

Available online at www.sciencedirect.com**SciVerse ScienceDirect**

Procedia Food Science 2 (2013) 99 – 112

Procedia

Food Science

36th National Nutrient Databank Conference

USDA Food and Nutrient Database for Dietary Studies (FNDDS), 5.0

Janice B. Montville* Jaspreet K.C. Ahuja, Carrie L. Martin, Kaushalya Y. Heendeniya, Grace Omolewa-Tomobi, Lois C. Steinfeldt, Jaswinder Anand, Meghan E. Adler, Randy P. LaComb, Alanna Moshfegh

Food Surveys Research Group, Beltsville Human Nutrition Research Center, Agricultural Research Service, United States Department of Agriculture, 10300 Baltimore Ave., Bldg. 005, Rm. 102, BARC-West, Beltsville, Maryland 20705, USA.

Abstract

The Food and Nutrient Database for Dietary Studies (FNDDS) is used to code and analyze dietary intakes for the What We Eat In America, National Health and Nutrition Examination Survey (WWEIA, NHANES). To create FNDDS 5.0 for WWEIA, NHANES 2009-2010, data for over 7,200 foods were updated to incorporate changes in the marketplace and information reported by survey participants. The updates include nearly 100 new foods and extensive changes to food descriptions, portions, weights, and recipes. The USDA National Nutrient Database for Standard Reference, Release 24 is the basis for the 65 nutrient values for each FNDDS food. FNDDS 5.0 is available at <http://www.ars.usda.gov/ba/bhnrc/fsrg>.

© 2013 The Authors. Published by Elsevier Ltd. Open access under [CC BY-NC-ND license](https://creativecommons.org/licenses/by-nc-nd/4.0/).

Selection and peer-review under responsibility of National Nutrient Databank Conference Steering Committee

Keywords: Food and nutrient database; USDA survey database; Dietary studies; Food consumption surveys; Nutrient intake; Food intake; Food portion weights

1. Introduction

The Food and Nutrient Database for Dietary Studies (FNDDS) is developed by the Food Surveys Research Group of the United States Department of Agriculture (USDA) to code and analyze dietary intakes from What We Eat in America (WWEIA), the dietary intake interview component of the National Health and Nutrition Examination Survey (NHANES). This is a continuous survey involving approximately 5,000 individuals per year, with two 24-hour diet recalls per individual, and data are released in two-year datasets. The FNDDS is a readily available resource for the study of food consumption, which can be downloaded at no charge from the internet. The database provides

* Corresponding author. Tel.: 1-301-504-0176; fax: 1-301-504-0377.

E-mail address: jan.montville@ars.usda.gov.

comprehensive information for use in coding foods and portion sizes, as well as nutrient values for calculating nutrient intakes. The nutrient values in FNDDS are based on the nutrient values in another USDA database, the National Nutrient Database for Standard Reference (SR). This paper describes the background of the FNDDS, the relationship between the FNDDS and SR, the contents of FNDDS, its uses in dietary research, changes in the most recent release (5.0), and directions on how to obtain it.

2. Background

2.1. History

USDA conducted the first national survey of food intakes by individuals in 1965–66 [1,2]. Since that time, extensive electronic data files about foods (descriptive information, nutrient values, and weights for typical food portions) have been assembled by USDA to support additional surveys. These files have been used to process thousands of dietary intake records, including those collected in the USDA Nationwide Food Consumption Surveys (NFCS) 1965–66, 1977–78, and 1987–88, and the Continuing Surveys of Food Intakes by Individuals (CSFII) 1985–86, 1989–91, and 1994–96, 1998. They were also used with the NHANES 1988–1994, and 1999–2000 (U.S. Department of Health and Human Services [3] and [4]). These data files continue to be used with WWEIA, NHANES, the ongoing survey that resulted from the integration of CSFII with the dietary interview component of NHANES. Each version of the FNDDS is developed specifically to support each release of two-year survey data from WWEIA, NHANES, i.e., FNDDS 1.0 was used for survey data collected in 2001–2002, FNDDS 2.0 for 2003–2004, FNDDS 3.0 for 2005–2006, FNDDS 4.1 for 2007–2008, and FNDDS 5.0 for 2009–2010. Over the years, the data files have been updated and expanded to address the increasing requirements for national food consumption data in the U.S.

The food and nutrient data files are released in association with the release of dietary intake data from WWEIA, NHANES to document how the dietary data were processed. Since 2004 this database of food information has been available on the internet, not only for researchers analyzing national survey data, but also for those conducting other dietary studies [5].

2.2. Relationship between FNDDS and SR

The relationship between FNDDS and SR is a very close one. FNDDS is built upon a foundation of nutrient data from approximately 2,900 SR codes. Both databases are produced by the Beltsville Human Nutrition Research Center of the USDA Agricultural Research Service. The Food and Nutrient Database for Dietary Studies (FNDDS) is published by the Food Surveys Research Group (FSRG) and the National Nutrient Database for Standard Reference (SR) is published by the Nutrient Data Laboratory (NDL). The databases each have unique features because they are designed for different purposes and serve different needs. The primary purpose of FNDDS is to assess food and nutrient consumption for the national U.S. survey WWEIA, NHANES. The purpose of SR is to disseminate composition data on U.S. foods as the “standard reference”.

Because of their different purposes and designs, each database has features that make it more appropriate for certain uses. For example, a search in FNDDS 5.0 for “beef steak” finds 18 codes, all representing cooked steak. Five cooking methods (broiled, fried, etc.) are represented plus one “cooked, NS (not specified) as to cooking method”. For each cooking method, there are three codes to describe whether just the lean meat was eaten, or the lean and fat, or if it was not specified (NS). The same search in SR24 finds 25 codes for specific individual cuts of beef steak, described as “lean and fat” or “lean only”, often in both raw and cooked versions, and with a few different cooking methods. This comparison relates back to the different purposes of the databases. The detail in SR is useful for finding nutrient values, if the specific cut of beef and enough of the other details are known in order to distinguish among

the list of codes. The more general descriptions in FNDDS are useful for food surveys and other dietary studies because generally survey respondents cannot report the specific cut of beef, they just report “steak”. In FNDDS, a representative nutrient profile for steak is calculated from a composite of SR codes for different types of steak.

Another difference between the databases is their code numbering schemes. FNDDS has 8 digit codes, with about 280 specific food groups/subgroups, in a hierarchical grouping designed for reporting and analyzing food consumption on a commodity group basis. (See Appendix A.) The FNDDS food coding scheme has been used with USDA surveys for over 40 years, allowing the study of food consumption over time. SR has 5 digit codes, with 25 food groups for the purposes of collecting and disseminating food composition data.

FNDDS contains more food mixtures than SR because it is specifically designed for use with dietary intake studies, and more food is consumed as mixtures than as single food items. In addition, FNDDS has more portion weights for a food than are usually found in the SR. FNDDS includes a large number of options for coding food amounts because people report intake using a wide variety of terms. Regarding nutrients/food components, FNDDS contains 65, with no missing values; SR may contain up to 146 nutrients/food components but values may be missing for some foods.

3. Description of FNDDS data, files, uses and updates

3.1. Contents of FNDDS

The FNDDS contains information about foods as they are consumed by the U.S. population. It includes food descriptions, weights for common food portions, and values for food energy and 64 other nutrients/food components. The FNDDS does not include dietary supplements. The database consists of several separate, but linked, data files. The primary linking field is an 8-digit food code. Together, the files form a normalized, relational database system where data redundancy is minimized. Figure 1 shows a diagram of the FNDDS files and their interrelationships. Table 1 lists the files and a brief description of each file’s contents.

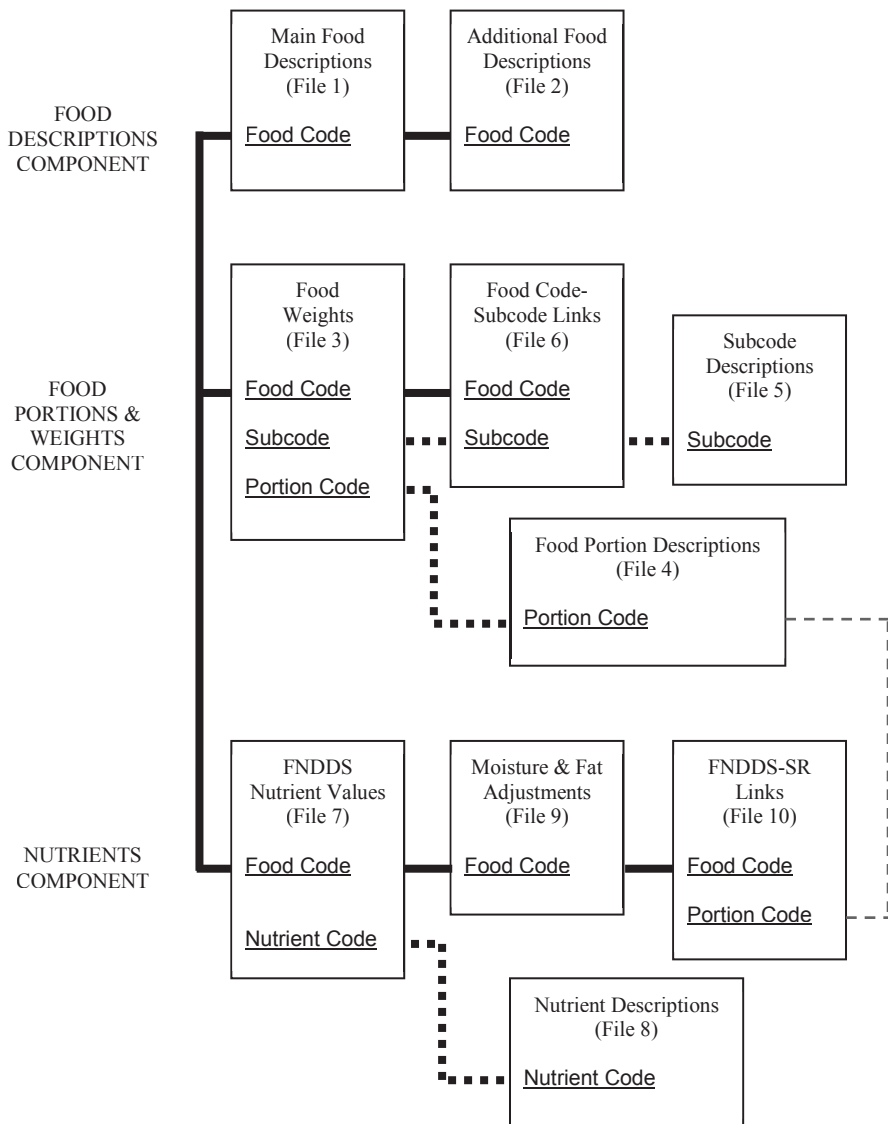


Fig. 1. Diagram of USDA Food and Nutrient Database for Dietary Studies files and interrelationships

File number in parentheses refers to the order of files as listed in Table 1. Food code is the primary link (thick solid lines) between the database components. Secondary links between files (dotted lines) include subcode and portion code in the Food Portions & Weights component, and nutrient code in the Nutrients component. Portion code also connects the FNDDS-SR Links file to the Food Portion Descriptions file (lighter dashed line.)

Table 1. Components and files of the USDA Food and Nutrient Database for Dietary Studies 5.0

FNDDS components and files	Data contained
<u>Food Descriptions Component:</u>	
1. Main Food Descriptions	primary description associated with each food code
2. Additional Food Descriptions	descriptions for additional foods associated with each main food description, sharing the same nutrient profiles and same food portion weights
<u>Food Portions and Weights Component:</u>	
3. Food Weights	gram weights for various portions of each food or beverage
4. Food Portion Descriptions	descriptions for portions of foods and beverages
5. Subcode Descriptions	descriptions for subcodes, which represent foods that are nutritionally similar to a main food, but have different weights for the same portion description
6. Food Code–Subcode Links	records that show the association between main food descriptions and subcodes
<u>Nutrients Component:</u>	
7. FNDDS Nutrient Values	a complete nutrient profile (energy and 64 nutrients/food components) for each food code
8. Nutrient Descriptions	descriptions and units of measure associated with the nutrients in the FNDDS
9. Moisture & Fat Adjustments	factors used during calculation of the nutrient values for some foods in the database
10. FNDDS–SR Links	information used during calculation of nutrient values in the database; documents the links between the FNDDS and the USDA National Nutrient Database for Standard Reference (SR)

Three additional files are included as part of the FNDDS 5.0 release. The Modifications Descriptions file and the Modifications Nutrient Values file provide the codes, descriptions and nutrient values for items used in WWEIA, NHANES 2009-2010 that are modifications of standard FNDDS foods. The file named “Nutrient Values for Ingredients Not Released in SR24” is an Excel® file that provides the descriptions and nutrient values for the small number of records in the FNDDS-SR Links file that use an SR code not in SR24 (the version of SR used for FNDDS 5.0). (See Sections 3.1.4 and 3.1.5 for more discussion.)

3.1.1. Food Descriptions component

The Food Descriptions component includes more than 7,200 main food descriptions. Each main description in File 1 is linked to a unique 8-digit food code, which is assigned following a structured scheme for grouping foods (Appendix A). There are also more than 7,400 additional food descriptions in File 2 (about half of which are brand names) linked to the food codes and main descriptions. The additional food descriptions provide information that is useful when assigning a reported food to the appropriate food code during the coding of dietary intake data. Table 2 shows an example of the food descriptions linked to a food code.

Table 2.Examples of data records from the Food Descriptions Component of the FNDDS

From the Main Food Descriptions file	From the Additional Food Descriptions file
Food Code: 53206000	Food Code: 53206000
Food Description: Cookie, chocolate chip	Additional Food Descriptions: Pepperidge Farm Chocolate Chunk® Nabisco Chips Ahoy!® Grandma® Keebler Rainbow Chips Deluxe®

3.1.2. Food Portions and Weights component

The Food Portions and Weights component contains approximately 31,500 weights for common portions of foods, including portion weights for many specific brand names. The wide variety of portion weights in the FNDDS makes it easier to code the assortment of food amounts that are reported in dietary studies. For each food in the FNDDS, there is a set of portions appropriate to that food and weights for those portions (File 3). The descriptions for food portions are provided in a separate file (File 4). Also included in this component are two files (File 5 and File 6) containing data for subcodes, which represent foods that are nutritionally similar to a main food but have different weights for the same portion description. Some examples of food portion descriptions are given in Table 3.

Table 3.Examples of FNDDS food portion descriptions

Types of portion descriptions	Examples
individual portions	slice, piece
containers and packages	can, snack size, 100-calorie pack
brand names (when related to portion size)	1 McDonald's® Sundae, 1 Hot Pocket®
relative size	small, regular, large
household measures	teaspoon, tablespoon, cup

3.1.3. Nutrients component

The Nutrients component includes values for food energy and 64 other nutrients/food components for each food code, as listed in Appendix B. The source of nutrient values (File 7) and nutrient descriptions (File 8) for the FNDDS is the latest release of the USDA National Nutrient Database for Standard Reference (SR) at the time that FNDDS is released. FNDDS 1.0 is based on SR, Release 16.1 (SR 16.1); FNDDS 2.0 is based on SR 18; FNDDS 3.0 is based on SR 20; FNDDS 4.1 is based on SR 22; FNDDS 5.0 is based on SR 24 [6]. Nutrient values in FNDDS are calculated from the nutrients of approximately 2,900 SR codes. The SR documentation, available from the USDA Nutrient Data Laboratory (NDL) website, includes discussion of the sources of nutrient values which include scientific and technical literature, and unpublished data from food industry, other government agencies, and USDA-contracted research. A source code in the SR Nutrient data file indicates if a value was based on laboratory analyses or calculated by using appropriate algorithms, factors, or recipes.

The Nutrients component also includes the Moisture & Fat Adjustments file (File 9) and the FNDDS-SR Links file (File 10). Those files document how nutrient values for the FNDDS are calculated from the SR data. The FNDDS-SR Links file documents the link between SR codes and FNDDS foods. Approximately one-third of FNDDS foods are represented by a one-to-one link between an FNDDS code and the corresponding SR code (e.g., whole milk, raw apple) and the remaining two-thirds of FNDDS

foods are linked to multiple SR codes and may represent commercial, restaurant, or home-prepared foods. Nutrient values for food mixtures or “recipes” are calculated according to the retention factor method [7].

3.1.4. Modifications files

During the coding process of dietary recalls in WWEIA, NHANES, predefined recipes for some food mixtures are modified to match more closely the food as described by the respondent. Nutrients for the food are modified by substituting ingredients (such as the type of fat or milk) in the standard recipe for the mixture or by modifying the amount of liquid. An example of a modified recipe is an egg fried in butter instead of margarine (the fat used in the standard recipe). Each modification is assigned a unique 6-digit identification number. The files for modifications descriptions and modifications nutrients have been made available with previous versions of FNDDS upon request. With this version of the FNDDS, they are now included with the downloaded FNDDS 5.0 files. Reported food items that were modified in WWEIA, NHANES 2009-2010 are identified in the Individual Foods File by a 6-digit modification code (in the DR1MC or DR2MC fields), in addition to the 8-digit USDA food code for the item that was modified (in the DR1IFDCD or DR2IFDCD fields). The Individual Foods File of the WWEIA data release can be accessed from the FSRG website (www.ars.usda.gov/ba/bhnrc/fsrg) by following the links for What We Eat in America.

3.1.5. Nutrient Values for Ingredients Not Released in SR24

With few exceptions, the codes from SR24 used in the FNDDS-SR Links file are available from the NDL website (www.ars.usda.gov/ba/bhnrc/ndl). For the 38 items that are not released in SR24, nutrient values for these items are included with the downloaded FNDDS 5.0 files as an Excel® file that includes the SR code, description, and nutrient values for each of the 38 items.

3.2. Special Features of FNDDS

The database includes a wide variety of foods, reflecting the diversity in the American diet and the type of products in the market. There are more than 800 ethnic foods including Latino/Hispanic and Asian items; regional foods including various types of wild game; and more than 140 low or reduced sodium foods. There are also foods identified as “defaults” to be used when survey participants are not able to provide details about the item they ate. The descriptions for default foods include the term “NFS” which stands for the phrase “not further specified” (e.g. Milk, NFS), or the term “NS” which stands for “not specified” as to a certain factor (e.g. Ground beef, NS as to % lean).

There are a wide variety of portions in FNDDS, reflecting the way survey participants report foods by package sizes and brand names (e.g., 1 Capri Sun® container, 1 McDonald’s® cheeseburger). Default amounts are identified that can be used when survey participants are not able to provide complete information about the amount they consumed. Nearly all foods have a portion described as “Quantity not specified”, e.g. for milk the Quantity not specified is 244 grams, the equivalent weight of 1 cup. Some foods also have portions described as a “Guideline amount”, e.g. for milk there is a Guideline amount per cup of ready-to-eat cereal equal to 122 grams, the equivalent weight of one half cup.

3.3. Purpose and Uses of FNDDS

The primary purpose of the FNDDS is to code foods and portions, and to calculate nutrients for the national U.S. dietary survey. The FNDDS is useful for analyses of the survey data. Some examples of how the database files have been used in conjunction with past survey data include (1) development of a special food grouping scheme to study trends in food consumption [8]; (2) disaggregation of mixed foods to study portions of specialized food groups [9]; and (3) addition of food components to the database to expand the nutritional analysis of the survey data [10].

The database can also be used in other food intake studies to code foods and amounts and to calculate the energy and nutrient content of those foods. For example, FNDDS was used in the following research projects:

- School Nutrition Dietary Assessment Study (SNDA) – a nationally representative study of meals and snacks served to children in the National School Lunch Program and School Breakfast Program, and the food environment (Food and Nutrition Service, USDA)
- The National Household Food Acquisition and Purchase Survey (FoodAPS) - a nationally representative survey of household food purchases and acquisitions (Economic Research Service, USDA)
- Healthy Aging in Neighborhoods of Diversity across the Life Span (HANDLS) – a 20 year longitudinal study to understand the sources of persistent health disparities (National Institute on Aging, NIH)

In addition, FNDDS is the underlying database for many other specialized databases, and consumer and research products, including:

- USDA Food Patterns Equivalents Database (formerly MyPyramid Equivalents Database (MPED) – translates foods consumed in national dietary surveys to food groups based on dietary guidance (Food Surveys Research Group, USDA)
- Food Intakes Converted to Retail Commodities Database (FICRCD) – converts foods consumed in national dietary surveys to retail-level commodities (Food Surveys Research Group, USDA)
- *What's In The Foods You Eat* Search Tool – a consumer-friendly search tool for viewing nutrient profiles for 13,000 foods (Food Surveys Research Group, USDA)
- SuperTracker and Food-A-Pedia – consumer-friendly online dietary assessment and food information tool (Center for Nutrition Policy and Promotion, USDA)
- Automated Self-administered 24-hour Recall (ASA24) - web-based tool for conducting self-administered 24-hour recalls for research studies (National Cancer Institute, NIH)
- Diet History Questionnaire - a food frequency questionnaire for research studies (National Cancer Institute, NIH)

3.4. Updates to the database for FNDDS 5.0

The focus of updates to each FNDDS has been on new foods and beverages reported in the survey, fortified foods and beverages, top national brands, and priority foods and beverages. As WWEIA food intakes are processed and the reported foods and amounts are coded, the FNDDS food descriptions and portion weights undergo continual review. New food items and new portion sizes are added as needed. The nutrients for all foods are updated to reflect the nutrient composition values from the most recent version of SR available at the time each version of FNDDS is finalized.

Two types of regular, planned data reviews also contribute to FNDDS updates. First, before a new version of FNDDS is used to process survey data, foods are selected for comprehensive review based on frequency of use by ethnicity and age, changes in the marketplace, date of last review, and changes in SR. These reviews ensure that the descriptions, weights, and nutrients in FNDDS reflect the current marketplace. The second type of regular, planned data review is done before finalizing the database for release, when all changes made to high priority foods undergo in-depth review. The high priority foods, selected based on frequency of reports and total consumption, include about 400 foods that account for about 70% of intake. These high priority foods are reviewed to ensure the accuracy of changes made to these foods [11,12].

For each version of FNDDS, the FNDDS Nutrient Values file and the FNDDS-SR Links file are updated using the latest release of the SR corresponding with the release of WWEIA data (e.g., FNDDS 5.0 was updated with SR24 for WWEIA 2009-2010). Data for about 2,900 SR items were used to determine the nutrient values for the more than 7,200 FNDDS foods. As new and updated nutrient data

are included in the SR, they are evaluated and incorporated into the FNDDS. Updates include the complete nutrient profiles for new foods; the addition of new nutrients for existing foods, and revisions to reflect updates to SR when appropriate. New nutrients are added to FNDDS when sufficient analytical data are available to permit NDL to estimate values for the SR foods required for FNDDS. The latest nutrient added to the database was Vitamin D (D2+D3) for FNDDS 4.1. Updates to SR foods overall and those used in FNDDS are reviewed and revised as appropriate for each FNDDS.

The size and complexity of the FNDDS necessitates careful quality control practices to ensure accuracy and consistency of the data. The FNDDS contains about 3 million data points held in many files interrelated through common fields. A comprehensive quality control plan is in place to ensure that interrelationships are maintained among the various database files and that updates do not introduce errors [13]. Checks for content validity, accuracy, and referential integrity are performed at all data processing steps. These checks are reviewed and updated for each 2-year data release. Historical files are also maintained to provide documentation of all changes in database values.

Updates to the database for FNDDS 5.0 include the addition of approximately 100 new foods that were reported in 2009-2010, along with more than 2,000 revisions made to weight data. Linkages to SR were revised for approximately 1,500 recipes. Table 4 provides a summary of major changes and examples of foods reflecting those changes. For each version of FNDDS, the documentation that accompanies the database includes a similar table which provides a summary of the changes from the previous version.

Table 4. Major updates to the database for FNDDS 5.0

Type of change	Number	Examples of foods
New foods added	99	New fast food sandwiches, brand name cereal/snack bars, low calorie versions of some sports drinks, ready-to-eat breakfast cereals, infant formulas Expansion of whole egg and egg white omelets with different fillings, oatmeal made with milk, pizzas to further differentiate types of crust and toppings, French fries topped with cheese and/or chili
Food codes discontinued	20	Products no longer on the market, such as certain brands of ready-to-eat cereals
Food descriptions revised	357	Ready-to-eat breakfast cereals where name changed by manufacturer
Revisions made to weight data	2,261	Additions: New portion sizes for baby food items and fast food items; 100-calorie packages and single servings for snack items, candies, ready-to-eat cereals; School container portions for juices. Deletions: For fast food and baby food items where portion weights are no longer available Revisions: Changes made to weights for some fast food items including chicken tenders and strips, sandwiches, order sizes of French fries and milk shakes Portion weights increased to follow market trends and/or to match changes in SR: chicken parts (breast, drumstick, thigh, leg, and wing); scoop/dip sizes for ice cream; top-reported breads, rolls, biscuits, tortillas, fruit muffins, chocolate chip cookies
Changes in SR that impact FNDDS	Numerous	Processed cheese, eggs, chicken, pasta sauce, beef frankfurter, pork, fish, shrimp, bread, rolls, tortilla, French fries, pizza, ready-to-eat cereals, tortilla chips
Revisions in the selection of SR items to determine nutrient values for FNDDS foods	About 1,500	New SR codes used to revise linkages for foods including sausage pizza, chili, fast food chicken sandwiches, tacos, burritos, ice-cream sandwiches, salad dressings, wheat bagels, ravioli, Hot Pockets [®] /turnovers, pies, icing, sauces, Chinese entrees. Composites for “not further specified” items updated to reflect market share data: milk, chocolate milk, cheese, fish, wheat bread Additional changes within food mixtures including incorporation of enhanced pork and chicken; adjustment of salt in select mixed dishes; revision of select Asian foods; other miscellaneous changes.

The FNDDS is used by the research community to address a variety of research interests and applications beyond WWEIA. Sometimes FNDDS users question whether versions of the database could be released more frequently. It must be kept in mind that the reason FNDDS is developed is to process dietary intake data and calculate appropriate nutrient intakes for a particular two-year WWEIA, NHANES survey period. The two-year release of data follows the protocol for NHANES. When the FNDDS is updated, the focus is on updating data values for that survey time period including both changes in the marketplace and information reported by survey participants. The FNDDS is released a few weeks prior to the release of the WWEIA, NHANES dietary data. This timing assures that the quality control checks of the dietary data including nutrient intake values have been performed. Thus, the FNDDS data will be appropriate for the specific two-year WWEIA survey period of dietary data collection, not the date when the database is released.

3.5. Obtaining the FNDDS

The FNDDS is available for downloading from the internet (<http://www.ars.usda.gov/ba/bhnrc/fsrg>) in three common formats – Microsoft Access®, SAS®, and ASCII. Detailed instructions for downloading

are provided on the website, as well as extensive documentation that describes the files, their fields and the relationships between files. Also available is a function to search the description, weight and nutrient data for one food at a time called the “What’s in the Foods You Eat Search Tool”.

The FNDDS is available free and is not copyrighted, but users are asked to cite the database in publications of their research. The suggested citation for FNDDS 5.0 is:

Ahuja JKC, Montville JB, Omolewa-Tomobi G, Heendeniya KY, Martin CL, Steinfeldt LC, Anand J, Adler ME, LaComb RP, and Moshfegh AJ. 2012. *USDA Food and Nutrient Database for Dietary Studies, 5.0*. U.S. Department of Agriculture, Agricultural Research Service, Food Surveys Research Group, Beltsville, MD.

4. Conclusion

A new version of the FNDDS (5.0) is available on the internet. The database, which was used to process and analyze dietary intakes from What We Eat in America, NHANES 2009-2010, may be used in conjunction with research utilizing dietary data from the national food survey, or it may be used for other dietary research projects. The FNDDS provides information to use for coding dietary intakes and analyzing those intakes for nutrient content. The database is updated and a new version is released every two years in conjunction with the release of data for a WWEIA, NHANES survey period. To learn more, researchers are encouraged to explore the FSRG website (<http://www.ars.usda.gov/ba/bhnrc/fsrg>) and sign up for the listserv for email announcements about the FNDDS, What We Eat in America, and other FSRG products and activities.

Disclaimer

Mention of commercial products in this article is solely for the purpose of providing specific information and does not imply recommendation or endorsement by the U.S. Department of Agriculture over others not mentioned.

References

- [1] U.S. Department of Agriculture, Agricultural Research Service. Food and Nutrient Intakes of Individuals in the United States, Spring 1965. USDA Household Food Consumption Survey 1965-66, Report No.11, 1972. (Accessed September 10, 2012, at http://www.ars.usda.gov/SP2UserFiles/Place/12355000/pdf/6566/hfcs6566_rep_11.pdf)
- [2] Tippet KS, Enns CW, Moshfegh AJ. Food consumption surveys in the U.S. Department of Agriculture. *Nutr Today* 1999; 34: 33–46.
- [3] U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. Plan and Operation of the Third National Health and Nutrition Examination Survey, 1988–1994. National Center for Health Statistics. Vital and Health Stat. 1 (32), 1994. (DHHS Publ. No. PHS 94-1038)
- [4] U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. NHANES 1999–2000 and 2001–2002. Data Files: Dietary Intakes (Individuals Foods File) Documentation, 2002. (Accessed May 20, 2004, at <http://www.cdc.gov/nchs/nhanes.htm>)
- [5] Bodner-Montville J, Ahuja JKC, Ingwersen LA, Haggerty ES, Enns CW, Perloff BP. USDA Food and Nutrient Database for Dietary Studies: Released on the web. *J Food Comp Anal* 2006; 19(Supplement 1):S100-S107.
- [6] U.S. Department of Agriculture, Agricultural Research Service. USDA National Nutrient Database for Standard Reference, Release 24. 2011. (Accessed February 2, 2012, at <http://www.ars.usda.gov/ba/bhnrc/ndl>)
- [7] Powers PM, Hoover LW. Calculating the nutrient composition of recipes with computers. *J Am Diet Assoc* 1989; 89(2):224–232.
- [8] Nielsen SJ, Siega-Riz AM, Popkin BM. Trends in energy intake in U.S. between 1977 and 1996: Similar shifts seen across age groups. *Obes Res* 2002; 10(5):370–378.

- [9] Smiciklas-Wright H, Mitchell DC, Mickle SJ, Cook AJ, Goldman JD. Foods Commonly Eaten in the United States: Quantities Consumed per Eating Occasion and in a Day, 1994–1996. U.S. Department of Agriculture NFS Report No. 96-5, 2002; 252 pp. (Accessed September 10, 2012, at <http://www.ars.usda.gov/SP2UserFiles/Place/12355000/pdf/Portion.pdf>)
- [10] Maras JE, Bermudez OI, Qiao N, Bakun PJ, Boody-Alter EL, Tucker KL. Intake of alpha-Tocopherol is limited among US adults. *J Am Diet Assoc* 2004; 104(4):567–575.
- [11] Ahuja JKC, Perloff, BP. Quality control procedures for the USDA Food and Nutrient Database for Dietary Studies nutrient values. *J Food Comp Anal* 2008; 21:S119-S124.
- [12] Ahuja JKC, Montville JB, Moshfegh AM. Priority Foods approach to managing and updating USDA’s Food and Nutrient Database for Dietary Studies. [abstract]. 33rd National Nutrient Databank Conference. Program & Abstracts, 2009;P23. (Accessed December 8, 2011, at http://www.nutrientdataconf.org/PastConf/NDBC33/Program_book.pdf)
- [13] Anderson E, Steinfeldt LC, Ahuja JKC. Food and nutrient changes: software designed to enhance data quality. *J Food Comp Anal* 2004; 17:557–564.

Presented at NNDC (March 25-28, 2012 – Houston, TX) as Poster # 27

Appendix A. FNDDS Food Coding Scheme

A food is assigned an 8-digit number according to a scheme developed by FSRG that outlines the major food groups and subgroups. The first digit in the food code identifies one of the following nine major commodity food groups:

- 1 Milk and Milk Products
- 2 Meat, Poultry, Fish and Mixtures
- 3 Eggs
- 4 Legumes, Nuts and Seeds
- 5 Grain Products
- 6 Fruits
- 7 Vegetables
- 8 Fats, Oils, and Salad Dressings
- 9 Sugars, Sweets, and Beverages

The second, third, and sometimes fourth digits of the 8-digit food code identify increasingly specific subgroups. Below is an example of some of the subgroups in the Meat, Poultry, Fish and Mixtures group.

- 2 Meat, Poultry, Fish and Mixtures
 - 25 Organ meats, sausages and lunchmeats, and meat spreads
 - 252 Frankfurters, sausages, lunchmeats, meat spreads
 - 2521 Frankfurter
 - 2522 Sausages
 - 2523 Luncheon meats

The remaining part of the code number (the fifth through the eighth digit) does not have a specific meaning in terms of food grouping, although close numbers are usually assigned to similar foods.

The entire coding scheme is included in documentation that accompanies the FNDDS.

Appendix B. List of nutrients/food components and units in FNDDS 5.0

Food energy (kcal)	Vitamin A as retinol activity equivalents (mcg)
Protein (g)	Retinol (mcg)
Carbohydrate (g)	Carotenoids:
Fat, total (g)	Carotene, alpha (mcg)
Alcohol (g)	Carotene, beta (mcg)
	Cryptoxanthin, beta (mcg)
Sugars, total (g)	Lycopene (mcg)
Dietary fiber, total (g)	Lutein + zeaxanthin (mcg)
Water (g)	Vitamin E as alpha-tocopherol (mg)
	Vitamin E, added (mg)
Saturated fatty acids, total (g)	Vitamin D (D2+D3) (mcg)
Monounsaturated fatty acids, total (g)	Vitamin K as phylloquinone (mcg)
Polyunsaturated fatty acids, total (g)	Vitamin C (mg)
Cholesterol (mg)	Thiamin (mg)
	Riboflavin (mg)
Individual fatty acids:	Niacin (mg)
4:0 (g)	Vitamin B-6 (mg)
6:0 (g)	Folate, total (mcg)
8:0 (g)	Folate as dietary folate equivalents (mcg)
10:0 (g)	Folic acid (mcg)
12:0 (g)	Food folate (mcg)
14:0 (g)	Vitamin B-12 (mcg)
16:0 (g)	Vitamin B-12, added (mcg)
18:0 (g)	Choline, total (mg)
16:1 (g)	
18:1 (g)	Calcium (mg)
20:1 (g)	Iron (mg)
22:1 (g)	Magnesium (mg)
18:2 (g)	Phosphorus (mg)
18:3 (g)	Potassium (mg)
18:4 (g)	Sodium (mg)
20:4 (g)	Zinc (mg)
20:5 n-3 (g)	Copper (mg)
22:5 n-3 (g)	Selenium (mcg)
22:6 n-3 (g)	
	Caffeine (mg)
	Theobromine (mg)
