Food Intakes Converted to Retail Commodities Databases 2003-08: Methodology and User Guide

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Chapter 1

Overview

The Food Intakes Converted to Retail Commodities Database

The Food Intakes Converted to Retail Commodities Database (FICRCD) is jointly produced by USDA's Agricultural Research Service (ARS) and Economic Research Service (ERS). The purpose for developing FICRCD is to convert foods consumed in the national dietary surveys What We Eat In America, National Health and Nutrition Examination Survey (WWEIA, NHANES) to the respective amounts of 65 retail-level food commodities such as fluid milk, fruits, vegetables, meat, fish, eggs, oils, and caloric sweeteners. This document describes the methodology of developing the FICRCDs for the three WWEIA, NHANES cycles conducted between 2003 and 2008 [1-3]. The foods for the three survey cycles are in the Food and Nutrient Database for Dietary Studies (FNDDS) versions 2.0 [4] 3.0 [5] and 4.1 [6]. The documentation describes the process of disaggregation of FNDDS foods, their assignment to appropriate commodities, and the application of conversion factors to convert foods to respective amounts of commodities. The appendices of the documentation provide a list of foods included in each commodity (Appendix A), a list of selected conversion factors that are used to convert foods in FNDDS to retail food commodities (Appendix B), and the names of the variables in the 100 gram FICRCD database (Appendix C).

Why Develop the Food Intakes Converted to Retail Commodities Database?

The FICRCD is the continuation of previously released FICRCDs 1994-2002 [7]. Before the release of the FICRCDs 1994-2002, there were no national databases that provided information on foods in the WWEIA, NHANES surveys in terms of equivalent amounts of respective food commodities. By converting foods to retail commodities, the FICRCD provides the missing link between food consumption and food production in terms of food commodities available at the retail level for purchase by Americans. The FICRCD also provides opportunities for several unique applications and has the potential to link nutrition, agriculture, and economics.

In addition to its basic purpose of linking to the appropriate WWEIA, NHANES dietary survey data, the FICRCD can be linked to other dietary data that use USDA food codes and to some of the local and national food price databases. When linked to WWEIA, NHANES, the FICRCD can be used to answer questions addressing the dietary patterns and dietary choices of Americans such as which age, gender, race/ethnicity, or income groups consume specific types of fruit or vegetable commodities and in some cases can also be used to estimate money spent on foods by pricing the commodities. A few examples of questions that can be answered are listed below:

- The FICRCD can be used to estimate the amounts of various retail commodities that are consumed by different age, gender, income, and ethnic groups.
- The FICRCD can be used to address questions such as:
    - How is a commodity used in the American diet? (e.g., what are the popular uses of the cheese commodity –in sandwiches, pizza, salads, or other foods?)
    - Which foods in the dietary surveys contain specific commodities such as tomatoes, tree nuts, or eggs, and in what amounts?
    - Is a specific commodity more often eaten at home or away-from-home? (e.g., do people consume more commodities such as fluid milk, beef, and potatoes, at home or away from home?)
- By linking the FICRCD to economic databases, cost of commodities such as fruits, vegetables, fluid milk, cheese, and yogurt can be computed, and the types and amounts of retail commodities that may be purchased for a healthful diet can be estimated. This permits determination of affordability of healthful diets for economic and nutrition policy purposes and for planning nutrition interventions.
- By linking the FICRCDs of different survey cycles with the MyPyramid Equivalents Database 2.0 (MPED) [8] or to-be-released Food Patterns Equivalents Database (FPED) for the same survey periods, one can estimate healthful food options in terms of retail commodities. The MPED, which is also released by ARS, converts foods in the dietary surveys to corresponding MyPyramid equivalents for the 32 food groups and other components of the MyPyramid and is based on the MyPyramid Food Guidance System [9], which provides guidance on the types and amounts of foods Americans need to eat to have a healthful diet. The FPED is the new name for the former MPED. The FPED converts the FNDDS foods to the respective number of cup equivalents of fruits, vegetables, and dairy; ounce equivalents of grains and protein foods; number of alcoholic drinks for alcoholic beverages; teaspoon equivalents of added sugars; and gram equivalents of discretionary solid fats and oils. There are 37 Food Patterns components in FPED. The MPED/FPED provide data on edible portions of foods as consumed, whereas the FICRCD provides data on uncooked forms of foods with refuse included in many of the commodities. From the MPED/FPED, nutrition educators can estimate the amounts of fruits and vegetables their clients should eat to meet the dietary recommendations. The FICRCD provides commodity data on the same foods that are included in the MPED/FPED. Nutrition educators can estimate the amounts of fruit and vegetable commodities to be purchased. Such an exercise can help nutrition educators offer guidance to their clients not only in terms of what foods to eat, but also in terms of the amounts of food commodities they need to purchase to meet the dietary recommendations. By pricing these commodities, one could estimate the cost of nutritious food choices.

What Is Included in the FICRCD Release?

The FICRCD release includes several components as described below:

- Documentation of the development of the FICRCD.
- Databases in MSAccess® and SAS®, which include the amounts of the 65 commodities present in 100 grams of FNDDS 2.0, FNDDS 3.0 and FNDDS 4.1 foods. The characteristics of the files in the FICRCD 2003-04, 2005-06 and 2007-08 are in Table 1.

Table 1. Characteristics of files in the FICRCD

Characteristics	FICRCD 2003-04	FICRCD 2005-06	FICRCD 2007-08
Survey period	WWEIA, NHANES 2003-04	WWEIA, NHANES 2005-06	WWEIA, NHANES 2007-08
Name of the documentation file	Documentation FICRCD 2003_08.pdf		
Total number of food records	7753	7723	8076
Technical files and resources used to create FICRCD	FNDDS 2.0, SR 18, AH-102, ERS technical files	FNDDS 3.0, SR 20, AH-102, ERS technical files	FNDDS 4.1, SR 22, AH-102, ERS technical files
Name of FICRCD 100-gram MS Access® database	FICRCD_2003_04.mdb	FICRCD_2005_06.mdb	FICRCD_2007_08.mdb
Name of FICRCD 100-gram SAS® database	FICRCD_2003_04. sas7bdat	FICRCD_2005_06. sas7bdat	FICRCD_2007_08. sas7bdat

What Is Included in the Documentation?

The documentation describes the process of disaggregation of foods, their assignment to appropriate commodities, and the application of conversion factors to convert foods to respective amounts of commodities. The appendices of the documentation provide a list of foods included in each commodity (Appendix A), a list of selected conversion factors that are used to convert foods as consumed to retail food commodities (Appendix B), and the names of the variables in the 100 gram FICRCD database (Appendix C).

Definition of Retail Commodities in the FICRCD

Retail commodities are defined as those available for purchase in retail stores, supermarkets, or other retail food outlets, with a few exceptions such as industrial shortening, corn syrup, and high-fructose corn syrup that are solely used by the food industry, and game meats that are obtained elsewhere. There are 8 major categories of commodities in the FICRCD: Dairy Products; Fats and Oils; Fruits; Grains; Meat, Poultry, Fish and Eggs; Nuts; Caloric Sweeteners; and Vegetables, Dry Beans and Legumes. Each of the major categories has several components. Hence, the FICRCD contains a total of 65 food commodities. Foods within each commodity are converted to a single commodity type even if the food is available in different forms at retail stores (e.g., there are no canned, frozen, or dried carrots; instead any type of carrots in the FNDDS 2.0, 3.0, and 4.1 are converted to the carrots commodity; similarly, nonfat dry milk is converted to fluid skim milk in the FICRCD). Table 2 includes a list of the major commodity categories, the food commodities within these categories, and specific types of commodities presented in the FICRCD. Appendix A lists major foods within each commodity**.**

Table 2. Alphabetical list of commodities included in the FICRCD

Major commodity category (# within the category)	Commodities within the major commodity category[1]	Commodity types in the FICRCD
Dairy Products (10)	Total Dairy Products Total Fluid Milk Fluid Whole Milk Fluid 2% Milk Fluid 1% Milk Fluid Skim Milk Butter Cheese Yogurt Other Dairy Products	• Dairy products are presented as those available in retail stores or supermarkets.
Fats and Oils (5)	Total Fats and Oils Margarine Salad & Cooking Oils Shortening (includes industrial shortenings) Other Oils	• Fats and oils are presented as those available in retail stores or supermarkets, except for the shortening commodity which also includes industrial shortenings. • Animal fats are not assigned a separate commodity, but are included in the total fats and oils commodity.

Table 2 (cont.). Alphabetical list of commodities included in the FICRCD

Major commodity category (# within the category)	Commodities within the major commodity category[1]	Commodity types in the FICRCD
Fruits (14)	Total Fruit Total Apples Apples from Fruit Apples from Juice Bananas Berries Grapes Melons Total Oranges Oranges from Fruit Oranges from Juice Other Citrus Fruits Stone Fruits Tropical Fruits	• Fruits are presented as raw fruits with refuse (e.g., core, crown, peel, skin, seeds, pits). • Two commodity variables are included for apples and oranges. Differentiation has been made between the amounts of fruit consumed as fruit and the amounts of fruit consumed as fruit juices. • Fruits not assigned to a specific commodity are included in the total fruit commodity
Grains (5)	Total Grains Corn Flour & Meal Oats & Oat Flour Rice (dry) Wheat Flour	• Wheat, corn, and oats are presented as uncooked flour, or meal. • Rice is presented as uncooked grain, without husk. • Other grains are included in the total grains commodity.
Meat, Poultry, Fish & Eggs (10)	Total Meat, Poultry, & Fish Total Meat Beef Pork Total Poultry Chicken Turkey Finfish & Shellfish Eggs, with shell (shell eggs) Eggs, without shell (liquid eggs)	• Meat, poultry and fish are presented as uncooked, boneless meat. • Poultry with or without skin are combined and presented as one commodity. • Eggs are presented in two ways: shell eggs and eggs without shell (liquid eggs). • Game meat is included in the total meat and game birds in the total poultry commodities.
Nuts (tree nuts & peanuts) (3)	Total Nuts Peanuts Tree Nuts	• Nuts are presented as raw nuts without the shell.

Table 2 (cont.). Alphabetical list of commodities included in the FICRCD

Major commodity category (# within the category)	Commodities within the major commodity category[1]	Commodity types in the FICRCD
Sweeteners, Caloric (1)	Total Caloric Sweeteners	• Sugars and syrups are presented as available in retail stores or supermarkets. • Corn syrup solids and high-fructose corn syrups are presented as such, without conversion.
Vegetables, dry beans & peas (legumes) (17)	Total Vegetables Total Brassica (cruciferous vegetables) Broccoli & Cauliflower Carrots Celery Cucumbers Green peas Total Leafy Vegetables Lettuce (head & leaf) Onions Peppers (bell & non-bell) Tomatoes Sweet Corn Total Roots & Tubers Potatoes Snap Beans (string beans) Legumes (dry beans & peas)	• Vegetables are presented as raw vegetables with refuse (e.g., peel, skin, seeds). • Dry beans and peas (legumes) are presented as uncooked, without pods. • The totals in each vegetable commodity category include other similar vegetables that have not been assigned to a separate commodity.

[1]Some of the commodities not given a separate commodity assignment may be included in the respective total commodity category. See Appendix A for details on foods included in each commodity.

Criteria for Establishing Commodity Categories

ERS provided ARS with a list of commodities. Eight major commodity categories were developed, based on the ERS list. In the early stages of the development of the FICRCD, many commodities were developed to be similar to that included in the ERS Food Availability spreadsheets. However, after converting dietary intakes to commodities, mean commodities consumed were estimated for 23 age-gender population groups. Commodities having very low mean estimates with large relative standard errors were either aggregated with similar commodities, or were included only under the totals of the respective major commodity. As a result, the commodity totals may exceed the sum of individual commodities presented in FICRCD for the following categories: Total

Fruit, Total Grains, Total Meat, Total Poultry, Total Vegetables, Total Brassica, Total Leafy Vegetables, and Total Roots and Tubers.

The placement of FNDDS foods into commodity categories is mainly determined by ERS requirements and the general guiding principles in developing commodity categories are explained below. However, the users of the data may reassign foods to a different commodity based on their own requirements.

The following guiding principles were used for assigning vegetables to their respective commodities:

- If ERS-suggested commodity grouping was not possible due to low mean intake estimates, then vegetables were grouped based on botanical classifications or other commonalities. For example, within the Brassica family, broccoli and cauliflower were given their own commodity assignment because of high mean intake estimates, and the remaining Brassica vegetables with low mean intake estimates were included in the Total Brassica commodity only.
- Among leafy vegetables, only lettuce had a high mean intake and was assigned to its own commodity, and the rest of the leafy vegetables were included in the Total Leafy Vegetables commodity. Leafy vegetables that were not Brassica were assigned to Total Leafy Vegetables commodity.
- All roots and tubers, except potatoes, were assigned only to the Total Roots and Tubers commodity.
- Non-bell peppers, because of low mean intake estimates were combined with the Bell Peppers commodity to form a single Peppers commodity.
- All dry beans and peas (legumes) were combined into a single Legumes commodity.
- Carrots, celery, cucumbers, green peas, tomatoes, sweet corn, snap beans (string beans) and onion have their own commodities, due to high mean intake estimates.
- Many of the other vegetable commodities such as asparagus, eggplant, garlic, mushroom, okra, squash, and zucchini that had low mean intake estimates could not be combined with any of the other 16 vegetable commodities because of a lack of similarity with other vegetable commodities. These commodities were included only under the Total Vegetables commodity (Appendix 1).

There were fruits (e.g., dates, figs, kiwi, pomegranate) and grains (e.g., amaranth, barley, millets, rye, triticale) that had low mean intake estimates and were included only under the Total Fruit or Total Grains commodities, respectively. Only a single Total Caloric Sweeteners commodity category that included sugar, corn syrups, maple and other syrups, honey, and molasses was established because of the difficulties in the identification of the exact type of caloric sweetener used in several of the food products.

Non-Commodities

Not all foods in the FNDDS have been converted to commodities. Foods that were classified as non-commodities include: highly processed products such as infant formula and protein supplements; broth; baking powder, cocoa powder; coconut; food flavors, herbs other than fresh herbs such as parsley and cilantro; orange and other citrus peels used as flavorings; seeds such as flax seed, pumpkin seeds, sesame seed, sunflower seeds and their butters; salt, spices; onion and garlic powders; and non-caloric sugar substitutes (e.g., aspartame, saccharin), vinegar, yeast and other leavening agents, and water. The data on spices and herbs in foods are very generic in the FNDDS and are not representative of the actual amounts used in foods, and hence are not assigned to a commodity. Seeds, because of very small dietary intakes and coconut, not being a tree nut, are also not assigned to a commodity. Foods classified as non-commodities were given a value of zero for each of the 65 commodities.

Beverages Other Than Milk and Fruit Juices

No separate commodity category has been established for beverages such as alcoholic beverages, soft drinks, fruit drinks, coffee, and tea, because these beverages are stand-alone foods and their use as ingredients in other foods is minimal, if any. Therefore, their intakes can be directly estimated from the survey dietary data without requiring conversions to commodities. However honey added to tea; sugar, cream, or milk added to coffee; fruit juice in mixed alcoholic drinks; and the caloric sweeteners present in beverages are counted under the appropriate commodities. Due to a lack of data, the FICRCD does not account for the grapes and other fruits used in wine production, the grains used in beer production, and the grains and potatoes used in distilled spirits production.

Differences between the FICRCD, EPA's Food Commodity Intake Database, and ERS Food Availability Data Series

The FICRCD is unique in its definition and purpose and is different from the Food Commodity Intake Database (FCID) of Environmental Protection Agency (EPA) [10] and the Food Availability data series released by ERS [11].

Like the FICRCD, EPA's FCID is also based on actual food intake data, but serves a different purpose. EPA's FCID converts foods consumed in national dietary surveys to respective amounts of EPA-defined food commodities to estimate pesticide exposure from foods. The FCID definitions of commodities are different from that of the FICRCD, because FCID is designed for the purpose of estimating the probable intakes of pesticide residues through foods. The amounts of various pesticides that are present in foods are contingent upon several factors including processing techniques, cooking method, and the fat or water content of foods. Therefore, FCID distinguishes between

different types of the same foods (e.g., fresh, canned, frozen, dried), cooked status of the food, and also the different components of the same food (e.g., milk separated into milk fat, nonfat-milk solids, and milk water components). In comparison, for each food commodity in the FICRCD, a single retail commodity type is represented without differentiating between fresh, frozen, or canned foods or cooking status. That is, fresh, frozen, or canned vegetables and sautéed, steamed, or grilled vegetables are converted to raw vegetables.

The ERS Food Availability (formerly known as U.S. Food Supply data or Disappearance data) [11] annual data series is not based on actual food intake data. The data series includes U.S. per capita estimates of foods that are available for human consumption. Here, the amounts of food commodities available for human consumption are estimated by measuring food supplies moving from production through marketing channels for domestic consumption for several hundred foods. In addition, ERS also adjusts the per capita food availability data for food loss due to spoilage; inedible components of foods such as bones, shells, and seeds; and plate waste and pet food use in the Loss-Adjusted Food Availability data series to account for food loss prior to consumption. Because it is per capita data, Food Availability data cannot be used to estimate the amounts of commodities actually consumed by different socio-economic and ethnic groups.

Chapter 2

Methodology for Converting USDA Survey Foods into Retail Food Commodities

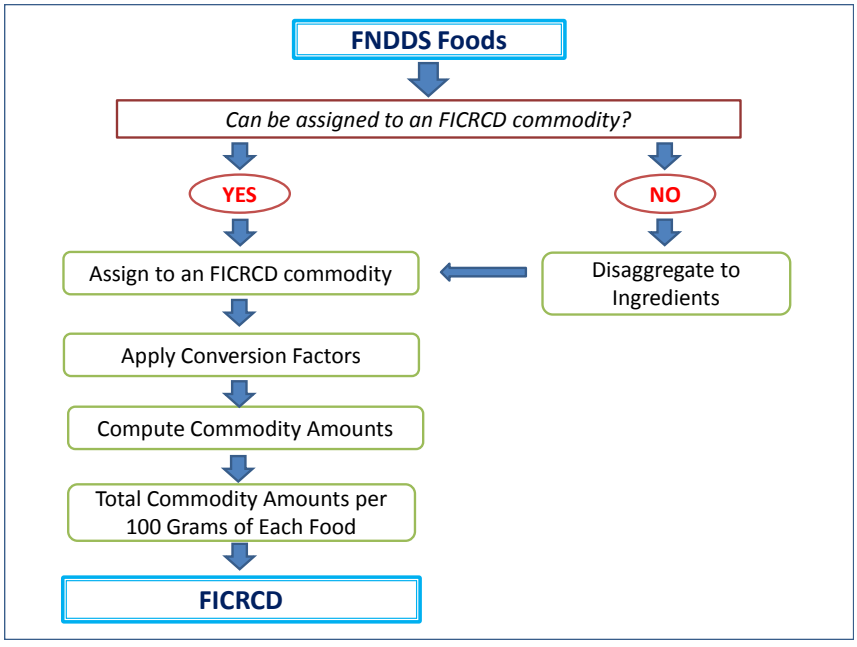
Major Processing Steps

There are four major steps involved in converting the survey foods back to respective amounts of commodities:

1. Disaggregation of survey foods to ingredients, where necessary.
2. Assignment of food ingredients to FICRCD retail commodities.
3. Conversion of foods to retail commodities by using appropriate conversion factors.
4. Determination of the amounts of each of the 65 commodities present per 100 grams of each survey food.

Figure 1 provides an overview of converting FNDDS foods to respective amounts of retail commodities.

Figure 1. Overview of the FICRCD Process



Assignment of FNDDS Foods to Retail Commodities

The FNDDS foods that can be directly assigned to a FICRCD commodity are assigned to the appropriate retail commodity. Whole fruits, raw vegetables, butter, cooking oils, cheese, fluid milk, and peanuts and tree nuts are examples of single-ingredient foods that do not require disaggregation and can be directly assigned to a single commodity.

Disaggregation of FNDDS Foods into Ingredients

Most of the FNDDS foods are multi-ingredient foods (e.g., pizza, sandwiches, soups, cakes, cookies, candies, ready-to-eat cereals, rice with vegetables and meat, frozen dinners) and cannot be directly assigned to an FICRCD commodity. If a direct assignment is not possible, the food is disaggregated into ingredients that can be assigned to an appropriate commodity. The level of disaggregation of a food into its ingredients is contingent upon the description of the foods and other information available in the technical files such as the FNDDS and internal recipe files created from food labels and cookbook information. Table 3 includes examples of disaggregation of foods to ingredients that can be assigned to commodities.

Assignment of Ingredients to Retail Commodities

After the disaggregation process, each ingredient is either assigned to an appropriate commodity listed in Table 2 or to the "non-commodity" category.

Conversion of Foods into Retail Commodities Using Conversion Factors

Conversion factors are applied to convert foods that have a commodity assignment to a common retail commodity form to facilitate grouping of similar commodities (e.g. fluid, dry, and evaporated milk are converted to fluid milk; raw, cooked, or canned tomatoes, tomato sauce, tomato paste, and tomato puree to raw tomatoes). The amounts of retail commodities are computed by multiplying the food or ingredient amount by the respective conversion factors.

Computation of Retail Commodities per 100 Grams of FNDDS Foods

The amounts of each retail commodity present in the ingredients of FNDDS foods are totaled to get the profile of 65 commodities per 100 grams of each FNDDS food. FNDDS foods that are non-commodities will have a zero value for each of the 65 retail commodities.

Table 3. A conceptual model for food disaggregation

Survey Food Description	Recipe for the previous level		
	Level 1 disaggregation	**Level 2 disaggregation**	**Level 3 disaggregation**
Tuna noodle casserole with cream or white sauce [a]	1. Light tuna fish, canned in oil, drained	Tuna fish [b] Soybean oil [b] Salt [c]	
	2. Egg noodles, cooked	Egg noodles, dry	Whole eggs, raw [b] Wheat flour [b]
	3. Fluid milk [b]		
	4. Regular stick margarine, 80% fat [b]		
	5. White all purpose wheat flour [b]		
Polish sausage [a]	1. Pork [b]		
	2. Sugar [b]		
	3. Spices [c]		
	4. Water [c]		
Coffee, latte [a]	1. Espresso brewed coffee [c]		
	2. Fluid milk [b]		
Carbonated soft drink, regular type [a]	1. Water [c]		
	2. High fructose corn syrup [b]		
Tequila Sunrise [a]	1. Tequila [c]		
	2. Orange juice, unsweetened [b]		
	3. Lime juice, unsweetened [b]		
	4. Grenadine	High fructose corn syrup [b] Water [c]	
Vanilla ice cream [a]	1. Heavy cream [b]		
	2. Fluid whole milk [b]		
	3. Sugar [b]		
	4. Vanilla extract [c]		

[a] Only major ingredients of the foods are listed in the first column.
[b] Indicates the level at which commodity assignments are made.
[c] Ingredient is defined as a non-food commodity.

The following table provides an overview of computing retail commodity values for sweetened yogurt with strawberries.

Table 4. Retail Commodity Computation: Sweetened Yogurt with Fruit

Ingredients[1]	Amount per 100 grams of yogurt	Conversion Factor	Commodity assignment	Amount of retail commodity (g)
Yogurt	82	1.0	Yogurt	82
Strawberries	6	1.03	Berries	6.4
Caloric sweetener	12	1	Caloric Sweetener	12

[1]Only the salient ingredients are included.

In the FICRCD, 100 grams of sweetened yogurt will have 82 grams of Yogurt and Total Dairy; 6.4 grams of Berries and Total fruit; and 12 grams of Total Caloric Sweeteners. The rest of the commodities will have zero values.

Need for Conversion Factors

In the FICRCD, commodities are represented per 100 grams of FNDDS foods, which are in as consumed forms. During the conversion of FNDDS foods to food commodities, weight losses that occur due to food preparation and cooking or processing are rectified by using conversion factors. The conversion factors are applied to foods within a commodity to convert them to a common commodity type to facilitate aggregation of similar commodities. Appendix B includes a list of conversion factors that are applied in the FICRCD.

The conversion of foods to commodities may result in commodity values exceeding 100 grams, in most cases. For example, 100 grams of raw apples eaten without peel and core, when expressed as a retail commodity will weigh 130 grams. This is because 23% of refuse (13% peel and 10% core and stem) is added back to the apples as eaten [math check: 130 x [(100-23)/100]=100 grams of edible portion].

Where the Conversion Factors Are Applied

The following examples illustrate the use of conversion factors:

- To convert cooked foods to raw or uncooked foods (e.g., cooked pasta, rice, legumes, dry beans, meat, fish, poultry, vegetables to the respective raw forms).
- To convert fruits and vegetables in FNDDS to fruits or vegetables with refuse (e.g., skin, peel, core, crown, parings, seeds, pits, trimmings). Fruit and vegetable

(including tubers) commodities in the FICRCD include appropriate refuse components.
- To convert 100% fruit juices to respective whole fruits with refuse (e.g., apple, cranberry, orange, lime, lemon, grape, and pineapple juices).
- To convert frozen, 100% fruit juice concentrates to single-strength, ready-to-drink- 100% fruit juice and then to the respective raw fruit commodities. Here, two conversion factors are applied. The first factor converts frozen concentrates to single-strength juice and the second factor converts the juice to whole fruit with refuse.
- To convert roasted nuts to raw nuts, without the shell.
- To convert peanut butter and almond butter to respective whole raw nuts, without the shell or hulls.
- To convert dried fruits and vegetables to raw fruits and vegetables with refuse (e.g., dried apples, prunes, raisins, dates, dried figs, dried pears and sun-dried tomatoes).
- To convert dried foods to raw foods, as applicable (e.g., to convert dried milk to fluid milk, dried fish to raw fish, dried meat to raw meat).

At times, more than one conversion factor is necessary for foods such as cooked or dried fruits and vegetables to convert them to the respective retail commodities.

Sources of Conversion Factors

The conversion factors applied in the development of the FICRCD come from the following sources:
- The FNDDS versions for the respective surveys [4-6]. The data from the FNDDS "MoistFatAdjust" file is used to adjust for cooking losses (e.g., loss of weight during broiling fish and cooking meat or vegetables), to adjust back moisture gained during cooking (e.g., cooked pasta or rice back to uncooked pasta or rice), and the "FNDDSSRLINKS" file is used to adjust for dilution of frozen, concentrated fruit juices to single-strength juices.
- The National Nutrient Database for Standard Reference 18 [12], SR 20 [13] and SR 22 [14] are used to compute percentage refuse factors for fruits and vegetables as explained in the above example of raw apples; and also to adjust for weight changes due to cooking, if this information is not available in the FNDDS.
- Agriculture Handbook No. 102, Food Yields Summarized by Different Stages of Preparation [15], is used only if the percentage refuse factors for fruits and vegetables are not available in the National Nutrient Database for Standard Reference.
- USDA, Economic Research Service provided some of the conversion factors [16]. Agricultural Handbook No. 697, Weights, Measures, and Conversion Factors for Agricultural Commodities and Their Products [17], is one of the resources used by ERS.

Types of Conversion Factors

Conversion factors serve different purposes and are classified based on their functions as described below.

1. To adjust for preparation losses or refuse: These conversion factors are applied to add the refuse (e.g., skin, peel, core, crown, parings, seeds, pits, trimmings) to the edible portions of raw fruits and vegetables. ARS' National Nutrient Database for Standard Reference is the major source for establishing percentage refuse factors. The computational steps are explained below:

Banana:
A banana has, on average, 36% of its weight as peel (refuse)
64 grams of edible portion of banana =100 grams with peel
100 grams of edible portion of banana =[(100/64)x100]
=156 grams with peel

Conversion factor to convert 100 grams of edible portion of banana to banana as a commodity =156/100=**1.56**

Raw, ripe tomatoes:
Red, ripe tomatoes have 9% refuse (composed of core and stem)
91 grams of edible portion of tomatoes =100 grams with refuse
100 grams of edible portion of tomatoes =[(100/91)x100]
=110 grams with refuse

Conversion factor to convert 100 grams of edible portion of tomato to tomato as a commodity =110/100=**1.1**

2. To adjust for the weight loss that occurs during cooking: Examples of foods where this type of conversion factor is applied include broiled, grilled, or baked fish, meat, and vegetables. The percentage weight loss is obtained from FNDDS for this type of conversion factor.

Broiled tomatoes:
Raw tomatoes lose 20% of their weight during broiling
80 grams of grilled tomatoes =100 grams raw tomatoes
100 grams of grilled tomatoes =[(100/80)x100]=125 grams raw

Conversion factor to convert 100 grams of grilled tomatoes to raw edible portion of tomatoes =125/100=1.25

To further convert broiled tomatoes to tomatoes commodity, a second conversion factor of 1.1 is applied to add back the refuse component.
Final conversion factor =1.25x1.1=**1.38**

Baked or broiled fish:
Raw, boneless fish loses 23% of its weight during broiling
77 grams of broiled fish =100 grams raw, boneless fish
100 grams of broiled fish =[(100/77)x100]
=130 grams raw, boneless fish

Conversion factor to convert 100 grams of grilled fish to raw, boneless fish =130/100=**1.30**
Since this is boneless fish, there is no refuse.

3. To convert cooked foods to dry, uncooked foods by removing moisture: This type of conversion factor is applied to convert cooked rice or cooked pasta back to uncooked rice or pasta, respectively. In this instance, the total solid contents (100 - % moisture) of the cooked and uncooked food are used to compute the conversion factor. The percent moisture values are obtained from FNNDS; when not available in FNDDS, the National Nutrient Database for Standard Reference is used.

Rice:
% total solids, cooked rice =31.56 (% moisture=68.44)
% total solids, uncooked rice =88.38 (% moisture=11.62)

Conversion factor to convert cooked rice to uncooked rice= 31.56/88.38
= **0.36**

Macaroni, whole wheat:
% total solids, cooked macaroni =32.85 (% moisture=67.15)
% total solids, uncooked macaroni =90.1 (% moisture=9.9)

Conversion factor to convert cooked macaroni to uncooked macaroni
=32.85/90.1
=**0.37**
There is no refuse for rice and macaroni.

4. To convert dried foods to raw or fresh state by adding moisture: This type of conversion factor is applied in the conversion of foods such as dried fruits and vegetables to their respective raw or fresh state. The total solid contents of the dried and the raw foods are used to compute the conversion factors. The principle is the same as that described above. The percent moisture values are obtained from FNNDS; when not available in FNDDS, the National Nutrient Database for Standard Reference is used.

Sun-dried tomatoes:
% total solids, sun-dried tomatoes =85.44 (% moisture=14.56)
% total solids, raw, ripe tomatoes =5.5 (% moisture=94.5)

Conversion factor to convert sun-dried tomatoes to raw, ripe edible portion of tomatoes =85.44/5.5**=**15.53

To further convert sun-dried tomatoes to tomatoes as commodity, a second conversion factor of 1.1 is applied to add back the refuse component.

Final conversion factor =15.53x1.1=**17.08**

5. To convert frozen fruit juice concentrates to single-strength juices: A conversion factor of **4** is applied to frozen fruit juice concentrate when the addition of water is required to be 3 times the amount of concentration. The dilution data are obtained from FNDDS.

6. To convert single-strength or ready-to-drink fruit juices to raw fruits: Conversion factors are applied to directly convert single-strength fruit juices to respective raw fruit, with refuse included. The conversion factors used are obtained from the USDA, Economic Research Service [17]. Examples:

Apple juice to apples with refuse, conversion factor =**1.5**
Grape juice to grapes with refuse, conversion factor =**1.3**
Orange juice to oranges with refuse, conversion factor=**2.0**
Tomato juice to tomatoes with refuse, conversion factor=**1.53**

7. To convert cooked, frozen vegetables to raw vegetables: The total solid contents (100 - % moisture) of vegetables are used to convert cooked, frozen vegetables to raw vegetables with refuse. The percent moisture values are obtained from the National Nutrient Database for Standard Reference.

Spinach:
% total solids in frozen spinach, cooked =11.06 (% moisture=88.94)
% total solids in raw spinach, cooked =8.79 (% moisture=91.21)
% total solids in raw spinach, uncooked =8.60 (% moisture=91.40)

Conversion factor to convert cooked, frozen spinach, drained to raw spinach without refuse =11.06/8.60=1.29
Conversion factor to convert cooked spinach to raw spinach, without refuse =8.79/8.60=1.02

Raw spinach has 28% refuse that is composed of large stems and roots.
100 grams of edible portion of raw spinach =[(100/72)x100] grams
=139 grams with refuse
Conversion factor used to include refuse in raw spinach
=139/100=1.39
Conversion factor to convert cooked, frozen spinach, drained to raw spinach with refuse =1.29x1.39=**1.79**
Conversion factor to convert cooked, spinach, drained to raw spinach with refuse =1.02x1.39=**1.42**

Broccoli:
% total solids in frozen broccoli, cooked =9.28 (% moisture=90.72)
% total solids in raw broccoli, cooked =10.75 (% moisture=89.25)
% total solids in raw broccoli =10.70 (% moisture=89.30)

Conversion factor to convert cooked, frozen broccoli to raw broccoli without refuse =9.28/10.70=0.87
Conversion factor to convert cooked broccoli to raw broccoli, edible portion without refuse =10.75/10.70=1.00

Raw broccoli has 39% refuse that is composed of leaves and tough stalks with trimmings
100 grams of edible portion of raw broccoli=[(100/61)x100] grams
=164 grams with refuse
Conversion factor used to include refuse in raw broccoli
=164/100=1.64
Conversion factor to convert cooked, frozen, drained broccoli to raw broccoli with refuse =0.87x1.64=**1.43**
Conversion factor to convert cooked broccoli, edible portion to raw broccoli with refuse=1.00x1.64=**1.64**

Use of a Conversion Factor of One

There are foods in the surveys that can be directly matched to a respective commodity, without any intermediate conversions. In such cases, a conversion factor of one is applied. Examples include:

- All dairy products such as fluid whole milk, 2% milk, 1% milk, and non-fat milk; cheese; yogurt; and butter.
- Boneless meat, poultry, and fish ingredients. If these ingredients are raw (uncooked), a conversion factor of 1 is applied because the FICRCD reports these commodities as uncooked, boneless.
- Flours and meals of grains such as wheat, rice, oats, and corn.
- Shortenings, margarine, cooking oils, and salad oils.

- Beet and cane sugars; corn syrup; honey; malt extract; molasses; and cane, malt, maple, and sorghum syrups.

Summary of Conversion Factors Application

An application of conversion factors to convert different apple products to the apple commodity (raw apples with refuse) is shown in Table 5, as an example.

Table 5. Application of conversion factors in apple products

Apple products	Factor applied to convert to raw apples without refuse[1]	Factor applied to convert to single strength juice	Factor applied to add refuse[1]	Final conversion factor applied to convert to raw apples at retail level
Apple, dried	4.73	-	1.3	6.15
Apple, baked	1.08	-	1.3	1.4
Applesauce	1.08	-	1.3	1.4
Apple raw	1	-	1.3	1.3
Apple juice, frozen concentrate (3:1)	-	4	1.5	6.0
Apple juice, single strength	-	-	1.5	1.5

[1] Refuse= peel, core, and seeds

Instances Where No Additional Weight Adjustments Are Made to a Commodity Category

The FICRCD does not adjust for the following losses:

- Variability in the refuse factors (proportion of peel and seeds to the total weight) due to differences within varieties of fruits and vegetables. The FICRCD uses a single conversion factor for each type of fruit and vegetable, without adjusting for varietal differences.
- Variability in refuse loss in fruits and vegetables due to person-to-person variability in food preparation techniques.
- Discarded left-over foods and plate waste.
- Fat trimmed or drained from meat at home after purchase.
- Left-over cooking oils used for deep frying and discarded after use.
- Foods that are discarded at home because of spoilage. This may apply to all fruits, vegetables, dairy products, meats, fish, and eggs that are not used within the expiration dates.
- Non-food use of flour, oils, eggs, and other food commodities.
- The use of fruits and vegetables for decorative purposes.

Other Sources of Variation Between Food Commodities Estimated Using the FICRCD and the ERS Food Availability Data Series

Some of the discrepancies between the two types of estimations may be due to the use of a single conversion factor for all varieties of a single fruit or vegetable and due to home food losses as explained above. In addition to these losses, there are other sources of food losses, which include:

- The supermarket items such as raw meat, poultry, fish, eggs, dairy products, bread and other food commodities discarded after the expiration date or due to other reasons, including food recalls or the inability to maintain the appropriate storage temperatures. Fruits and vegetables are removed and discarded in supermarkets when they are no longer fresh and lack consumer appeal. Certain amounts of prepared hot food items and deli foods are also discarded.
- Loss of foods before and after preparation in restaurants, fast food restaurants, and other food service venues.

Chapter 3

Development of Major Commodity Categories and Their Components

This chapter describes the commodities included within each of the eight major categories, the process of categorizing the foods in the survey to the appropriate commodity, and the decisions that are specific to each commodity category.

Dairy Products Commodity Category and Its Components

The Dairy Products commodity category consists of the following 10 commodities: Total Dairy Products, Total Fluid Milk, Fluid Whole Milk, Fluid 2% Milk, Fluid 1% Milk, Fluid Skim Milk (nonfat milk), Butter, Cheese, Yogurt, and Other Dairy Products. Foods within each of the 10 dairy products commodities are listed in Appendix A. The conversion factors applied to convert foods in the Dairy Product commodity category to respective commodities are in Appendix B.

Foods that are single diary items such as fluid milk, cheese, cream, half and half, and plain yogurt are directly assigned to the appropriate Dairy Product commodity, without disaggregation. Multi-ingredient, milk-based foods such as ice cream and other frozen dairy desserts, puddings and custards, ice milk, milk shake, flavored milk, malted milk, and yogurt with added sugar are separated into dairy and non-dairy components. Mixed dishes such as sandwiches with cheese, cheeseburgers, pizza, and tacos containing dairy ingredients are disaggregated; and the dairy components are assigned to the appropriate Dairy Product commodity.

The following are specific to the Dairy Product commodity category:

- The Dairy Products commodities in the FICRCD are presented in terms of that available at retail stores.
- Dry milk and evaporated milk are converted to respective amounts of fluid milk and are included in the appropriate fluid milk commodity. Because of this conversion of dry milk to fluid milk, some of the bakery and other food products may appear to have fluid milk present in them.
- Yogurts with fruit and/or nuts are presumed to contain 6 percent fruit and 3 percent nuts.
- Frozen yogurt is presumed to contain 80% yogurt.
- Low-calorie, flavored yogurt and low-calorie, frozen yogurt are presumed as 100% yogurt.
- Butter is considered a Dairy commodity in the ERS Food Availability Data Series; therefore, it is included in the Dairy Product commodity category, and not in the Fats and Oils commodity category.

Fats and Oils Commodity Category and Its Components

The Fats and Oils commodity category consists of the following five commodities: Total Fats and Oils, Margarine, Salad and Cooking Oils, Shortening, and Other Oils. Foods within each of the five fats and oils commodities are listed in Appendix A. The conversion factors applied to convert foods in the fats and oils category to appropriate commodities are listed in Appendix B. Dairy fats such as butter and cream are considered a Dairy Product commodity by ERS Food Availability Data Series and thus, are included under the Dairy Product commodity category and not under the Fats and Oils commodity category.

Foods that are only fats or oils are directly assigned to the appropriate Fats and Oils commodity, without disaggregation. Multi-ingredient foods such as fried foods, bakery products such as bread, cookies, cakes and pies, and condiments that contain fats or oils as ingredients are disaggregated. The fat or oil ingredients of the foods are assigned to the appropriate Fats and Oils commodity.

The following are specific to the Fats and Oils commodity category:

- There is no differentiation made between industrial shortenings and that sold in grocery stores. A single, shortening commodity has been created.
- Animal fats such as lard and beef fat (tallow) do not have separate commodity assignments, but are included in the Total Fats and Oils commodity.
- Shortenings made with animal or vegetable fats are not separated by animal or vegetable origin, because of the generic nature of food ingredients in FNDDS, but are included under the Shortening commodity.
- Margarine, light margarine and margarine-like spreads are included under the Margarine Commodity, without disaggregation.
- Margarine-butter blends are disaggregated into margarine and butter and placed in either the Margarine or Butter commodities, as appropriate.

Fruit Commodity Category and Its Components

The Fruit commodity category consists of the following 14 commodities: Total Fruit; Total Apples; Apples from Fruit; Apples from Juice; Bananas; Berries such as strawberry and blueberry; Grapes; Melons such as cantaloupe and honeydew; Total Oranges; Oranges from Fruit; Oranges from Juice; Other Citrus Fruits; Stone Fruits such as cherry and peach; and Tropical Fruits. Fruit juices consumed alone or as components of other beverages are converted to their respective fruit with refuse and assigned to the appropriate Fruit commodity. Fruits such as dates, figs, kiwifruit, persimmon, pomegranate, and tamarind that are consumed in amounts too small to warrant a separate commodity assignment by themselves are included in the Total Fruit commodity, along with the rest of the commodities listed above. Foods within each of the 14 fruit commodities are listed in Appendix A. The conversion factors applied to

convert foods in the Fruit commodity category to appropriate commodities are listed in Appendix B.

Foods that are composed of only fruits or 100% fruit juices are directly assigned to the appropriate Fruit commodity, without disaggregation. Multi-ingredient foods such as fruit cocktail, fruit salads, fruit pies, muffins, cakes, breads, mixed drinks, and desserts that contain fruits are disaggregated into respective food ingredients. The fruit components of the foods are assigned to the appropriate Fruit commodity. Fresh, frozen, and canned fruits may be ingredients of some of the foods. Foods that use canned fruits as ingredients include only the fruit component and not the liquid component. For each type of fruit, a common conversion factor is applied to convert canned, frozen, or fresh fruit reported eaten to its commodity.

The following are specific to the Fruit commodity category:

- All fruit commodities in the FICRCD are presented as raw fruit commodities with refuse (e.g., peel, core, and seeds, crown, pits, leftover pulp after juice extraction, as applicable) included.
- Apples and oranges have two commodity forms: (1) eaten as fruit (Apples/Oranges from Fruit) and (2) consumed as juice and converted to fruit (Apples/Oranges from Juice). The two commodity forms are added together and reported under the Total Apples or the Total Oranges commodities, as appropriate.
- All other fruit juices that are present in 100% fruit juices, fruit drinks, or in mixed alcoholic drinks are converted to fruit and reported under the respective Fruit commodity.
- In canned fruits such as apricots, cherries, figs, grapes, peaches, pears, pineapples, and plums packed in any liquid medium (e.g., water pack, light or heavy syrup), the drained weight is presumed to be 65% of net weight.
- Sweetened, frozen fruits are presumed to contain 85% fruit and 15% added sugar.
- Grapes and other fruits used in the production of wine and other alcoholic beverages are excluded from the Fruit commodity, because of the lack of conversion factors.
- Orange and lemon peels used as flavorings are not included in the FICRCD.

Grains Commodity Category and Its Components

The Grains commodity category consists of the following five commodities: Total Grains, Corn Flour and Meal, Oats and Oat Flour, Rice, and Wheat Flour. The grains such as amaranth, barley, buckwheat, millets, and triticale that are consumed in amounts too small to warrant a separate commodity assignment by themselves are included in the Total Grains commodity, along with the rest of the commodities listed above. Foods within each of the five grain commodities are listed in Appendix A. The

conversion factors applied to convert foods in the Grains commodity category to respective commodities are listed in Appendix B.

Foods that are composed of only grains are directly assigned to the appropriate Grain commodity, without disaggregation. Multi-ingredient foods such as bread, cookies, pizza, burritos, and sandwiches that contain grains as an ingredient are disaggregated into respective ingredients. The grains components of the foods are assigned to the appropriate Grains commodity.

The following are specific to the Grains commodity category:

- Many of the Grains commodities in the FICRCD such as wheat, corn, and oats are presented as their respective flour or meals: Corn Flour & Meal, Oats & Oat Flour, and Wheat Flour. Mature, dry corn that is used to make popcorn is included in the Total Grains commodity.
- Rice is presented as uncooked grain, without the husk.
- The grains used in the production of alcoholic beverages and malted beverages are not included in the Grains commodity category due to a lack of data.

Meat, Poultry, Fish, and Eggs Commodity Category and Its Components

The Meat, Poultry, Fish, and Eggs commodity category consists of the following 10 commodities: Total Meat, Poultry, and Fish; Total Meat; Beef; Pork; Total Poultry; Chicken; Turkey; Finfish and Shellfish; Eggs with Shell (shell eggs); and Eggs without Shell. All types of fin- and shellfish are combined together into a single fish commodity and are also included under the Total Meat, Poultry, and Fish commodity. Similarly, fresh, frozen, and dried egg whites, egg yolks, and whole eggs are combined together into a single eggs commodity and represented in two different commodity forms: Eggs with Shell and Eggs without Shell. Some foods in the meat and poultry commodities are consumed in amounts too small to warrant a separate commodity assignment by themselves and are totaled separately, and included under the appropriate commodity totals (total meat, total poultry), as well as the main commodity category total. For example:

- Lamb, goat, and game meats do not have their own commodity assignments. Instead, they are aggregated together and included in the Total Meat commodity and in the Total Meat, Poultry, Fish, and Eggs commodity.
- Dove, duck, goose, pheasant, and quail meats do not have their own commodity assignments. Instead, they are aggregated together and included in the Total Poultry commodity and in the Total Meat, Poultry, and Fish commodity category.

Foods within each of the 10 Meat, Poultry, Fish, and Eggs commodities are listed in Appendix A. The conversion factors applied to convert foods within this commodity category to appropriate commodities are listed in Appendix B.

Foods that are composed of only meat, poultry, fish, or eggs are directly assigned to the appropriate food commodities, without disaggregation. Examples include broiled fish or chicken with no added fat, broiled meat, and boiled or poached eggs. Multi-ingredient foods such as stews, burritos, omelets, sausages, and sandwiches that contain meat, poultry, fish, or egg as an ingredient are disaggregated to its ingredients. The meat, poultry, fish, or eggs components of the foods are assigned to the appropriate Meat, Poultry, Fish, or Eggs commodity.

The following are specific to the Meat, Poultry, Fish, and Eggs commodity category:

- The foods in the Meat, Poultry, and Fish commodity category are presented as raw (uncooked) and boneless. This allows for the comparison of results with other ERS Food Availability and Loss Adjusted Food Availability databases where meat, fish, and poultry are raw and boneless.
- The Poultry commodity includes poultry with or without skin depending upon the survey respondent's description of the poultry item they consumed. No attempt has been made to remove the skin from poultry products reported as eaten with skin or to add skin to the skinless poultry products reported; and so, no additional conversion factor was applied to the skinless poultry.
- Veal is combined with the Beef commodity.
- The Eggs commodity includes only chicken eggs and is presented as two different commodity types: Eggs with Shell (shell eggs) and Eggs without Shell; Eggs with Shell, includes both liquid egg and egg shell, and Eggs without Shell includes only liquid egg. Conversion factors are applied to convert Eggs without Shell to Eggs with Shell (shell eggs).
- Sausages and frankfurters are disaggregated into their major ingredients before commodity assignments are made. The meat components from these foods are assigned to the respective commodities such as beef, pork, chicken, or turkey. Luncheon meats are presumed to be 100% meat and are directly assigned to the respective commodity category.
- Organ meats and meat by-products are included in their respective meat commodity. Organ meats without further description in FNDDS are assigned to the Beef commodity.

Nuts Commodity Category and Its Components

The Nuts commodity category consists of the following three commodities: Total Nuts, Peanuts, and Tree Nuts. The Total Nuts commodity category includes tree nuts and peanuts. Peanut butter is included with peanuts. Foods within each of the three nuts commodities are listed in Appendix A. The conversion factors applied to convert nuts to respective commodities are listed in Appendix B.

Foods that are composed of only nuts such as almonds, walnuts, and peanuts are directly assigned to the appropriate nuts commodity, without disaggregation. Multi-ingredient foods such as cereals, muffins, breads, cookies, snacks, and candies that contain nuts as an ingredient are disaggregated. The nut components of the foods are appropriately assigned to either the Tree Nuts or Peanuts commodity.

The following are specific to the nuts commodity category:

- Tree nuts and peanuts are presented as raw nuts, without shell.
- Nut butters such as peanut butter and almond butter are converted to the respective raw nuts, without shell.

Caloric Sweeteners Commodity Category and Its Components

The Caloric Sweeteners commodity category consists of a single commodity, Total Caloric Sweeteners. In the early stages of the database development, attempts were made to separate beet/cane sugars and corn syrups from other caloric sweeteners such as dextrose; honey; malt extract; molasses; and cane, malt, maple, and sorghum syrups. However, the difficulties in identifying the exact types of caloric sweeteners present in many of the foods resulted in combining all caloric sweeteners into a single commodity, namely Total Caloric Sweeteners. Hence, the caloric sweeteners data may not be pertinent, because it is not possible to estimate consumption of individual sweeteners such as cane sugar or high fructose corn syrup from the FICRCD. Foods within the Total Caloric Sweeteners commodity are listed in Appendix A. The conversion factors applied to convert caloric sweeteners to respective commodities are listed in Appendix B.

Foods that are composed of only caloric sweeteners such as cane sugar and corn syrup are directly assigned to Total Caloric Sweeteners commodity, without disaggregation. Multi-ingredient foods such as cookies, cakes, pies, muffins, ice cream, ready-to-eat cereals, snacks, and beverages such as non-diet soft drinks, non-diet fruit drinks, coffee, tea, mixed alcoholic drinks, and other sweetened beverages that contain caloric sweetener as an ingredient are disaggregated to their ingredients. The caloric sweetener components of the foods and beverages are assigned to the Total Caloric Sweeteners commodity.

The following are specific to the caloric sweeteners commodity category:

- Inter-conversion of corn syrup solids and liquid corn syrup is not done due to the difficulty in identifying which sweetener is used. Corn syrup solids and liquid corn syrups are retained as such.
- Corn syrups and dextrose are included as retail commodities. This is one of two exceptions (the other being industrial shortenings) where non-retail type commodities are included with retail commodities in the FICRCD.

Vegetables Commodity Category and Its Components

The Vegetables commodity category consists of the following 17 commodities: Total Vegetables, Total Brassica (cruciferous), Broccoli and Cauliflower, Carrots, Celery, Cucumbers, Green Peas, Total Leafy Vegetables, Lettuce (head and leafy), Onions, Peppers (bell and non-bell), Tomatoes, Sweet Corn, Total Roots and Tubers, Potatoes, Snap Beans (string beans), and Legumes (dry beans and peas). Some of the vegetables are consumed in amounts too small to warrant a separate commodity. These vegetables are aggregated separately and included in the appropriate total commodities.

- Roots and tubers such as beets, cassava, jicama, parsnips, sweet potatoes, tapioca, taro, and yam do not have their own commodity due to small mean intakes and are included in the Total Roots and Tubers commodity and in the Total Vegetables commodity.
- Brussels sprouts, cabbage, collard greens, kale, kohlrabi, mustard greens, and turnip green and roots do not have their own commodities due to small mean intakes and are included in the Total Brassica (cruciferous vegetables) commodity and in the Total Vegetables commodity.
- Leafy vegetables such as beet greens, chard, chicory greens, cress, dandelion greens, endive, grape leaves, pumpkin leaves, spinach, sweet potato leaves, taro leaves, and watercress do not have their own commodities due to small mean intakes and are included in the Total Leafy Vegetables commodity and in the Total Vegetables commodity.
- Alfalfa sprouts, artichokes, asparagus, avocados, bean sprouts, breadfruit, eggplant, garlic, mushrooms, okra, olives, summer and winter squash, pumpkin, and tomatillos do not have their own commodities due to small mean intakes and are included in the Total Vegetables commodity.

Foods within each of the 17 vegetable commodities are listed in Appendix A. The conversion factors applied to convert vegetables to respective commodities are listed in Appendix B.

Foods that are composed only of vegetables are directly assigned to the appropriate vegetable commodity, without disaggregation. Multi-ingredient foods such as mixed vegetable dishes and vegetable soup, salads, stew, rice dishes with vegetables, and sandwiches that contain vegetables as ingredients are disaggregated. The vegetable components of the foods are assigned to the appropriate vegetable commodity.

The following are specific to the vegetables commodity category:

- The vegetables in the FICRCD are presented as raw vegetable commodities with refuse (e.g., peel, skin, seeds, trimming, as applicable) included.
- Legumes (dry beans and peas) are presented as uncooked (dry) and without the pod.

- Soybean and soy products such as tofu, soy milk and soy flour are not used in cooking in a manner similar to dry beans and peas (legumes). These foods are not given a separate commodity, but are included under the Total Vegetables commodity.
- Only sweet corn is included in the vegetables commodity category. All other mature, dry corn products such as corn meal, corn flour, and popcorn are included in the Grain commodity category.
- Potatoes used in the production of alcoholic beverages are not included in the vegetables commodity category.
- The FNDDS food code descriptions of some of the meat, poultry, or fish dishes with mixed vegetables describe these foods as containing several vegetables. However, all of the vegetables listed in the FNDDS food code description may not be present in the commodity assignment. For example, the food *Beef with vegetables including carrots, broccoli, and/or dark-green leafy vegetables, tomato-based sauce* includes carrots, onions, and tomatoes commodities and does not include broccoli or total leafy vegetables commodities.

Other Issues in the Vegetables Commodity Category

Among frozen vegetables, some lose moisture and others gain moisture during cooking. Frozen, leafy vegetables such as collard greens, spinach, and turnip greens lose moisture when cooked and therefore have lower moisture contents than the respective raw forms. Whereas frozen vegetables such as beans, broccoli, carrots, corn, and other mixed vegetables gain moisture when cooked and thus have slightly higher moisture contents than the respective raw forms. Because of these differences, the final conversion factors used to convert leafy vegetables to commodities are higher for frozen leafy vegetables than raw leafy vegetables, and the reverse is true for beans, broccoli, carrots, corn, and other mixed vegetables. Example 7 under the 'Types of Conversion Factors' section in Chapter 2 includes details on the computation of conversion factors for spinach and broccoli.

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Appendix A: List of Foods in the Commodity Categories

This list identifies the majority of the foods (and ingredients) in each commodity group. Text in bold and parenthesis () identifies the form of the group reported.

Dairy Products Commodities	Foods Included
Total Dairy	Foods in the Dairy Product Commodities listed below.
Total Fluid Milk	All foods in the Fluid Milk Commodities listed below.
Fluid Whole Milk	Fluid milk that contain 3.25% or more fat including: Cows' milk Chocolate milk Dry milk (reconstituted) Evaporated milk (diluted)
Fluid 2% Milk	Fluid cows' milk, flavored milk, and buttermilk that contain 2% fat
Fluid 1% Milk	Fluid cows' milk and flavored milk that contain 1% fat
Fluid Skim Milk	Fluid cows' milk, flavored milk, and buttermilk that contain less than 1% fat
Butter	Butter Ghee
Cheese	All types of cheese including: Cheese spreads Cottage cheese Hard natural cheese Processed cheese Ricotta cheese Soft cheese
Yogurt	All types of plain, flavored, and fruit yogurt
Other Dairy Products	Cream cheese Fluid cream Sour cream

Fats and Oils Commodities	Foods Included
Total Fats and Oils	Foods listed in the Fats and Oils Commodities and animal fats such as beef fat and lard.
Margarine	Margarine and margarine-like spreads
Salad and Cooking Oils	Canola oil Corn oil Olive oil Peanut oil Safflower oil Sesame oil Soybean oil
Shortening	Household and industrial shortenings
Other Oils	Almond oil Coconut oil Flaxseed oil Palm oil

Fruit Commodities	Foods Included
Total Fruit	Foods listed in the Fruit Commodities and the following: Dates Figs Kiwi Pears Persimmon Pomegranate Rhubarb Tamarind
Total Apples	Apples from juice converted back to fruit and apples consumed as fruit
Apples from Fruit	Raw apples Baked apples Dried apples Apple sauce
Apples from Juice	Apples from apple cider, apple juice (single strength) and apple juice concentrate converted back to apples
Bananas	Bananas Plantains
Berries	Blackberries Blueberries Boysenberries Cranberries Cranberry juice Currants Huckleberries Loganberries Mulberries Raspberries Strawberries Strawberry juice
Grapes	Grapes Grape juice Raisins
Melons	Cantaloupe Casaba Honeydew Watermelon Watermelon juice

Fruit Commodities (cont.)	Foods Included
Total Oranges	Oranges from juice converted back to fruit and oranges consumed as fruit
Oranges from Fruit	Oranges consumed as fruit
Oranges from Juice	Oranges from orange juice and orange juice concentrate converted back to oranges
Other Citrus Fruits	Grapefruits Grapefruit juice Kumquats Lemons Lemon juice Limes Lime juice Mandarin oranges Tangelos Tangerines Tangerine juice
Stone Fruits	Apricots Cherries Nectarines Peaches Plums Prune juice
Tropical Fruits	Guava Lychees Mangoes Mango juice Papayas Passion fruit Passion fruit juice Pineapples Pineapple juice Soursop Starfruit

Grain Commodities	Foods Included
Total Grains	Foods listed in the Grain Commodities and the following: Amaranth, Barley, Buckwheat, Millets, Popcorn, Rye, Triticale
Corn Flour and Meal	Corn flour, Corn grits, Corn meal, Corn starch, Dried corn, Hominy
Oats and Oat Flour	Oats and oat flour
Rice (Dry)	Rice flour, Rice cereal, White rice, Brown rice, Wild rice
Wheat Flour	Wheat flour, Wheat, Farina, Semolina, Couscous, Bulgur, Macaroni, Spaghetti, Noodles

Meat, Poultry, Fish, and Eggs Commodities	Foods Included
Total Meat, Poultry, and Fish	Foods in the Meat, Poultry and Fish Commodities listed below.
Total Meat	Foods in the beef and pork commodities and the following: Bear Bison Caribou Deer Frog legs Goat Lamb Moose Rabbit Raccoon Squirrel
Beef	Beef meat, boneless Bacon (beef) Beef sausage & hot dogs Corned beef Luncheon meat (beef) Pastrami Veal Organ meats
Pork	Pork meat, boneless Bacon (pork) Cured ham Luncheon meat (pork) Pork sausage and hot dogs

Meat, Poultry, Fish, and Eggs Commodities (cont.)	Foods Included
Total Poultry	Foods listed in the Chicken and Turkey Commodities and the following: Dove Duck Goose Quail
Chicken	Chicken meat, boneless Luncheon meat (chicken) Organ meats Cornish game hen
Turkey	Turkey meat Luncheon meat (turkey) Organ meats
Finfish and Shellfish	All types of finfish and shellfish including: Abalone Clams Crabs Crayfish Conch Fish roe Finfish, freshwater and saltwater (includes tuna and salmon) Lobster Mussels Octopus Oysters Scallops Shrimp Snails Squid
Eggs, with shell	Chicken eggs (whole, yolk, and white)
Eggs, without shell	Chicken eggs (whole, yolk, and white)

Nuts Commodities	Foods Included	
Total Nuts	Foods in the Nuts Commodities listed below.	
Peanuts	Peanuts	Peanut butter
Tree Nuts	Almonds Almond butter Brazil nuts Chestnuts Cashews Cashew butter	Hazelnuts (Filberts) Macadamias Pecans Pine nuts Pistachios Walnuts

Caloric Sweeteners Commodities	Foods Included	
Total Caloric Sweeteners	Includes the following caloric sweeteners: Beet and cane sugar (brown and white) Corn syrup (including high fructose) Cane syrup Grenadine syrup	Honey Maple syrup Molasses Sorghum syrup

Vegetables Commodities	Foods Included
Total Vegetables	Foods listed in the Vegetable Commodities and the following: Alfalfa sprouts Artichokes Asparagus Avocado Bamboo shoots Bean sprouts Breadfruit Cactus Chayote Chives Eggplant Fennel Garlic Leeks Mushrooms Okra Olives Palm hearts Pumpkin Radicchio Seaweed Soybeans (cooked) Soybean curd (tofu) Soy flour & meal Soy milk Soy nuts (dry soybeans) Summer squash Water chestnuts Winter squash Zucchini
Total Brassica	Foods listed in the Broccoli and Cauliflower commodity and the following: Brussels sprouts Cabbage Collards Cress Horseradish leaves Kale Kohlrabi Mustard greens Radish Rutabagas Turnips Turnip greens
Broccoli and Cauliflower	Broccoli Cauliflower

Vegetables Commodities (cont.)	Foods Included
Carrots	Carrots and carrot juice
Celery	Celery and celery juice
Cucumbers	Cucumber
Green Peas	Green peas and edible pod peas
Total Leafy Vegetables	Foods listed in the Lettuce (head and leaf) commodity and the following: Basil (fresh) Beet greens Chard Chicory greens Cilantro (fresh) Dandelion greens Endive Grape leaves Jute Parsley (fresh) Pumpkin leaves Spinach Taro leaves
Lettuce	Leaf and head lettuce
Onions	Onions
Peppers (Bell and Non-bell)	Banana peppers Bell peppers Pimento Non-bell peppers

Vegetables Commodities (cont.)	Foods Included
Tomatoes	Tomatoes, tomato paste, tomato puree, and tomato juice
Sweet Corn	White and yellow corn (excludes mature, dry corn)
Total Roots and Tubers	All foods listed in the Potatoes Commodity and the following: Beets Burdock root Cassava Celeriac Jicama Lotus root Parsnips Sweet potatoes Tapioca Taro Yam
Potatoes	Potatoes
Snap Beans (String beans)	Snap beans (String beans)
Legumes (Dry Beans and Peas)	Black beans Chickpeas Cowpeas Fava beans Kidney beans Lentils Lima beans Mung beans Navy beans Pigeon peas Pink beans Pinto beans Split peas White beans

Appendix B: List of Conversion Factors

A list of conversion factors used to convert selected foods consumed to commodities.

	Convert From	Convert To	Conversion Factor
Dairy			
	Butter, all types	Butter, all types	1.00
	Cheese, all types	Cheese, all types	1.00
	Non-fat dry milk, reconstituted	Fluid skim milk	1.00
	Dry milk, lowfat	Fluid lowfat milk	10.50
	Dry buttermilk	Fluid buttermilk	10.50
	Fluid milk (including buttermilk), all types	Fluid milk, all types	1.00
	Evaporated milk, all types	Fluid milk, all types	2.20
	Fluid cream, all types	Fluid cream, all types	1.00
	Sour cream, all types	Sour cream, all types	1.00
	Yogurt, all types	Yogurt, all types	1.00
Eggs			
	Egg, fresh or liquid, without shell	Egg with shell, raw	1.14
	Egg, dried, whole, yolk & white	Egg without shell, raw	4.01
	Egg, dried, whole, yolk & white	Egg with shell, raw	4.57
	Egg, whole, cooked, hard-boiled	Egg with shell, raw	1.20
	Egg, whole, cooked, poached	Egg with shell, raw	1.15
Fats and Oils			
	Lard	Lard	1.00
	Margarine, all types	Margarine, all types	1.00
	Oils, salad and cooking	Oils, salad and cooking	1.00
	Shortening, all types	Shortening, all types	1.00
Fish			
	Fish and shellfish, all types, raw, boneless	Fish and shellfish, all types, raw, boneless	1.00
	Catfish, baked or broiled, boneless	Catfish, raw, boneless	1.25
	Catfish, steamed or poached, boneless	Catfish, raw, boneless	1.25
	Cisco, smoked	Cisco, raw, boneless	1.43

	Convert From	Convert To	Conversion Factor
Fish (continued)			
	Cod, baked or broiled, boneless	Cod, raw, boneless	1.25
	Cod, steamed or poached, boneless	Cod, raw, boneless	1.25
	Croaker, baked or broiled, boneless	Croaker, raw, boneless	1.49
	Croaker, steamed or poached, boneless	Croaker, raw, boneless	1.25
	Flounder, baked or broiled, boneless	Flounder, raw, boneless	1.25
	Flounder, steamed or poached, boneless	Flounder, raw, boneless	1.25
	Mackerel, baked or broiled, boneless	Mackerel, raw, boneless	1.25
	Mackerel, salted	Mackerel, raw, boneless	1.91
	Perch, baked or broiled, boneless	Perch, raw, boneless	1.25
	Perch, steamed or poached, boneless	Perch, raw, boneless	1.25
	Salmon, baked or broiled, boneless	Salmon, raw, boneless	1.30
	Salmon, steamed or poached, boneless	Salmon, raw, boneless	1.25
	Sea bass, baked or broiled, boneless	Sea bass, raw, boneless	1.30
	Sea bass, steamed or poached, boneless	Sea bass, raw, boneless	1.25
	Sturgeon, smoked	Sturgeon, raw, boneless	1.60
	Trout, baked or broiled, boneless	Trout, raw, boneless	1.25
	Trout, steamed or poached, boneless	Trout, raw, boneless	1.25
	Trout, smoked	Trout, raw, boneless	1.79
	Tuna, baked or broiled, boneless	Tuna, raw, boneless	1.25
	Tuna, steamed or poached, boneless	Tuna, raw, boneless	1.26
	Clams, baked or broiled	Clams, raw, without shell	1.25
	Clams, steamed or boiled	Clams, raw, without shell	1.25
	Crab, blue, steamed	Crab, blue, raw, without shell	1.08
	Crayfish, steamed	Crayfish, raw, boneless	1.16
	Lobster, steamed	Lobster,raw, without shell	1.03
	Oysters, smoked	Oysters, raw, without shell	1.62
	Oysters, steamed	Oysters, raw, without shell	1.25

	Convert From	Convert To	Conversion Factor
Fish (continued)			
	Scallops, baked or broiled	Scallops, raw, without shell	1.25
	Shrimp, baked or broiled	Shrimp, raw, without shell	1.25
	Shrimp, canned	Shrimp, raw, without shell	1.00
	Shrimp, steamed or boiled	Shrimp, raw, without shell	1.31
	All types of dried fish	Fish, raw, boneless	2.70
	Octopus, dried	Octupus, raw	4.00
	Shrimp, dried	Shrimp, raw, without shell	3.6
	Squid, dried	Squid, raw	3.9
Fruits			
	Apples, raw, with skin, edible portion	Apples, with refuse	1.30
	Apples, raw, without skin, cooked	Apples, with refuse	1.38
	Apples, dried, uncooked	Apples, with refuse	6.15
	Apple juice, canned or bottled, unsweetened	Apples, with refuse	1.50
	Apple juice, frozen concentrate, unsweetened, undiluted	Apples, with refuse	6.00
	Applesauce, canned, unsweetened	Apples, with refuse	1.40
	Apricots, raw, edible portion	Apricots, with refuse	1.08
	Apricots, dried, uncooked	Apricots, with refuse	5.46
	Bananas, raw, edible portion	Bananas, with refuse	1.56
	Bananas, dehydrated	Bananas, with refuse	6.04
	Bananas, red, raw, edible portion	Bananas, red, with refuse	1.56
	Blackberries, raw, edible portion	Blackberries, with refuse	1.04
	Blackberries, frozen, unsweetened	Blackberries, with refuse	1.56
	Blueberries, raw, edible portion	Blueberries, with refuse	1.05
	Blueberries, frozen, unsweetened	Blueberries, with refuse	1.05
	Boysenberries, frozen, unsweetened	Boysenberries, with refuse	1.04
	Carambola (starfruit), raw, edible portion	Carambola (starfruit), with refuse	1.03
	Cherries, sweet, raw, edible portion	Cherries, with refuse	1.09

	Convert From	Convert To	Conversion Factor
Fruits (continued)			
	Cranberries, raw, edible portion	Cranberries, with refuse	1.02
	Cranberry juice, unsweetened	Cranberries, with refuse	1.30
	Currants, red and white, raw, edible portion	Currants, red and white, with refuse	1.02
	Dates, deglet noor	Dates, deglet noor, with refuse	1.11
	Figs, dried	Figs, with refuse	3.38
	Grapes, American type (slip skin), raw, edible portion	Grapes, with refuse	1.72
	Grapes, red or green (european type varieties, such as, Thompson seedless), raw, edible portion	Grapes, with refuse	1.04
	Raisins, golden seedless	Grapes, with refuse	4.54
	Grape juice, canned or bottled, unsweetened	Grapes, with refuse	1.30
	Grapefruit, raw, all types	Grapefruit, with refuse	2.00
	Grapefruit juice, white, frozen concentrate, unsweetened, undiluted	Grapefruit, with refuse	10.3
	Grapefruit juice, frozen, unsweetened (reconstituted with water)	Grapefruit, with refuse	2.25
	Guavas, common, raw, edible portion	Guavas, common, with refuse	1.28
	Kiwi fruit, (chinese gooseberries), raw, edible portion	Kiwi fruit, (chinese gooseberries), with refuse	1.16
	Kumquats, raw, edible portion	Kumquats, with refuse	1.08
	Lemons, raw, edible portion	Lemons, with refuse	1.89
	Lemon juice	Lemons, with refuse	3.25
	Limes, raw, edible portion	Limes, with refuse	1.20
	Lime juice	Limes, with refuse	3.25
	Lychees, raw, edible portion	Lychees, with refuse	1.67
	Lychees, dried	Lychees, with refuse	7.11
	Mangos, raw, edible portion	Mangos, with refuse	1.45
	Melons, cantaloupe, raw, edible portion	Melons, cantaloupe, with refuse	1.96
	Melons, casaba, raw, edible portion	Melons, casaba, with refuse	1.67
	Melons, honeydew, raw, edible portion	Melons, honeydew, with refuse	2.17
	Nectarines, raw, edible portion	Nectarines, with refuse	1.10
	Oranges, raw, edible portion	Oranges, with refuse	1.37

	Convert From	Convert To	Conversion Factor
Fruits (continued)			
	Orange juice, canned, unsweetened	Oranges, with refuse	2.00
	Orange juice, frozen concentrate, unsweetened, undiluted	Oranges, with refuse	8.00
	Papaya, green	Papayas, with refuse	1.49
	Papayas, raw, edible portion	Papayas, with refuse	1.49
	Passion-fruit (granadilla), purple, raw, edible portion	Passion-fruit (granadilla), purple, with refuse	1.28
	Passion-fruit juice, yellow, raw, edible portion	Passion-fruit, with refuse	1.88
	Peaches, raw, edible portion	Peaches, with refuse	1.04
	Peaches, dried	Peaches, with refuse	6.38
	Pears, Asian, raw, edible portion	Pears, Asian, with refuse	1.10
	Pears, raw, edible portion	Pears, with refuse	1.11
	Pears, dried	Pears, with refuse	5.00
	Persimmons, japanese, raw, edible portion	Persimmons, japanese, with refuse	1.19
	Pineapple, raw, edible portion	Pineapple, with refuse	1.96
	Pineapple juice, canned, unsweetened	Pineapple, with refuse	1.88
	Pineapple juice, frozen concentrate, unsweetened, undiluted	Pineapple, with refuse	8.44
	Plantains, raw, edible portion	Plantains, with refuse	1.54
	Plums, raw, edible portion	Plums, with refuse	1.06
	Plums, dried (prunes)	Plums, with refuse	5.73
	Prune juice, canned	Plums, with refuse	1.63
	Pomegranates, raw, edible portion	Pomegranates, with refuse	1.79
	Raspberries, raw, edible portion	Raspberries, with refuse	1.04
	Rhubarb, raw, edible portion	Rhubarb, with refuse	1.33
	Soursop, raw, edible portion	Soursop, with refuse	1.49
	Strawberries, raw, edible portion	Strawberries, with refuse	1.06
	Tamarinds, raw, edible portion	Tamarinds, with refuse	2.94
	Tangelo, raw, edible portion	Tangelo, with refuse	1.35
	Tangerines (mandarin oranges), raw, edible portion	Tangerines (mandarin oranges), with refuse	1.35

	Convert From	Convert To	Conversion Factor
Fruits (continued)			
	Tangerine juice, NFS	Tangerines, with refuse	2.00
	Watermelon, raw, edible portion	Watermelon, with refuse	1.92
Grains			
	All grains and flours, uncooked	All grains and flours, uncooked	1.00
	Barley, pearled, cooked	Barley, pearled, uncooked	0.35
	Buckwheat groats, cooked	Buckwheat groats, uncooked	0.27
	Couscous, cooked	Couscous, uncooked	0.28
	Macaroni, cooked	Macaroni, uncooked	0.37
	Macaroni, whole-wheat, cooked	Macaroni, whole-wheat, uncooked	0.37
	Millet, cooked	Millet, uncooked	0.29
	Oats, regular and quick and instant, cooked	Oats, regular and quick and instant, uncooked	0.16
	Rice, white, cooked	Rice, white, uncooked	0.36
	Spaghetti, cooked	Spaghetti, uncooked	0.37
	Wild rice, cooked	Wild rice, uncooked	0.36
Meats			
	Meat, all types, raw, boneless	Meat, all types, raw, boneless	1.00
	Beef, brisket, whole, trimmed to 1/4" fat, all grades, braised	Beef, brisket, whole, all grades, raw, boneless	1.25
	Beef, chuck, arm pot roast, trimmed to 1/8" fat, all grades, braised	Beef, chuck, arm pot roast, all grades, raw, boneless	1.35
	Beef, chuck, blade roast, trimmed to 1/8" fat, all grades, braised	Beef, chuck, blade roast, all grades, raw, boneless	1.35
	Beef, cured, corned beef, brisket, cooked	Beef, raw, boneless	1.20
	Beef, cured, dried	Beef, cured, corned beef, raw	1.38
	Beef, ground, 75% lean meat / 25% fat, patty, broiled	Beef, ground, 75% lean meat / 25% fat, raw	1.05
	Beef, ground, 80% lean meat / 20% fat, patty, broiled	Beef, ground, 80% lean meat / 20% fat, raw	1.15
	Beef, ground, 85% lean meat / 15% fat, patty, broiled	Beef, ground, 85% lean meat / 15% fat, raw	1.25
	Beef, rib, large end (ribs 6-9), trimmed to 1/8" fat, all grades, roasted	Beef, rib, large end (ribs 6-9), all grades, raw, boneless	1.15
	Beef, round, bottom round, trimmed to 1/8" fat, all grades, braised	Beef, round, bottom round, all grades, raw, boneless	1.36
	Beef, round, eye of round, trimmed to 1/8" fat, all grades, roasted	Beef, round, eye of round, all grades, raw, boneless	1.24

	Convert From	Convert To	Conversion Factor
Meats (continued)			
	Beef, round, tip round, trimmed to 1/8" fat, all grades, cooked, roasted	Beef, round, tip round, all grades, raw, boneless	1.24
	Beef, round, top round, trimmed to 1/8" fat, all grades, broiled	Beef, round, top round, all grades, raw, boneless	1.31
	Beef, short loin, top loin, trimmed to 1/8" fat, all grades, broiled	Beef, short loin, top loin, all grades, raw, boneless	1.19
	Beef, tenderloin, trimmed to 1/8" fat, all grades, broiled	Beef, tenderloin, all grades, raw, boneless	1.14
	Beef, top sirloin, trimmed to 1/8" fat, all grades, cooked, broiled	Beef, top sirloin, all grades, raw, boneless	1.32
	Veal, ground, broiled	Veal, ground, raw	1.22
	Veal, leg (top round), roasted	Veal, leg (top round), raw, boneless	1.35
	Veal, loin, roasted	Veal, loin, raw, boneless	1.33
	Veal, rib, braised	Veal, rib, raw, boneless	1.62
	Veal, shoulder, whole (arm and blade), roasted	Veal, shoulder, whole (arm and blade), raw, boneless	1.42
	Veal, sirloin, roasted	Veal, sirloin, raw, boneless	1.33
	Lamb, ground, broiled	Lamb, ground, raw	1.11
	Lamb, leg, whole (shank and sirloin), choice, roasted	Lamb, domestic, leg, whole (shank and sirloin), choice, raw, boneless	1.19
	Lamb, shoulder, whole (arm and blade), choice, roasted	Lamb, domestic, shoulder, whole (arm and blade), choice, raw, boneless	1.13
	Pork, cured, bacon, broiled, pan-fried or roasted	Pork, cured, bacon, raw	1.47
	Pork, cured, canadian-style bacon, grilled	Pork, cured, canadian-style bacon, raw	1.16
	Pork, cured, ham, boneless, regular, roasted	Pork, cured, ham, boneless, regular, raw	1.07
	Pork, leg (ham), whole, roasted	Pork, leg (ham), whole, raw, boneless	1.20
	Pork, loin, sirloin (chops), boneless, broiled	Pork, loin, sirloin (chops), raw, boneless	1.42
	Pork, loin, tenderloin, braised	Pork, loin, tenderloin, raw, boneless	1.39
	Pork, loin, whole, broiled	Pork, loin, whole, raw, boneless	1.28
	Pork, shoulder, blade, boston (roasts), roasted	Pork, shoulder, blade, boston (roasts), raw, boneless	1.25
	Pork, spareribs, braised	Pork, spareribs, raw, boneless	1.38
	Chicken, broilers or fryers, back, meat and skin, roasted	Chicken, broilers or fryers, back, meat and skin, raw, boneless	1.11
	Chicken, broilers or fryers, breast, meat and skin, roasted	Chicken, broilers or fryers, breast, meat and skin, raw, boneless	1.23
	Chicken, broilers or fryers, breast, meat and skin, stewed	Chicken, broilers or fryers, breast, meat and skin, raw, boneless	1.11
	Chicken, broilers or fryers, drumstick, meat and skin, roasted	Chicken, broilers or fryers, drumstick, meat and skin, raw, boneless	1.36

	Convert From	Convert To	Conversion Factor
Meats (continued)			
	Chicken, broilers or fryers, drumstick, meat and skin, stewed	Chicken, broilers or fryers, drumstick, meat and skin, raw, boneless	1.27
	Chicken, broilers or fryers, leg, meat and skin, roasted	Chicken, broilers or fryers, leg, meat and skin, raw, boneless	1.30
	Chicken, broilers or fryers, leg, meat and skin, stewed	Chicken, broilers or fryers, leg, meat and skin, raw, boneless	1.20
	Chicken, broilers or fryers, thigh, meat and skin, roasted	Chicken, broilers or fryers, thigh, meat and skin, raw, boneless	1.26
	Chicken, broilers or fryers, wing, meat and skin, roasted	Chicken, broilers or fryers, wing, meat and skin, raw, boneless	1.33
	Chicken, broilers or fryers, wing, meat and skin, stewed	Chicken, broilers or fryers, wing, meat and skin, raw, boneless	1.12
	Chicken, cornish game hens, meat and skin, roasted	Chicken, cornish game hens, meat and skin, raw, boneless	1.30
	Chicken, liver, simmered	Chicken, liver, raw	1.41
	Turkey, dark meat, meat and skin, roasted	Turkey, dark meat, meat and skin, raw, boneless	1.38
	Turkey, light meat, meat and skin, roasted	Turkey, light meat, meat and skin, raw, boneless	1.23
	Turkey, ground, cooked	Turkey, ground, raw	1.45
Nuts			
	Almonds, dry roasted	Almonds, raw, without shell	1.03
	Almond butter	Almond, raw, without shell	1.03
	Cashews, dry roasted	Cashews, raw, without shell	1.03
	Cashew butter	Cashews, raw, without shell	1.03
	Chestnuts, european, roasted	Chestnuts, european, raw, without shell	1.24
	Peanuts, dry-roasted	Peanuts, raw, without shell	1.05
	Peanuts, raw, without shell	Peanuts, raw, without shell	1.00
	Peanut butter, all types	Peanuts, raw, without shell	1.05
	Pistachio nuts, dry roasted	Pistachio nuts, raw, without shell	1.03
	Walnuts, English, raw, without shell	Walnuts, English, raw, without shell	1.00
Sweeteners			
	Beet or cane sugar	Beet or cane sugar	1.00
	Cane syrup	Cane syrup	1.00
	Corn syrup solids	Corn syrup solids	1.00
	Corn syrup, all types	Corn syrup, all types	1.00

	Convert From	Convert To	Conversion Factor
Sweeteners (continued)			
	Honey	Honey	1.00
	Malt syrup	Malt syrup	1.00
	Maple syrup	Maple syrup	1.00
	Molasses	Molasses	1.00
	Sorghum syrup	Sorghum syrup	1.00
Vegetables			
	Arugula, raw, edible portion	Arugula, with refuse	1.67
	Asparagus, raw, edible portion	Asparagus, with refuse	1.89
	Avocados, raw, edible portion	Avocados, raw, edible portion	1.35
	Balsam-pear (bitter gourd), pods, cooked, boiled, drained	Balsam-pear (bitter gourd), pods, with refuse	1.06
	Bamboo shoots, raw, edible portion	Bamboo shoots, with refuse	3.45
	Beans, snap, green, raw, edible portion	Beans, snap, green, with refuse	1.14
	Beet greens, raw, edible portion	Beet greens, with refuse	1.79
	Beet greens, cooked, boiled, drained	Beet greens, with refuse	2.17
	Beets, cooked, boiled, drained	Beets, with refuse	1.55
	Beets, raw, edible portion	Beets, with refuse	1.49
	Black beans, cooked, boiled	Black beans, uncooked	0.38
	Turnips, cooked, boiled, drained	Turnips, with refuse	0.97
	Breadfruit, raw, edible portion	Breadfruit, with refuse	1.28
	Broadbeans (fava beans), cooked, boiled	Broadbeans (fava beans), uncooked	0.32
	Broccoli, chinese, cooked	Broccoli, with refuse	0.87
	Broccoli, raw, edible portion	Broccoli, with refuse	1.64
	Broccoli, cooked, boiled, drained	Broccoli, with refuse	1.64
	Broccoli, frozen, chopped, cooked, boiled, drained	Broccoli, with refuse	1.43
	Broccoli, frozen, chopped, unprepared	Broccoli, with refuse	1.31
	Brussels sprouts, raw, edible portion	Brussels sprouts, with refuse	1.11
	Cabbage, chinese (pak-choi), raw, edible portion	Cabbage, chinese (pak-choi), with refuse	1.14

	Convert From	Convert To	Conversion Factor
Vegetables (continued)			
	Cabbage, raw, edible portion	Cabbage, with refuse	1.25
	Cabbage, red, raw, edible portion	Cabbage, red, with refuse	1.25
	Cabbage, red, cooked, boiled, drained	Cabbage, red, with refuse	1.19
	Carrots, raw, edible portion	Carrots, with refuse	1.12
	Carrot juice	Carrots, with refuse	1.12
	Cauliflower, raw, edible portion	Cauliflower, with refuse	2.56
	Celery, raw, edible portion	Celery, with refuse	1.12
	Celery juice	Celery, with refuse	5.00
	Chard, swiss, raw, edible portion	Chard, swiss, with refuse	1.09
	Chickpeas (garbanzo beans, bengal gram), cooked, boiled	Chickpeas (garbanzo beans, bengal gram), uncooked	0.45
	Collards, raw, edible portion	Collards, with refuse	1.75
	Corn, sweet, white or yellow, raw, edible portion	Corn, sweet, white or yellow, with refuse	2.78
	Corn, sweet, white or yellow, cooked, boiled, drained	Corn, sweet, white or yellow, with refuse	3.53
	Corn, sweet, white or yellow, frozen, unprepared	Corn, sweet, white or yellow, with refuse	2.89
	Cowpeas (Blackeyes), cooked, boiled, drained	Cowpeas (Blackeyes), uncooked	0.28
	Cucumber, with peel, raw, edible portion	Cucumber, with refuse	1.03
	Dandelion greens, cooked, boiled, drained	Dandelion greens, with refuse	0.71
	Eggplant, raw, edible portion	Eggplant, with refuse	1.23
	Eggplant, cooked, boiled, drained	Eggplant, with refuse	1.67
	Endive, raw, edible portion	Endive, with refuse	1.16
	Garlic, raw, edible portion	Garlic, with refuse	1.15
	Jerusalem-artichokes, raw	Jerusalem-artichokes, with refuse	2.50
	Kidney beans, cooked, boiled	Kidney beans, uncooked	0.37
	Leeks, (bulb and lower leaf-portion), raw, edible portion	Leeks, (bulb and lower leaf-portion), with refuse	2.27
	Lentils, cooked, boiled	Lentils, uncooked	0.34
	Lettuce, butterhead, raw, edible portion	Lettuce, butterhead, with refuse	1.35
	Lettuce, cos or romaine, raw, edible portion	Lettuce, cos or romaine, with refuse	1.06

	Convert From	Convert To	Conversion Factor
Vegetables (continued)			
	Lettuce, green leaf, raw, edible portion	Lettuce, green leaf, with refuse	1.56
	Lettuce, iceberg, raw, edible portion	Lettuce, iceberg, with refuse	1.05
	Lima beans, cooked, boiled	Lima beans, uncooked	0.34
	Mungo beans, cooked, boiled	Mungo beans, uncooked	0.31
	Mushrooms, raw, edible portion	Mushrooms, with refuse	1.03
	Mushrooms, shiitake, dried	Mushrooms, shiitake, with refuse	12.32
	Mustard greens, raw, edible portion	Mustard greens, with refuse	1.08
	Okra, raw, edible portion	Okra, with refuse	1.16
	Okra, cooked, boiled, drained	Okra, with refuse	0.88
	Olives, black, canned	Olives, black, canned	0.89
	Onions, raw, edible portion	Onions, with refuse	1.11
	Onions, cooked, boiled, drained	Onions, with refuse	1.18
	Onions, spring or scallions, raw, edible portion	Onions, spring or scallions, with refuse	1.04
	Peas, edible-podded, raw, edible portion	Peas, edible-podded, with refuse	1.06
	Peas, green, raw, edible portion	Peas, green, with refuse	2.63
	Peas, green, cooked, boiled, drained	Peas, green, with refuse	2.76
	Peas, split, cooked, boiled	Peas, split, uncooked	0.34
	Pepper, banana, raw, edible portion	Pepper, banana, with refuse	1.22
	Pepper, serrano, raw, edible portion	Pepper, serrano, with refuse	1.03
	Peppers, hot chili, raw, edible portion	Peppers, hot chili, with refuse	1.37
	Peppers, jalapeno, raw, edible portion	Peppers, jalapeno, with refuse	1.09
	Peppers, sweet, green, raw, edible portion	Peppers, sweet, green, with refuse	1.22
	Pinto beans, cooked, boiled	Pinto beans, uncooked	0.42
	Potato, flesh and skin, raw, edible portion	Potatoes, with refuse	1.33
	Potato, baked, flesh and skin	Potatoes, with refuse	1.62
	Potatoes, boiled, cooked in skin, flesh	Potatoes, with refuse	1.48
	Potatoes, boiled, cooked without skin, flesh	Potatoes, with refuse	1.45

	Convert From	Convert To	Conversion Factor
Vegetables (continued)			
	Potatoes, french fried, frozen, unprepared	Potatoes, with refuse	2.15
	Potatoes, frozen, whole, unprepared	Potatoes, with refuse	1.33
	Potato flour	Potatoes, with refuse	6.01
	Potatoes, mashed, dehydrated, granules without milk, dry form	Potatoes, with refuse	6.02
	Pumpkin, raw, edible portion	Pumpkin, with refuse	1.43
	Radicchio, raw, edible portion	Radicchio, with refuse	1.10
	Radishes, oriental, raw, edible portion	Radishes, with refuse	1.27
	Radishes, raw, edible portion	Radishes, with refuse	1.11
	Rutabagas, raw, edible portion	Rutabagas, with refuse	1.18
	Soy flour	Soy flour	1.00
	Soy milk, fluid	Soybeans, cooked	0.17
	Spinach, raw, edible portion	Spinach, with refuse	1.39
	Spinach, cooked, boiled, drained	Spinach, with refuse	1.42
	Spinach, frozen, chopped or leaf, unprepared	Spinach, with refuse	1.71
	Spinach, frozen, chopped or leaf, cooked, boiled, drained	Spinach, with refuse	1.79
	Squash, summer, all varieties, raw, edible portion	Squash, summer, with refuse	1.05
	Squash, summer, all varieties, cooked, boiled, drained	Squash, summer, with refuse	1.24
	Squash, winter, all varieties, raw, edible portion	Squash, winter, with refuse	1.41
	Squash, winter, all varieties, cooked, baked	Squash, winter, with refuse	1.48
	Sweetpotato, raw, edible portion	Sweetpotato, with refuse	1.39
	Sweetpotato, cooked, baked in skin	Sweetpotato, with refuse	1.49
	Tomatoes, raw, edible portion	Tomatoes, with refuse	1.10
	Tomatoes, green, raw, edible portion	Tomatoes, with refuse	1.10
	Tomatoes, cooked, from fresh	Tomatoes, with refuse	1.13
	Tomatoes, canned, whole	Tomatoes, with refuse	1.27
	Tomato juice	Tomatoes, with refuse	1.53
	Tomato paste	Tomatoes, with refuse	5.30

	Convert From	Convert To	Conversion Factor
Vegetables (continued)			
	Tomato puree	Tomatoes, with refuse	2.42
	Tomatoes, sun-dried	Tomatoes, with refuse	17.08
	Turnip greens, cooked, boiled, drained	Turnip greens, with refuse	0.94
	Turnips, raw, edible portion	Turnips, with refuse	1.23
	Waterchestnuts, chinese, (matai), raw, edible portion	Waterchestnuts, chinese, (matai), with refuse	1.30
	Watercress, raw, edible portion	Watercress, with refuse	1.09
	Waxgourd, (chinese preserving melon), cooked, boiled, drained	Waxgourd, (chinese preserving melon), with refuse	1.42
	Yam, raw, edible portion	Yam, with refuse	1.16
	Yam, cooked, boiled, drained, or baked	Yam, with refuse	1.14
	Yambean (jicama), raw, edible portion	Yambean (jicama), with refuse	1.09

Appendix C: List of Variables in the 100-gram FICRCD Database

The names and descriptions of the variables in the FICRCD are listed below.

Sequence	Variable Name	Description
1	FoodCode	USDA 8-digit food code
2	ModCode	Food modification code
3	Description	Food code description
4	TotalDairy	Total dairy products
5	TotalFluidMilk	Total fluid milk
6	FluidMilkWhl	Fluid whole milk
7	FluidMilk2pct	Fluid 2% milk
8	FluidMilk1pct	Fluid 1% milk
9	FluidMilkSkim	Fluid skim milk
10	Butter	Butter
11	Cheese	Cheese
12	Yogurt	Yogurt
13	OtherDairy	Other dairy products
14	TotalFatAndOils	Total fats and oils
15	Margarine	Margarine
16	SaladCookingOils	Salad and cooking oils
17	Shortening	Shortening
18	OtherOils	Other oils
19	TotalFruit	Total fruit
20	TotalApples	Total apples
21	Apples	Apples from fruit
22	ApplesFromJuice	Apples from juice
23	Bananas	Bananas
24	Berries	Berries
25	Grapes	Grapes
26	Melons	Melons
27	TotalOranges	Total oranges
28	Oranges	Oranges from fruit

Sequence	Variable Name	Description
29	OrangesFromJuice	Oranges from juice
30	OtherCitrusFruits	Other citrus fruits
31	StoneFruits	Stone fruits
32	TropicalFruits	Tropical fruits
33	TotalGrain	Total grains
34	CornFlour	Corn flour and meal
35	OatFlour	Oats and oat flour
36	RiceDried	Rice (dry or uncooked)
37	WheatFlour	Wheat flour
38	TotalMeatPoultryFish	Total meat, poultry, and fish
39	TotalMeat	Total meat
40	Beef	Beef
41	Pork	Pork
42	TotalPoultry	Total poultry
43	Chicken	Chicken
44	Turkey	Turkey
45	FinAndShellfish	Finfish and shellfish
46	EggsWithShell	Eggs, shell included
47	EggsNoShell	Eggs, without shell
48	TotalNuts	Total nuts
49	Peanuts	Peanuts
50	TreeNuts	Tree nuts
51	TotalCaloricSweeteners	Total caloric sweeteners
52	TotalVegetables	Total vegetables
53	TotalBrassica	Total brassica (cruciferous) vegetables
54	BroccoliAndCauliflower	Broccoli and cauliflower
55	Carrots	Carrots
56	Celery	Celery
57	Cucumbers	Cucumbers
58	GreenPeas	Green peas
59	TotalLeafyVeg	Total leafy vegetables
60	Lettuce	Lettuce (head and leaf)

Sequence	Variable Name	Description
61	Onions	Onions
62	Peppers	Peppers (bell and non-bell)
63	Tomatoes	Tomatoes
64	SweetCorn	Sweet corn
65	TotalRootsAndTubers	Total roots and tubers
66	Potatoes	Potatoes
67	SnapBeans	Snap beans/string beans
68	LegumesDried	Legumes (dry beans and peas - uncooked)