [N = numeric with width and number of decimals (w.d) or A = alphanumeric], and maximum record length. The actual length in the data files may be less and most likely will change in later releases. Values will be padded with trailing zeroes when imported into various software packages, depending on the formats used.

Food Description File (file name = FOOD_DES). This file (Table 4) contains long and short descriptions and food group designators for 7.538 food items, along with common names, manufacturer name, scientific name, percentage and description of refuse, and factors used for calculating protein and kilocalories, if applicable. Items used in the FNDDS are also identified by value of "Y" in the Survey field.

- Links to the Food Group Description file by the FdGrp_Cd field
- Links to the Nutrient Data file by the NDB_No field
- Links to the Weight file by the NDB_No field
- Links to the Footnote file by the NDB_No field

Table 4.—Food Description File Format

Field name	Type	Blank	Description
NDB_No	A 5*	N	5-digit Nutrient Databank number that uniquely identifies a food item. If this field is defined as numeric, the leading zero will be lost.
FdGrp_Cd	A 4	N	4-digit code indicating food group to which a food item belongs.
Long_Desc	A 200	N	200-character description of food item.
Shrt_Desc	A 60	N	60-character abbreviated description of food item. Generated from the 200-character description using abbreviations in Appendix A. If short description is longer than 60 characters, additional abbreviations are made.
ComName	A 100	Y	Other names commonly used to describe a food, including local or regional names for various foods, for example, "soda" or "pop" for "carbonated beverages."
ManufacName	A 65	Y	Indicates the company that manufactured the product, when appropriate.
Survey	A 1	Y	Indicates if the food item is used in the USDA Food and Nutrient Database for Dietary Studies (FNDDS) and thus has a complete nutrient profile for the 65 FNDDS nutrients.

Ref_desc	A 135	Y	Description of inedible parts of a food item (refuse), such as seeds or bone.
Refuse	N 2	Y	Percentage of refuse.
SciName	A 65	Y	Scientific name of the food item. Given for the least processed form of the food (usually raw), if applicable.
N_Factor	N 4.2	Y	Factor for converting nitrogen to protein (see p. 9).
Pro_Factor	N 4.2	Y	Factor for calculating calories from protein (see p. 11).
Fat_Factor	N 4.2	Y	Factor for calculating calories from fat (see p. 11).
CHO_Factor	N 4.2	Y	Factor for calculating calories from carbohydrate (see p. 11).

* Primary key for the Food Description file.

Food Group Description File (file name = FD_GROUP). This file (Table 5) is a support file to the Food Description file and contains a list of food groups used in SR22 and their descriptions.

- Links to the Food Description file by FdGrp_Cd

Table 5.—Food Group Description File Format

Field name	Type	Blank	Description
FdGrp_Cd	A 4*	N	4-digit code identifying a food group. Only the first 2 digits are currently assigned. In the future, the last 2 digits may be used. Codes may not be consecutive.
FdGrp_Desc	A 60	N	Name of food group.

* Primary key for the Food Group Description file.

Nutrient Data File (file name = NUT_DATA)**.** This file (Table 6) contains the nutrient values and information about the values, including expanded statistical information.

- Links to the Food Description file by NDB_No.
- Links to the Weight file by NDB_No.
- Links to the Footnote file by NDB_No and when applicable, Nutr_No.
- Links to the Nutrient Definition file by Nutr_No.
- Links to the Source Code file by Src_Cd
- Links to the Derivation Code file by Deriv_Cd

Table 6.—Nutrient Data File Format

Field name	Type	Blank	Description
NDB_No	A 5*	N	5-digit Nutrient Databank number.
Nutr_No	A 3*	N	Unique 3-digit identifier code for a nutrient .
Nutr_Val	N 10.3	N	Amount in 100 grams, edible portion †.
Num_Data_Pts	N 5.0	N	Number of data points (previously called Sample_Ct) is the number of analyses used to calculate the nutrient value. If the number of data points is 0, the value was calculated or imputed.
Std_Error	N 8.3	Y	Standard error of the mean. Null if can not be calculated.
Src_Cd	A 2	N	Code indicating type of data.
Deriv_Cd	A 4	Y	Data Derivation Code giving specific information on how the value is determined.
Ref_NDB_No	A 5	Y	NDB number of the item used to impute a missing value. Populated only for items added or updated starting with SR14.
Add_Nutr_Mark	A 1	Y	Indicates a vitamin or mineral added for fortification or enrichment. This field is populated for ready-to-eat breakfast cereals and many brand-name hot cereals in food group 8.
Num_Studies	N 2	Y	Number of studies.
Min	N 10.3	Y	Minimum value.
Max	N 10.3	Y	Maximum value.
DF	N 2	Y	Degrees of freedom.
Low_EB	N 10.3	Y	Lower 95% error bound.
Up_EB	N 10.3	Y	Upper 95% error bound.
Stat_cmt	A 10	Y	Statistical comments. See definitions below.
CC	A 1	Y	Confidence Code indicating data quality, based on evaluation of sample plan, sample handling, analytical method, analytical quality control, and number of samples analyzed. Not included in this release, but is planned for future releases.

* Primary keys for the Nutrient Data file.
† Nutrient values have been rounded to a specified number of decimal places for each nutrient. Number of decimal places is listed in the Nutrient Definition file.

Definitions of each statistical comment included in the Nutrient Data table follow:

1. The displayed summary statistics were computed from data containing some less-than values. Less-than, trace, and not-detected values were calculated.
2. The displayed degrees of freedom were computed using Satterthwaite's approximation (Korz and Johnson, 1988).
3. The procedure used to estimate the reliability of the generic mean requires that the data associated with each study be a simple random sample from all the products associated with the given data source (for example, manufacturer, variety, cultivar, and species).
4. For this nutrient, one or more data sources had only one observation. Therefore, the standard errors, degrees of freedom, and error bounds were computed from the between-group standard deviation of the weighted groups having only one observation.

Nutrient Definition File (file name = NUTR_DEF). This file (Table 7) is a support file to the Nutrient Data file. It provides the 3-digit nutrient code, unit of measure, INFOODS tagname, and description.

- Links to the Nutrient Data file by Nutr_No.

Table 7.—Nutrient Definition File Format

Field name	Type	Blank	Description
Nutr_No	A 3*	N	Unique 3-digit identifier code for a nutrient.
Units	A 7	N	Units of measure (mg, g, µg, and so on).
Tagname	A 20	Y	International Network of Food Data Systems (INFOODS) Tagnames.† A unique abbreviation for a nutrient/food component developed by INFOODS to aid in the interchange of data.
NutrDesc	A 60	N	Name of nutrient/food component.
Num_Dec	A 1	N	Number of decimal places to which a nutrient value is rounded.
SR_Order	N 6	N	Used to sort nutrient records in the same order as various reports produced from SR.

* Primary key for the Nutrient Definition file.
† INFOODS, 2009.

Source Code File (file name = SRC_CD). This file (Table 8) contains codes indicating the type of data (analytical, calculated, assumed zero, and so on) in the Nutrient Data file. To improve the usability of the database and to provide values for the FNDDS, NDL staff imputed nutrient values for a number of proximate components, total dietary fiber, total sugar, and vitamin and mineral values.

- Links to the Nutrient Data file by Src_Cd

Table 8.—Source Code File Format

Field name	Type	Blank	Description
Src_Cd	A 2*	N	2-digit code.
SrcCd_Desc	A 60	N	Description of source code that identifies the type of nutrient data.

* Primary key for the Source Code file.

Data Derivation Code Description File (file name = DERIV_CD). This file (Table 9) provides information on how the nutrient values were determined. The file contains the derivation codes and their descriptions.

- Links to the Nutrient Data file by Deriv_Cd

Table 9.—Data Derivation Code File Format

Field name	Type	Blank	Description
Deriv_Cd	A 4*	N	Derivation Code.
Deriv_Desc	A 120	N	Description of derivation code giving specific information on how the value was determined.

* Primary key for the Data Derivation Code file.

For example, the data derivation code that indicates how α-tocopherol (Nutrient No. 323) in Emu, fan fillet, raw (NDB. No. 05623) was calculated is BFSN. The breakdown of the code is as follows:

B = based on another form of the food or a similar food;
F = concentration adjustment used;
S = solids, the specific concentration adjustment used; and
N = retention factors not used

The Ref_NDB_No is 05621 Emu, ground, raw. This means that the analytical α-tocopherol value in the total solids of emu, ground, raw is used to calculate the α-tocopherol in the total solids of emu, fan fillet, raw.

$$N_t = (N_s * S_s)/S_t$$

where

N_t = the nutrient content of the target item,
N_s = the nutrient content of the source item,
For NDB No. 05621, α-tocopherol = 0.24 mg/100 g
S_s = the total solids content of the source item, and
For NDB No. 05621, solids = 25.38 g/100 g

S_t = the total solids content of the target item.
For NDB No. 05623, solids = 27.13 g/100 g

So, using this formula for the above example:

N_t = (0.24 × 25.38)/27.13 = 0.22 mg/100 g α-tocopherol in Emu, fan fillet, raw

Only items that were imputed starting with SR14 (2001) will have both derivation codes and reference NDB numbers. Other items that have been imputed outside the NDBS will have data derivation codes, but the Ref_NDB_No field will be blank.

Weight File (file name = WEIGHT). This file (Table 10) contains the weight in grams of a number of common measures for each food item.

- Links to Food Description file by NDB_No.
- Links to Nutrient Data file by NDB_No.

Table 10.— Weight File Format

Field name	Type	Blank	Description
NDB_No	A 5*	N	5-digit Nutrient Databank number.
Seq	A 2*	N	Sequence number.
Amount	N 5.3	N	Unit modifier (for example, 1 in “1 cup”).
Msre_Desc	A 80	N	Description (for example, cup, diced, and 1-inch pieces).
Gm_Wgt	N 7.1	N	Gram weight.
Num_Data_Pts	N 3	Y	Number of data points.
Std_Dev	N 7.3	Y	Standard deviation.

* Primary key for the Weight file.

Footnote File (file name = FOOTNOTE**).** This file (Table 11) contains additional information about the food item, household weight, and nutrient value.

- Links to the Food Description file by NDB_No.
- Links to the Nutrient Data file by NDB_No and Nutr_No.

Table 11.—Footnote File Format

Field name	Type	Blank	Description
NDB_No	A 5	N	5-digit Nutrient Databank number.
Footnt_No	A 4	N	Sequence number. If a given footnote applies to more than one nutrient number, the same footnote number is used. As a result, this file cannot be indexed.
Footnt_Typ	A 1	N	Type of footnote: D = footnote adding information to the food description; M = footnote adding information to measure description; N = footnote providing additional information on a nutrient value. If the Footnt_typ = N, the Nutr_No will also be filled in.
Nutr_No	A 3	Y	Unique 3-digit identifier code for a nutrient to which footnote applies.
Footnt_Txt	A 200	N	Footnote text.

Sources of Data Link File (file name = DATSRCLN). This file (Table 12) is used to link the Nutrient Data file with the Sources of Data table. It is needed to resolve the many-to-many relationship between the two tables.

- Links to the Nutrient Data file by NDB No. and Nutr_No.
- Links to the Sources of Data file by DataSrc_ID.

Table 12.—Sources of Data Link File Format

Field name	Type	Blank	Description
NDB_No	A 5*	N	5-digit Nutrient Databank number.
Nutr_No	A 3*	N	Unique 3-digit identifier code for a nutrient.
DataSrc_ID	A 6*	N	Unique ID identifying the reference/source.

* Primary key for the Sources of Data Link file.

Sources of Data File (file name = DATA_SRC). This file (Table 13) provides a citation to the DataSrc_ID in the Sources of Data Link file.

- Links to Nutrient Data file by NDB No. through the Sources of Data Link file

Table 13.—Sources of Data File Format

Field name	Type	Blank	Description
DataSrc_ID	A 6*	N	Unique number identifying the reference/source.
Authors	A 255	Y	List of authors for a journal article or name of sponsoring organization for other documents.
Title	A 255	N	Title of article or name of document, such as a report from a company or trade association.
Year	A 4	Y	Year article or document was published.
Journal	A 135	Y	Name of the journal in which the article was published.
Vol_City	A 16	Y	Volume number for journal articles, books, or reports; city where sponsoring organization is located.
Issue_State	A 5	Y	Issue number for journal article; State where the sponsoring organization is located.
Start_Page	A 5	Y	Starting page number of article/document.
End_Page	A 5	Y	Ending page number of article/document.

* Primary key for the Sources of Data file.

Abbreviated File

The Abbreviated file **(**file name = ABBREV) is available in ASCII format and as a Microsoft Excel spreadsheet. It contains all the food items found in the relational database, but with fewer nutrients and other related information. The abbreviated file does not include values for starch, fluoride, betaine, vitamin D_2 and D_3, added vitamin E, added vitamin B_{12}, alcohol, caffeine, theobromine, phytosterols, individual amino acids, individual fatty acids, or sugars. Table 14 lists all the nutrients included in the abbreviated file. With SR22 (2009), Vitamin D in µg and IU has been added to the Abbreviated file. The ASCII file (Table 14) is in delimited format. Fields are separated by a caret (^) and text fields are surrounded by tildes (~). Data refer to 100 g of the edible portion of the food item. Decimal points are included in the fields. Missing values are denoted by the null value of two consecutive carets (^^) or two carets and two tildes (~~). The file is sorted in ascending order by the NDB number. Two common measures are provided, which are the first two common measures in the Weight file for each NDB number. To obtain values per one of the common measures, multiply the value in the desired nutrient field by the value in the desired common measure field and divided by 100. For example, to calculate the amount of fat in 1 tablespoon of butter (NDB No. 01001),

$$V_H=(N*CM)/100$$

where:

Vh = the nutrient content per the desired common measure
N = the nutrient content per 100 g
For NDB No. 01001, fat = 81.11 g/100 g
CM = grams of the common measure
For NDB No. 01001, 1 tablespoon = 14.2 g

So using this formula for the above example:
Vh = (81.11*14.2)/100 = 11.52 g fat in 1 tablespoon of butter

This file is a flat file and is provided for those users who do not need a relational database. It contains the information in one record per food item and is suitable for importing into a spreadsheet. The data file has been imported into a Microsoft Excel 2003 spreadsheet for users of that application. Users of other software applications can import either the Microsoft Excel 2003 spreadsheet or the ASCII files. If additional information is needed, this file can be linked to the other SR files by the NDB number.

Table 14.—Abbreviated File Format

Field name	Type	Description
NDB_No.	A 5*	5-digit Nutrient Databank number.
Shrt_Desc	A 60	60-character abbreviated description of food item.†
Water	N 10.2	Water (g/100 g)
Energ_Kcal	N 10	Food energy (kcal/100 g)
Protein	N 10.2	Protein (g/100 g)
Lipid_Tot	N 10.2	Total lipid (fat)(g/100 g)
Ash	N 10.2	Ash (g/100 g)
Carbohydrt	N 10.2	Carbohydrate, by difference (g/100 g)
Fiber_TD	N 10.1	Total dietary fiber (g/100 g)
Sugar_Tot	N 10.2	Total sugars (g/100 g)
Calcium	N 10	Calcium (mg/100 g)
Iron	N 10.2	Iron (mg/100 g)
Magnesium	N 10	Magnesium (mg/100 g)
Phosphorus	N 10	Phosphorus (mg/100 g)
Potassium	N 10	Potassium (mg/100 g)
Sodium	N 10	Sodium (mg/100 g)
Zinc	N 10.2	Zinc (mg/100 g)
Copper	N 10.3	Copper (mg/100 g)
Manganese	N 10.3	Manganese (mg/100 g)

Field name	Type	Description
Selenium	N 10.1	Selenium (µg/100 g)
Vit_C	N 10.1	Vitamin C (mg/100 g)
Thiamin	N 10.3	Thiamin (mg/100 g)
Riboflavin	N 10.3	Riboflavin (mg/100 g)
Niacin	N 10.3	Niacin (mg/100 g)
Panto_acid	N 10.3	Pantothenic acid (mg/100 g)
Vit_B6	N 10.3	Vitamin B_6 (mg/100 g)
Folate_Tot	N 10	Folate, total (µg/100 g)
Folic_acid	N 10	Folic acid (µg/100 g)
Food_Folate	N 10	Food folate (µg/100 g)
Folate_DFE	N 10	Folate (µg dietary folate equivalents/100 g)
Choline_Tot	N 10	Choline, total (mg/100 g)
Vit_B12	N 10.2	Vitamin B_{12} (µg/100 g)
Vit_A_IU	N 10	Vitamin A (IU/100 g)
Vit_A_RAE	N 10	Vitamin A (µg retinol activity equivalents/100g)
Retinol	N 10	Retinol (µg/100 g)
Alpha_Carot	N 10	Alpha-carotene (µg/100 g)
Beta_Carot	N 10	Beta-carotene (µg/100 g)
Beta_Crypt	N 10	Beta-cryptoxanthin (µg/100 g)
Lycopene	N 10	Lycopene (µg/100 g)
Lut+Zea	N 10	Lutein+zeazanthin (µg/100 g)
Vit_E	N 10.2	Vitamin E (alpha-tocopherol) (mg/100 g)
Vit_D_mcg	N 10.1	Vitamin D (µg/100 g))
Vit_D_IU	N 10	Vitamin D (IU/100 g))
Vit_K	N 10.1	Vitamin K (phylloquinone) (µg/100 g)
FA_Sat	N 10.3	Saturated fatty acid (g/100 g)
FA_Mono	N 10.3	Monounsaturated fatty acids (g/100 g)
FA_Poly	N 10.3	Polyunsaturated fatty acids (g/100 g)
Cholestrl	N 10.3	Cholesterol (mg/100 g)
GmWt_1	N 9.2	First household weight for this item from the Weight file.‡
GmWt_Desc1	A 120	Description of household weight number 1.

Field name	Type	Description
GmWt_2	N 9.2	Second household weight for this item from the Weight file.‡
GmWt_Desc2	A 120	Description of household weight number 2.
Refuse_Pct	N 2	Percent refuse.§

* Primary key for the Abbreviated file.
† For a 200-character description and other descriptive information, link to the Food Description file.
‡ For the complete list and description of the measure, link to the Weight file.
§ For a description of refuse, link to the Food Description file.

Update Files

The update files contain changes made between SR21 (2008) and SR22 (2009). Update files in ASCII are provided for those users who reformatted previous releases for their systems and wish to do their own updates. If a release earlier than SR21 is used, it is necessary to first obtain the update files for that release through SR21, update the database to SR21, and then use the update files provided with SR22. The earlier update files are available on NDL's website: http://www.ars.usda.gov/nutrientdata.

New data added to SR22 are given in the following files:

- ADD_FOOD for descriptions of the new items,
- ADD_NUTR for added nutrient data,
- ADD_WGT for added weight and measure data,
- ADD_FTNT for added footnotes,
- ADD_NDEF for added nutrient definitions,
- ADD_FDGP for added food group descriptions.

These files are in the same formats as the Food Description file, the Nutrient Data file, the Weight file, the Footnote file, the Nutrient Definition file and the Food Group Description file.

Four files contain changes made since SR21 (2008):

- CHG_FOOD contains records with changes in the descriptive information for a food item.
- CHG_NUTR contains changes to the following fields: nutrient values, standard errors, number of data points, source code, and data derivation code.
- CHG_WGT contains records with changes to the gram weights or measure information.
- CHG_NDEF contains records with changes to the nutrient definitions.

If the values in any fields have changed, the entire record is included for that file. These files are in the same format as the Food Description, Nutrient Data, Weight, and Nutrient Definition files.

Four files contain records that were deleted since SR21 (2008):

- DEL_FOOD file (Table 15) lists those food items that were deleted from the database.
- DEL_NUTR file (Table 16) lists those nutrient values that were removed from the database.
- DEL_WGT contains any gram weights that were removed. These records are in the same format as the Weight file (Table 10).
- DEL_FTNT contains any footnotes that were removed from the database (Table 17). Starting with SR19, if a given footnote applied to more than one nutrient number, the same footnote number can be used. When these footnote numbers are updated, the extra footnotes are deleted.

Table 15.—Foods Deleted Format

Field name	Type	Blank	Description
NDB_No	A 5*	N	Unique 5-digit number identifying deleted item.
Shrt_Desc	A 60	N	60-character abbreviated description of food item.

* Primary key for Foods Deleted file.

Table 16. —Nutrients Deleted Format

Field name	Type	Blank	Description
NDB_No	A 5*	N	Unique 5-digit number identifying the item that contains the deleted nutrient record.
Nutr_No	A 3	N	Nutrient number of deleted record.

* Primary key for Nutrients Deleted file.

Table 17.—Footnotes Deleted Format

Field name	Type	Blank	Description
NDB_No	A 5*	N	Unique 5-digit number identifying the item that contains the deleted nutrient record.
Footnt_No	A 4	N	Sequence number.
Footnt_Typ	A 1	N	Type of footnote of deleted record.

* Primary key for Footnotes Deleted file.

Update files in ASCII are also provided for the Abbreviated file:

- CHG_ABBR file contains records for food items where a food description, household weight, refuse value, or nutrient value have been added, changed, or deleted since SR19. This file is in the same format as the Abbreviated file (Table 14).
- DEL_ABBR contains food items that have been removed from the database; it is in the same format as DEL_FOOD.
- ADD_ABBR contains food items added since SR19; it is also in the same format as the Abbreviated file.

Summary

Values for vitamin D in µg have been added for all items in the FNDDS, while values for vitamin D in IU have been reviewed and updated to also include all food items in the FNDDS. Furthermore, when available, values for D_2 and D_3, were also added to the database. A number of new food items were added to the database as well. In particular, values for a number of Latino foods have been added. A number of food items, no longer on the market, such as certain processed foods, have been removed. Other processed foods have been updated to reflect changes in formulations. The nutrient profiles for a number of foods have been expanded in response to requests from FSRG to support the FNDDS, while other have been updated to reflect new data from NFNAP, the food industry, and other sources. These are described in "Specific Changes for SR22" (p. 1). The next release, SR23, available during summer 2010, will contain additional items and updates.

References

Adams, C.F. 1975. Nutritive Value of American Foods in Common Units. U.S. Department of Agriculture, Agricultural Handbook 456.

Association of Official Analytical Chemists. 2003. Official Methods of Analysis, 17th ed., 2nd revision. AOAC International, Gaithersburg, MD.

Booth, S.L., K.W. Davidson, and J.A. Sadowski. 1994. Evaluation of an HPLC method for the determination of phylloquinone (vitamin K_1) in various food matrices. Journal of Agricultural and Food Chemistry 42:295-300.

Byrdwell, W. C., J. Devries, J. Exler, J.M. Harnly, J.M. Holden, M.F. Holick, B.W. Hollis, R.L. Horst, M. Lada, L.E. Lemar, K.Y. Patterson, K.M. Philips, M.T. Tarrago-Trani, W.R. Wolf. 2008. Analyzing vitamin D in foods and supplements: methodologic challenges. American Journal of Clinical Nutrition. 88(2):554S-557S.

Chun, J., Martin, J.A., Chen, L., Lee, J., Ye, L., Eitenmiller, R. 2004. A differential assay of folic acid and total folate in foods containing enriched cereal-grain products to calculate µg dietary folate equivalents (µg DFE). Journal of Food Composition and Analysis 19(2-3):182-187.

Dietary Guidelines Advisory Committee (DGAC). 2004. The Report of the Dietary Guidelines Advisory Committee on Dietary Guidelines for Americans, 2005. Available from http://www.health.gov/dietaryguidelines/dga2005/report/default.htm (accessed 06/19/2009).

Fulton, L., E. Matthews, and C. Davis. 1977. Average Weight of a Measured Cup of Various Foods. U.S. Department of Agriculture, Home Economics Research Report 41.

Gebhardt, S.E., and R.G. Thomas. 2002. Nutritive Value of Foods. U.S. Department of Agriculture, Home and Garden Bulletin 72.*

Haytowitz, D.B., P.R. Pehrsson, and J.M Holden. 2008. The national food and nutrient analysis program: a decade of progress. Journal of Food Composition and Analysis 21(Supp. 1):S94-S102. *

Holden, J.M., S.A. Bhagwat, and K.Y. Patterson. 2002. Development of a multi-nutrient data quality evaluation system. Journal of Food Composition and Analysis 15(4):339–348.*

Holden, J.M., A.L. Eldridge, G.R. Beecher, et al. 1999. Carotenoid content of U.S. foods: An update of the database. Journal of Food Composition and Analysis 12:169–196.*

INFOODS. 2009. Tagnames for Food Components. INFOODS website. http://www.fao.org/infoods/tagnames_en.stm. (Accessed 06/19/2009).

Institute of Medicine. 1998. Dietary reference intakes for thiamin, riboflavin, niacin, vitamin B_6, folate, vitamin B_{12}, pantothenic acid, biotin, and choline. National Academy Press, Washington, DC.

Institute of Medicine. 2000. Dietary reference intakes for vitamin C, vitamin E, selenium, and carotenoids. National Academy Press, Washington, DC.

Institute of Medicine. 2001. Dietary reference intakes for vitamin A, vitamin K, arsenic, boron, chromium, copper, iodine, iron, manganese, molybdenum, nickel, silicon, vanadium, and zinc. National Academy Press, Washington, DC.

Jones, D.B. 1941. Factors for Converting Percentages of Nitrogen in Foods and Feeds into Percentages of Protein. U.S. Department of Agriculture, Circular 83, slight revision.*

Koc, H., Mar, M. H., Ranasinghe, A., Swenberg, J. A., and Zeisel, S. H. 2002. Quantitation of choline and its metabolites in tissues and foods by liquid chromatography/electrospray ionization-isotope dilution mass spectrometry. Analytical Chemistry 74:4734-4740.

Korz, S., and N.L. Johnson. 1988. Encyclopedia of Statistical Sciences. Vol. 8, pp. 261–262, John Wiley and Son, New York, NY.

Kubota, J., and W.H. Allaway. 1972. Geographic distribution of trace element problems. *In* J.J. Mortvedt, ed., Micronutrients in Agriculture: Proceedings of Symposium held at Muscle Shoals, Alabama, pp. 525–554. Soil Science Society of America, Madison, WI.

Lee, J., Suknark, K., Kluvitse, Y., Philips, R.D, Eitenmiller, R.R. 1999. Rapid liquid chromatographic assay of vitamin E and retinyl palmitate in extruded weaning foods. Journal of Food Science 64:968-972.

Leonard, S.W., C.K. Good, E.T. Gugger, and M.G. Traber. 2004. Vitamin E bioavailability from fortified breakfast cereal is greater than that from encapsulated supplements. American Journal of Clinical Nutrition 79:86–92.

Liem, I.I.H., K.H. Steinkraus, and J.C. Cronk. 1977. Production of vitamin B_{12} in tempeh: A fermented soybean food. Applied Environmental Microbiology 34:773–776.

Livesay, G., and E. Marinos. 1988. Estimation of energy expenditure, net carbohydrate utilization, and net fat oxidation and synthesis by indirect calorimetry: Evaluation of errors with special reference to the detailed composition of fuels. American Journal of Clinical Nutrition 47:608–628.

Mangels, A.R., J.M. Holden, G.R. Beecher, et al. 1993. Carotenoid content of fruits and vegetables: An evaluation of analytic data. Journal of the American Dietetic Association 93:284–296.

Martin, J.I., W.O. Landen, A.M. Soliman, and R.R. Eitenmiller. 1990. Application of a tri-enzyme extraction for total folate determination in foods. Journal of the Association of

Analytical Chemistry 73:805–808.

Matthews, R.H., and Y.J. Garrison. 1975. Food Yields Summarized by Different Stages of Ppreparation. U.S. Department of Agriculture, Agriculture Handbook 102.*

Merrill, A.L., and B.K. Watt. 1973. Energy Value of Foods: Basis and Derivation, revised. U.S. Department of Agriculture, Agriculture Handbook 74.*

Murphy, E.W., P.E. Criner, and B.C. Gray. 1975. Comparison of methods for determining retentions of nutrients in cooked foods. Journal of Agriculture and Food Chemistry 23:1153.*

National Research Council. 1989. Recommended dietary allowances, 10th ed. National Academy Press, Washington, DC.

Phillips K.M., W.C. Byrdwell, J. Exler, J.M. Harnly, J.M. Holden, M.F. Holick, B.W. Hollis, R.L. Horst, L.E. Lemar, K.Y. Patterson, M.T.Tarrago-Trani, and W.R. Wolf. 2008. Development and validation of control materials for the measurement of vitamin D_3 in selected US foods. Journal of Food Composition and Analysis 21:527-534.

Reamer, D.C., and C. Veillon. 1981. Determination of selenium in biological materials by stable isotope dilution gas chromatography-mass spectrometry. Analytical Chemistry 53(14):2166–2169.

Schakel, S.F., I.M. Buzzard, and S.E. Gebhardt. 1997. Procedures for estimating nutrient values in food composition databases. Journal of Food Composition and Analysis 10:102–114.*

Sheppard, A.J. 1992. Lipid Manual: Methodology Suitable for Fatty acid-Cholesterol Analysis. William C. Brown Publishers, Dubuque, IA.

U.S. Department of Agriculture, Agricultural Research Service. 1976. Composition of Foods: Dairy and Egg products; raw, processed, prepared. Agriculture Handbook 8–1.

U.S. Department of Agriculture, Agricultural Research Service. 1977. Composition of Foods: Spices and herbs; raw, processed, prepared. Agriculture Handbook 8–2.

U.S. Department of Agriculture, Agricultural Research Service. 1978. Composition of Foods: Baby foods; raw, processed, prepared. Agriculture Handbook 8–3.

U.S. Department of Agriculture, Agricultural Research Service. 1979. Composition of Foods: Fats and oils; raw, processed, prepared. Agriculture Handbook 8–4.

U.S. Department of Agriculture, Agricultural Research Service. 1979. Composition of Foods: Poultry products; raw, processed, prepared. Agriculture Handbook 8–5.

U.S Department of Agriculture, Agricultural Research Service. 1980. Composition of Foods Soups, sauces, and gravies; raw, processed, prepared. Agriculture Handbook 8–6.

U.S. Department of Agriculture, Agricultural Research Service. 1980. Composition of Foods Sausages and luncheon meats; raw, processed, prepared. Agriculture Handbook 8–7.

U.S. Department of Agriculture, Agricultural Research Service. 1982. Composition of Foods Breakfast cereals; raw, processed, prepared. Agriculture Handbook 8–8.

U.S. Department of Agriculture, Agricultural Research Service. 1982. Composition of Foods Fruits and fruit juices; raw, processed, prepared. Agriculture Handbook 8–9.

U.S. Department of Agriculture, Agricultural Research Service. 1992. Composition of Foods Pork products; raw, processed, prepared. Agriculture Handbook 8–10.

U.S. Department of Agriculture, Agricultural Research Service. 1984. Composition of Foods Vegetables and vegetable products; raw, processed, prepared. Agriculture Handbook 8–11.

U.S. Department of Agriculture, Agricultural Research Service. 1984. Composition of Foods Nut and seed products; raw, processed, prepared. Agriculture Handbook 8–12.

U.S. Department of Agriculture, Agricultural Research Service. 1990. Composition of Foods Beef products; raw, processed, prepared. Agriculture Handbook 8–13.

U.S. Department of Agriculture, Agricultural Research Service. 1986. Composition of Foods Beverages; raw, processed, prepared. Agriculture Handbook 8–14.

U.S. Department of Agriculture, Agricultural Research Service. 1987. Composition of Foods Finfish and shellfish products; raw, processed, prepared. Agriculture Handbook 8–15.

U.S. Department of Agriculture, Agricultural Research Service. 1986. Composition of Foods Legumes and legume products; raw, processed, prepared. Agriculture Handbook 8–16.

U.S. Department of Agriculture, Agricultural Research Service. 1989. Composition of Foods Lamb, veal, and game products; raw, processed, prepared. Agriculture Handbook 8–17.

U.S. Department of Agriculture, Agricultural Research Service. 1992. Composition of Foods Baked products; raw, processed, prepared. Agriculture Handbook 8–18.

U.S. Department of Agriculture, Agricultural Research Service. 1991. Composition of Foods Snacks and sweets; raw, processed, prepared. Agriculture Handbook 8–19.

U.S. Department of Agriculture, Agricultural Research Service. 1989. Composition of Foods Cereal grains and pasta; raw, processed, prepared. Agriculture Handbook 8–20.

U.S. Department of Agriculture, Agricultural Research Service. 1988. Composition of Foods Fast foods; raw, processed, prepared. Agriculture Handbook 8–21.

U.S. Department of Agriculture, Agricultural Research Service. 1990. Composition of Foods Raw, processed, prepared. Agriculture Handbook 8, 1989 Supplement.

U.S. Department of Agriculture, Agricultural Research Service. 1991. Composition of Foods Raw, processed, prepared. Agriculture Handbook 8, 1990 Supplement.

U.S. Department of Agriculture, Agricultural Research Service. 1992. Composition of Foods Raw, processed, prepared. Agriculture Handbook 8, 1991 Supplement.

U.S. Department of Agriculture, Agricultural Research Service. 1993. Composition of Foods Raw, processed, prepared. Agriculture Handbook 8, 1992 Supplement.

U.S. Department of Agriculture, Agricultural Research Service. 1992. Provisional Table on the Selenium Content of Foods. USDA, HNIS, PT–109.

U.S. Department of Agriculture. 2007. USDA Table of Nutrient Retention Factors, Release 6. Nutrient Data Laboratory Home Page at http://www.ars.usda.gov/nutrientdata. (Accessed 6/19/2009*

U.S. Department of Agriculture, Agricultural Research Service. 2004. USDA Database for the Choline Content of Common Foods. Nutrient Data Laboratory website: http://www.ars.usda.gov/nutrientdata/choline. (Accessed 6/19/2009 *

U.S. Department of Agriculture, Agricultural Research Service. 2005. USDA National Fluoride Database of Selected Beverages and Foods - Release 2. Nutrient Data Laboratory website: http://www.ars.usda.gov/nutrientdata/fluoride. (Accessed 6/19/2009)*

U.S. Department of Agriculture, Agricultural Research Service. 2008. USDA Food and Nutrient Database for Dietary Studies (release 3.0) [database]. Food Surveys Research Group website: http://www.ars.usda.gov/ba/bhnrc/fsrg (Accessed 6/19/2009).

U.S. Food and Drug Administration, Department of Health and Human Services. 2008. Food Labeling. Code of Federal Regulations, Title 21, Pt. 101. U.S. Government Printing Office website: http://www.gpoaccess.gov/cfr/index.html (Accessed 6/19/2009).

Van Winkle S, Levy S.M., Kiritsy M.C., Heilman J.R., Wefel J.S., Marshall T. 1995. Water and formula fluoride concentrations: Significance for infants fed formula. Pediatric Dentistry. 17(4):305-310.

Watt, B.K., and A.L. Merrill. 1963. Composition of Foods Raw, processed, prepared. U.S. Department of Agriculture, Agriculture Handbook 8.

Weihrauch, J.L., and A.S. Chatra. 1994. Provisional Table on the Vitamin K Content of Foods, Revised. USDA, HNIS, PT–104.*

Weihrauch, J.L., L.P. Posati, B.A. Anderson, and J. Exler. 1977. Lipid conversion factors for calculating fatty acid content of foods. Journal of the American Oil Chemists Society 54:36–40.

Weihrauch, J.L., and J. Tamaki. 1991. Provisional Table on the Vitamin D Content of Foods. USDA, HNIS, PT–108.*

Williams, J., Patterson, K., Howe, J. (Retired), Snyder, C., Boillot, K., Lofgren, P., Thompson, L., Luna, A., Nalawade, A., Douglass, L., Holden, J. 2009. Nutrient Composition in Ground Pork using Regression Techniques (Poster). Institute of Food Technologists Annual Meeting + Food Expo. Anaheim, CA. June 6-9, 2009, http://www.ars.usda.gov/SP2UserFiles/Place/12354500/Articles/IFT09_GrdPork.pdf (Accessed 8/20/2009) *

Zeisel, S. H., and Blusztajn, J. K. 1994. Choline and human nutrition. Annual Reviews of Nutrition. 14:269-296

Zeisel, S.H., Mar, M.H., Howe, J. C., Holden, J. M 2003. Concentrations of choline – containing compounds and betaine in common foods. Journal of Nutrition 133:1302-1307; Erratum. 2003. Journal of Nutrition. 133:2918-2919

* Available on NDL’s website: http://www.ars.usda.gov/nutrientdata

Appendix A. Abbreviations Used in Short Descriptions

All purpose	ALLPURP
Aluminum	AL
And	&
Apple	APPL
Apples	APPLS
Applesauce	APPLSAUC
Approximate	APPROX
Approximately	APPROX
Arm and blade	ARM&BLD
Artificial	ART
Ascorbic acid	VIT C
Aspartame	ASPRT
Aspartame-sweetened	ASPRT-SWTND
Baby food	BABYFD
Baked	BKD
Barbequed	BBQ
Based	BSD
Beans	BNS
Beef	BF
Beverage	BEV
Boiled	BLD
Boneless	BNLESS
Bottled	BTLD
Bottom	BTTM
Braised	BRSD
Breakfast	BRKFST
Broiled	BRLD
Buttermilk	BTTRMLK
Calcium	CA
Calorie, calories	CAL
Canned	CND
Carbonated	CARB
Center	CNTR
Cereal	CRL
Cheese	CHS
Chicken	CHICK
Chocolate	CHOC
Choice	CHOIC
Cholesterol	CHOL
Cholesterol-free	CHOL-FREE
Chopped	CHOPD
Cinnamon	CINN

Coated	COATD
Coconut	COCNT
Commercial	COMM
Commercially	COMMLY
Commodity	CMDTY
Composite	COMP
Concentrate	CONC
Concentrated	CONCD
Condensed	COND
Condiment, condiments	CONDMNT
Cooked	CKD
Cottonseed	CTTNSD
Cream	CRM
Creamed	CRMD
Dark	DK
Decorticated	DECORT
Dehydrated	DEHYD
Dessert, desserts	DSSRT
Diluted	DIL
Domestic	DOM
Drained	DRND
Dressing	DRSNG
Drink	DRK
Drumstick	DRUMSTK
English	ENG
Enriched	ENR
Equal	EQ
Evaporated	EVAP
Except	XCPT
Extra	EX
Flank steak	FLANKSTK
Flavored	FLAV
Flour	FLR
Food	FD
Fortified	FORT
French fried	FRENCH FR
French fries	FRENCH FR
Fresh	FRSH
Frosted	FRSTD
Frosting	FRSTNG
Frozen	FRZ
Grades	GRDS
Gram	GM
Green	GRN
Greens	GRNS
Heated	HTD

Heavy	HVY
Hi-meat	HI-MT
High	HI
Hour	HR
Hydrogenated	HYDR
Imitation	IMITN
Immature	IMMAT
Imported	IMP
Include, includes	INCL
Including	INCL
Infant formula	INF FORMULA
Ingredient	ING
Instant	INST
Juice	JUC
Junior	JR
Kernels	KRNLS
Large	LRG
Lean	LN
Lean only	LN
Leavened	LVND
Light	LT
Liquid	LIQ
Low	LO
Low fat	LOFAT
Marshmallow	MARSHMLLW
Mashed	MSHD
Mayonnaise	MAYO
Medium	MED
Mesquite	MESQ
Minutes	MIN
Mixed	MXD
Moisture	MOIST
Natural	NAT
New Zealand	NZ
Noncarbonated	NONCARB
Nonfat dry milk	NFDM
Nonfat dry milk solids	NFDMS
Nonfat milk solids	NFMS
Not Further Specified	NFS
Nutrients	NUTR
Nutrition	NUTR
Ounce	OZ
Pack	PK
Par fried	PAR FR
Parboiled	PARBLD
Partial	PART

Partially	PART
Partially fried	PAR FR
Pasteurized	PAST
Peanut	PNUT
Peanuts	PNUTS
Phosphate	PO4
Phosphorus	P
Pineapple	PNAPPL
Plain	PLN
Porterhouse	PRTRHS
Potassium	K
Powder	PDR
Powdered	PDR
Precooked	PRECKD
Preheated	PREHTD
Prepared	PREP
Processed	PROC
Product code	PROD CD
Propionate	PROP
Protein	PROT
Pudding, puddings	PUDD
Ready-to-bake	RTB
Ready-to-cook	RTC
Ready-to-drink	RTD
Ready-to-eat	RTE
Ready-to-feed	RTF
Ready-to-heat	RTH
Ready-to-serve	RTS
Ready-to-use	RTU
Reconstituted	RECON
Reduced	RED
Reduced-calorie	RED-CAL
Refrigerated	REFR
Regular	REG
Reheated	REHTD
Replacement	REPLCMNT
Restaurant-prepared	REST-PREP
Retail	RTL
Roast	RST
Roasted	RSTD
Round	RND
Sandwich	SNDWCH
Sauce	SAU
Scalloped	SCALLPD
Scrambled	SCRMBLD
Seed	SD

Select	SEL
Separable[1]	
Shank and sirloin	SHK&SIRL
Short	SHRT
Shoulder	SHLDR
Simmered	SIMMRD
Skin	SKN
Small	SML
Sodium	NA
Solids	SOL
Solution	SOLN
Soybean	SOYBN
Special	SPL
Species	SP
Spread	SPRD
Standard	STD
Steamed	STMD
Stewed	STWD
Stick	STK
Sticks	STKS
Strained	STR
Substitute	SUB
Summer	SMMR
Supplement	SUPP
Sweet	SWT
Sweetened	SWTND
Sweetener	SWTNR
Teaspoon	TSP
Thousand	1000
Toasted	TSTD
Toddler	TODD
Trimmed[1]	
Trimmed to[1]	
Uncooked	UNCKD
Uncreamed	UNCRMD
Undiluted	UNDIL
Unenriched	UNENR
Unheated	UNHTD
Unprepared	UNPREP
Unspecified	UNSPEC
Unsweetened	UNSWTND
Variety, varieties	VAR
Vegetable, vegetables	VEG
Vitamin A	VIT A
Vitamin C	VIT C
Water	H20

Whitener	WHTNR
Whole	WHL
Winter	WNTR
With	W/
Without	WO/
Yellow	YEL

[1] Removed in short description

Appendix B. Other Abbreviations

ap	as purchased
ARS	Agricultural Research Service
DFE	Dietary Folate Equivalent
dia	diameter
DRI	Dietary Reference Intakes
fl oz	fluid ounce
FNDDS	USDA Food and Nutrient Database for Dietary Studies
g	gram
INFOODS	International Network of Food Data Systems
IU	International Unit
kcal	kilocalorie
kJ	kilojoule
lb	pound
mg	milligram
µg, mcg	microgram
ml	milliliter
NDB	Nutrient Databank
NDBS	Nutrient Databank System
NDL	Nutrient Data Laboratory
NFNAP	National Food and Nutrient Analysis Program
NLEA	Nutrition Labeling and Education Act
oz	ounce
RAE	Retinol Activity Equivalent
RE	Retinol Equivalents
RDA	Recommended Dietary Allowances, a Dietary Reference Intake
SR	USDA National Nutrient Database for Standard Reference
UL	Tolerable Upper Intake Level, a Dietary Reference Intake