

# THE FOOD PATTERNS EQUIVALENTS DATABASE

## What is FPED?

The Food Patterns Equivalents Database (FPED) is a free federal resource that allows researchers to examine diets in a standardized way. Like nutrient composition databases, which translate amounts of foods into quantities of the nutrients they contain, FPED can be used to translate foods as eaten into quantities of dietary components of interest.

The database disaggregates foods as eaten (i.e., the way foods are reported on surveys) into their ingredients and then classifies those ingredients into predefined, nutritionally meaningful groupings, such as Whole Grains or Added Sugars,

which it terms “components.” This disaggregation and classification result in variables representing important constructs that can be used in dietary analyses.

The U.S. Department of Agriculture (USDA) originally developed FPED for use in analyzing dietary data from What We Eat In America (WWEIA), the dietary intake portion of the National Health and Nutrition Examination Survey (NHANES). However, this research resource can be used in many other types of dietary studies as well. By using FPED, nutritionists and researchers can characterize many different kinds of food and beverages beyond those reported in WWEIA into components that are relevant to dietary analysis and guidance.

## Why do we need FPED?

Dietary data collected through WWEIA and other kinds of dietary studies tell us what people eat and drink. Restaurant and cafeteria menus tell us what food and beverage choices people have when they eat out. This information can be used to answer many types of research questions about the extent to which Americans are following dietary guidance recommendations; the relationship of dietary choices to health outcomes, such as obesity or high blood pressure; and the healthfulness of foods available in communities where people live and work.

To answer these questions, researchers need to be able to quantify food components of nutritional importance in a standardized way. It would be easy to do that if people consumed only simple foods and beverages, like these shown here.



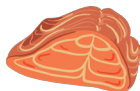
### Ingredients

- Sweet potato



### Ingredients

- White rice



### Ingredients

- Salmon



### Ingredients

- Nonfat milk



### Pizza ingredients

- Flour
- Tomato sauce
- Cheese
- Olives
- Peppers
- Mushrooms
- Sausage
- Vegetable oil



### Soup ingredients

- Broth
- Onions
- Carrots
- Potatoes
- Tomatoes
- Celery
- Kidney beans
- Pasta
- Beef

Furthermore, even individual ingredients within foods can have components that are relevant to dietary intake research and dietary guidance. For example, the sausage in the pizza contains protein, an important nutrient, but it also contains solid fats, which add calories and saturated fats.

## How is FPED organized?

FPED has 37 Food Patterns<sup>1</sup> components. These include components to encourage (e.g., Dark-Green Vegetables, Whole Grains) and components to limit or avoid (e.g., Solid Fats, Added Sugars) (Table 1, p. 3).

Collectively, FPED components can be used to fully characterize basic commodity foods, multi-ingredient foods, and processed and prepared foods.

## How does FPED disaggregate foods and classify their ingredients into components?

The sandwich example below provides a graphic representation of how FPED components are determined.

Note that even some single-ingredient foods, like the ham, can be disaggregated. Solid fats naturally found in meat and dairy are classified into the Solid Fats component. Fats naturally found in nuts and seeds, fish, olives, and avocados are classified into the Oils component. Added sugars found in foods such as applesauce or ice cream are classified into the Added Sugars component, and refined grains contained in any grain food are classified into the Refined Grains component.

## How are amounts assigned to FPED components?

Once a group of foods has been disaggregated and their ingredients classified into FPED components, the data are almost ready to be analyzed to answer such questions as how

well dietary intakes conform to dietary recommendations. But first, the amounts of the FPED components must be determined.

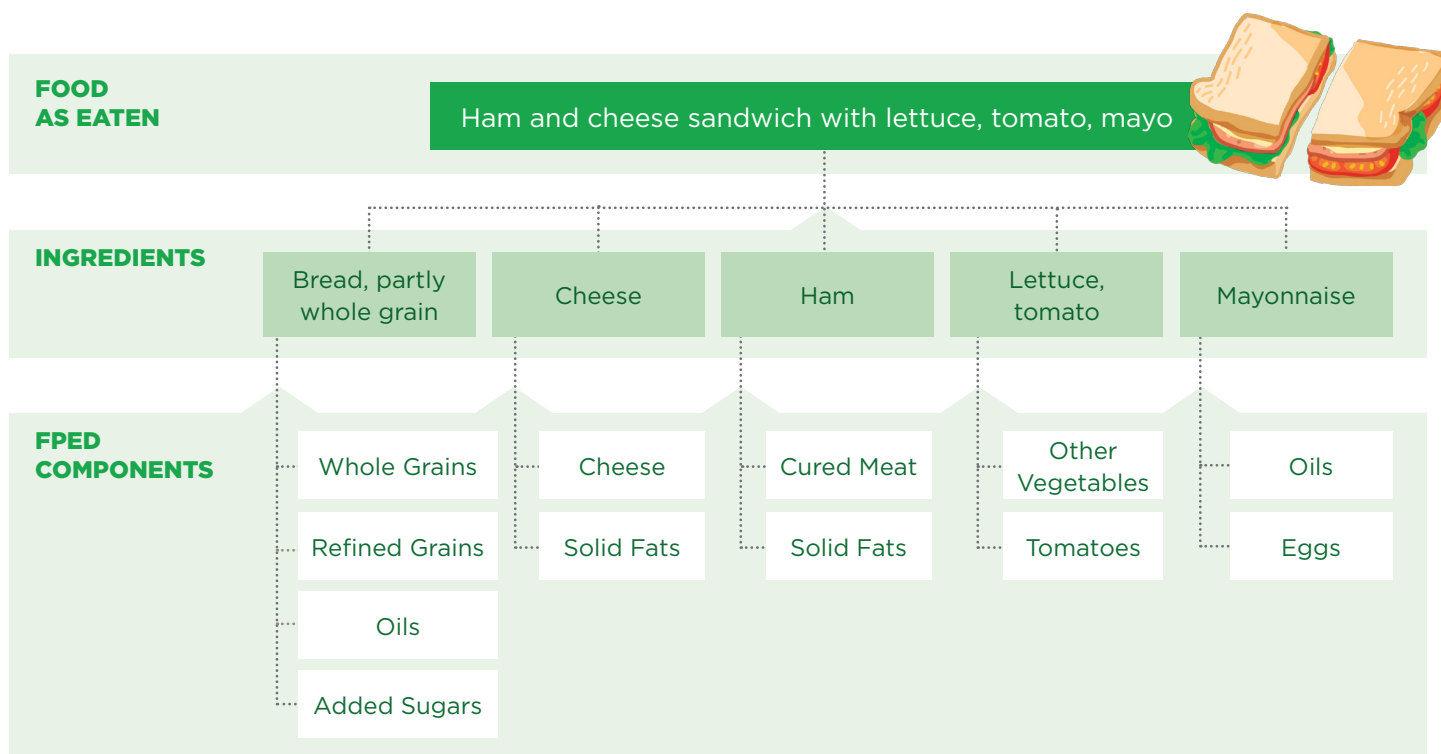
That presents a challenge because foods as reported in surveys or gathered for research purposes are generally presented in terms of their weight in grams. However, dietary recommendations, like those in USDA's Food Patterns, are given in terms of typical household measures, such as cups, ounces, and teaspoons. That means that the gram amounts of foods in FPED components, such as Total Grains or Dark-Green Vegetables, must be converted into these measures.

An additional challenge is that the foods in FPED components may differ from each other in various characteristics and that makes their amounts hard to compare. One way to mitigate these differences is to standardize the amounts of foods in each component by using "equivalents."

An **equivalent** is an amount considered nutritionally equal to 1 cup in the vegetable, fruit, or dairy components or 1 ounce in the grains or protein foods components.

A **cup equivalent** may be less than a measured cup because the food has been concentrated (tomato paste). It may be more than a cup if the food is airy in its raw form (salad greens). Or, it may be measured differently (cheese). FPED 1-cup equivalents:

- **Vegetables and Fruits:** 1 cup raw or cooked vegetable or fruit; ½ cup dried vegetable or fruit; 1 cup vegetable or fruit juice; 2 cups leafy salad greens.



**Table 1. FPED Components**

Total Fruit
Citrus, Melons, Berries
Other Fruits
Fruit Juice

Total Vegetables
Dark-Green Vegetables
Total Red-Orange Vegetables
Tomatoes
Other Red-Orange Vegetables, Excluding Tomatoes
Total Starchy Vegetables
White Potatoes
Other Starchy Vegetables, Excluding White Potatoes
Other Vegetables
Beans and Peas*

Total Grains
Whole Grains
Refined Grains

Total Dairy (Milk, Yogurt, Cheese)**
Milk (including calcium-fortified soy milk)**
Yogurt**
Cheese**

Total Protein Foods***
Total Meat, Poultry, Seafood***
Meat (beef, veal, pork, lamb, game)***
Cured Meat (frankfurters, sausage, corned beef, and luncheon meat made from beef, pork, poultry)***
Organ Meat (from beef, veal, pork, lamb, game, poultry)***
Poultry (chicken, turkey, other fowl)***
Seafood high in n-3 fatty acids (e.g., salmon)***
Seafood low in n-3 fatty acids (e.g., tilapia)***
Eggs***
Soybean Products (excluding calcium-fortified soy milk and immature soybeans)***
Nuts and Seeds***
Beans and Peas*

Oils (e.g., olive oil, vegetable oil, and fats naturally found in nuts, fish, olives, and avocado)
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Solid Fats (e.g., butter; fats naturally found in dairy and meat; fats used in making cookies, cakes, ice cream)
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Added Sugars (e.g., caloric sweeteners in soda, candy, dairy desserts, cakes, cookies)
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Alcoholic Drinks
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\* Beans and peas are included twice in the FPED database because they can be quantified either as a vegetable or a protein food.

\*\* Nonfat portion    \*\*\* Lean portion

► **Dairy:** 1 cup milk, fortified soy beverage, or yogurt; 1½ ounces natural cheese (e.g., cheddar); 2 ounces of processed cheese (e.g., American).

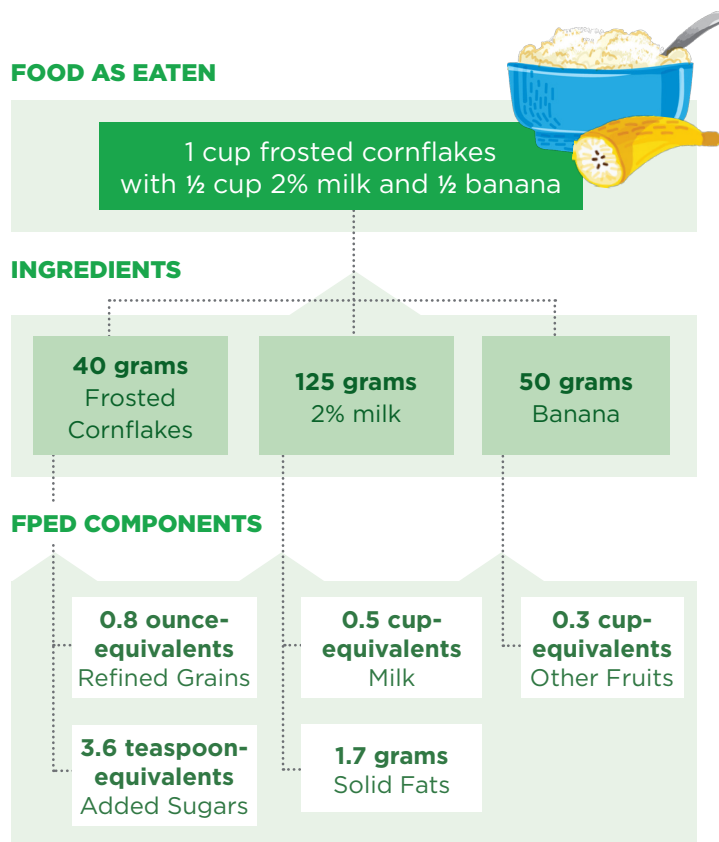
An **ounce equivalent** may be less than a measured ounce if the food is concentrated or low in water content (nuts, peanut butter, dried meats, or flour), or more than an ounce if the food contains a relatively large amount of moisture (tofu, cooked rice, or pasta). FPED 1-ounce equivalents:

- **Grains:** For grain products such as bagels, breads, cakes, cookies, doughnuts, pretzels, muffins, pancakes, pies, and tortillas, each 16 grams of flour in the food is a 1-ounce equivalent. For intact grains, like bulgur, or grain products like hot cereals or ready-to-eat cereals, each 28.35 grams of grain is a 1-ounce equivalent.
- **Protein Foods:** 1 ounce lean meat, poultry, seafood; 1 egg; 1 tablespoon peanut butter; ½ ounce nuts or seeds. ¼ cup cooked beans or ¼ cup peas also may be counted as a 1 ounce-equivalent.

Equivalents for other FPED components:

- **Added Sugars:** Teaspoons
- **Solid Fats, Oils:** Grams
- **Alcoholic Drinks:** Number of alcoholic drinks

Using equivalents, FPED calculates an amount of each component based on the grams of the original ingredient as eaten. Here's how it works, using another example.



## How can FPED be used?

FPED is the only publicly available U.S. database that systematically translates foods as eaten in the WWEIA, NHANES, into Food Patterns components of nutritional interest. Because of that, it is an essential tool for any nutritionist interested in examining food intakes in a standardized way.

FPED is especially easy to use with any data collection system, tool, or application that relies on USDA's Food and Nutrient Database for Dietary Studies (FNDDS) to examine foods and beverages.<sup>2</sup> As a free federal resource, FPED also provides complete documentation, ensuring transparency about how the data are derived.

FPED has been primarily used to assess how well Americans are doing in following dietary guidance recommendations. It has a number of other potential applications as well.

It can be used to conduct nutrition intervention research, epidemiologic research, and policy-related analysis. For example, researchers could:

- ▶ Conduct an intervention to increase fruit and vegetable consumption in schools. At the end of the study, they could use FPED in their analysis to evaluate whether the children's diets had improved. The resulting measure of fruit and vegetable intake would likely be more precise than other assessments because it would capture all sources of fruits and vegetables, even those in multi-ingredient foods.
  - ▶ Examine the effect of dietary patterns or overall diet quality in relation to some health outcome. Researchers could use FPED to characterize the population's diets according to their dietary component composition and then determine the patterns inherent in, and the quality of, those diets using a scoring metric, such as the Healthy Eating Index-2010<sup>3</sup> or the Alternative Healthy Eating Index. The standardization that FPED provides would facilitate comparisons across studies.
- ▶ Conduct a modeling study to estimate the effects of a policy change in a food assistance program or a change in food labeling regulations. FPED could be used to estimate the effects of the policy change on people's diet; the metrics would be in terms of dietary guidance and would be comparable to other studies.

FPED also can be used to develop or enhance educational and assessment tools:

- ▶ [SuperTracker](#) is USDA's web-based tool that helps people plan, analyze, and track their food intake and physical activity. More than 2 million consumers have already signed up. FPED serves as the basis for the database used in SuperTracker to show users how their diets compare to dietary recommendations.
- ▶ The [ASA24™](#) is a web-based, automated, self-administered 24-hour recall developed by the National Cancer Institute (NCI). Linking the data collected to FPED allows ASA researchers to examine dietary component intakes as well as nutrient intakes, thus conducting a much greater range of analyses than would otherwise be possible.
- ▶ Researchers are beginning to use a new generation of mobile and hand-held devices to collect dietary data, and access to FPED can significantly expand the potential applications of this emerging technology.

### LEARN MORE ABOUT FPED

- ▶ Visit USDA's [Food Surveys Research Group](#) website.
- ▶ [Obtain](#) FPED 2009–2010 products, databases, and data analysis software files.
- ▶ Access summarized [data tables](#) from the 2007–2008 and 2009–2010 FPED data releases.

## NOTES

- 1 The [Food Patterns](#) are templates for healthy eating that USDA developed to help Americans translate the 2010 Dietary Guidelines into everyday eating choices.
- 2 [FNDDS](#) is a database of about 8,000 foods and beverages, their nutrient values, and weights for typical portions. The items in FNDDS are derived from foods and beverages reported in NHANES/WWEIA. Each of the items in FNDDS has a distinct code, and these codes form a link between the FNDDS and the FPED.
- 3 To learn more, visit the Healthy Eating Index-2010 websites at [NCCOR](#), [USDA](#), and [NCI](#).