



## Improving the Data Infrastructure to Support Diet and Nutrition Research<sup>1</sup>

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### Abstract

The USDA Economic Research Service plays a leading role in providing food data and analytical information to inform policymakers and the public, and to serve as public goods to enable economic research on critical policy questions facing the Nation. This article describes ERS's mainstay of data products and the efforts that have filled many important data gaps, fueling research on key and unanswered hypotheses. The paper also identifies a few of many findings, and documents the scope and the extent of research projects that utilize these resources.

**Keywords: Food Data Gaps, Data Infrastructure, Food Policy, Diet, Health, Nutrition Knowledge, Time Use, Food Access, Food Environment, Food Prices, Food Assistance Programs**

### Introduction

Food data are the foundation of producing key economic intelligence needed to support robust decisions by policy makers to address complex dietary and nutrition issues facing the nations around the world. Science has established strong links between diet and health. In the United States, obesity and overweight have been described as a national epidemic. Even small improvements in the average diet can yield large economic benefits. To accelerate the transfer of benefits from nutrition science to consumers requires investments in information systems to better understand the drivers of consumer food choice behavior.

The Economic Research Service (ERS) of US Department of Agriculture has been a pioneer in providing key economic indicators about the status of the food consumers and in buttressing research on critical issues with timely and relevant data. Its Consumer Data and Nutrition Research Program (CDNR) produces data that are used heavily to shed light on key issues facing the Nation. The CDNR mission is to *“develop data and information that support food economics research including the determinants of food access, consumer food choices, and Nutrition and Health outcomes.”* This paper describes the mainstay of the data products that have supported key issues, provides statistics on their wide use, and point to timely and key topics that they are being used for.

Until recently, the capacity to conduct research on critical policy issues was severely limited by lack of access to timely and detailed data on food choices. To overcome this data gap, the CDNR program was initiated in 2006 to supplement ERS's existing and solid data products. The program underpins a variety of research on critical policy issues. ERS worked closely with the Committee on National Statistics (CNSTAT) of the National Research Council to solicit feasible and effective strategies for meeting the objectives of the CDNR program. The CNSTAT formed a panel of distinguished academics, key industry players, other Federal Agencies and key stakeholders and published the NRC-CNSTAT report *“Improving Data to Analyze Food and Nutrition Policies”* that made specific recommendations: 1) rely on proprietary data, 2) supplement the existing governmental surveys with modules on specific issues, 3) integrate and

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<sup>1</sup> The views expressed are those of the author and may not be attributed to the Economic Research Service of U.S. Department of Agriculture.

link data from disparate surveys. ERS has made significant progress in filling the identified data gaps. This paper explains the progress made to date, and describes the breath and the scope of research uses to address key issues the program is designed to enable.

### ERS's Unique Food Data Fuel Analyses of Key Issues Facing the Nation

Easily available and disseminated through its website, ERS's mainstay of data products provide information and insights into the economics of the food supply and the drivers of consumer and producer behavior. These data enable research on key economic issues affecting food prices, food access and availability, food consumption patterns, and related health outcomes. As a result, these data products are widely utilized by the public.

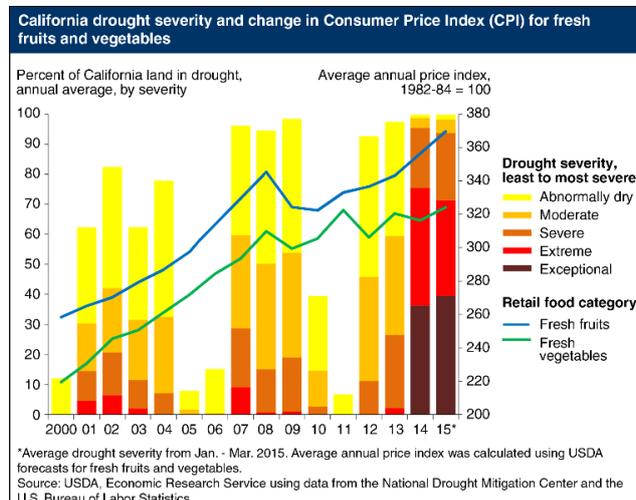
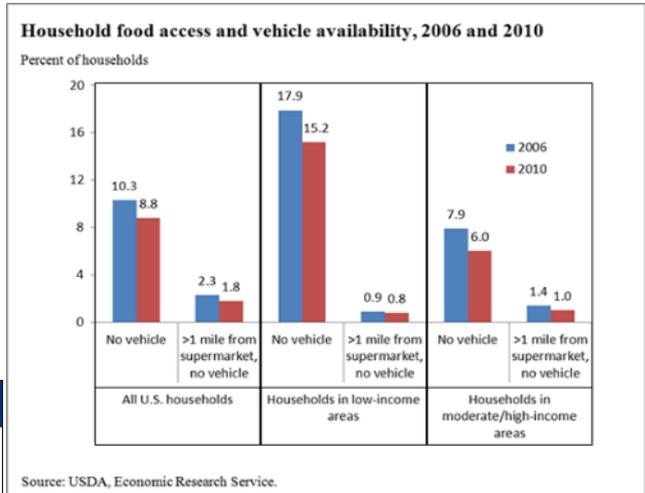
Table 1. Usage statistics of Selected ERS Food Data Products

Food Data Products	2014 Visits
Food Access Research Atlas	294,836
Food Price Outlook	111,325
Food Environment Atlas	108,983
Food Availability (Per Capita) Data System	59,171
Fruit and Vegetable Prices	52,408
Food Expenditures	41,933
Food Consumption and Nutrient Intakes	17,248
Food Security in the United States	14,162
Food Dollar Series	12,367
Price Spreads from Farm to Consumer	9,254
Quarterly Food-At-Home Price Database	4,697
Quarterly Food-Away-from-Home Prices	1,245

Source: <http://www.ers.usda.gov/data-products.aspx>

The percentage of households both without a vehicle and farther than a mile from a supermarket also dropped from 2.3 percent in 2006 to 1.8 percent in 2010. A greater share of households in low-income areas does not have vehicles. However, because low-income areas tend to be more densely populated, households in these areas often live closer to supermarkets

ERS's own research uses these data to provide fundamental economic intelligence supporting policy and decision makers. For example, access to nutritious, affordable food is often measured by the distance a household must travel to the nearest supermarket. Between 2006 and 2010, the number of individuals living more than one mile from a supermarket increased, but more individuals had access to vehicles in 2010 to travel to and from stores. In 2006, 10.3 percent of all U.S. households had no access to a vehicle, dropping to 8.8 percent by 2010.

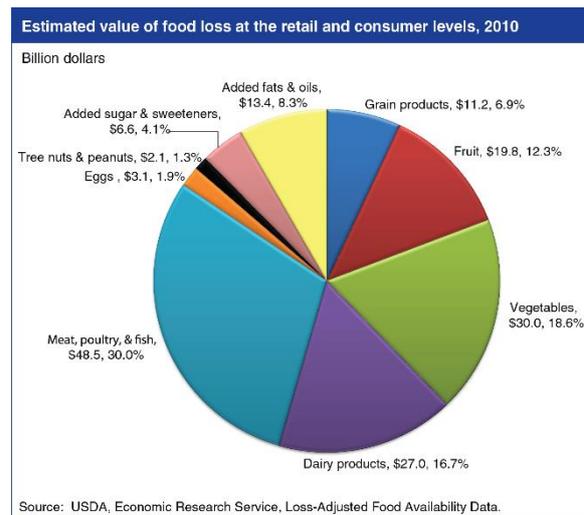


than in higher-income areas (Ver Pleog, et al. 2012).

Often, timely analytical information are on concurrent trends and events. For example, the "Food Price Outlook" provided analytical results on the impact of California drought. The California drought continues into 2015—as of March, 42 percent of the State is classified under the exceptional drought rating. Despite these conditions,

U.S. fresh fruit and vegetable price inflation is expected to be close to its historical average in 2015. ERS predicts fresh fruit prices will increase 2.5 to 3.5 percent and fresh vegetable prices 2.0 to 3.0 percent in 2015. While California does grow a large percentage of many U.S. fresh fruits and vegetables, portions of the produce purchased in grocery stores are imported from various foreign markets. Currently, the strong U.S. dollar is making foreign produce relatively less expensive, offsetting the drought-related upward pressure on U.S. retail produce prices. Commodities that are grown almost entirely in California and whose supplies are not largely supplemented by imports could begin to experience higher price increases.

An important concurrent policy question relates to the food loss. Assessing food loss serves two purposes. By subtracting food loss from available foods, ERS is able to better estimate foods consumed in the United States. Second, the amount of food loss varies by sector and along the marketing chain. This information can be leveraged to reducing food loss in the system, with implications for resources use and sustainability. Using the popular ERS Food Availability data system that spans over a century, Buzby (2014) found that 31 percent—or 133 billion pounds—of the 430 billion pounds of the available food supply at the retail and consumer levels went uneaten in 2010. The estimated value of this food loss was \$161.6 billion, using 2010 retail prices. Food loss by retailers, foodservice establishments, and consumers occurs for a variety of reasons—a refrigerator malfunctions and food spoils, a store or restaurant overstocks holiday foods that do not get purchased, or consumers cook more than they need and choose to throw the extra food away. Food loss also includes cooking loss and natural shrinkage, such as when leafy greens wilt.



### Improving Data to Analyze Food and Nutrition Policy

Food data in Table 1 and food data from other Federal Statistical Agencies and the private sector (<http://www.ers.usda.gov/topics/food-nutrition-assistance/food-nutrition-assistance-research/extramural-research/national-data-sets.aspx>) provide a variety of information on various aspect of food markets and consumer food choice behavior. Each of the data sources is designed to cover some, but not all, of the information needed to support key economic analysis of food and nutrition issues. As a result, until recently, the capacity to conduct policy research was severely limited by lack of access to timely and detailed data on food choices. Researchers needed data on how much of which foods consumers purchase, where, and at what prices; how behavior of food assistance program participants differ from others; and how dietary knowledge, or lack thereof, and time affect consumer food choices.

In 2006, ERS began to implement the 3 strategies recommended by NRC-CNSTAT to fill the data gaps: leveraging proprietary data sources, supplementing existing government surveys focused on specific topics, and integrating and linking disparate sources of data. As proprietary data sources are often based on convenience samples, ERS obtained Nielsen data, and conducted and published a series of articles on statistical properties of the data. The price and quantity information at the item level along with detailed product descriptions purchased from various sources have resulted in 87 journal articles and 32 USDA reports on a variety of high-profile



topics, such as *“The Effect of Wal-Mart Supercenters on Grocery Prices,” “The Relationship Between National Brand and Private Label Food Products: Prices, Promotions, Recessions, and Recoveries,* and *“Are Healthy Foods Really More Expensive? It Depends on How You Measure the Price.”*

The significant return to investment led to expansion of proprietary data in 2012, adding a variety of IRI’s datasets (Table 2.)

Table 2. IRI Datasets (2008 – 2014)

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| <ul style="list-style-type: none"> <li>• <b>Household Panel:</b> Food purchase transactions and demographics of 110,000+ households – IRI Consumer Network <ul style="list-style-type: none"> <li>○ <b>Health &amp; Wellness:</b> 49,000+ households – IRI MedProfiler</li> <li>○ <b>Ailment &amp; Prescription:</b> 11,000+ households – IRI RXPulse</li> </ul> </li> <li>• <b>Retail:</b> About 40 billion records of food purchase transactions at retail stores – IRI Infoscan</li> <li>• <b>Product Dictionaries:</b> IRI Product information (including nutrition) for about 1 million</li> </ul> |
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Currently, four studies are underway to study the statistical properties of the data: Documentation of collection protocols, comparison to existing benchmarks, comparison to other nutrition database, assessing health and wellness module, and the representativeness of retail Infoscan (retailer scanner) data. A Symposium: “Understanding and Analyzing IRI Scanner Data for Food Policy Analysis” is scheduled to be delivered on these topics at the 2015 American Agricultural Economics Association meetings. Under an interagency agreement with USDA Center for Nutrition Policy and Promotion (CNPP) and the Agricultural Research Service, ERS is linking the IRI UPCs to the USDA nutrition data to enable analyses supporting the United States Dietary Guidelines for Americans and to CNPP to design nutrition Food Plans for low-income households. Finally, these, and other data, support the new Center for Behavioral Economics and Healthy Food Choice Research that ERS and the USDA Food and Nutrition Service (FNS) established in 2014 at Duke University and the University of North Carolina at Chapel Hill to develop strategies to promote healthy food choices, particularly among the 50 million Americans receiving federal food benefits. The center will employ an innovative approach combining big data analysis with field experiments to evaluate policies that improve consumers’ diet, do not negatively impact the retailers’ bottom, and have broad impact on the public good.

***Food Insecurity***

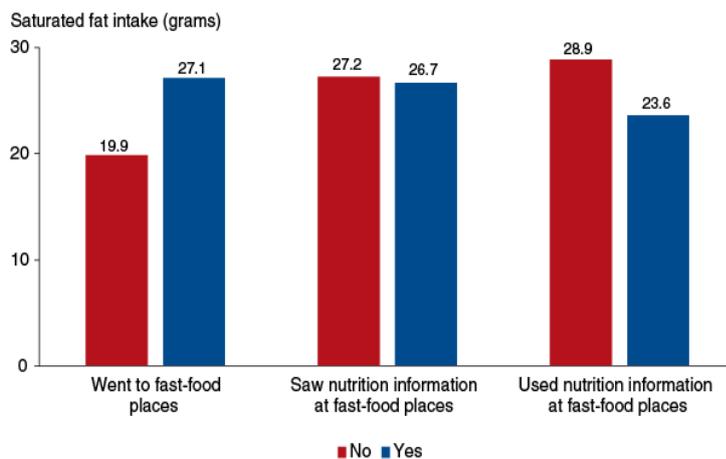
ERS has also established three high-profile modules surveys. Food Security Supplement to Current Population Survey has placed ERS in the frontier of research and monitoring activities related to food security issues. ERS plays a leading role in Federal research on food security and food security measurement in U.S. households. Various publications have focused on improving food security measurement (how many food secure, who are the food insure, and the length of food insecure episodes), identifying and understanding determinants of food insecurity, examining how participation in USDA’s Food and Nutrition Assistance Program (SNAP) affects food insecurity, and understating the impacts of SNAP and macroeconomic factors on food security status (Coleman-Jensen, et al. 2014, Coleman-Jensen, et al. 2013, Coleman-Jensen and Nord 2013, and Nord 2012. )

### Flexible Consumer Behavior Survey (FCBS)

The FCBS is a consumer behavior module in the United States' premier health and food consumption survey, the National Health and Nutrition Examination Survey (NHANES). Because the FCBS is based on a nationally representative sample, the survey results reflect national trends about changing food habits, attitudes, and dietary behaviors of U.S. consumers.

The FCBS is part of the NHANES household interview as well as part of a follow-up telephone interview. The FCBS household interview questions do not change from one survey year to the next, but the telephone interview was designed to be flexible so that new topical questions could

**Americans who go to fast-food places have higher saturated fat intake; those who use nutrition information at fast-food places have lower saturated fat intake**



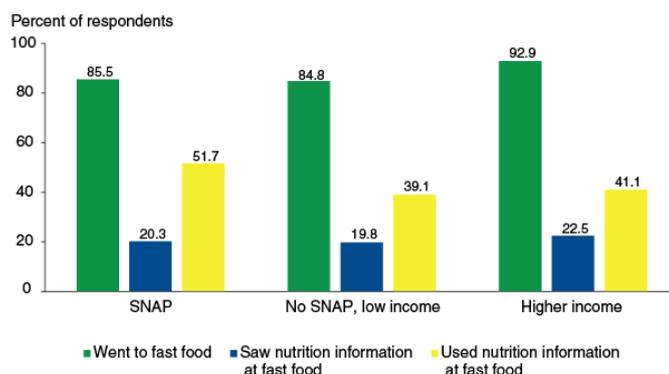
Only respondents who answered affirmatively to the question about whether they went to fast-food places were asked whether they saw nutrition information. Only those who answered affirmatively to the question about whether they saw nutrition information were asked whether they used nutrition information.  
Source: USDA, Economic Research Service using National Health and Nutrition Examination Survey (NHANES) 2007-10 data.

occasionally replace older questions. The FCBS collects income, amount food expenditures, and whether the household participates in food and nutrition assistance programs such as SNAP or WIC (Special Supplemental Nutrition Program for Women, Infants, and Children); and Dietary and behavioral indicators, such as self-reported diet quality; types of foods available in the home; how often one eats out; time spent grocery shopping and time spent cooking meals at home; nutritional knowledge; use of food labels while grocery shopping and use of nutrition information when eating out; and the importance to the consumer of price, convenience, and taste when grocery shopping or eating out.

Given the growing importance of foods consumed away from home (FAFH), the 2010 Patient Protection and Affordable Care Act

requires that nutrition information be posted at points of purchase. To establish a baseline against which to measure changes in the use of onsite nutrition information about FAFH, Gregory et al. used the 2007-2010 FCBS and examined the demographic characteristics. In particular, they examined the characteristics of consumers who use nutrition information and of those who express interest in using the information when they eat out. They find that individuals who use nutrition information have lower saturated fat, and SNAP participants are more likely to use nutrition information after seeing it in fast food restaurants.

**SNAP participants are more likely to use nutrition information after seeing it in fast-food places than other low-income consumers and higher-income consumers**



SNAP = Supplemental Nutrition Assistance Program. Only respondents who answered affirmatively to the question about whether they went to fast-food places were asked whether they saw nutrition information. Only those who answered affirmatively to the question about whether they saw nutrition information were asked whether they used nutrition information.  
Source: USDA, Economic Research Service using National Health and Nutrition Examination Survey (NHANES) 2007-10 data.



## ***Time Use***

Individual decisions about how to use the 24 hours in a day have short- and long-term implications for income and earnings, health, and other aspects of well-being. Understanding time use patterns can provide insight into economic behaviors associated with eating patterns as well as the diet and health status of individuals. Knowing more about eating patterns, grocery shopping, and meal preparation, as well as understanding whether participants in food and nutrition assistance programs face different time constraints than nonparticipants can inform the design of food assistance and nutrition policies and program. In 2008, ERS initiated the module “The Eating and Health” as a supplement to the Bureau of Labor Statistics Time use Survey ([http://www.ers.usda.gov/data-products/eating-and-health-module-\(atus\).aspx](http://www.ers.usda.gov/data-products/eating-and-health-module-(atus).aspx)). So far, these data have resulted in 5 ERS publications and 22 external journal publications, and 29 working papers (details are provided at [http://www.ers.usda.gov/data-products/eating-and-health-module-\(atus\)/readings.aspx](http://www.ers.usda.gov/data-products/eating-and-health-module-(atus)/readings.aspx)).

## **The National Household Food Acquisition and Purchase Survey**

ERS’s most recent contribution is the National Household Food Acquisition and Purchase Survey (FoodAPS). Jointly sponsored by ERS and FNS, FoodAPS is a representative survey of American households to collect unique and comprehensive data about household food purchases and acquisitions. Detailed information was collected about foods purchased or otherwise acquired for consumption at home and away from home, including foods acquired through food and nutrition assistance programs. The survey includes nationally representative data from 4,826 households, including Supplemental Nutrition Assistance Program (SNAP) households, low-income households not participating in SNAP, and higher income households. The Food Acquisitions cover both food-at-home items as well as food-away-from-home acquisitions for all household members for one week. The survey uniquely covers acquisitions of foods obtained for free (school, food pantries, gardens, etc.), locations of where the foods were obtained and by whom, and the expenditures and quantities of all items acquired. FoodAPS also collects data on determinant of food acquisition such as the name and location of the primary food stores, reasons for usual food shopping locations, usual mode of transportation, household non-food expenses, participation in food assistance programs, income of individual members, body size, allergies, school enrollment and school meals, and questions to assess food security status of the households. To enable research on the impact of local food environments the survey data are enriched by extant data on locations of local food stores and restaurants as well as their food prices, food-related school and community policies, other area-based population characteristics and program administrative data. Finally, FoodAPS incorporate the nutrient contents for each food item using the official USDA-ARS nutrition databases.

ERS is using FoodAPS to produce several publications on the relationships between American households’ food acquisitions, factors influencing food demand, and household well-being, on how the food environment influences SNAP households’ store choices, quality of acquired foods, and food security, on whether SNAP participants pay different prices than nonparticipants, and on adequacy the real values of SNAP benefits to purchase the Thrifty Food Plans. The first publication. Release in March 2015, examined where Americans usually shop for food and how they travel to get there. It shows that 88% of households drive their own vehicle to do their regular food shopping while only 68% of SNAP participants and 65% of poor nonparticipants drive their own car. Similarly, food insecure households are less likely to take their own car to do their main food shopping, and more likely to use someone else’s car or use another form of transportation. The study shows that differences in transportation mode are not related to the types of stores used. 90% of SNAP participants and poor nonparticipants do their usual food shopping at a supermarket or

supercenter. This is similar to higher income nonparticipants. The similarity results from the fact that on average, households don't shop at the closest supermarket or superstore.

Currently, FoodAPS data are being used for 35 research projects, 12 of which are competitive grants supported by ERS and FNS, the results of which will be presented at a workshop in Washington, DC Oct 22-23, 2015. Project details are available at <http://www.ers.usda.gov/data-products/foodaps-national-household-food-acquisition-and-purchase-survey/grant-awards.aspx>).

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