

**2021-2023 Food and Nutrient Database  
for Dietary Studies  
Documentation**



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You may also consider including the following sentence in your manuscript: USDA's Food and Nutrient Database for Dietary Studies 2021-2023 was used to code dietary intake data and calculate nutrient intakes.

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## INTRODUCTION

### **FNDDS – an application database for What We Eat in America, NHANES**

The USDA's Food and Nutrient Database for Dietary Studies (FNDDS) is an application database created for analyzing dietary intakes from What We Eat in America (WWEIA), National Health and Nutrition Examination Survey (NHANES). It converts food and beverage portions reported in the survey into gram amounts and determines their nutrient values.

*Appendix A* lists abbreviations used in this documentation. The FNDDS 2021-2023 is the eleventh version released.

Because the FNDDS generates the nutrient intake data files for WWEIA, NHANES, researchers do not need to use the FNDDS to estimate the nutrient intake for the survey respondents. FNDDS is made available for researchers to review the recipe calculations and nutrient profiles used to estimate intakes. Additionally, FNDDS can be applied in other dietary research studies to determine the amounts of nutrients/food components in food and beverages.


### **What We Eat in America, NHANES**

The NHANES is a nationally representative, cross-sectional survey designed to monitor the health and nutritional status of the civilian, noninstitutionalized U.S. population and is conducted by the Centers for Disease Control and Prevention's National Center for Health Statistics. WWEIA – the dietary intake component of NHANES is performed in partnership with the USDA. Dietary intake data are obtained from two 24-hour recalls.

Since 1999, NHANES has been collecting data every year with data releases every two years. Each 2-year cycle included about 9,000 participants from sampled counties across the country. However, the coronavirus disease 2019 pandemic required suspension of data collection in March 2020. As a result, the partially completed NHANES 2019-2020 cycle was not nationally representative and unbiased estimates could not be reliably produced. Therefore, the 2019-March 2020 data were combined with the data from the 2017-2018 cycle to create the nationally representative 2017-March 2020 prepandemic data files (Akinbami et al 2022).

### **NHANES August 2021- August 2023**

After almost an 18-month gap in data collection, NHANES resumed operations in August 2021 for a new 2-year cycle. The August 2021-August 2023 NHANES survey cycle is based on an updated sample design and includes modified questionnaires, and examination procedures. (Terry et al, 2024)

 *New* – WWEIA, NHANES August 2021-August 2023 – both dietary recalls by phone

To limit face-to-face contact in a COVID-19 environment, both dietary interviews were administered via telephone. During the Mobile Exam Center (MEC) examination, all NHANES participants were asked to schedule an initial 24-hour recall (Day 1), to be collected 3-7 days after the MEC examination. Participants received a Food Model Booklet and measuring aids to use during the telephone interview. (Terry et al, 2024) (Paulose-Ram et al, 2021). A second 24-hour recall (Day 2) was scheduled 3-10 days after the first recall, on a different day of the week.

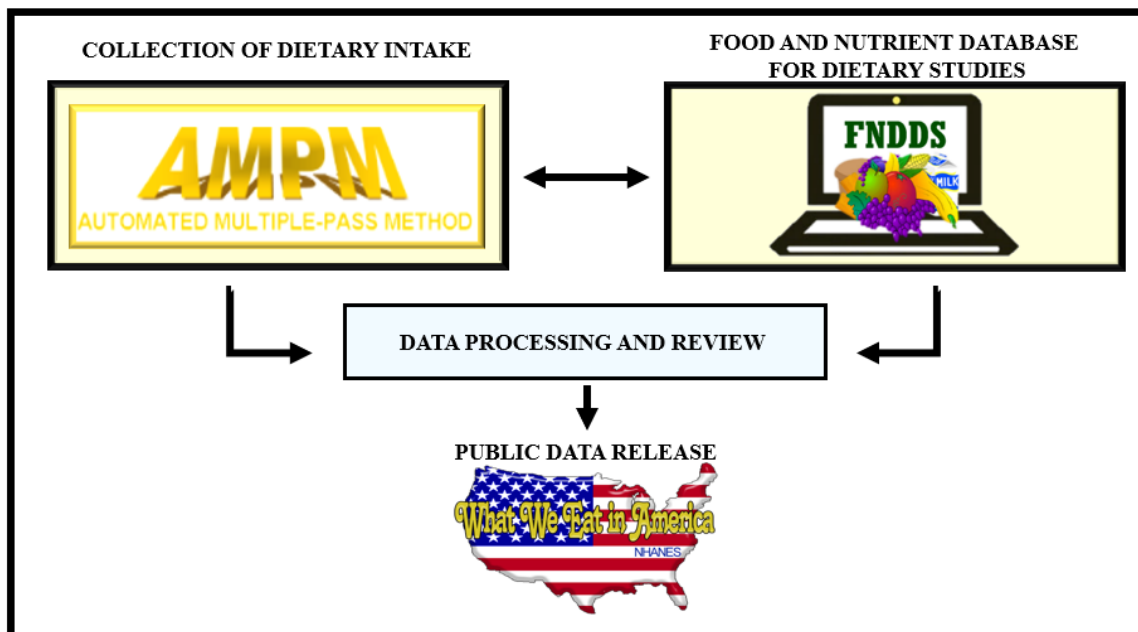
This is a change from previous WWEIA, NHANES cycles when an initial 24-hour recall (Day 1) was collected in-person at a NHANES MEC and a second recall (Day 2) was collected by telephone 3-10 days later.

The Food Surveys Research Group of the Beltsville Human Nutrition Research Center of USDA's Agricultural Service has lead responsibility for the survey's dietary data collection methodology and maintenance of the databases used to code and process data. Trained interviewers using the 5-step USDA Automated Multiple-Pass Method (AMPM) collect dietary intakes.

The AMPM includes an extensive compilation of standardized food-specific questions and possible response options. Routing of questions is based on previous responses. The AMPM was validated in a large study and shown to be an effective method for accurately assessing group energy (Moshfegh et al, 2008) and sodium intake of adults (Rhodes et al, 2013).

### The Interrelationship with AMPM

The FNDDS is a companion component to USDA's 24-hour dietary recall instrument, the AMPM. Together, the FNDDS and AMPM form the two pillars of dietary surveillance in WWEIA, NHANES (Moshfegh et al, 2022) and are augmented by a data processing and review component.



The AMPM and FNDDS are interrelated. AMPM questions and response options are the basis for the foods and portion options in the FNDDS. Since FNDDS codes are linked to pathways in the AMPM, updates to both are coordinated. An updated version of the AMPM is launched at the beginning of each 2-year survey cycle of NHANES. A new version of the FNDDS is released to support the updated AMPM.

See [Appendix B](#) for each version of FNDDS and its corresponding survey cycle of WWEIA, NHANES. Also, provided is the number of food codes added and discontinued for each FNDDS version as well as the total number of additional descriptions and nutrients/components.

## Database Structure and Download

A brief overview of FNDDS 2021-2023 is provided in [Appendix C](#); the nutrients and food components are listed in [Appendix D](#).

FNDDS 2021-2023 is organized into 10 Access® tables or datasets linked by primary and secondary data items forming a relational database. As illustrated in [Appendix E. 2020-2023 FNDDS File Relationships](#), the primary link is the food code; secondary links are portion code, nutrient code, ingredient code and derivation code. Two files were discontinued for FNDDS 2019-2020 – Subcode Descriptions and Food Code-Subcode Links.

The complete FNDDS 2021-2023 consists of the 10 data tables or datasets plus an additional table/dataset - *FNDDSRecCount* - that identifies the number of records in each table. Listed below are the full name and abbreviated name for each of the tables/datasets, separated into three components - Food Descriptions, Food Portions and Weights, and Nutrients.

<b>Full Name</b>	<b>Abbreviated Name</b>
<b>Food Descriptions Component</b>	
Main Food Descriptions	<i>MainFoodDesc</i>
Additional Food Descriptions	<i>AddFoodDesc</i>
<b>Food Portions and Weights Component</b>	
Food Weights	<i>FoodWeights</i>
Food Portion Descriptions	<i>FoodPortionDesc</i>
<b>Nutrients Component</b>	
FNDDS Nutrient Values	<i>FNDDSNutVal</i>
Nutrient Descriptions	<i>NutDesc</i>
Moisture Adjustment	<i>MoistAdjust</i>
FNDDS Ingredients	<i>FNDDSIngred</i>
Ingredient Nutrient Values	<i>IngredNutVal</i>
Derivation Descriptions	<i>DerivDesc</i>



Field name and description for every variable in FNDDS 2021-2023 are provided in [\*Appendix F. FNDDS 2021-2023 Contents of Datasets.\*](#)

The complete FNDDS 2021-2023 is available for download at [www.ars.usda.gov/nea/bhnrc/fsrg](http://www.ars.usda.gov/nea/bhnrc/fsrg) in both Access® and SAS®.

### **FNDDS At A Glance**

Selected variables provide quick viewing and searching in five Excel® files:

- Foods and Beverages
- Portions and Weights
- FNDDS Ingredients
- Ingredient Nutrient Values
- FNDDS Nutrient Values

[\*Appendix G. FNDDS 2021-2023 At A Glance\*](#) provides a list of variables plus descriptions contained in each of the five Excel® spreadsheets. Each file contains an additional tab listing variables and descriptions. Although the Excel® files contain only selected variables, data, by variable, are the same in all database formats.

The next sections describe some of the aspects of the three components: Food Descriptions, Food Portions and Weights, and Nutrients.

## FOOD DESCRIPTIONS COMPONENT

The FNDDS 2021-2023 contains 5,432 food and beverage items (4,827 foods/605 beverages). *Appendix B* provides a summary of the number of food codes added and discontinued for each version of FNDDS.

### Food Code

An 8-digit number – food code – uniquely identifies each food or beverage item in FNDDS. Food code numbers are generally assigned according to a classification scheme that associates the first digit with one of nine major food commodity groups: Milk and Milk Products; Meat, Poultry, Fish, and Mixtures; Eggs; Dry Beans, Peas, Other Legumes, Nuts, and Seeds; Grain Products; Fruits; Vegetables; Fat, Oils, and Salad Dressings; Sugars, Sweets, Beverages. The first two digits of the 8-digit code, as illustrated in *Appendix H*, identify subgroups that are more specific.

If a food or beverage as described in FNDDS is determined to have changed dramatically or not reported, the food code may be discontinued. Discontinued food codes are removed from the current FNDDS, and the 8-digit numbers are not recycled. It is important to note that although a code number was discontinued, the food or beverage associated with that food code may still be available; however, it is now associated with one or more different food codes. Beginning with the FNDDS 2011-2012, a resource file details every discontinued food, rationale for discontinuation, and if appropriate, a link to a new FNDDS code (Friday et al, 2023). *Discontinued Food Codes between FNDDS 2019-2020 and FNDDS 2021-2023* are available on the FSRG website [www.ars.usda.gov/nea/bhnrc/fsrg](http://www.ars.usda.gov/nea/bhnrc/fsrg).

### Main Description


The main food description is the primary complete description identified by a unique 8-digit food code and may include form, preparation method, and source of item. Main food descriptions may be modified over time; however, if the food or beverage is determined to have changed dramatically or no longer reported, the food code may be discontinued.

The main descriptions are usually generic in nature; however, some codes include a brand name, often in parentheses. This designates that a respondent reported the brand name product; however, the nutrient profile may match a generic food/beverage or a composite of several similar products because the full nutrient profile of the individual brand name product was not available. Main descriptions that contain a brand name include infant formulas, chips, crackers, energy drinks, nutrition bars and powders, and selected burgers from two fast food chains.

## Additional Food Description

The FNDDS 2021-2023 contains 9,648 additional food descriptions located in *AddFoodDesc*. Additional food descriptions, associated with a specific main food description, share the same nutrient values and portion weights as the main food description. More than one additional description may be associated with a food code; not all food codes have additional descriptions.

Many additional food descriptions are brand names; others represent similar forms of the main food description. The additional food descriptions provide information that is particularly useful when coding dietary intakes from respondents in WWEIA, NHANES based on responses elicited from questions asked during the 24-hour recall.

 *New for FNDDS 2021-2023* – updated food codes

Specific categories of foods/beverages completely updated in AMPM and FNDDS 2021-2023 include the following: soups, stews, chili, and hot cocoa. Other changes were made to plant-based milks and plant-based yogurts as well as to some yogurt and flavored milk codes.

## Single codes for sandwiches and tacos/burritos

Currently, most sandwiches and burgers reported in WWEIA, NHANES are collected and coded as single items in FNDDS. Beginning with 2015-2016, the shift began to collect sandwiches as a single item versus collecting very detailed information about each component and amounts (bread, meat, cheese, condiments) – details not known by many participants.

Tacos, burritos and burrito bowls, enchiladas, quesadillas, and other Mexican items were updated in AMPM and FNDDS 2019-2020; most are currently collected and coded as single items.

Condiments and vegetables that are on sandwiches, burgers, taco, burritos, and other Mexican items are collected as additions and usually coded reflecting a guideline amount.

## FNDDS codes for use with sandwiches and vegetables

Food codes to collect vegetables/bacon on sandwiches, and sauces/meats in vegetables were added to FNDDS beginning in 2017-2018. The 'for use with' codes all have 899 as the first 3-digits.

Nine codes capture the following ingredients for use on a sandwich or burger: avocado, cucumber, lettuce, mushrooms, onions, pepper, spinach, tomatoes, and bacon. These codes allow researchers to determine the contribution of sandwiches more readily to vegetable intake in WWEIA.

In addition, nine codes capture the following for use with cooked vegetables: *bacon, ham, beef, chicken, cream sauce, cheese sauce, gravy, soy-based sauce, and tomato sauce*. This reduces the necessity of creating multiple codes for each vegetable variety to capture products cooked with meat or cooked with a sauce.

## NFS, NS

When a survey participant in NHANES is unable to answer all questions about a food/beverage or if detailed questions are not asked, a food code is selected that contains the term NS (not specified) or NFS (not further specified) in its main or additional description. Nutrient values and portion weight data for the NFS or NS food codes are based on food consumption data from WWEIA, internal data on the frequency of reports, food production and supply statistics, and food industry publications.

Sources used to determine proportions and subsequent nutrient profiles for *11100000 Milk, NFS*, *82101000 Vegetable oil, NFS*, as well as other top reported NFS codes were reviewed and revised as necessary to reflect data current during the corresponding 2-year survey cycle. For example, data on food availability and products from the USDA, Economic Research Service helped determine the proportions of different fat-content milks (USDA, ERS, Food Availability) and various types of vegetable oils (USDA, ERS, Oil Crops Yearbook).

For FNDDS 2021-2023, there was no justification to change proportions for *11100000 Milk, NFS*. However, *11511000 Chocolate milk, NFS* was revised to reflect USDA, Food and Nutrition Service Nutrition Standards allowing both fat-free and low-fat (1%) flavored and unflavored milk in schools (USDA, FNS). In FNDDS 2021-2023, *11511000 Chocolate milk, NFS* reflects 25% fat-free and 75% low-fat. This is a change; since FNDDS 2013-2014, *11511000 Chocolate milk, NFS* was 100% fat-free milk.

## What We Eat in America Food Category Number and Description

Beginning with FNDDS 2015-2016, the WWEIA Food Category number and description are included for each FNDDS food code. Both the WWEIA Food Category 4-digit number and description are included as variables in four of the At A Glance Excel® spreadsheets to support search capabilities.

The WWEIA Food Categories provide an application to analyze foods and beverages as consumed in the American diet (Rhodes et al, 2017). The focus of this classification system is grouping similar foods and beverages together based on how items are typically consumed and on their nutrient content. Each FNDDS food code is assigned to only one of the WWEIA Food Categories.

**Appendix I. WWEIA Food Categories 2021-2023** lists the 172 individual food categories combined into 15 main groups: Milk and Dairy; Protein Foods; Mixed Dishes; Grains; Snacks and Sweets; Fruit; Vegetables; Beverages; Alcoholic Beverages; Water; Fats and Oils; Condiments and Sauces; Sugars; Baby Foods and Formulas; and Other. Within the main groups are subgroups (Milk, Flavored Milk, Dairy Drinks, Cheese, Yogurt, Plant-based Dairy) characterized by similar food-related properties. Designed to be flexible, the WWEIA Food Categories can easily be combined into a variety of larger groupings.

 *New for FNDDS 2021-2023 – WWEIA Food Categories for soups and plant-based dairy*

Changes made to the WWEIA Food Categories reflect updates to AMPM questions and FNDDS codes for soups. WWEIA Food Categories 2021-2023 contain 3 new categories for broth-based, cream-based and Ramen and Asian broth-based soups.

Additional changes reflect the increased consumption of plant-based dairy. The WWEIA Food Categories 2021-2023 includes a new subgroup – Plant-based Dairy (under the main group of Milk and Dairy). It consists of 2 new food categories - **plant-based milk** and **plant-based yogurt**. The original food category for ‘milk substitutes’ was deleted, and its food codes assigned to the new plant-based milk food category. An additional modification to reflect the variety of plant-based foods is a name change. The original food category for ‘processed soy products’ was renamed to **soy and meat-alternative products**.

## FOOD PORTIONS AND WEIGHTS COMPONENT

Since both 24-hour recalls are collected by telephone, participants in WWEIA, NHANES August 2021-August 2023 estimate the amount of food and beverages consumed using the USDA Food Model Booklet. Participants can also report specific amounts such as a medium apple, 2 slices of bread, and a can of soda. Either way, the amounts of foods and beverages reported need to be converted into a gram weight amount. FNDDS 2021-2023 contains approximately 22,000 weights for portions of foods and beverages. The wide variety of portion weights in the FNDDS makes it easier to code the extensive assortment of amounts that are reported in WWEIA, NHANES and other dietary studies.

### Portion Code and Portion Description

For each food code in FNDDS, there is a set of portion codes (*FoodWeights*) and portion descriptions (*FoodPortionDesc*). A portion code is a unique 5-digit number that identifies a portion description or unit of measure, e.g., slice, piece, snack size, medium, teaspoon, cup. The same portion description and code are used for many different foods/beverages. Each food and beverage item in FNDDS contains multiple portion codes and portion descriptions.

### Portion Weight

The weight of a food/beverage item for the portion indicated by a portion code is available in *FoodWeights*. All weights are in grams of edible portion as consumed. Weights are estimations to represent a group of foods and beverages and may not account for all sizes available for a specific product. A single FNDDS food code often includes several products; therefore, portion gram weights reflect a generic food/beverage or a composite of several similar products. Among comparable types of foods and beverages, portion weights were streamlined for consistency.

Portion weights in FNDDS, developed for estimating food and nutrient intakes of respondents in WWEIA, NHANES, may not be applicable for calculating density or weight per volume for any specific liquid.

Subcodes and their unique portion weights were discontinued beginning with FNDDS 2019-2020. The two sets of foods that contained subcodes – candy and snack cakes – were revised for that release and food codes for candy and snack cakes reflect generic products and generic weights.

## **Unknown Amounts and Guideline Amounts**


The FNDDS contains a portion code 90000 - Quantity Not Specified (QNS) for most food/beverage items in FNDDS. When a participant is unable to estimate the amount they consumed, this portion code is selected.

QNS values may reflect the most frequently consumed or most likely portion measure, or they may reflect consumption patterns estimated from WWEIA data for a category of foods or beverages. Therefore, for any individual food code, the QNS measure may not represent the amount reported by most respondents. Database users should not assume that QNS values accurately represent the average amount of a food or beverage consumed.

Some FNDDS codes contain portion codes that reflect a guideline amount. Condiments and vegetables that are reported on a sandwich are coded as sandwich additions with their amounts reflecting a guideline amount rather than querying respondents for each specific amount. The guideline amounts reflect a typical portion such as 1 slice of tomato (20g), 1 lettuce leaf (8g) or 1 teaspoon mustard (5g) for a regular sandwich. Larger amounts are provided for a submarine or large sandwich. Other examples of guideline amounts include sweetener or cream added to a beverage.

## NUTRIENTS COMPONENT

The six tables in the Nutrients Component of FNDDS 2021-2023 provide the nutrient profile for each food code. In addition, they specify details on the development of each nutrient profile as well as the source for each individual nutrient value used to generate FNDDS food codes. Every FNDDS food code, except for human milk, contains a complete nutrient data set for energy and 64 nutrient/food components. The nutrient values reflect an average value for a generic representation of foods, likely consumed by the U.S. population. The food codes and nutrient profiles are not intended to represent specific products and may not indicate level of preparation, degree of processing or level of contaminants. The FNDDS is an application database created for analyzing dietary intakes from WWEIA, NHANES.

 *New for FNDDS 2021-2023* – no nutrient profile for human milk

FNDDS code *11000000 Milk, human* was based on the profile in the USDA Nutrient Database for Standard Reference. The data were 50 years old, the source was unverifiable, and some values were based on cow's milk. This profile was determined to be unsuitable and not a relevant profile for human milk to calculate population estimates of nutrients (Casavale KO, et al 2023). Based on the scarcity of reliable data derived from preferred analytical methods, the current body of research on nutrient content of human milk cannot be used to update USDA's FDC. (Mohr et al, 2023)

In WWEIA, NHANES each report of human milk consumed by infants and children is collected as well as the reported time for each feeding. Amounts of human milk are not quantified; therefore, no nutrient values are included in WWEIA, NHANES Individual Food Files for human milk.

FNDDS 2021-2023 includes the food code 11000000 Milk, human; it does not provide any nutrient values.

### Source of Nutrient Values

For FNDDS 2021-2023, the source for nutrient values is the USDA FoodData Central (FDC) integrated data system (USDA, ARS, 2024) available at [www.fdc.nal.usda.gov](http://www.fdc.nal.usda.gov). Containing all USDA's major sources of food and nutrient data, FDC (Fukagawa et al, 2022) includes five distinct data types that provide information on food and nutrient profiles.

Because of the uniqueness of each data type, not all provide data on every nutrient. FNDDS utilizes data from Foundation Foods and SR Legacy for the basis of its nutrient values.

**SR Legacy** provides historical data derived from analyses, calculations, and published literature. The final update was in 2018.

**Foundation Foods** includes analytical data/metadata on commodity and minimally processed food samples.



The six tables or datasets explained in the Nutrients Component section include:

*FNDDSNutVal*  
*NutDesc*  
*FNDDSIngred*  
*MoistAdjust*  
*IngredNutVal*  
*Derides*

## **FNDDS Nutrient Values and Nutrient Descriptions**

Nutrient values per 100 grams of edible portion for energy and 64 nutrients/food components for each FNDDS food/beverage item by nutrient code are in *FNDDSNutVal*.

The nutrient code is the same unique 3-digit identifier code for a nutrient historically used in SR. The nutrient description for each 3-digit nutrient code is in *NutDesc*.

Since the numerical codes designating a nutrient differ between FNDDS and FDC, [Appendix K](#) provides a crosswalk. For each nutrient/food component in FNDDS, both the 3-digit Nutrient Code in FNDDS and SR Legacy as well as the 4-digit FDC Nutrient ID are listed.

This table, *NutDesc*, also contains the measurement unit (g, mg, or µg) and the number of decimal places to which a nutrient value is rounded for energy and each of the 64 nutrient/food components. The number of decimal places follows conventions in SR Legacy and does not reflect the accuracy of the value. Also included in *NutDesc* is Tagname, the INFOODS unique abbreviation for a food component (Food and Agriculture Organization).

## **FNDDS Ingredients**

Information provided in *MoistAdjust* and *FNDDSIngred* generate the nutrient profiles for foods and beverages in FNDDS 2021-2023 as provided in *FNDDSNutVal*.

Data for about 1,700 items in FDC were used to determine the values for the 5,432 food and beverage items in FNDDS 2021-2023. Approximately one-fourth of the FNDDS food codes are a direct match to a single FDC code and therefore have only one **ingredient code**.

The FNDDS ingredient codes can be identified by number of digits.

- FDC code (4, 5 or 6-digit NDB No)
- FSRG generated code (6-digit, begin with '9')
- FNDDS code (8-digit)
- FNDDS code for use only in recipes (8-digit, begin with '9999')

The **ingredient description** may be an FDC description, FNDDS main description, or a generated description based on another FDC code. *FNDDSIngred* also provides the amount, measure, and portion code used to calculate ingredient weights(s).

## Recipe Calculations

The nutrient profiles for the other three-fourths of the FNDDS food codes in FNDDS 2021-2023 were generated using a recipe calculation process utilizing two or more *ingredients*. The **ingredient codes** can be FDC codes, FNDDS codes, FSRG generated codes, or a combination of these codes.

Recipe calculation can be briefly summarized into 3 steps:

- select the ingredients and their amounts
- apply factors, if appropriate – nutrient retention and moisture adjustment
- sum nutrient values for all ingredients to generate a nutrient profile

The ‘recipes’ are not cookbook-style recipes, but rather calculated nutrient values based on ingredient proportions. A recipe calculation does not usually reflect a specific recipe for an item; but rather selects ingredients and amounts to estimate a nutrient profile that may represent several variants of a particular food or beverage. A variety of sources was utilized to determine ingredients and their amounts: food label data from USDA Global Branded Food Products Database and company websites, product preparation instructions, label ingredients, and cookbooks and recipe websites as well as professional judgement.

In general, a recipe calculation approach generated nutrient profiles for home-prepared dishes, as well as cooked meats, eggs, grains, and vegetables that consider salt and/or fat used in preparation. When no appropriate composition data from FDC for processed or restaurant foods were available, recipe calculations generated nutrient profiles for those foods as well.

Recipe calculations were the most common technique used to generate nutrient data for the approximately 400 FNDDS food codes new/updated for the following categories in 2021-2023: soups, stews, chili, hot cocoa as well as plant-based milks/yogurts. General protocols were developed to standardize and streamline the ingredients for comparable codes within a type or category of related foods/beverages.

Each ingredient code, plus the amount, used to create a nutrient profile for a food or beverage in FNDDS is in the table/dataset *FNDDSIngred*. The ingredient codes used to generate nutrient profiles for each FNDDS food code are easily viewed in the Excel® spreadsheet **At A Glance: FNDDS Ingredients**.

It is important to remember:

- *Recipe calculations are developed to represent multiple variants of a basic dish.*
- *Since ingredients are selected to yield a nutrient profile for a food/beverage code, the ingredient codes selected do not necessarily represent the exact ingredients in a product. Ingredients used in recipe calculation are not ‘label ingredients’ found on products.*
- *Recipe ingredients do not generally include items that contribute minimally to the nutrient content of the food or beverage.*
- *FNDDS food codes consider salt and fat used in preparation and may be included as an ingredient. However, each ingredient for salt or fat does not imply they are actually ‘ingredients’ in a product. They may be added to a recipe calculation to represent a nutrient profile.*

## Retention Codes and Moisture Adjustment

In addition to selecting the appropriate ingredients and proportions for each recipe calculation, retention factors and moisture adjustments are applied to calculate FNDDS nutrient values (Powers and Hoover, 1989).

### Retention codes

Nutrient losses that occur because of cooking are accounted for in many recipe calculations using the *USDA Table of Nutrient Factors, Release 6* (USDA, ARS, 2007). The table has retention factors for 16 vitamins, 8 minerals, and alcohol for types of foods; each retention factor is the percent of the specific nutrient that remains in the food after preparation. Retention factors are provided for different food groups with a range of cooking and preparation methods. Each food group/cooking method (retention description) has a unique 4-digit retention code.

When a retention factor is utilized for an ingredient code, the 4-digit retention code is listed in *FNDDSIngred*. During the recipe calculation the retention factor (percentages of nutrient retained) was applied at the ingredient-level to create the final nutrient profile.

### Moisture adjustment

The moisture change accounts for how much water a food will lose or gain during cooking. The loss or gain of water during cooking can have a substantial effect on the nutrient content when expressed on a per 100-gram basis. Provided in *MoistAdjust*, moisture change is expressed as a percentage of the total weight of the food/beverage item. Moisture loss is applied at the recipe-level; therefore, the weight for each ingredient is the weight before adjustments for moisture loss.

Selection of a moisture loss to represent a cooked product is informed using *USDA's Food Yields Summarized by Different Stages of Preparation* (USDA, ARS, 1975) as well as other limited sources. For some recipes, moisture adjustments were performed until the moisture value in the recipe food was close to the moisture value of a similar analyzed food where available.

Any increase or decrease in fat during cooking is incorporated into the ingredients; therefore, recipe calculations do not include any fat change - gain or fat loss during cooking. This process began with FNDDS 2015-2016.

Links to both the *USDA Table of Nutrient Retention Factors* and *Food Yields Summarized by Different Stages of Preparation* are available for quick reference as resources on the FSRG website along with FNDDS databases and documentation.

In addition to FDC codes and FNDDS codes, two types of ingredient codes were developed by FSRG to assist in generating nutrient profiles. FNDDS 2021-2023 includes 8 ingredient codes for lower sodium products and 8 ingredient codes for single nutrients and a vitamin composite.

## Ingredient Codes – Lower Sodium Products

Beginning with FNDDS 2015-2016, codes were developed to reflect reduced sodium products. These codes are 6-digits with '9' as the initial digit. Except for sodium, the nutrient profiles are identical to the FDC code (identified by digits 2-6) and FDC description (following REDUCED SODIUM). The amount of sodium in each FDC code was decreased by 25% for each REDUCED SODIUM product to reflect the nutrient content claim for products labeled as reduced sodium. An additional code was added for FNDDS 2019-2020 to reflect tomato juice, low sodium.

FNDDS 2021-2023 ingredient codes for lower sodium products include:

907971	REDUCED SODIUM: Bologna, meat and poultry
907057	REDUCED SODIUM: Pepperoni, beef and pork, sliced
907072	REDUCED SODIUM: Salami, dry or hard, pork, beef
907028	REDUCED SODIUM: Ham, sliced, pre-packaged, deli meat (96%fat free, water added)
907961	REDUCED SODIUM: Chicken breast, deli, rotisserie seasoned, sliced, prepackaged
907081	REDUCED SODIUM: Turkey breast, sliced, prepackaged
907043	REDUCED SODIUM: Roast beef, deli style, prepackaged, sliced
911540	LOW SODIUM: Tomato juice

## Ingredient Codes – Single/Composite Nutrients

 *New for FNDDS 2021-2023* – additional single nutrient code for Vitamin B12


FNDDS 2021-2023 contains 8 ingredient codes that are specific for a single nutrient or composite of nutrients. These codes are 6-digits; 999 followed by the nutrient code (3-digit identification number). New for this release is a nutrient code for vitamin B12, used in the recipe calculation for the new FNDDS code *11360200 Oat milk*.

999001	Vitamin B composite in cereals
999291	Fiber, total dietary, as ingredient
999301	Calcium as ingredient
999303	Iron as ingredient
999328	Vitamin D as ingredient
999401	Vitamin C as ingredient
999418	Vitamin B12 as ingredient
999431	Folic acid as ingredient

The other single/composite nutrient ingredient codes are used to meet nutrient profiles for assumed fortification of ready-to-eat cereals, revised for FNDDS 2019-2020.

Vitamin D (added to FNDDS 2017-2018) is also used for regular yogurt and baby food yogurt; recipe calculations assume 1.2µg vit D/100g. FNDDS 2021-2023 includes new recipe calculations for plant-based yogurts and assume fortified with vitamin D at 1.2µg/100g. New recipe calculations for Greek yogurt in FNDDS 2021-2023 continue to assume fruit/other flavors fortified with vitamin D at 0.9µg/100g; plain is not fortified with vitamin D, supported by analytical values in new Foundation Food codes for plain Greek yogurts.

## FNDDS Codes Used Only in Recipes

 *New for FNDDS 2021-2023* – 9 additional ‘as ingredient’ codes

The recipe approach was also used to create nutrient profiles for a group of food codes that were only used in subsequent recipe calculations. FNDDS 2021-2023 contains 37 codes; all have 9999 as the first four digits. These food codes are not used to code dietary intakes in WWEIA. The 9999 codes are only used as an ingredient in recipe calculations to standardize and streamline the development of nutrient profiles. The 9 ingredient codes added to FNDDS 2021-2023 include:

99992600	Fish, cooked, as ingredient
99995620	Rice, white, cooked, as ingredient
99995625	Rice, brown, cooked, as ingredient
99997100	Potato, cooked, as ingredient
99997340	Sweet potato, cooked, as ingredient
99997555	Celery, cooked, as ingredient
99997805	Mirepoix, cooked, as ingredient
99997815	Vegetables as ingredients in soups
99997820	Vegetables as ingredients in stews

Vegetables as ingredients in soup and in stews reflect a composite of individual vegetables likely to be in these dishes. The recipe proportions are based on frequencies of vegetables reported in soups and in stews in AMPM 2017-2018 when participants listed vegetables in their soups/stews. They also represent vegetables found in commercial products or listed on cooking websites. Mirepoix is based on standard proportions from cooking websites.

The other new ‘as ingredients’ codes were created to incorporate Foundation Food codes, which are raw products, into cooked or as-consumed products.

Selected codes previously added in FNDDS include:

99991400	Cheese as ingredient in sandwiches
99991410	Cheese and Queso as ingredient
99992100	Beef as ingredient in recipes
99992230	Breakfast meat as ingredient in omelet
99992405	Chicken as ingredient in recipes
99995000	Breading or batter as ingredient in food
99995130	Wheat bread as ingredient in sandwiches
99995135	Wheat bun as ingredient in sandwiches
99997310	Carrots, cooked, as ingredient
99997800	Dark green vegetables as ingredient in omelet
99997802	Tomatoes as ingredient in omelet
99997810	Vegetables as ingredient in curry

FNDDS provides transparent and easy access to the individual ingredients for the ‘as ingredient’ codes, as well as all recipes in FNDDS. **At A Glance – FNDDS Ingredients** provides quick viewing and searching. This Microsoft Excel file lists ingredient codes and amounts that generate nutrient profiles – or recipes – for each FNDDS code.

## Ingredient Nutrient Values

The development of FNDDS 2021-2023 began with the continued evaluation of the integrity and currency of underlying values for the ingredient codes from FDC that form the basis of nutrient profiles for each FNDDS food/beverage. This evaluation resulted in the removal of SR Legacy codes used in earlier versions of FNDDS and the addition of new Foundation Foods. Some nutrient values for FDC codes were modified or corrected for inclusion in FNDDS and therefore differ from the value in FDC.

To enhance the transparency of developing nutrient profiles in FNDDS, expanded characterization of both the source used for the nutrient values, and the year of their determination were added to *IngredNutVal* beginning with the FNDDS 2015-2016.

The dataset *IngredNutVal* contains the ingredient codes from FDC and does not contain FNDDS codes used as ingredients. Included in *IngredNutVal* are the NDB number (Ingredient code) and corresponding description (Ingredient description). Also provided, for each ingredient code are the following:

- Nutrient value for energy and 64 nutrients– amount per 100g edible portion
- Nutrient value source
- Derivation code
- SR AddMod Year or Foundation year acquired

The variable – **nutrient value source** – provides the FDC database or additional source that is the basis for each individual nutrient value. See [Appendix L](#) for the 10 sources that are the basis for each nutrient value in FNDDS 2021-2023. Unlike prior releases, FNDDS 2021-2023 does not include any nutrient values from earlier releases of Standard Reference such as SR 26 and SR 28.

Most nutrient values for ingredient codes in FNDDS 2021-2023 utilized the value obtained directly from FDC as downloaded on October 2023 which included data types - SR Legacy and Foundation Foods. These nutrient values will also have a FNDDS variable - FDC ID. Currently, an FDC\_ID number is assigned randomly when new or updated versions of foods are published in FDC.

Since the launch of FDC in 2019, FNDDS has utilized Foundation Foods to reflect more current analytical data. FNDDS 2021-2023 utilizes 163 Foundation Food codes, compared to 113 codes in the previous FNDDS. At the same time, the number of SR Legacy codes has decreased with subsequent releases of FNDDS. For FNDDS 2021-2023, there are 1,549 SR Legacy codes used as ingredients, compared to 1,753 SR Legacy codes used as ingredients in FNDDS 2019-2020. SR Legacy is historical data; final update was in 2018.



**New** – optimizing food composition values for use in FNDDS

Foundation Foods target important nutrients in that food; therefore, they do not contain all the nutrients provided in FNDDS. For the Foundation Food codes utilized in FNDDS 2021-2023, only 40% of the nutrient values are truly Foundation Food values for the ingredient code's FF NDB number. Therefore, of the Foundation Foods in FNDDS 2021-2023, 60% of the nutrient values were matched to a similar SR Legacy code or a Foundation Food, calculated, or assumed zero.

Examples of assumptions and calculations include:

- Where nutrient values were not available for a Foundation Food from a similar Foundation Food or the same NDB number for a SR Legacy code, the closest matching food was used to complete the profile.
- Value for energy utilized the Foundation Foods value for Atwater General Factors (FDC Nutrient ID 2047) of 4, 9, and 4 for protein, fat and carbohydrate, respectively. When not provided, energy was calculated using the same Atwater General Factors.
- Values for fiber utilized the Foundation Foods FDC value for fiber, total dietary (FDC Nutrient ID 1079) to be consistent with FNDDS.
- Foundation Foods provides values for Sugars, Total NLEA (nutrient code 269.3/ID 1063); this value was used for the FNDDS nutrient Sugars, total (nutrient code 269).
- Values for added B12 and added vitamin E were assumed from the values for total vitamin B12 and vitamin E provided in Foundation Foods and the added fortification amount found in similar Foundation or SR Legacy codes.
- Values for food folate, folic acid and folate (DFE) were assumed from the value for total folate - the only folate component provided in Foundation Foods. Values for food folate from similar Foundation or SR Legacy codes were used to impute the value of folic acid and calculation of folate, DFE, of enriched flours.
- For carotenoids, retinol, and Vitamin A as retinol activity equivalents, missing values were obtained/calculated from similar FDC codes or assumed zero when SR Legacy values were minimal.
- Values for total fatty acids and/or individual fatty acids not listed for a Foundation Food were either obtained from a similar FDC code or assumed to be zero. When fatty acid data were available, calculated sums of cis- and trans-fatty acids from Foundation Foods were used to be consistent with FNDDS nutrients.

Nutrient values in Foundation Foods are rounded to scientifically appropriate significant figures and may differ from the number of digits that FNDDS reports for a nutrient. After making necessary calculations, the nutrient values were rounded to be in line with FDC rounding methods for Foundation Foods.

The FNDDS dataset *IngedNutVal* contains additional variables to provide details important in assessing the currency for each nutrient value downloaded from FDC. The variables differ based on which FDC data type is used. If the source is SR Legacy, **SR AddMod year** is provided which indicates the year a nutrient value was added or last modified as defined by SR. Although SR provides a month and year, only the year is listed in FNDDS. If SR ADDMod year is blank for an ingredient with nutrient value source as SR Legacy, the data were missing.

If the source is Foundation, **Foundation year acquired** is listed which is defined in FDC as the minimum purchase year. If blank, the date was not provided.

## Derivation Description

If the nutrient value source is SR Legacy or Foundation, a derivation code provides information about how a value was calculated or imputed as defined in FDC. [Appendix J](#) is a list of FDC derivation codes and descriptions that provide specific information on how the value was determined. This information is available in a new table/dataset added in FNDDS 2015-2016 and expanded for subsequent versions of FNDDS.

Some SR derivation codes reference 'source codes' in the description. [Appendix J](#) includes a listing of the referenced source code and accompanying description. The source codes (indicating the type of data) and descriptions are as defined by FDC.

## Major Changes in FNDDS 2021-2023

For FNDDS 2021-2023, the continued focus was on generic codes that reflect likely products as consumed by the U.S. population and on generating nutrient profiles that reflect a variety of items rather than linking to a single SR Legacy code. The focus was also on standardizing and streamlining development of recipes/nutrient profiles. There were 235 codes discontinued for FNDDS 2021-2023 and 43 new codes added.



*New* – challenge to build nutrient profiles for FNDDS 2021-2023

The 65 nutrient values provided for each FNDDS code are defined by the accuracy and completeness of the food composition values in FDC. SR Legacy provides extensive nutrient values on many representative foods; however, the data may not be current. The focus of FNDDS has been moving toward generic codes with nutrient profiles generated by recipe calculations rather than linked to a single SR Legacy code. The collection of soups was updated for the AMPM and reflected in FNDDS 2021-2023 codes that may represent multiple variants of soups.

Foundation Foods provides new analytical data on basic foods and provides extensive underlying metadata on the individual samples. However, Foundation Foods are generally unprocessed or lightly processed foods, and the individual samples are not selected to be nationally representative of products consumed in the U.S. Foundation Foods reports analyzed nutrients considered important in the food, not all 65 FNDDS nutrients.

The considerable increase in the number of commercial foods available in supermarkets and restaurants do not allow for analysis of the comprehensive intake of an individual. The FNDDS is an application database created for analyzing dietary intakes from WWEIA, NHANES and reflects average values for a generic representation of foods and beverages as consumed by the U.S. population (Moshfegh et al, 2022).



## Table salt

Recipe calculations are the most common technique to generate nutrient data for FNDDS food codes representing home-prepared, commercially processed and packaged foods, as well as those obtained from a restaurant. The ingredient code used to add sodium to recipe calculations is the Foundation Food for salt, table, iodized (NDB Number 2047). It is added to represent a nutrient profile for sodium or to represent salt added in preparation.

In FNDDS 2021-2023, this ingredient code is now displayed as **Salt, table**. FNDDS codes do not reflect the use of iodized salt.

 **New** – select updated sodium values for FNDDS 2021-2023

Since FNDDS 2017-2018, recipes for specific categories of foods/beverages were updated and the amount of sodium often reduced. Some FNDDS food codes are matched to only one ingredient code; therefore, the nutrient value for sodium is obtained directly from either SR Legacy or Foundation Foods. After evaluating sodium levels among categories of food which contribute substantially to sodium intake, values in the following ingredient codes were reduced in FNDDS 2021-2023.

Bread products. Sodium values were reduced 4-6% from their previous values for the following ingredient codes: flour tortilla, white bread, rye bread and 4 wheat breads (wheat, whole-wheat, multi-grain, white wheat). The sodium value was reduced about 20% from the previous value for the ingredient code for croissant.

Pizza. Sodium values were reduced about 10% from their previous values for 6 fast food pizza ingredient codes; no change to frozen pizza codes. In addition, 2 ingredient codes for fast food and frozen pizza previously utilized in FNDDS were replaced with lower sodium ingredient codes to reflect the marketplace.

Deli meats. Sodium values were reduced 10-20% from their previous values for the following ingredient codes: ham, sliced, prepackaged; turkey breast, sliced, prepackaged; bologna, meat and poultry; and frankfurter, meat and poultry.

In addition, the sodium values were reduced 10% from their previous values for the ingredient codes for ranch dressing and hard pretzels.

These changes were made for FNDDS 2021-2023 after reviewing FDC sodium values compared to sodium values in USDA Global Branded Food Products Database (USDA, ARS, 2024), company websites, and Voluntary Sodium Reduction Goals from the Food & Drug Administration (U.S. FDA).

FNDDS provides transparent and easy access to the individual value for sodium (and all nutrients) for ingredient codes from FDC as well as the nutrient value source. **AT A Glance – FNDDS Ingredient Nutrient Values** provides quick viewing and searching.

The collection of both baby/toddler foods and ready-to-eat cereals were updated for the AMPM used to collect dietary intakes beginning with NHANES data collection that started January 2019. The FNDDS codes were also updated. As first reported in FNDDS 2019-2020, the changes are provided below.

### Baby Toddler Foods

Changes to Baby Toddler foods for FNDDS 2019-2020 highlight the focus toward generic codes with nutrient profiles that represent a variety of items. As in earlier versions of FNDDS, appropriate SR Legacy codes are used for single fruits, vegetables, meats, juices, dry cereals, and baby snack items. Generic codes – such as *baby toddler fruit and vegetables* – were developed to represent multiple variants of baby food pouches, jars, and trays. The proportions of fruit and vegetables in this code are based on frequency reports from WWEIA, commercial websites and published research (Moding et al, 2018).

FNDDS 2019-2020 contains 84 items (utilizing 56 FDC codes) that represent all baby /toddler foods – cereals, juices, snacks, single fruits and vegetables and mixtures. This is a change from 2017-2018 when there were 229 FNDDS codes linked to 191 very specific SR Legacy codes.

### Ready-to-eat cereals

The changes to ready-to-eat cereals represent the most dramatic change incorporated into the FNDDS. For FNDDS 2019-2020, recipes – or nutrient profiles – were developed for each ready-to-eat cereal code. In previous releases, cereals were matched directly to a specific SR code. Most of these were from SR28 and are not included in SR Legacy.

For FNDDS 2019-2020, codes for ready-to-eat cereals used FDC codes for basic ingredients – 5 types of flour, sugar, oil, salt, and soy protein isolate. Extra items were used for products that contained raisins, nuts, chocolate, peanut butter, or marshmallows. The 7 ingredient codes for single/composite nutrients were incorporated to reflect the nutrient profiles of popular cereals and published research (Smith et al, 2020). The result is 43 FNDDS codes for ‘generic’ ready-to-eat cereals.

The food code descriptions and nutrient profiles of ready-to-eat cereals in FNDDS 2019-2020 do not necessarily represent one specific brand of cereal; they may include several brands, store brands, or a combination of different varieties. In comparison, FNDDS 2017-2018 contained 134 very specific FNDDS codes linked to 122 SR28 codes.

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## ***Appendix A. List of Abbreviations***

AMPM	USDA Automated Multiple-Pass Method
ARS	Agricultural Research Service
BHNRC	Beltsville Human Nutrition Research Center
FDA	Food and Drug Administration
FDC	FoodData Central
FDC ID	Unique permanent identifier of a food in FoodData Central food table
FNDDS	Food and Nutrient Database for Dietary Studies
FSRG	Food Surveys Research Group
MAFCL	Methods and Application of Food Composition Laboratory
NDB No.	Nutrient Databank number
NHANES	National Health and Nutrition Examination Survey
NFS	Not further specified
NS	Not specified
QNS	Quantity not specified
SAS®	Statistical Analysis System
SR	USDA National Nutrient Database for Standard Reference
USDA	United States Department of Agriculture
WWEIA	What We Eat in America

**Appendix B. Number of Food/Beverages by  
Food and Nutrient Database for Dietary Studies Version**

FNDDS version by NHANES survey years	FNDDS 1 (2001-02)	FNDDS 2 (2003-04)	FNDDS 3 (2005-06)	FNDDS 4.1 (2007-08)	FNDDS 5 (2009-10)	FNDDS 2011-12	FNDDS 2013-14	FNDDS 2015-16	FNDDS 2017-18	FNDDS 2019-20	<b>FNDDS 2021-23</b>
Food codes	6,974	6,940	6,921	7,174	7,253	7,618	8,536	8,690	7,083	5,624	<b>5,432</b>
<i>added</i>	<i>n/a</i>	70	115	283	99	1,156	1,197	978	209	361	<b>43</b>
<i>discontinued</i>	<i>n/a</i>	104	134	30	20	791	279	824	1,816	1,820	<b>235</b>
Additional descriptions	6,585	6,600	6,801	7,255	7,437	9,791	12,128	14,449	12,953	10,047	<b>9,648</b>
Nutrients/components	61	63*	64*	65*	65	65	65	65	65	65	<b>65</b>

\*Nutrients added by year:

2007-2008: Vitamin D (D2+D3) (µg)

2005-2006: Total Choline (mg)

2003-2004: Added Vitamin E (mg) and Added Vitamin B12 (µg)



# Food and Nutrient Database for Dietary Studies 2021-2023

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The USDA Food and Nutrient Database for Dietary Studies 2021-2023 (FNDDS) is an application database designed to convert food and beverage portions reported in What We Eat in America, National Health and Nutrition Examination Survey into gram amounts and to determine their nutrient values.

The complete FNDDS 2021-2023 consists of 10 datasets (Access® and SAS®). Select variables available in quick view/search format (Excel®). All available for download at [www.ars.usda.gov/nea/bhnrc/fsrg](http://www.ars.usda.gov/nea/bhnrc/fsrg).

## Food Descriptions Component

### Main Food Descriptions

Primary descriptions for 5,432 foods/beverages (4,827 foods/605 beverages)  
Unique 8-digit code assigned to each main food description

### Additional Food Descriptions

Descriptions for 9,648 additional foods/beverages associated with a specific main food/beverage

## Food Portions and Weights Component

### Food Weights

Weights (g) for 22,046 portions

### Food Portion Descriptions

Descriptions for unit measure of foods/beverages

## Nutrients Component

### FNDDS Nutrient Values

Nutrient values for food energy and 64 nutrients/food components (**other side of page**) for each food/beverage

### Nutrient Descriptions

Descriptions and measurement units for nutrients

### Moisture Adjustment

Factors used during calculation of nutrient values for foods/beverages

### FNDDS Ingredients

Information used in calculating FNDDS nutrient values per 100g

### Ingredient Nutrient Values

Sources of nutrient values - USDA FoodData Central (*accessed 10/2023*) or other sources

### Derivation Descriptions

Descriptions for derivation codes defined by USDA FoodData Central (*accessed 10/2023*)

## FNDDS 2021-2023 Nutrients and Food Components (unit)

Food energy (kcal)	Vitamin A as retinol activity equivalents (µg)
Protein (g)	Retinol (µg)
Carbohydrate (g)	
Fat, total (g)	<i>Carotenoids:</i>
Alcohol (g)	Carotene, alpha (µg)
	Carotene, beta (µg)
Sugars, total (g)	Cryptoxanthin, beta (µg)
Dietary fiber, total (g)	Lycopene (µg)
Water (g)	Lutein + zeaxanthin (µg)
Saturated fatty acids, total (g)	Vitamin E as alpha-tocopherol (mg)
Monounsaturated fatty acids, total (g)	*Added vitamin E (mg) <i>(added 2003-04)</i>
Polyunsaturated fatty acids, total (g)	Vitamin D (D2 + D3) (µg) <i>(added 2007-08)</i>
Cholesterol (mg)	Vitamin K as phylloquinone (µg)
	Vitamin C (mg)
<i>Individual fatty acids:</i>	Thiamin (mg)
<i>Saturated fatty acids:</i>	Riboflavin (mg)
4:0 Butyric acid (g)	Niacin (mg)
6:0 Caproic acid (g)	Vitamin B6 (mg)
8:0 Caprylic acid (g)	
10:0 Capric acid (g)	Folate, total (µg)
12:0 Lauric acid (g)	Folate (DFE) (µg)
14:0 Myristic acid (g)	Folic acid (µg)
16:0 Palmitic acid (g)	Food folate (µg)
18:0 Stearic acid (g)	
	Vitamin B12 (µg)
<i>Monounsaturated fatty acids:</i>	**Added vitamin B12 (µg) <i>(added 2003-04)</i>
16:1 Palmitoleic acid (g)	Choline, total (mg) <i>(added 2005-06)</i>
18:1 Oleic acid (g)	
20:1 Gadoleic acid (g)	Calcium (mg)
22:1 Erucic/citoleic acid (g)	Iron (mg)
	Magnesium (mg)
<i>Polyunsaturated fatty acids:</i>	Phosphorus (mg)
18:2 Linoleic acid (g)	Potassium (mg)
18:3 Linolenic acid (g)	Sodium (mg)
18:4 Parinaric acid (g)	Zinc (mg)
20:4 Arachidonic acid (g)	Copper (mg)
20:5 n-3 Eicosapentaenoic acid (EPA) (g)	Selenium (µg)
22:5 n-3 Docosapentaenoic acid (DPA) (g)	
22:6 n-3 Docosahexaenoic acid (DHA) (g)	Caffeine (mg)
	Theobromine (mg)

\*Represents a synthetic subcomponent of vitamin E and is included in the vitamin E value.

\*\*Represents a fortified subcomponent of vitamin B12 and is included in the vitamin B12 value.



**Food Surveys Research Group**  
**Beltsville Human Nutrition Research Center**  
**Agricultural Research Service, USDA**  
**July 2024**



## Appendix D. FNDDS 2021-2023 Nutrients and Food Components (unit)

Food energy (kcal)	Vitamin A as retinol activity equivalents (µg)
Protein (g)	Retinol (µg)
Carbohydrate (g)	
Fat, total (g)	<i>Carotenoids:</i>
Alcohol (g)	Carotene, alpha (µg)
	Carotene, beta (µg)
Sugars, total (g)	Cryptoxanthin, beta (µg)
Dietary fiber, total (g)	Lycopene (µg)
Water (g)	Lutein + zeaxanthin (µg)
Saturated fatty acids, total (g)	Vitamin E as alpha-tocopherol (mg)
Monounsaturated fatty acids, total (g)	*Added vitamin E (mg) <i>(added 2003-04)</i>
Polyunsaturated fatty acids, total (g)	Vitamin D (D2 + D3) (µg) <i>(added 2007-08)</i>
Cholesterol (mg)	Vitamin K as phylloquinone (µg)
	Vitamin C (mg)
<i>Individual fatty acids:</i>	Thiamin (mg)
<i>Saturated fatty acids:</i>	Riboflavin (mg)
4:0 Butyric acid (g)	Niacin (mg)
6:0 Caproic acid (g)	Vitamin B-6 (mg)
8:0 Caprylic acid (g)	
10:0 Capric acid (g)	Folate, total (µg)
12:0 Lauric acid (g)	Folate (DFE) (µg)
14:0 Myristic acid (g)	Folic acid (µg)
16:0 Palmitic acid (g)	Food folate (µg)
18:0 Stearic acid (g)	
	Vitamin B12 (µg)
<i>Monounsaturated fatty acids:</i>	**Added vitamin B12 (µg) <i>(added 2003-04)</i>
16:1 Palmitoleic acid (g)	Choline, total (mg) <i>(added 2005-06)</i>
18:1 Oleic acid (g)	
20:1 Gadoleic acid (g)	Calcium (mg)
22:1 Erucic/citoleic acid (g)	Iron (mg)
	Magnesium (mg)
<i>Polyunsaturated fatty acids:</i>	Phosphorus (mg)
18:2 Linoleic acid (g)	Potassium (mg)
18:3 Linolenic acid (g)	Sodium (mg)
18:4 Parinaric acid (g)	Zinc (mg)
20:4 Arachidonic acid (g)	Copper (mg)
20:5 n-3 Eicosapentaenoic acid (EPA) (g)	Selenium (µg)
22:5 n-3 Docosapentaenoic acid (DPA) (g)	
22:6 n-3 Docosahexaenoic acid (DHA) (g)	Caffeine (mg)
	Theobromine (mg)

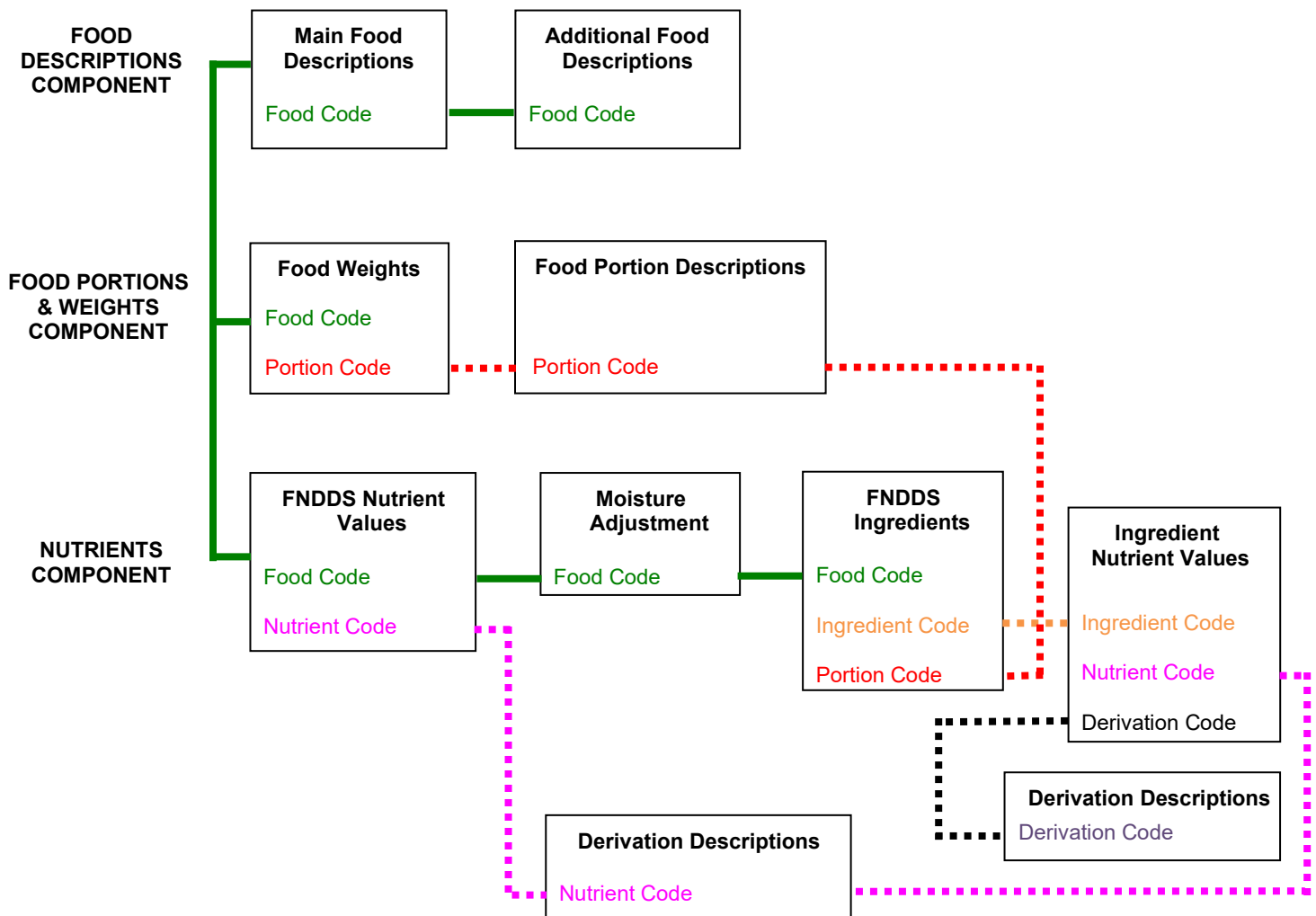
\*Represents a synthetic subcomponent of vitamin E and is included in the vitamin E value.

\*\*Represents a fortified subcomponent of vitamin B12 and is included in the vitamin B12 value.

## Appendix E. FNDDS 2021-2023 File Relationships

The USDA Food and Nutrient Database for Dietary Studies 2021-2023 (FNDDS) is an application database designed to convert food and beverage portions reported in What We Eat in America, National Health and Nutrition Examination Survey into gram amounts and to determine their nutrient values.

The complete FNDDS 2021-2023 consists of 10 datasets linked by primary and secondary data items forming a relational database. The primary link is the food code, indicated with a solid line. Secondary links are portion code, nutrient code, ingredient code, and FDC derivation code indicated with dotted lines.



## Appendix F. FNDDS 2021-2023 Content of Datasets



### 2021-2023 Food and Nutrient Database for Dietary Studies

### Content of Datasets

The USDA Food and Nutrient Database for Dietary Studies 2021-2023 (FNDDS) is an application database designed to convert food and beverage portions reported in What We Eat in America, National Health and Nutrition Examination Survey into gram amounts and to determine their nutrient values.

The complete FNDDS 2021-2023 consists of 10 datasets (Access® and SAS®). Select variables in quick view and search format also available in Excel®. All available for download at [www.ars.usda.gov/nea/bhnrc/fsrg](http://www.ars.usda.gov/nea/bhnrc/fsrg).

#### Food Descriptions Component

##### Main Food Descriptions (MainFoodDesc)

Field Name	Field Type	Description
<b>Food code</b> ‡	N 8	Unique 8-digit identification number
Main food description	A 200	Primary description for a food code
WWEIA Category number	N 4	Unique 4-digit identification number
WWEIA Category description	A 80	Description for a WWEIA category

##### Additional Food Descriptions (AddFoodDesc)

Field Name	Field Type	Description
<b>Food code</b> ‡	N 8	Unique 8-digit identification number
Seq num	N 2	Number for ordering additional food descriptions
Additional food description	A 80	Description(s) associated with a food code/main description

#### Food Portions and Weights Component

##### Food Weights (FoodWeights)

Field Name	Field Type	Description
<b>Food code</b> ‡	N 8	Unique 8-digit identification number
Seq num	N 2	Number for ordering portion descriptions
<b>Portion code</b> ‡	N 5	Unique 5-digit identification number
Portion weight	N 8.3	Edible portion in grams (g)

##### Food Portion Descriptions (FoodPortionDesc)

Field Name	Field Type	Description
<b>Portion code</b> ‡	N 5	Unique 5-digit identification number
Portion description	A 120	Unit of measure

## Nutrients Component

### FNDDS Nutrient Values (FNDDSNutVal)

Field Name	Field Type	Description
Food code‡	N 8	Unique 8-digit identification number
Nutrient code‡	N 5	3-digit identification number
Nutrient value	N 10.x	Amount per 100g edible portion for energy and 64 nutrients

### Nutrient Descriptions (NutDesc)

Field Name	Field Type	Description
Nutrient code‡	N 5	3-digit identification number
Nutrient description	A 45	Description of nutrient or food component
Tagname	A 15	INFOODS international food component identifier
Unit	A 10	Measurement unit for nutrient value
Decimals	N 1	Number of decimal places

### Moisture Adjustment (MoistAdjust)

Field Name	Field Type	Description
Food code‡	N 8	Unique 8-digit identification number
Moisture change	N 5.1	Percentage moisture change of total weight

### FNDDS Ingredients (FNDDSIngred)

Field Name	Field Type	Description
Food code‡	N 8	Unique 8-digit identification number
Seq num	N 2	Number for ordering ingredient codes
Ingredient code‡	N 8	NDB number or FNDDS food code
Ingredient description	A 240	Description of NDB number or FNDDS food code
Amount	N 11.3	Number of measures of ingredient code
Measure	A 3	Unit of measure to quantify amount of ingredient code
Portion code‡	N 5	Unique 5-digit identification number
Retention code	N 4	Retention factor identification code
Ingredient weight	N 11.3	Edible portion in grams (g)

### Ingredient Nutrient Values (IngredNutVal)

Field Name	Field Type	Description
Ingredient code‡	N 8	Identifies only NDB number
Ingredient description	A 200	Description of NDB number
Nutrient code‡	N 5	3-digit identification number
Nutrient value	N 10.x	Amount per 100g edible portion for energy and 64 nutrients
Nutrient value source	A 80	FDC or other source for nutrient value
FDC ID	N 7	Identifier of food in FDC
Derivation code‡	A 4	Derivation code as defined by FDC
SR AddMod year	N 4	Year value added or last modified as defined by SR
Foundation year acquired	N 4	Initial year acquired as defined by FDC

### Derivation Descriptions (DerivDesc)

Field Name	Field Type	Description
Derivation code‡	A 4	Derivation code as defined by FDC
Derivation description	A 120	Description of derivation code

‡ linking field across files

Note: Start/end dates included on all datasets (except NutDesc and DerivDesc) indicate time period corresponding to WWEIA data.

## Appendix G. FNDDS 2021-2023 At A Glance



### 2021-2023 Food and Nutrient Database for Dietary Studies At A Glance

The USDA Food and Nutrient Database for Dietary Studies 2021-2023 (FNDDS) is an application database designed to convert food and beverage portions reported in What We Eat in America, National Health and Nutrition Examination Survey into gram amounts and to determine their nutrient values.

**At A Glance** provides select variables in quick view/search format (Excel®) from the FNDDS 10 datasets (Access® and SAS®). All available for download at [www.ars.usda.gov/nea/bhnrc/fsrg](http://www.ars.usda.gov/nea/bhnrc/fsrg).

	Variable	Description
<b>Food and Beverages</b>	Food code	Unique 8-digit identification number
	Main food description	Primary description for a food code
	Additional food description	Description(s) associated with a food code/main description
	WWEIA Category number	Unique 4-digit identification number
	WWEIA Category description	Description for a WWEIA category
<b>Portions and Weights</b>	Food code	Unique 8-digit identification number
	Main food description	Primary description for a food code
	WWEIA Category number	Unique 4-digit identification number
	WWEIA Category description	Description for a WWEIA category
	Seq num	Number for ordering portion descriptions
	Portion description	Unit of measure
	Portion weight	Edible portion in grams (g)
<b>FNDDS Ingredients</b>	Food code	Unique 8-digit identification number
	Main food description	Primary description for a food code
	WWEIA Category number	Unique 4-digit identification number
	WWEIA Category description	Description for a WWEIA category
	Seq num	Number for ordering ingredient codes
	Ingredient code	NDB number or FNDDS food code
	Ingredient description	Description of NDB number or FNDDS food code
	Ingredient weight	Edible portion in grams (g)
	Retention code	Retention factor identification code
Moisture change	Percentage moisture change of total weight	
<b>Ingredient Nutrient Values</b>	Ingredient code	Identifies only NDB number
	Ingredient description	Description of NDB number
	Nutrient code	3-digit identification number
	Nutrient description	Description of nutrient or food component
	Nutrient value	Amount per 100g edible portion for energy and 64 nutrients
	Nutrient value source	FDC or other source for nutrient value
	FDC ID	Identifier of food in FDC
	Derivation code	Derivation descriptor as defined by FDC
	SR AddMod year	Year value added or last modified as defined by SR
	Foundation year acquired	Initial year acquired as defined by FDC
<b>FNDDS Nutrient Values</b>	Food code	Unique 8-digit identification number
	Main food description	Primary description for a food code
	WWEIA Category number	Unique 4-digit identification number
	WWEIA Category description	Description for a WWEIA category
	Value for each nutrient	Amount per 100g edible portion for energy and 64 nutrients

FDC = FoodData Central (accessed 10/2023)

## Appendix H. FNDDS 2021-2023 Food Code: Grouping by First 2 Digits

<b>1 Milk and Milk Products</b>	<ul style="list-style-type: none"> <li>11 <i>Milks, milk drinks, yogurts, infant formulas</i></li> <li>12 <i>Creams and cream substitutes</i></li> <li>13 <i>Milk desserts and sauces</i></li> <li>14 <i>Cheeses</i></li> </ul>
<b>2 Meat, Poultry, Fish, and Mixtures</b>	<ul style="list-style-type: none"> <li>20 <i>Meat</i></li> <li>21 <i>Beef</i></li> <li>22 <i>Pork</i></li> <li>23 <i>Lamb, veal, game</i></li> <li>24 <i>Poultry</i></li> <li>25 <i>Organ meats, frankfurters, sausages, lunchmeats</i></li> <li>26 <i>Fish, shellfish</i></li> <li>27 <i>Meat, poultry, fish mixtures</i></li> <li>28 <i>Frozen meals, soups, gravies</i></li> </ul>
<b>3 Eggs</b>	<ul style="list-style-type: none"> <li>31 <i>Eggs</i></li> <li>32 <i>Egg mixtures</i></li> <li>33 <i>Egg substitutes</i></li> </ul>
<b>4 Dry Beans, Peas, Other Legumes, Nuts, and Seeds</b>	<ul style="list-style-type: none"> <li>41 <i>Legumes</i></li> <li>42 <i>Nuts, nut butters, nut mixtures</i></li> <li>43 <i>Seeds and seed mixtures</i></li> <li>44 <i>Carob products</i></li> </ul>
<b>5 Grain Products</b>	<ul style="list-style-type: none"> <li>50 <i>Flour and dry mixes</i></li> <li>51 <i>Yeast breads, rolls</i></li> <li>52 <i>Quick breads</i></li> <li>53 <i>Cakes, cookies, pies, pastries, bars</i></li> <li>54 <i>Crackers, snack products</i></li> <li>55 <i>Pancakes, waffles, French toast, other grain products</i></li> <li>56 <i>Pastas, rice, cooked cereals</i></li> <li>57 <i>Cereals, not cooked</i></li> <li>58 <i>Grain mixtures, frozen meals, soups</i></li> <li>59 <i>Meat substitutes</i></li> </ul>
<b>6 Fruits</b>	<ul style="list-style-type: none"> <li>61 <i>Citrus fruits, juices</i></li> <li>62 <i>Dried fruits</i></li> <li>63 <i>Other fruits</i></li> <li>64 <i>Fruit juices and nectars excluding citrus</i></li> <li>67 <i>Fruits and juices baby food</i></li> </ul>
<b>7 Vegetables</b>	<ul style="list-style-type: none"> <li>71 <i>White potatoes, starchy vegetables</i></li> <li>72 <i>Dark-green vegetables</i></li> <li>73 <i>Orange vegetables</i></li> <li>74 <i>Tomatoes, tomato mixtures</i></li> <li>75 <i>Other vegetables</i></li> <li>76 <i>Vegetables and mixtures mostly vegetables baby food</i></li> <li>77 <i>Vegetables with meat, poultry, fish</i></li> <li>78 <i>Mixtures mostly vegetables without meat, poultry, fish</i></li> </ul>
<b>8 Fats, Oils, and Salad Dressings</b>	<ul style="list-style-type: none"> <li>81 <i>Fats</i></li> <li>82 <i>Oils</i></li> <li>83 <i>Salad dressings</i></li> <li>89 <i>'For use' with a sandwich or vegetable</i></li> </ul>
<b>9 Sugars, Sweets, and Beverages</b>	<ul style="list-style-type: none"> <li>91 <i>Sugars, sweets</i></li> <li>92 <i>Nonalcoholic beverages</i></li> <li>93 <i>Alcoholic beverages</i></li> <li>94 <i>Noncarbonated water</i></li> <li>95 <i>Formulated nutrition beverages, energy drinks, sports drinks</i></li> <li>99 <i>Used as an ingredient, not for coding</i></li> </ul>

## Appendix I. WWEIA Food Categories 2021-2023:

Code, Description, Number of FNDDS Codes/Category

<b>MILK AND DAIRY</b>	<b>Code Description</b>	<b>No. FNDDS Codes</b>
<b>Milk</b>	1002 Milk, whole	7
	1004 Milk, reduced fat	4
	1006 Milk, lowfat	3
	1008 Milk, nonfat	4
<b>Flavored Milk</b>	1202 Flavored milk, whole	4
	1204 Flavored milk, reduced fat	12
	1206 Flavored milk, lowfat	7
	1208 Flavored milk, nonfat	9
<b>Dairy Drinks</b>	1402 Milk shakes and other dairy drinks	13
<b>Cheese</b>	1602 Cheese	58
	1604 Cottage/ricotta cheese	16
<b>Yogurt</b>	1820 Yogurt, regular	17
	1822 Yogurt, Greek	14
<b>Plant-based Dairy</b>	1902 Plant-based milk	18
	1904 Plant-based yogurt	3
<b>PROTEIN FOODS</b>		
<b>Meats</b>	2002 Beef, excludes ground	34
	2004 Ground beef	5
	2006 Pork	26
	2008 Lamb, goat, game	18
	2010 Liver and organ meats	13
<b>Poultry</b>	2202 Chicken, whole pieces	160
	2204 Chicken patties, nuggets and tenders	15
	2206 Turkey, duck, other poultry	46
<b>Seafood</b>	2402 Fish	109
	2404 Shellfish	41
<b>Eggs</b>	2502 Eggs and omelets	147
<b>Cured Meats/Poultry</b>	2602 Cold cuts and cured meats	44
	2604 Bacon	12
	2606 Frankfurters	5
	2608 Sausages	21
<b>Plant-based Protein Foods</b>	2802 Beans, peas, legumes	75
	2804 Nuts and seeds	78
	2806 Soy and meat-alternative products	18

## Appendix I. WWEIA Food Categories 2021-2023:

Code, Description, Number of FNDDS Codes/Category (continued)

<b>MIXED DISHES</b>	<b>Code Description</b>	<b>No. FNDDS Codes</b>
<b>Mixed Dishes – Meat, Poultry, Seafood</b>	3002 Meat mixed dishes	233
	3004 Poultry mixed dishes	133
	3006 Seafood mixed dishes	96
<b>Mixed Dishes – Bean/Vegetable-based</b>	3102 Bean, pea, legume dishes	23
	3104 Vegetable dishes	34
<b>Mixed Dishes – Grain-based</b>	3202 Rice mixed dishes	132
	3204 Pasta mixed dishes, excludes macaroni & cheese	174
	3206 Macaroni and cheese	16
	3208 Turnovers and other grain-based items	36
<b>Mixed Dishes – Asian</b>	3402 Fried rice and lo/chow mein	44
	3404 Stir-fry and soy-based sauce mixtures	70
	3406 Egg rolls, dumplings, sushi	25
<b>Mixed Dishes – Mexican</b>	3502 Burritos and tacos	48
	3504 Nachos	7
	3506 Other Mexican mixed dishes	52
<b>Mixed Dishes – Pizza</b>	3602 Pizza	91
<b>Mixed Dishes – Sandwiches</b>	3702 Burgers	62
	3703 Frankfurter sandwiches	29
	3704 Chicken fillet sandwiches	21
	3706 Egg/breakfast sandwiches	47
	3720 Cheese sandwiches	14
	3722 Peanut butter and jelly sandwiches	22
	3730 Seafood sandwiches	20
	3740 Deli and cured meat sandwiches	63
	3742 Meat and BBQ sandwiches	20
3744 Vegetable sandwiches/burgers	11	
<b>Mixed Dishes - Soups</b>	3804 Soups, broth-based	47
	3806 Soups, cream-based	13
	3808 Ramen and Asian broth-based soups	15
<b>GRAINS</b>		
<b>Cooked Grains</b>	4002 Rice	30
	4004 Pasta, noodles, cooked grains	18
	4202 Yeast breads	113
<b>Breads, Rolls, Tortillas</b>	4204 Rolls and buns	37
	4206 Bagels and English muffins	30
	4208 Tortillas	7
<b>Quick Breads and Bread Products</b>	4402 Biscuits, muffins, quick breads	48
	4404 Pancakes, waffles, French toast	54
<b>Ready-to-Eat Cereals</b>	4602 Ready-to-eat cereal, higher sugar (>21.2 g/100g)	22
	4604 Ready-to-eat cereal, lower sugar (=<21.2g/100g)	20
<b>Cooked Cereals</b>	4802 Oatmeal	21
	4804 Grits and other cooked cereals	26



## Appendix I. WWEIA Food Categories 2021-2023:

Code, Description, Number of FNDDS Codes/Category (continued)

<b>SNACKS AND SWEETS</b>	<b>Code Description</b>	<b>No. of FNDDS codes</b>
	5002 Potato chips	27
<b>Savory Snacks</b>	5004 Tortilla, corn, other chips	32
	5006 Popcorn	26
	5008 Pretzels/snack mix	45
	5202 Crackers, excludes saltines	56
<b>Crackers</b>	5204 Saltine crackers	5
	5402 Cereal bars	33
<b>Snack/Meal Bars</b>	5404 Nutrition bars	13
	5502 Cakes and pies	89
<b>Sweet Bakery Products</b>	5504 Cookies and brownies	102
	5506 Doughnuts, sweet rolls, pastries	66
	5702 Candy containing chocolate	25
<b>Candy</b>	5704 Candy not containing chocolate	23
	5802 Ice cream and frozen dairy desserts	60
<b>Other Desserts</b>	5804 Pudding	26
	5806 Gelatins, ices, sorbets	17

## FRUIT

	6002 Apples	7
	6004 Bananas	2
	6006 Grapes	1
	6008 Peaches and nectarines	6
	6009 Strawberries	3
	6011 Blueberries and other berries	11
<b>Fruits</b>	6012 Citrus fruits	11
	6014 Melons	4
	6016 Dried fruits	18
	6018 Other fruits and fruit salads	42
	6020 Pears	5
	6022 Pineapple	5
	6024 Mango and papaya	5

## VEGETABLES

	6402 Tomatoes	6
	6404 Carrots	20
	6406 Other red and orange vegetables	20
	6407 Broccoli	15
	6409 Spinach	15
	6410 Lettuce and lettuce salads	14
	6411 Other dark green vegetables	50
<b>Vegetables, excluding Potatoes</b>	6412 String beans	20
	6413 Cabbage	11
	6414 Onions	7
	6416 Corn	20
	6418 Other starchy vegetables	39
	6420 Other vegetables and combinations	147
	6430 Fried vegetables	21
	6432 Coleslaw, non-lettuce salads	17
	6489 Vegetables on a sandwich	8
		6802 White potatoes, baked or boiled
<b>White Potatoes</b>	6804 French fries and other fried white potatoes	44
	6806 Mashed potatoes and white potato mixtures	56

## Appendix I. WWEIA Food Categories 2021-2023:

Code, Description, Number of FNDDS Codes/Category (continued)

<b>BEVERAGES</b>	<b>Code</b>	<b>Description</b>	<b>No. of FNDDS Codes</b>
	7002	Citrus juice	12
100% Juice	7004	Apple juice	3
	7006	Other fruit juice	19
	7008	Vegetable juice	9
Diet Beverages	7102	Diet soft drinks	13
	7104	Diet sport and energy drinks	12
	7106	Other diet drinks	6
Sweetened Beverages	7202	Soft drinks	13
	7204	Fruit drinks	49
	7206	Sport and energy drinks	19
	7208	Nutritional beverages	15
Coffee and Tea	7220	Smoothies and grain drinks	25
	7302	Coffee	109
	7304	Tea	45

### ALCOHOLIC BEVERAGES

Alcoholic Beverages	7502	Beer	8
	7504	Wine	13
	7506	Liquor and cocktails	69

### WATER

Plain Water	7702	Tap water	2
	7704	Bottled water	1
Flavored or Enhanced Water	7802	Flavored or carbonated water	5
	7804	Enhanced water	2

### FATS AND OILS

Fats and Oils	8002	Butter and animal fats	10
	8004	Margarine	8
	8006	Cream cheese, sour cream, whipped cream	13
	8008	Cream and cream substitutes	18
	8010	Mayonnaise	10
	8012	Salad dressings and vegetable oils	51

### CONDIMENTS AND SAUCES

Condiments and Sauces	8402	Tomato-based condiments	12
	8404	Soy-based condiments	10
	8406	Mustard and other condiments	28
	8408	Olives, pickles, pickled vegetables	30
	8410	Pasta sauces, tomato-based	11
	8412	Dips, gravies, other sauces	59

### SUGARS

Sugars	8802	Sugars and honey	8
	8804	Sugar substitutes	10
	8806	Jams, syrups, toppings	36

## Appendix I. WWEIA Food Categories 2021-2023:

Code, Description, Number of FNDDS Codes/Category (continued)

<b>BABY FOODS AND FORMULAS</b>	<b>Code</b>	<b>Description</b>	<b>No. of FNDDS Codes</b>
	9002	Baby food: cereals	14
	9004	Baby food: fruit	13
<b>Baby Foods</b>	9006	Baby food: vegetables	14
	9007	Baby food: mixtures	12
	9008	Baby food: meat and dinners	11
	9010	Baby food: yogurt	2
	9012	Baby food: snacks and sweets	11
<b>Baby Beverages</b>	9202	Baby juice	6
	9204	Baby water	1
<b>Infant Formulas</b>	9402	Formula, ready-to-feed	17
	9404	Formula, prepared from powder	50
<b>Human Milk</b>	9602	Human milk	1
<b>OTHER</b>			
<b>Other</b>	9802	Protein and nutritional powders	17
	9999	Not included in a food category	77

## Appendix J. FDC Derivation Codes and Descriptions

Code	Description
<b>A</b>	<i>Analytical data</i>
<b>AI</b>	<i>Analytical data; from the literature or government; incomplete documentation</i>
<b>AR</b>	<i>Analytical data; derived by linear regression</i>
<b>AS</b>	<i>Summed</i>
<b>BD</b>	<i>Based on same food; Drained solids from solids and liquids or vice versa (canned fruits and vegetables)</i>
<b>BFAN</b>	<i>Based on another form of the food or similar food; Concentration adjustment; Ash; Retention factors not used</i>
<b>BFCN</b>	<i>Based on another form of the food or similar food; Concentration adjustment; Carbohydrate; Retention factors not used</i>
<b>BFFN</b>	<i>Based on another form of the food or similar food; Concentration adjustment; Fat; Retention factors not used</i>
<b>BFFY</b>	<i>Based on another form of the food or similar food; Concentration adjustment; Fat; Retention factors used</i>
<b>BFNN</b>	<i>Based on another form of the food or similar food; Concentration adjustment; Non-fat solids; Retention factors not used</i>
<b>BFNY</b>	<i>Based on another form of the food or similar food; Concentration adjustment; Non-fat solids; Retentions factors used</i>
<b>BFPN</b>	<i>Based on another form of the food or similar food; Concentration adjustment; Protein; Retention factors not used</i>
<b>BFPY</b>	<i>Based on another form of the food or similar food; Concentration adjustment; Protein; Retention factors used</i>
<b>BFSN</b>	<i>Based on another form of the food or similar food; Concentration adjustment; Solids; Retention factors not used</i>
<b>BFSY</b>	<i>Based on another form of the food or similar food; Concentration adjustment; Solids; Retention factors used</i>
<b>BFYN</b>	<i>Based on another form of the food or similar food; Concentration adjustment; Yield; Retention factors not used</i>
<b>BFYY</b>	<i>Based on another form of the food or similar food; Concentration adjustment; Yield; Retention factors used</i>
<b>BFZN</b>	<i>Based on another form of the food or similar food; Concentration adjustment; No adjustment; Retention factors not used</i>
<b>BFZY</b>	<i>Based on another form of the food or similar food; Concentration adjustment; No adjustment; Retention factors used</i>
<b>BNA</b>	<i>Based on another form of the same food or similar food: constituents normalized to total; vitamin A</i>
<b>CAAN</b>	<i>Calculated from different food; From average values for food category; Ash; Retention factors not used</i>
<b>CAFN</b>	<i>Calculated from different food; From average values for food category; Fat; Retention factors not used</i>
<b>CASN</b>	<i>Calculated from different food; From average values for food category; Solids; Retention factors not used</i>
<b>CAZN</b>	<i>Calculated from different food; From average values for food category; No adjustment; Retention factors not used</i>
<b>DA</b>	<i>Concentration adjustment using factor; derived from analytical data</i>
<b>DI</b>	<i>Concentration adjustment using factor; derived from imputed data</i>
<b>FLA</b>	<i>Estimated formulation based on ingredient list; Linear program used to estimate ingredients; Analytical data</i>
<b>FLC</b>	<i>Estimated formulation based on ingredient list; Linear program used to estimate ingredients; Claim on label/serving</i>
<b>FLM</b>	<i>Estimated formulation based on ingredient list; Linear program used to estimate ingredients; Manuf. Calc. data/100</i>
<b>JA</b>	<i>Aggregated data involving combinations of data with only source codes* 1 and 12 and/or 13</i>
<b>JO</b>	<i>Aggregated data involving combinations of data with different source codes* when at least one code is not 1, 6, 12, or 13</i>
<b>LC</b>	<i>Label claim (back calculated from label by NDJ staff; Calculated from label claim/serving (g or %RDI)</i>
<b>MA</b>	<i>Manufacturer supplied(industry or trade association); Analytical data, incomplete documentation</i>
<b>MC</b>	<i>Manufacturer supplied; Calculated by manufacturer or unknown if analytical or calculated</i>
<b>ML</b>	<i>Manufacturer supplied; Value upon which manufacturer based label claim for fortified/enriched nutrient</i>

## Appendix J. FDC Derivation Codes and Descriptions (continued)

Code	Description
NC	Calculated
NP	Nutrient that is based on other nutrient/s; calculated by difference or summed (with or without activity factors) Ex. Proximate component other than CHO by difference. Vitamin A calculated from components when one of the component values is not source code* 1 or 7
NR	Nutrient that is based on other nutrient/s; value used directly, ex. Nut.#204 from Nut.#298
O	Other procedure used from imputing
PAE	Based on physical composition; Derived from analytical data; Estimated physical composition
PAK	Based on physical composition; Derived from analytical data; Known physical composition
PIE	Based on physical composition; Derived from imputed data; Estimated physical composition
PIK	Based on physical composition; Derived from imputed data; Known physical composition
RA	Recipe; Approximate ingredient proportions (ex. combination of several recipes)
RC	Recipe; Cookbook
RF	Recipe; Formulary of standard products (formulary or standards of identity)
RK	Recipe; Known formulation (dissection data or proprietary formulation)
RKA	Recipe; Known formulation; No adjustments applied, combination of source codes* 1, 12, and/or 6
RKI	Recipe; Known formulation; No adjustments applied, combination of source codes* which includes codes other than 1,12,or 6
RP	Recipe; Per package directions (ex. refrigerated dough, toast, cake mix)
RPA	Recipe; Per package directions; No adjustments applied, combination of source codes* 1, 12, and/or 6.
RPI	Recipe; Per package directions; No adjustments applied, combination of source codes which includes codes* other than 1,12,or 6
S	Product standard, such as enrichment level specified in CFR or AMS commodity standard
T	Taken from another source--other tables of food composition
Z	Assumed zero (Insignificant amount or not naturally occurring in a food, such as fiber in meat)

Source: U.S. Department of Agriculture, Agricultural Research Service. (2024). FoodData Central. Available from: [www.fdc.nal.usda.gov](http://www.fdc.nal.usda.gov). Accessed October 2023.

\*Source code descriptions:

- 1 - analytical or derived from analytical
- 6 - aggregated data involving combinations of source codes 1 & 12
- 12 - manufacturer's analytical, partial documentation
- 13 - analytical data from the literature, partial documentation

## Appendix K. Nutrient Codes in FNDDS and FoodData Central

Nutrient Code	Nutrient Description	FDC Nutrient ID	Nutrient Code	Nutrient Description	FDC Nutrient ID
203	Protein	1003	601	Cholesterol	1253
204	Total Fat	1004	606	Fatty acids, total saturated	1258
205	Carbohydrate	1005	607	4:0 (Butyric acid)	1259
208	Energy	1008/2047	608	6:0 (Caproic acid)	1260
221	Alcohol	1018	609	8:0 (Caprylic acid)	1261
255	Water	1051	610	10:0 (Capric acid)	1262
262	Caffeine	1057	611	12:0 (Lauric acid)	1263
263	Theobromine	1058	612	14:0 (Myristic acid)	1264
269	Sugars, total	2000/1063	613	16:0 (Palmitic acid)	1265
291	Fiber, total dietary	1079	614	18:0 (Stearic acid)	1266
301	Calcium	1087	617	18:1 (Oleic acid)	1268
303	Iron	1089	618	18:2 (Linoleic acid)	1269
304	Magnesium	1090	619	18:3 (Linolenic acid)	1270
305	Phosphorus	1091	620	20:4 (Arachidonic acid)	1271
306	Potassium	1092	621	22:6 n-3 (Docosahexaenoic acid - DHA)	1272
307	Sodium	1093	626	16:1 (Palmitoleic acid)	1275
309	Zinc	1095	627	18:4 (Parinaric acid)	1276
312	Copper	1098	628	20:1 (Gadoleic acid)	1277
317	Selenium	1103	629	20:5 n-3 (Eicosapentaenoic acid - EPA)	1278
319	Retinol	1105	630	22:1 (Erucic/citoleic acid)	1279
320	Vitamin A, RAE	1106	631	22:5 n-3 (Docosapentaenoic acid - DPA)	1280
321	Carotene, beta	1107	645	Fatty acids, total monounsaturated	1292
322	Carotene, alpha	1108	646	Fatty acids, total polyunsaturated	1293
323	Vitamin E (alpha-tocopherol)	1109			
328	Vitamin D (D2 + D3)	1114			
334	Cryptoxanthin, beta	1120			
337	Lycopene	1122			
338	Lutein + zeaxanthin	1123			
401	Vitamin C	1162			
404	Thiamin	1165			
405	Riboflavin	1166			
406	Niacin	1167			
415	Vitamin B6	1175			
417	Folate, total	1177			
418	Vitamin B12	1178			
421	Choline, total	1180			
430	Vitamin K (phylloquinone)	1185			
431	Folic acid	1186			
432	Folate, food	1187			
435	Folate, DFE	1190			
573	Vitamin E, added	1242			
578	Vitamin B12, added	1246			

## Appendix L. FNDDS 2021-2023 Nutrient Value Sources

Nutrient Value Source	Description
Assumed zero	Based on related nutrient value of same product or similar product
Foundation	FDC Foundation Food <i>downloaded October 2023*</i>
Foundation code xxxxx	Imputed nutrient value from other FDC Foundation Food NDB number listed
Foundation fdc_id xxxxx	Based on specific subsample value for FDC Foundation Food NDB number
Informed by label/other sources	Based on nutrient values in FDC USDA Global Branded Food Products Database*, company websites or similar products
Informed by FDC Foundation and SR Legacy	Based on nutrient values of same NDB number in FDC Foundation Food and/or SR Legacy
Nutrient as ingredient	Ingredient code xxxxxx for nutrient used as ingredient
SR Legacy	FDC SR Legacy <i>downloaded October 2023*</i>
SR Legacy code xxxxx	Imputed nutrient value from other FDC SR Legacy NDB number listed
SR Legacy code xxxxx footnote	Reflects seafood product not treated with sodium

\*Link to FDC download October 2023 on FSRG website [www.ars.usda.gov/nea/bhnrc/fsrg](http://www.ars.usda.gov/nea/bhnrc/fsrg)