



Estimating Prices for Foods in the National Health and Nutrition Examination Survey: The Purchase to Plate Price Tool

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What Is the Issue?

The 2018 Farm Bill mandates that the market basket of the Thrifty Food Plan (TFP) be updated every 5 years using current food prices, food composition, food consumption patterns, and dietary guidance. The TFP forms the basis of the maximum allotment for the Supplemental Nutrition Assistance Program (SNAP) benefits and uses the same modeling framework as the other three USDA food plans (namely, the Low-Cost, Moderate-Cost, and Liberal food plans). The Department of Defense uses the Liberal Food Plan in setting the Basic Daily Food Allowance for service-members. Current food composition and food consumption data are available through What We Eat in America, the dietary component of the National Health and Nutrition Examination Survey (WWEIA/NHANES). *The Dietary Guidelines for Americans* provides current dietary guidance. However, food price information that aligns with these data are not available.

Researchers and policymakers have used retail and household scanner data for almost 2 decades to estimate food prices. However, many foods in the WWEIA/NHANES are represented as an edible rather than a retail food, making direct use of scanner data to estimate WWEIA food prices difficult. The weight of an edible food does not include inedible parts such as seeds, skins, cores, shells, and bones that are typically included in the retail weight. In addition, foods prepared at home are often combinations of several ingredients. For these reasons, edible food prices must be estimated using standard recipes and conversion factors to convert the retail foods represented in scanner data into the edible foods found in WWEIA/NHANES. This report presents an approach to using scanner data to estimate food prices for WWEIA/NHANES.

What Did the Study Find?

The Purchase to Plate Price Tool (PPPT) is a set of SAS programs that allow users to estimate prices for foods reported consumed by WWEIA participants. Using sales data for more than 350,000 products in the 2013 IRI retail scanner data, InfoScan, we constructed the PPPT. The tool calculates average prices for 97 percent of the food and beverages (measured in grams) reported as eaten by participants in the WWEIA/NHANES 2011–12 wave of the survey. Each price is an average of several products available in stores, and in some cases, a compilation of different types of products. The foods that are not included are those that were reported eaten fewer than 10 times by survey participants. Estimated prices do not include other costs such as the time, energy, and skills needed to buy and prepare food.

We used the PPPT to estimate the individual expenditures for foods reported by participants as food at home (FAH) purchases. The mean and median FAH expenditure estimates were \$4.54 and \$3.84 per day, respectively. Half of the estimates (25th to 75th percentile) were between \$2.13 and \$6.03, but 10 percent (90th percentile) had a 1-day estimated FAH expenditure over \$10.59.

ERS is a primary source of economic research and analysis from the U.S. Department of Agriculture, providing timely information on economic and policy issues related to agriculture, food, the environment, and rural America.

We also compared the PPPT-based food expenditures to two other government estimates of food costs.

USDA's Cost of Food at Home for June 2013 estimated the weekly cost of food at four expenditure levels (Thrifty, Low-Cost, Moderate-Cost, and Liberal). We compared our weekly total expenditure estimates to the Low-Cost, Moderate-Cost, and Liberal estimates by quartile of weekly food expenditures, where the first quartile is the lowest 25 percent of expenditures by individuals and the fourth quartile is the highest 25 percent of expenditures by individuals. The Low-Cost plan is comparable to the second quartile, the Moderate-Cost plan is comparable to the third quartile, and the Liberal Plan is comparable to the top quartile. We did not compare our findings to the TFP because the basis is not based on quartiles of expenditure. Note that our estimates were based on what individuals report eating, whereas the Cost of Food at Home was the cost of a healthy diet.

- Compared to the Low-Cost “Cost of Food at Home” estimates, we estimate that for WWEIA/NHANES individuals, food expenditures in the second quartile of food expenditures were 10 percent lower (\$190.60 vs. \$170.41).
- Expenditures for the third quartile were 3.8 percent higher (\$238.20) than for the Moderate-Cost estimates (\$247.16).
- The Liberal Plan estimate (\$289.30) is lower than the top quartile of expenditure estimates (\$390.83).

The ERS Food Expenditure Series provides annual per capita FAH expenditures estimates for annual household food expenditures in the United States. Data are compiled from the Economic Census, U.S. Census annual surveys, and from other U.S. statistical agencies and trade associations. For comparison, we estimated an annual per capita FAH expenditure using the PPPT and the individual foods reported by WWEIA/NHANES participants.

- The PPPT estimate was about 91 percent of the per capita estimate from the 2013 ERS Food Expenditure Series, or about \$190 less.

Finally, we compared the PPPT-based food expenditures to FAH expenditures contained in the Flexible Consumer Behavior Survey (FCBS) module of NHANES, using self-reported FAH expenditure data from the 2011–12 FCBS/NHANES.

- Mean per capita daily FAH expenditure from the FCBS was estimated to be \$5.29 (95 percent CI \$5.00 to \$5.58). The PPPT mean estimate of 1-day FAH expenditure, including adjustments for food and alcohol taxes and food loss, was \$5.34 (95 percent CI \$5.08 to \$5.62).

How Was the Study Conducted?

To estimate prices for foods that consumers in the United States reported eating, we relied on three data sources: WWEIA/NHANES 2011–12, the USDA Food and Nutrient Database for Dietary Studies (FNDDS) 2011–12, and IRI InfoScan 2013 (the most recent data available). We used the two 24-hour dietary recalls in WWEIA/NHANES data to develop a list of foods eaten at home in the United States. The FNDDS includes recipes used to list the ingredients required to prepare the foods. IRI InfoScan 2013 was used to estimate prices for the recipe ingredients and the foods purchased in ready-to-eat form.

We used the Purchase to Plate Crosswalk (PPC) to transition between the FNDDS and the IRI InfoScan data. The PPC includes a link between the FNDDS and the food items in the IRI data, as well as conversion factors to convert the purchased weight (i.e., retail weight) of each food item to the as-eaten weight. Once we had the quantities and calculated an average price for each ingredient, we summed the ingredient costs to create the average food price for each of the foods reported eaten by WWEIA participants. The Purchase to Plate Price Tool (PPPT) estimates the prices for purchasing foods at a store and putting them on the plates of consumers in the United States; however, it does not include other food-preparation costs such as time, energy to transport, store, and prepare food, and skill level that may impact time and energy use. An update using 2015 IRI data to estimate prices for FNDDS 2013–14 is forthcoming, and future updates are planned in compliance with the 2018 Farm Bill.